

GEOCHEMICAL AND PHYSICAL PROPERTIES OF WETLAND SOILS AT THE SAVANNAH RIVER SITE

K.L. Dixon, V.A. Rogers, S.P. Conner, C.L. Cummings, J.B. Gladden,
and J.M. Weber

UNCLASSIFIED

DOES NOT CONTAIN
UNCLASSIFIED CONTROLLED
NUCLEAR INFORMATION

ADC &
Reviewing
Official:

D. M. ...
(Name and Title)

Date: *5/23/97*

MAY 1997

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

MASTER

Westinghouse Savannah River Company
Aiken, SC 29808



SAVANNAH RIVER SITE

PREPARED FOR THE U.S. DEPARTMENT OF ENERGY UNDER CONTRACT NO. DE-AC09-96SR18500

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

This report has been reproduced directly from the best available copy.

Available to DOE and DOE contractors from the Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831; prices available from (615) 576-8401.

Available to the public from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161.

DISCLAIMER

Portions of this document may be illegible electronic image products. Images are produced from the best available original document.

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1

2.0 INTRODUCTION 3

3.0 OBJECTIVES 5

4.0 BACKGROUND 7

 4.1 Soil Forming Factors and Processes 7

 4.2 Formation of Wetland Soils 9

 4.3 Soil Horizon and Profile Development 10

 4.4 Soil Classification 13

5.0 METHODS 23

 5.1 Study Design 23

 5.1.1 Soil Groupings 23

 5.1.2 Sampling Locations 25

 5.2 Sample Collection 26

 5.2.1 Vibracore Sampling Methodology 27

 5.2.2 Hand Auger Sampling Methodology 28

 5.2.3 Core Opening and Subsampling 29

 5.2.4 Sampling Equipment Decontamination 30

 5.2.5 Quality Assurance/Quality Control Samples 31

 5.3 Sample Analysis 31

 5.4 Statistical Methods 32

 5.4.1 Introduction 32

 5.4.2 Raw Database Verification 33

 5.4.3 Final Wetland Soils Database 34

 5.4.4 Processing of Analytical Results 34

 5.4.4.1 Results Reported as Below the Limits of Detection 35

 5.4.4.2 Field and Laboratory Replicates 36

 5.4.5 Computation of Summary Statistics 36

TABLE OF CONTENTS (CONTINUED)

6.0 RESULTS59

 6.1 Current Study59

 6.2 Onsite Results60

 6.2.1 Metals.....61

 6.2.2 Other Inorganic Parameters62

 6.2.3 Organics62

 6.2.3.1 Total Organic Carbon and Total Organic Halogens63

 6.2.3.2 Appendix IX Volatiles and Semivolatiles.....63

 6.2.3.3 Appendix IX Pesticides/Herbicides and Dioxins/Furans.....63

 6.2.4 Radiological Parameters64

 6.2.5 Agricultural Parameters64

 6.3 Offsite Results.....64

 6.3.1 Metals.....65

 6.3.2 Other Inorganic Parameters65

 6.3.3 Organics66

 6.3.3.1 Total Organic Carbon and Total Organic Halogens66

 6.3.3.2 Appendix IX Volatiles and Semivolatiles.....66

 6.3.3.3 Appendix IX Pesticides/Herbicides and Dioxins/Furans.....67

 6.3.4 Radiological Parameters67

 6.3.5 Agricultural Parameters67

7.0 DISCUSSION87

 7.1 Metals and Inorganics87

 7.2 Organics87

 7.3 Other Studies.....88

 7.4 Summary91

8.0 REFERENCES99

LIST OF APPENDICES

APPENDIX A	Core Logs
APPENDIX B	Field Activities Logs
APPENDIX C	Background Wetland Soils Database Notes
APPENDIX D	Onsite Analytical Results
APPENDIX E	Offsite Analytical Results
APPENDIX F	Final Wetland Soils Database (provided in electronic format)
APPENDIX G	Particle Size Analysis

LIST OF FIGURES

4-1 Changes in Master Horizon Designations of Mineral Soils 15

4-2 Hypothetical Profile of Mineral Soils in Wetlands Showing the Principal Horizons and
Potential Occurrence on the Savannah River Site 16

5-1 Onsite Sampling Locations..... 38

5-2 Onsite Sampling Locations for Soil Grouping 1 (Organic Soils) 39

5-3 Onsite Sampling Locations for Soil Grouping 2 (Intergrade Mineral-Organic Soils) 40

5-4 Onsite Sampling Locations for Soil Grouping 3 (Mineral Soils)..... 41

5-5 Onsite Sampling Locations for Soil Grouping 4 (Upland Bays and Depressional Soils)... 42

5-6 Onsite Sampling Locations for Soil Grouping 5 (Large Stream Floodplain Soils) 43

5-7 Offsite Sampling Locations 44

5-8 Summary of Statistical Procedures for Processing of Analytical Results 45

6-1 Data Screening Process for Statistical Analysis 68

LIST OF TABLES

4-1	Summary of Taxonomic Terms Applicable to Soil Orders	17
4-2	Prefixes Used in Naming Suborders and Great Groups for SRS Wetland Soils	19
4-3	Taxonomic Modifiers Used to Describe SRS Wetland Soils	20
5-1	Wetland Soil Groupings.....	46
5-2	Soil Coring Coordinates for Onsite Sampling Locations	47
5-3	Soil Coring Coordinates for Offsite Sampling Locations.....	49
5-4	Particle Size Fractions Used in Lithologic Logging.....	50
5-5	Sampling Intervals for Each Soil Grouping.....	51
5-6	Analytical Methods.....	52
5-7	Sample Specifications for Soil Groupings.....	54
5-8	Information Included on the Electronic Diskettes Provided by Weston Analytics for the Background Wetland Soils Database (AN92 format).....	56
5-9	Information Included in the Final Background Wetland Soils Database.....	57
6-1	Constituents with No Results Above Detection in Any of the Soil Samples	69
6-2	Constituents with Only One Result Above Detection Over All Soil Samples	74
6-3	Constituents with No Results Above Detection by Soil Grouping and Sampling Depth..	75
6-4	Constituents with One or More Detects Onsite	76
6-5	Summary Statistics for Metals (Onsite Samples)	77
6-6	Summary Statistics for Other Inorganic Parameters (Onsite Samples).....	78
6-7	Summary Statistics for Organics (Onsite Samples).....	79
6-8	Summary Statistics for Radiological Parameters (Onsite Samples).....	80
6-9	Summary Statistics for Agricultural Parameters (Onsite Samples).....	81
6-10	Summary Statistics for Metals (Offsite Samples).....	82
6-11	Summary Statistics for Other Inorganic Parameters (Offsite Samples)	83
6-12	Summary Statistics for Organics (Offsite Samples).....	84
6-13	Summary Statistics for Radiological Parameters (Offsite Samples)	85
6-14	Summary Statistics for Agricultural Parameters (Offsite Samples)	86
7-1	Summary Data for Background Levels of Analytes in Wetland Soils from Published Studies	92
7-2	Comparison of Onsite Sample Results to Literature Review and SRS Soils Study	96

LIST OF ACRONYMS

CEC	Cation Exchange Capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DOE	Department of Energy
EDD	Electronic Data Diskette
EPA	Environmental Protection Agency
LOD	Limits of Detection
meq	Milliequivalents per 100 grams
PCB	Polychlorinated Biphenyl
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
SAS	Statistical Application Software
SRS	Savannah River Site
TOC	Total Organic Carbon
TOH	Total Organic Halogens
VOC	Volatile Organic Compound
VRD	Verified Raw Database
WSRC	Westinghouse Savannah River Company

1.0 EXECUTIVE SUMMARY

The wetland soils study was designed to establish the natural geochemical and physical properties of wetland soils occurring on the Savannah River Site (SRS). It involved collecting soil samples from numerous wetlands all across SRS and at several offsite locations. Objectives were to collect and analyze samples from unimpacted wetlands at onsite and offsite locations; analyze the samples for selected metals, organics, physical properties, and agricultural parameters according to established Environmental Protection Agency (EPA) protocol and standard methods; and use this information to characterize wetland soils at SRS and to supplement baseline data in the published literature with data obtained in this study.

Eighty-three 10-foot-long soil cores representing five soil groupings were collected using vibracoring technology, supplemented by hand auger sampling when necessary, to obtain a complete core sample. A lithologic log was prepared for each core. The core was then subsampled based on depth intervals specific to each of the soil groups.

The samples were analyzed for 259 chemical and physical parameters, including the Resource Conservation and Recovery Act (RCRA) Appendix IX list (metals, volatile organic compounds [VOCs], semivolatile organic compounds, herbicides/pesticides, and polychlorinated biphenyls [PCBs]), other inorganic species (fluoride, nitrate and nitrite, phosphate, silicon, and sulfate), cation exchange capacity (CEC), pH, percent solids, and tritium. Of the 259 parameters tested, 65 were detected in more than one onsite core. Summary statistics for these parameters were calculated after processing the analytical results. Summary statistics are presented in this report only for those data sets in which more than 50 percent of the analytical results exceeded the sample-specific analytical detection limit.

In general, large stream floodplain wetland soils contain higher concentrations of metals and inorganic constituents than do the other wetland soils sampled. Within this soil group, the concentrations of metals and other inorganic constituents decrease with depth. Correlative to this is a decrease in cation exchange capacity. This trend is reversed in upland bay and depressional soils in offsite locations, where metals and inorganic constituent concentrations increase with depth.

Most Appendix IX organic constituents were detected in only a few samples at concentrations very close to their detection limit and in an apparently random pattern. However, four organic species were detected in most of the sample intervals and soil groups. These species [acetone, dichloromethane, bis(2-ethylhexyl) phthalate, and di-n-butylphthalate] are common laboratory artifacts. Thus, it appears that the Appendix IX organic species are not a characteristic component of unimpacted wetland soils at SRS or in offsite soils.

Overall, the chemical and physical composition of wetland soils at SRS is similar to wetland soils reported in previous studies and shows a close correlation with offsite soils sampled in this study. The wetland soil compositions are broadly comparable to the upland soils characterized by Looney et al. (1990).

2.0 INTRODUCTION

The SRS, located in Aiken, Allendale, and Barnwell Counties, South Carolina, is a nuclear production facility operated for the U.S. Department of Energy (DOE) by Westinghouse Savannah River Company (WSRC). To facilitate future human health and ecological risk assessments, treatability studies, remedial investigations, and feasibility studies for its wetland areas, SRS needs a database of background geochemical and physical properties of wetland soils. These data are needed for comparison to data collected from wetland soils that may have been affected by SRS operations. SRS contains 36,000 acres of wetlands and an additional 5,000 acres of bottomland soils subject to flooding.

Recent studies of wetland soils near various waste units at SRS show that some wetlands have been impacted by releases of contaminants resulting from SRS operations (WSRC, 1992). Waste waters originating from the operations facilities typically have been discharged into seepage basins located in upland soils; direct discharge of waste water to wetland areas has been minimal. This suggests that impacted wetland areas have been affected indirectly as a result of transport mechanisms such as surface runoff, groundwater seeps, fluvial or sediment transport, and leaching.

Looney et al. (1990) conducted a study to characterize the geochemical and physical properties of upland soils and shallow sediments on the SRS. A primary objective of the upland study was to collect the data needed to assess the qualitative and quantitative impacts of SRS operations on the environment. By comparing the upland soils data to data collected from waste units located in similar soils, SRS impacts could be assessed. The data were also intended to aid in selection of remediation alternatives. Because waste units at SRS have historically been located in upland areas, wetland soils were not sampled. Although it now appears that transport processes have resulted in the migration of contaminants from the waste units into some of the wetland areas, data from the upland soils study cannot be used to assess wetlands contamination. This is because there are fundamental differences between the physical, biological, chemical, and geological processes occurring in the upland soils sampled by Looney et al. (1990) and wetland soils.

The purpose of the wetland soils study is to characterize the geochemical and physical properties of unimpacted wetland soils and shallow sediments at SRS. The data may be used in future studies to compare unimpacted and impacted wetlands, and to assess contaminant levels in

impacted wetland areas. Fifty-five soil cores (50 samples plus five replicates) representing five soil groupings were collected from 50 onsite locations. Each onsite location was selected to be in a wetland formed prior to development of the SRS, and in a watershed area with no history of impacts from SRS operations. In addition, 28 cores (25 samples plus three replicates) were collected from 25 offsite locations in South Carolina. Each offsite location selected was a wetland on South Carolina state or other public lands. The 83 cores collected were analyzed for chemical and physical parameters.

The resulting data are used to characterize wetland soils at SRS. This baseline characterization may be used to assess the impact from SRS waste units on wetland areas. The characterization may also aid in selecting remedial activities to minimize contaminant propagation and ecological damage within and downstream of the wetland areas.

3.0 OBJECTIVES

The wetland soils study was designed to establish the natural geochemical and physical properties of wetland soils occurring on SRS. In order to accomplish this goal, the study was designed to meet these specific objectives:

- (1) Determine the characteristics of unimpacted wetland soils on SRS. Constituents evaluated included metals, organics, physical properties, and agricultural parameters. These constituents correspond closely to the constituents included in many RCRA (1976) and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 1980) waste unit characterizations conducted at SRS. The specific constituents are listed below.

Metals

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium

Sulfide
Thallium
Tin
Vanadium
Zinc

Other Inorganic Parameters

Fluoride
Nitrate (as Nitrogen)
Nitrate + Nitrite
Phosphates, Total (as Phosphorus)
Silicon
Sulfate

Organic Compounds

Total Organic Carbon
Total Organic Halogens
RCRA Appendix IX Analyses
Dioxins/Furans
Volatile Organic Compounds
Semivolatile Organic Compounds
Pesticides/Herbicides
Polychlorinated Biphenyls

Radiological Parameters

Tritium

Agricultural Parameters

Cation Exchange Capacity
pH
Percent Solids
Particle Size Distribution

- (2) Determine the characteristics of offsite wetland soils near SRS to supplement data available in the published literature with regional data. Offsite soils were analyzed for the constituents listed above.

- (3) Analyze all samples according to established EPA protocol or standard methods.

The results of the SRS wetland soils study are documented in the remainder of this report. Section 4.0 is a review of soil formation and classification at SRS. Section 5.0 summarizes the study design, sample and analysis methods, and statistical methods used in this study. Sections 6.0 and 7.0 present the results and a discussion of the characterization.

4.0 BACKGROUND

4.1 Soil Forming Factors and Processes

Soils are dynamic, natural bodies with distinct biological, chemical, and physical properties. Soils are constantly changing as a result of the combined effects of climate and biological activity acting upon a parent material altered by topography and time. The five key components or soil-forming factors are: (1) climate, (2) biological activity, (3) parent material, (4) topography, and (5) time (Brady, 1984). Climate and biological activity are considered the active soil forming factors, topography may be an active or a passive factor, parent material is passive, and time is neutral as a soil forming factor.

Climate is the primary source of energy for soil formation. Temperature and moisture (precipitation) are the two most important climatic variables affecting the soil system. Together they control the rate and degree of chemical and physical weathering of parent material and soils. Both temperature and moisture are necessary for biological activity to occur. The climate at SRS is temperate with warm to hot summers and cool winters; rainfall is well distributed throughout the year (Rogers, 1990).

Biological activity affecting soils includes the capture of energy through photosynthesis (green plants) and the release of energy through respiration and decomposition. Biological activity affects soils both physically and chemically by cycling and transforming nutrients and organic matter through the soil profile. Nutrients in the soil are absorbed through plant roots and translocated to leaves, where they are used in photosynthesis and other metabolic activity. As leaves die and accumulate on the soil surface, fungi and bacteria decompose them, and nutrients and minerals stored in this organic material are reincorporated into the soil. Animals such as earthworms, ants, termites, and other invertebrates are important in the recycling of minerals and nutrients in organic matter back into the soil. Plants, especially trees, influence soil formation; they alter the soil microclimate by shading and cooling the soil surface and alter soil porosity with root growth.

Parent material is the raw material from which soils form. Parent material can either be organic or inorganic in nature. Parent material is usually closely related to the geology of the area, particularly in young, undeveloped soils. To a large extent, the physical and chemical properties

of developing soils are closely related to these same characteristics of the original parent material. However, as geologic materials are physically and chemically altered by weathering and biological activity, and soil horizons develop, the influence of parent material decreases. Soils may form from more than one parent material.

Most soils at SRS are derived from ancient alluvial (transported by water) deposits from the ocean and/or streams (Rogers, 1990). Many wetland soils at SRS have formed in parent material derived from recent alluvial deposits that originated from one or more geologic formations that were eroded, transported, and re-deposited in floodplains adjacent to streams and rivers. In some wetlands, organic matter may be more influential as a parent material than inorganic matter. At SRS, organic soils such as the Dorovan series have formed in poorly drained areas that are frequently flooded for long periods during the growing season.

Topography influences soil formation by affecting moisture, temperature, and the rate of erosion. In the northern hemisphere, aspect (exposure) acts to modify climatic effects by creating cooler and moister microclimates on north- and east-facing slopes. These microclimates affect weathering rates and the development of different plant and animal communities in a given area. Topography also influences the rate of geological erosion, because the length and steepness of slope affect the ability of water from precipitation to run off or infiltrate into the soil. This in turn affects the accumulation of colluvial (transported primarily by gravity) material at the base of slopes. Most wetlands at SRS have formed in areas where topographic relief is low with nearly level to gently sloping or depressional land forms; this allows moisture from precipitation, surface water, and flooding to accumulate and saturate or inundate soils for a period of time sufficient to allow wetland plant communities to develop (Rogers, 1990).

Time influences the rate of soil formation. The influence of time depends largely on the intensity of the other soil-forming factors. Although soil formation tends to be a slow process, the rates of soil development vary according to the physical and chemical properties of the parent materials. Alluvium and colluvium are porous and tend to weather faster than bedrock materials. Some rocks and minerals contain high levels of easily leachable or reactive elements, leading to faster weathering and alteration. Wetland soils at SRS exhibit a wide range of stages of soil development. Some soils in SRS wetlands are relatively young with little or no differentiation of soil horizons (e.g., entisols); other soils in wetlands at SRS have highly developed soil profiles (e.g., ultisols) (Rogers, 1990).

4.2 Formation of Wetland Soils

Wetland soils are often referred to as hydric soils. A hydric soil is defined as "a soil that in its undrained condition is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic (wetland) vegetation" (Environmental Laboratory, 1987). Water and its influence on soil development and properties is the primary factor that distinguishes wetland soils from upland soils. Wetland soils may be composed of inorganic or organic material, or a combination of both. Generally, wetland soils have higher organic matter content than upland soils because decomposition of organic material is slower in wetlands.

In wetlands, water must be present long enough for micro-organisms in the soil to consume all the available free oxygen (O_2) in the system. As the redox potential decreases, many soil micro-organisms seek the oxygen they need for respiration from other sources in the soil. The rate and sequence of depletion of oxygen from other compounds depends on soil pH and temperature, the availability of organic substrates for microbial respiration, and the chemical oxygen demand from chemical reductants such as ferrous iron in the soil (Gambrel and Patrick, 1978).

Anaerobic conditions can lead to a highly reduced soil chemical environment in as little as seven days, although this period can be substantially longer if conditions are less than ideal. Under anaerobic conditions, the transformation of specific compounds varies with pH. Generally the sequence of reduction of elements in the soil begins with oxygen and is followed by nitrogen, manganese, iron, sulfur, and then carbon (Gambrell and Patrick, 1978). The lack of oxygen affects plant growth by limiting aerobic activity (respiration) in plant roots, and by limiting the availability of plant nutrients in the soil (Mitsch and Gosselink, 1986).

Anaerobic conditions in waterlogged and inundated soils retard the rate of decomposition of organic matter from plants (Mitsch and Gosselink, 1986). When large amounts of organic materials build up over time, organic soils (histosols) may form that contain very little inorganic soil material. Organic soils can form under a variety of climatic conditions, as long as water is available to affect the rate of decay of organic material (Soil Survey Staff, 1975). Organic soils may develop from partially decayed mosses, herbaceous material, or wood and leaf litter. Classification of histosols is based on the botanical origin of the organic parent material and the extent to which that material has decomposed. When compared with mineral soils, organic soils

generally have lower bulk densities and hydraulic conductivities, and higher water holding capacities and CECs. Examples of organic soils are bogs, moors, fens, peats, and mucks.

For mineral soils, the changes in soil chemistry of wetland soils that result from variations in oxidation state are accompanied by distinct differences in soil morphology and other soil characteristics. In oxidized soil environments, the presence of ferric iron (Fe^{3+}) imparts a reddish brown color to soils. In highly reduced soils and sediments, the presence of the ferrous (Fe^{2+}) ion gives soils a bluish-grey to greenish-grey color (Soil Survey Staff, 1975; Buoma, 1983). In wetland soils with alternating wet and dry regimes, the changes in soil chemistry have also been related to the development of a grey matrix with brown or reddish brown mottles (Soil Survey Staff, 1975; Buoma, 1983). The change from red and brown colors to grey colors in the soil matrix is called gleization and results from the reduction and leaching of iron and manganese from the soil.

The relationship between anaerobic conditions and soil color is so strong that, in most mineral soils, the field indicators for hydric soils are based largely on the color of the soil matrix and any associated mottling (Environmental Laboratory, 1987). Other easily recognizable changes in soil morphology that are used as field indicators of hydric soils are the presence of iron or manganese concretions and a rotten egg smell from reduced sulfur in hydrogen sulfide (Environmental Laboratory, 1987).

Environmental conditions in wetland soils influence the types of plants that can successfully inhabit wetlands. The lack of free oxygen in the root zone of anaerobic soils in wetlands stresses plants by interfering with the ability of plant roots to carry out aerobic respiration (Mitsch and Gosselink, 1986). Highly reduced soil environments also restrict the availability of many essential nutrients, and can even increase availability of toxic substances. As a result, wetland plants (hydrophytic vegetation) have evolved with specific physiologic, reproductive, or morphological adaptations that allow them to survive and reproduce in saturated, flooded, or ponded conditions (Reed, 1988).

4.3 Soil Horizon and Profile Development

Soil formation can be broken down into four general processes: (1) additions of inorganic and organic materials to soil, (2) losses of these materials from the soil, (3) translocation of these materials from one place to another within the soil, and (4) chemical and physical transformations

of materials within the soil (Buol et al., 1980). These processes affect the way a soil develops and the morphology of each soil horizon. As soils develop, they form distinct layers or horizons. The morphology of soil horizons is directly correlated with the biological, chemical, and physical properties of soil (Soil Survey Staff, 1975; Wilding et al., 1983).

The following discussion of soil horizon development and soil classification is extracted from the summary prepared by Looney et al. (1990). It has been modified slightly to address conditions unique to wetland soils at SRS.

The soils that are formed by the five soil-forming factors discussed earlier are characteristically organized into layers that differ from each other and the underlying parent material in properties and chemical composition. Apart from differences in color and texture, the layers can differ in pH, organic matter, clay minerals, and inorganic chemical composition. Comparison of a given soil sample to a background sample is only reasonable if equivalent horizons are compared and the factors responsible for the formation of the two soils are similar. A typical soil profile is described below, along with the soil classification scheme that may be used to divide soils into groupings expected to have similar characteristics.

A soil profile is comprised of individual layers that are referred to as soil horizons and may range from a few centimeters to a meter or more in thickness. Profile development is primarily the result of vertical (both upward and downward) movement (translocation) of material in solution and suspension, accompanied by a complex series of chemical reactions (transformations). Organic matter and other materials may be incorporated into the soil (additions) in solution or by soil invertebrates. Erosion and leaching remove soil particles and mineral from the soil (losses). Water is the essential medium in which these additions, losses, translocations, and transformations take place.

Soil profiles vary within wide limits according to their genetic and geographic environment. Most well-developed profiles, however, can be divided into principal or master horizons. From the surface downward, these are identified by the letters O, A, E, B, C, and R. The O, A, E, and B horizons constitute the solum, or "true soil"; the C horizon is the partly weathered parent material from which the soil has been derived by soil-forming processes, and the R horizon is the underlying rock material. The O horizon is composed of nearly pure organic matter and may vary in thickness from one to several centimeters in mineral soils. Organic soils may consist of several

O horizons overlying inorganic material. Master soil horizon designations are shown in Figure 4-1. A hypothetical soil profile is shown in Figure 4-2.

The entire soil sequence is not always represented. For instance, immature soils frequently lack a B horizon, or erosion may lead to truncated profiles, sometimes to the extent of exposing the C horizon. When studied in detail, each of the principal horizons may be further subdivided. These subdivisions are identified by combined letters and numbers, for example, A, E, B1, B2, B3, etc. (Figure 4-1). Recognition of these subdivisions, apart from the A and E horizons, is usually unnecessary in geochemical studies. The distribution of metals may vary markedly with major changes down the profile. It is therefore important to distinguish the master horizons and to recognize immature and truncated profiles when these are encountered (USDA, 1981).

The A and E horizons are characterized by a process of leaching known as eluviation, meaning "to wash out," with maximum eluviation occurring in the E horizon. Eluviation is accomplished by the downward movement (percolation) of water through the soil. Some constituents are removed as ions or molecules in solution in the downward-moving water; others are removed as dispersed colloidal particles. The leaching of the A horizon may be accelerated by organic acids.

Under moist conditions and free drainage, soluble constituents will be carried to the water table. Some suspended matter may follow the same path. More often, however, colloidal silicates, oxides, and organic matter, as well as some dissolved constituents, will be deposited in the Bt horizon (t signifies the accumulation of clay), a zone of accumulation or illuviation meaning "to wash in". Thus, the Bt horizon tends to be enriched in clay and oxides and, in well-aerated upland soils, assumes a red or yellow-brown color. Mineral soils with poor internal drainage may have grey, greenish, or bluish colors. The level at which illuviation takes place depends on acidity, infiltration rate, hydraulic conductivity of the soil, rainfall, and climate; in fact, all of the soil-forming factors influence illuviation either directly or indirectly.

The C horizon consists of variably weathered parent material and lacks obvious evidence of biological activity. Material comprising the C horizon at the SRS has been deposited by marine and/or fluvial activity. There is evidence that a few million years ago a large stream, perhaps the Savannah River, cut across the site and flowed into or close to the area where the Salkehatchie River now enters St. Helena Sound. The soils at SRS have been weathered, formed, eroded, redeposited, and re-formed many times. They are the result of an active history of soil formation. As a rule, inorganic decomposition extends below the depth that is routinely described in the

classification of soils. In most areas, the C horizon could be subdivided further into weathering zones that decrease in weathering intensity with depth. The C horizon has little or no organic matter, no structural development, little or no evidence of illuvial clay minerals, and often has stratified sands and clays indicating sediment deposition by varied velocities of water flow.

4.4 Soil Classification

The current system of soil classification is based on recognition of the specific influence of the soil-forming factors and processes on the development and morphology of soil (Soil Survey Staff, 1975; Wilding et al., 1983). At the broadest level of classification in soil taxonomy, soils are divided into eleven soil orders determined largely by the presence of one or more diagnostic horizons (Soil Survey Staff, 1975). These eleven orders, along with their diagnostic features, are listed in Table 4-1. Recognizing the presence of several diagnostic horizons is the key to separation and classification of order and is potentially important in recognizing the nature of trace-metal concentrations. For example, oxisols are highly leached soils, and alfisols are less leached than ultisols. Ultisols are old mineral soils having an illuvial horizon of silicate clays (Bt or argillic horizon), low base saturation, and are susceptible to rapid leaching. Entisols are young mineral soils with weak or no pedogenic horizons or old soils that have mostly inert parent material such as quartz. The five soil orders that are found at the SRS are identified in Table 4-1.

Names in soil taxonomy are formed by taking the formative elements of key words referring to specific features of the soil (Soil Survey Staff, 1975). Orders are subdivided into suborders on the basis of climate, drainage, or other distinctive features or properties. Names for suborders are formed from a prefix denoting the "formative element" (Table 4-2) and a suffix denoting the order. For example, an aquod is a water-saturated spodosol (aqu- from aquatic moisture regime, and -od from spodic horizon). About 50 suborders are recognized. Successively more detailed subdivisions are great groups, subgroups, families, and series. Great groups are formed by adding a prefix to denote diagnostic horizons or variants of horizons. The names of subgroups are formed by an adjective preceding the name of the great group to indicate its gradational position in relation to the neighboring great groups. Family names add more adjectives to indicate properties important to plant growth. For example, the family name for the Ogeechee series is sandy, siliceous, thermic Typic Ochraqult (Table 4-3). This is a sandy soil composed of more than 90 percent silica minerals with a mean annual soil temperature from 15 to 22°C at a point 50 cm below the soil surface. The water table is close to the soil surface during part of the year (aquic moisture regime), and the soil has a light colored surface horizon with less than 1 percent

organic matter (ochric epipedon) and a clay-enriched (argillic) B horizon. The Ogeechee series is an old well-developed soil (ultisol) with a CEC less than 16 meq/100 g or base saturation less than 35 percent. At SRS, this soil typically has a low capacity to hold complex cations. Therefore, any complex cations added to this soil would likely end up in the groundwater.

The soil series is the most detailed and most specific part of the soil taxonomy system. A series must come from a particular type of parent material and must have consistent horizon development. The soil surface may differ, so series are further subdivided into soil types by adding adjectives describing the surface texture or hydrology; for example, Ogeechee sandy loam, ponded. There are approximately 29 series correlated in the SRS soil survey (Rogers, 1990); approximately 30 more series were of such limited extent that it was not feasible to specifically identify them in the survey. Nationwide there are approximately 14,000 different soil series.

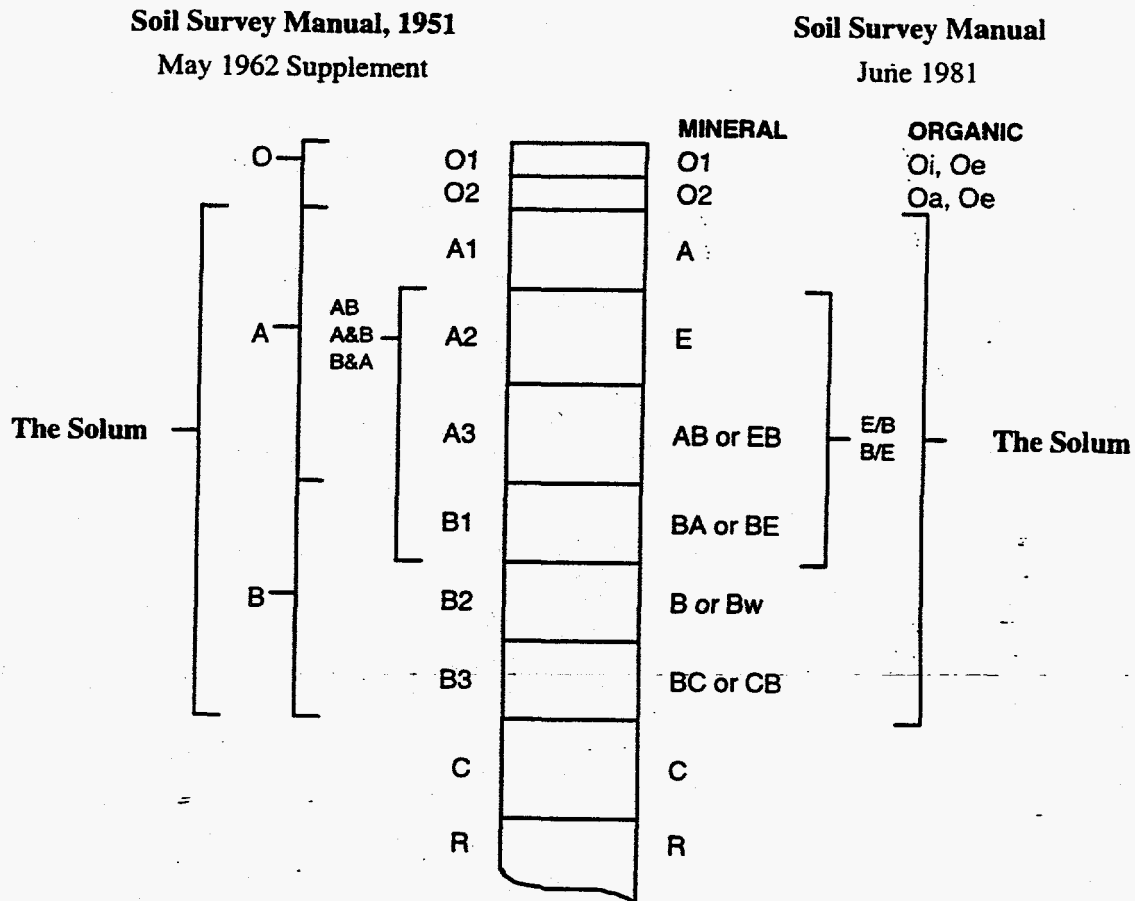


Figure 4-1. Changes in Master Horizon Designations of Mineral Soils

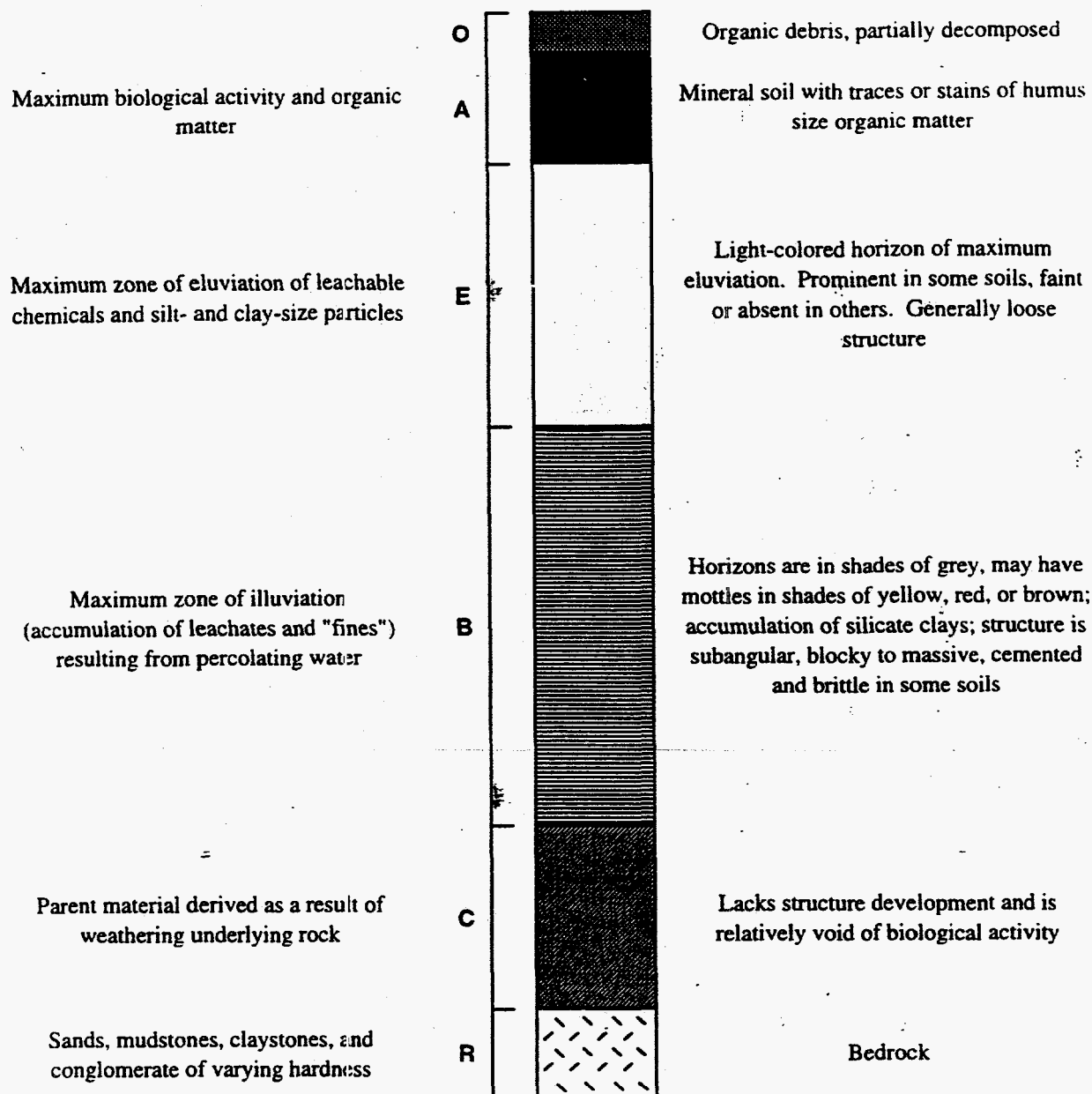


Figure 4-2. Hypothetical Profile of Mineral Soils in Wetlands Showing the Principal Horizons and Potential Occurrence on the Savannah River Site

Table 4-1. Summary of Taxonomic Terms Applicable to Soil Orders

Soil Order and Formative Ending	Derivation	Description
Soil Orders Found at SRS		
Entisol (-ent)	Recent	Mineral soils without significant profile development, with little modification of parent material, and no deep cracks in most years
Inceptisol (-ept)	<i>L. inceptum</i> , beginning	Mineral soils, some pedogenic horizons and some weatherable minerals, moisture available to mature a crop in most years, no horizon of illuvial clay, relatively low in organic matter or base saturation, or both
Spodosol (-od)	<i>L. spodos</i> , wood ash	Mineral soils with an illuvial horizon enriched in amorphous aluminum and organic matter, with or without amorphous iron; very limited distribution at SRS
Ultisol (-ult)	<i>L. ultimus</i> , last	Mineral soils with an illuvial argillic or kandic horizon enriched with silicate clays, low base saturation (<35%), old, well-developed profile
Histosol (-ist)	Gr. <i>histos</i> , tissue	Soils with partially decomposed organic material comprising >50% of the upper 80 cm
Soil Orders Not Found at SRS		
Alfisol (-alf)	Al-Fe	Soils with argillic, kandic, or natric B horizon, base saturation >35%; moist part of the time; lack calcic, gypsic, or mollic horizons
Andisol (-and)	Ando	Soils rich in amorphous aluminum derived from weathering of pyroclastic materials of volcanic origin
Oxisol (-ox)	Oxide	Highly leached soils with an oxic B horizon
Aridisol (-id)	<i>L. aridus</i> , dry	Soils with an ochric epipedon and high base saturation; may have calcic, gypsic, argillic, or natric B horizons

Table 4-1. Summary of Taxonomic Terms Applicable to Soil Orders (Continued)

Soil Order and Formative Ending	Derivation	Description
Soil Orders Not Found at SRS (Continued)		
Mollisol (-oll)	L. <i>mollis</i> , soft	Soils with a mollic epipedon, high base saturation, and high organic matter content
Vertisol (-ert)	L. <i>verto</i> , turn	Soils with a high content of swelling clay that forms wide cracks when dry, into which surface soil falls or washes

Table 4-2. Prefixes Used in Naming Suborders and Great Groups for SRS Wetland Soils

Prefix	Description
Aqu	Soils that are wet for long periods (suborder or great group)
Dys- or Dystr-	Soils with low base saturation (great group)
Fluv-	Recent soil material deposited by streams (alluvium) (suborder)
Hum-	Soils with appreciable amounts of humus (suborder or great group)
Med-	A soil of mid-latitudes (great group)
Ochr-	Light colored surface soils with little organic matter (suborder)
Sapr-	Soils with highly decomposed plant fibers (suborder)

Table 4-3. Taxonomic Modifiers Used to Describe SRS Wetland Soils

Modifier	Description
General Modifiers	
Arenic	Sandy alluvial horizon (sand or sandy loam texture), mostly between 50 and 100 cm thick
Cumulic	An epipedon (surface horizon) with a greater accumulation of humus than is typical of the humic epipedon
Typic	Characteristic of the specific great group
Acid	pH <5.0 (in 0.1 M CaCl ₂) throughout control section
Dysic	pH <4.5 (in 0.1 M CaCl ₂) in all parts of organic materials in control section (Histosols only)
Thermic	Soil with mean annual temperature between 15 and 22° C at depth of 50 cm below surface
Particle Size Modifiers	
Sandy	The texture of the fine earth is sand or loamy sand and rock fragments comprise <35% by volume
Loamy	The texture of the fine earth is loamy, very fine sand or finer, the amount of clay is <35%; and rock and rock fragments is <35%
Coarse loamy	15% or more of the particles are fine sand or coarser, including fragments 7.5 mm diameter
Fine-loamy	15% or more of the particles are fine sand or coarser, including fragments 7.5 mm diameter; 18-35% clay in the fine fraction
Clayey	The fine earth contains 35% clay, and rock fragments are 35%
Fine	A clayey particle-size class for soils having 35-59% clay in the fine earth fraction

Table 4-3. Taxonomic Modifiers Used to Describe SRS Wetland Soils (Continued)

Modifier	Description
Mineral Content Modifiers	
Siliceous	>90% by weight silica minerals and other durable minerals resistant to weathering
Mixed	Soils with <40% of any one mineral other than quartz or feldspar
Kaolinitic	>50% by weight kaolinite, tabular halloysite, dickite, or nacrite and smaller amounts of 1:1 or minor nonexpanding 2:1 layer minerals or gibbsite, <10% montmorillonite

(This page intentionally left blank.)

5.0 METHODS

Meeting the objectives of the wetland soils study required integrating the following activities:

- (1) Review existing data to select representative sites for sample collection.
- (2) Collect and analyze samples using standard protocol methods to facilitate comparison to data collected in other studies.
- (3) Summarize concentrations for soil groups by depth, and compare constituents in onsite and offsite soils to provide baseline data for comparison with other studies.

5.1 Study Design

This study was designed to collect soil samples that are representative of unimpacted wetland soils at both onsite and offsite locations. Soil samples from five soil groupings were collected from ten locations onsite at SRS. Soil samples from the same five soil groupings were collected from five offsite locations. Subsections 5.1.1 and 5.1.2 describe the soil groupings and sampling locations selected.

5.1.1 Soil Groupings

The wetlands on the SRS consist of nine different soil types that vary greatly in their geological and hydrogeological characteristics. Seven soil series and one great group comprise about 40,000 acres that are classified as hydric soils. Hydric soils are likely to be wetlands. The hydric soils have formed in three general topographic positions: along low-lying areas of the floodplain near streams, at the toe slope of upland soils, and in isolated upland depressions. These soils vary in age, thickness of profile, texture, organic content, and horizon development. To limit the number of soil types considered, the soils were combined into five groupings with similar geochemical and physical characteristics. The five soil groupings are listed in Table 5-1.

Three broad categories of soils were considered when grouping the soil types: soils occurring in upland bays and depressions, including Carolina bays; soils occurring in small stream floodplains; and soils occurring in large stream (Savannah River) floodplains. It is important to consider the type of watershed when assessing wetland soils on the SRS. The Savannah River drains a relatively large watershed compared to other onsite streams. Although the Savannah River at

SRS is within the Atlantic Coastal Plain, a portion of the upstream watershed extends into the Piedmont region. Soil material eroded from the Piedmont area is transported downstream and deposited on the floodplain. Thus, the Savannah River floodplain at SRS is composed of soil material derived from both the Piedmont and Coastal Plain regions. Unlike the watershed of the Savannah River, the watersheds of the smaller streams at SRS are located predominantly within the Coastal Plain, and receive little or no soil directly from the Piedmont region. As a result, the soils found near the smaller streams have different geochemical and physical properties than those found in the Savannah River floodplain.

Soils were assigned to each of the five soil groupings based on known chemical and physical differences. Factors considered in assigning a particular soil to a group included the type of watershed the soil developed within, the topographic position of the soil in the watershed, the parent material from which the soil weathered, the age of the soil, and the amount of organic matter present in the soil. Each of the five groupings includes from three to ten soil series, usually with one or two dominant series (Table 5-1).

Grouping 1 consists of soils in the order Histosol. Soils in this order are high (> 50%) in organic matter content in the top meter, with strata of sandy material below a depth of 2 meters. Because organic soils are not widespread on the SRS, this grouping is somewhat unique on the site. Dorovan is the most common soil series in grouping 1.

Grouping 2 consists of soils with moderately high organic matter content. Soils typical of this grouping belong to the subgroup Cumulic Humaquepts. Pickney and Johnston are the most common soil series in grouping 2.

Grouping 3 consists of soils that formed in the floodplains of small streams. These soils are sandy, stratified, and have little organic matter in the surface and subsurface layers. Soil grouping 3 represents a number of soil series that are similar to the Bibb and Osier soils. The taxonomic great group Fluvaquents is used for these soils; they have formed in complex patterns along narrow drainageways and small floodplains.

Grouping 4 consists of soils found in upland depressions, which include the Carolina bays. Soils in grouping 4 are typically older soils with better developed profiles than soils in the other groups. The most common soil series in soil grouping 4 are Rembert, Ogeechee, Williman, and Rains.

Grouping 5 consists of soils found in the Savannah River floodplain. These soils formed from clayey and silty sediments deposited from flooding of the river. Chastain and Tawcaw are the most common soil series in grouping 5.

5.1.2 *Sampling Locations*

Establishing the baseline geochemical and physical properties of unimpacted wetland soils required collecting samples from wetlands at both onsite and offsite locations. All sampling locations were carefully selected in an effort to avoid areas within close proximity or down-hydraulic gradient of any facility with operations that might result in soil contamination. Areas near power line right-of-ways were avoided, because these locations are routinely treated with herbicides. The location of each sampling station was determined using global positioning system devices.

Onsite, 50 sampling locations were selected, ten each for the five soil groupings (Figures 5-1 through 5-6). Each onsite location was selected to be (1) in a wetland formed prior to development of the SRS, (2) in a watershed with no history of impacts from SRS operations, and (3) in areas representing each of the soil types typical of wetlands at SRS. To fully represent SRS wetland soils, sampling locations were selected from as many areas of the site as possible, while avoiding areas with potential impacts from operations. An area was considered potentially impacted if it was located downstream from an SRS operations area or waste unit, if any portion of its source was groundwater from a waste unit or operations area, or if previous investigations suggest it may have been impacted. Because of potential contamination, sampling of soil grouping 5 was confined to the Savannah River floodplain north of Upper Three Runs Creek. Onsite sampling locations and descriptions are shown in Figures 5-1 through 5-6 and Table 5-2.

Offsite locations were sampled to supplement data in the literature for comparison to onsite locations. All offsite sampling locations are in South Carolina within 100 miles of the SRS. The offsite sampling locations were Aiken State Park, Aiken; the Audubon Society's Silver Bluff Sanctuary, Jackson; Congaree Swamp National Monument, Gadsden; Francis Beidler Forest, Harleyville; and Santee State Park, Santee (Figure 5-7). Five soil cores were collected from each soil group at the offsite locations (Table 5-3). The selection criteria for locations outside SRS were less rigorous due to greater difficulty in attaining access and approval for sampling; the locations were (1) on state or other public lands and (2) wetlands. The state parks and federal lands had been publicly owned for a considerable period of time. These lands contained no

industry within their boundaries, and were large enough to allow choosing sampling locations that were a considerable distance from any contaminant-producing commercial facility. In particular, the Audubon Sanctuary location near Jackson was chosen because it is located upstream of SRS on the Savannah River in the Southeast Atlantic Coastal Plain. This provided an opportunity to collect samples representing both the Coastal Plain and the Savannah River watershed. The offsite sampling locations and descriptions are shown in Figure 5-7 and Table 5-3.

5.2 Sample Collection

Eighty-three 10-foot-long soil cores were collected from 50 locations on SRS and 25 offsite locations in July, August, and September 1992. Onsite, 55 cores were collected at 50 sites (10 from each of the five soil groupings plus five duplicate cores). Offsite, 28 cores were collected at 25 sites (five from each of the five soil groupings plus three duplicate cores). Cores were collected with minimum disturbance to the wetland areas. Vehicles were not used in the wetlands; all equipment, materials, and cores were back-packed to and from the study sites.

Cores were collected by two methods: vibracore and hand auger. The study design was to collect samples to 10 feet below land surface. If the vibracore equipment could not penetrate to the study design depth, a bucket hand auger was used to retrieve samples. In this study, portions of 16 cores were hand-augered.

A lithologic log was prepared for each soil core location. Each core was divided into five individual soil samples according to soil horizons (labeled A through E), then sampled and packaged for analysis.

The methods used are described in WSRC (1992) and summarized in the following subsections.

During the data validation/verification process, it was discovered that the analytical laboratory, Weston Analytics, had not analyzed a portion of the onsite samples from soil grouping 5. When the laboratory was contacted, it had already discarded the samples. Thus, it was necessary to recollect the affected samples, which were from locations BGW052, BGW053, BGW054, BGW057, and BGW060. Using the hand augering methodology, these locations were resampled for all depth increments in September 1993. The hand augering method was selected for resampling because the vibracoring technology could not penetrate to the design depth at these

locations during the original sampling event, and most of the samples were completed with the hand augering method.

5.2.1 *Vibracore Sampling Methodology*

Vibracoring technology was chosen for sample collection for several reasons. Vibracoring enables the collection of continuous soil cores, to depths exceeding the design depth (10 feet) in most cases, with minimal impact to the wetlands being sampled. This is of major importance for both onsite and offsite sample collection, since preservation of existing wetlands is standard policy at SRS. Vibracoring equipment is also light-weight and portable, facilitating backpacking the equipment long distances to areas that are inaccessible by vehicle.

The vibracore sampling methodology consisted of vibrating a 3-inch diameter aluminum tube down to the maximum sampling depth of 10 feet. The cutting edge of the tube was beveled and sharpened to facilitate penetration into the soil profile. Sandy and gravelly soils tended to fall from the end of the tube upon withdrawal; therefore, when possible, the sample tube was vibrated to a depth of 11 or 12 feet to help ensure recovery of the full 10-foot interval. After the 3-inch aluminum tube was vibrated down to the desired depth, the headspace in the core barrel was filled with deionized water and capped with a plumber's test plug. The plug inhibited loss of the core from the sample tube during withdrawal. The 3-inch diameter aluminum tube was then extracted by using a jack, tripod, and tackle arrangement. Core penetration and core compaction were recorded prior to core extraction. The hole created by removal of the core was backfilled with soil obtained adjacent to the sampling area; this method of backfilling the hole was selected because the samples were collected from unimpacted background sites with no contamination. All cores were maintained at 4°C for transport from the field to SRS Building 704-B for core sampling.

Several changes were made in the initial sampling procedures in order to meet field conditions. Initially, plastic core liners were used inside a stainless steel vibracore sample barrel. Upon collection of the sample, the plastic liner would be slipped out of the stainless steel core barrel, and the core barrel would be reused. However, a special head was required to hold the plastic liner in place within the core barrel. Using this head and the plastic liner, it was not possible to penetrate the soil to design depth. Therefore, the use of the plastic liner and head was discontinued, and a standard unlined 3-inch aluminum core barrel was used to collect all cores.

The initial sampling protocol for the number of cores collected at each sampling site was also changed. Because a large volume of sample was needed to perform the laboratory analyses, it was necessary to collect two 10-foot vibracores at most sampling sites. If any core was compacted more than 5 percent during collection, an additional core was collected at that station. Example compaction calculations are presented in Appendix A. In soil groupings 3, 4, and 5 where there was a thin A horizon (less than 20 inches thick), grab samples were collected to obtain enough soil to fill the sample containers. These grab samples were collected by hammering short pieces of aluminum core barrel into the ground. The core was then pulled from the ground by hand.

5.2.2 Hand Auger Sampling Methodology

When vibracore sampling was not possible, typically due to clayey or gravelly soil layers, a 3-1/4-inch stainless steel bucket auger was used to collect the sample to the study design depth of 10 feet. Immediately upon recovery of the sample, a subsample for VOC analysis was placed in the appropriate container, sealed, labeled, and stored in a cooler at 4°C. The rest of the soil was placed in plastic bags, sealed, labeled according to station number and soil horizon/depth, and kept at 4°C for transport to the core sampling laboratory. Both augered depth and vibracoring depth were noted in the field log. While sampling with the auger, the field crew wore rubber gloves, which were replaced between soil intervals to prevent cross-contamination.

When flowing sands were encountered during the sampling, the bucket auger technique was replaced with the vibracore in order to obtain the sample. This was accomplished either by vibrating or pushing the tube through the material to the desired depth of 10 feet. The tube was then filled with deionized water, capped with the plumber's test plug, and extracted from the hole. After extraction, the deionized water was drained from the tube. At some locations it was necessary to extract the soil from the tube in the field. When this was done, the soil was divided by horizon and placed in plastic bags from which the VOC samples were immediately collected. The bags were then sealed, labeled with sampling location and depth, and maintained at 4°C during transport to the core sampling laboratory.

Portions of 16 cores were hand-augered. Only one sampling site was not completed to the designated depth of 10 feet. At sample site BGW050, large gravel (pebbles and cobbles) was encountered in the E horizon, which was impenetrable using the vibracore technique. Other attempts were made to complete the core (including use of the hand auger and general

excavation). Sample E was discarded because it was not characteristic of a wetland sediment: it consisted of 95 percent pebbles and cobbles (0.4 cm to 25.6 cm diameter particles) and 5 percent coarse sand with essentially no fines.

5.2.3 Core Opening and Subsampling

After a core was transported to SRS Building 704-B, it was cut longitudinally using a radial saw with a decontaminated carbide-tipped saw blade. The core was cut to minimize disturbance to the core sample (by cutting the aluminum tube only).

For each core location, a complete lithologic log was prepared for the entire 10-foot sampling depth plus any additional core that may have been collected at a given site. Detailed core logs are presented in Appendix A. These logs present the geologic character of the core locations and give a detailed breakdown of the subsample intervals used for the core. Field activity logs are shown in Appendix B. These logs contain information recorded during the actual coring and are an important supplement to the lithologic logs. The cores were logged from a sedimentological perspective. This included a description of significant lithologic changes, color, sediment composition (gravel; sand; mud, i.e., clay and silt), organic content, and rooting. The logs provide a graphic image of the core and the general sedimentological character. Samples were collected from each interval for grain size or particle size analysis to provide data for use in conjunction with the logs when analyzing the laboratory results (see Section 6.1). The particle size fractions are presented in Table 5-4. Grain size comments on the lithologic logs were derived from visual inspection based on the particle size fractions. The organic content of the cores was examined to avoid confusing a well decomposed peat (Sapric) with a mud.

Each core was divided into five subsamples based on general soil horizon changes as defined in Table 5-5. All intervals were corrected for compaction, which was averaged over the entire length of the core sample. Example compaction calculations are provided in Appendix A. The A and B sample intervals for soil groupings 3, 4, and 5 were determined only after visual inspection of a given core, with their sum total not to exceed 40 inches. For these three soil groupings, the A and B sampling intervals were determined by soil horizon, with intervals in the A sample coming from the A horizon, and the B sample coming from the horizon below.

If two cores were collected at a station, they were designated Core A and Core B. In most cases, Core A was logged and sampled, and additional soil material was taken from Core B if necessary.

In the event that Core B had deeper penetration, more complete recovery, and less compaction, Core B was logged and sampled.

Sampling the core for VOCs was done immediately after opening the core. The samples were collected from the center point of each horizon. The samples were promptly placed in appropriate containers such that no head space remained. The containers were sealed, labeled, and stored at 4°C.

To reduce aluminum contamination from the sampling procedure, the outer surface of the core was scraped to remove any visible aluminum chips resulting from the core opening process. Each interval was then removed from the core barrel, placed into a decontaminated stainless steel mixing bowl, and thoroughly agitated with a decontaminated stainless steel spoon to maximize sample homogenization. Samples were divided into quadrants in the bowl before filling the sample jars. Each jar was filled with soil taken from one quadrant. After four jars were filled, the remaining soil was homogenized and divided again. This procedure was repeated until all sample jars were filled. All sample jars were sealed, labeled, stored at 4°C, and packaged for shipment to the analytical laboratory.

All sample packaging met DOE and Department of Transportation shipping requirements. Only insulated coolers were used. Samples were packed one core per cooler. Once packaged, each cooler was custody-sealed and transported to SRS shipping/receiving along with a chain of custody form and shipping order. Chain of custody forms are included as Appendix C of WSRC (1992).

5.2.4 Sampling Equipment Decontamination

All sampling equipment that came in contact with the cores, including sample tubes, sample trays, sample spoons, and saw blades, was decontaminated using a detergent wash followed by a water-alcohol-water rinse (WSRC, 1992). This equipment was steam cleaned as well. All aluminum coring tubes were steam cleaned prior to sample collection and wrapped in polyethylene for transport to the field.

5.2.5 *Quality Assurance/Quality Control Samples*

One trip blank sample for VOC analysis for each sampling location was included in each packed cooler containing volatile organic samples. For each core, all samples to be analyzed for VOCs were packed in the same cooler, and the trip blank sample was packed with them. In no case were VOC samples from two different locations shipped together in the same cooler.

One field blank sample for metals analyses was carried throughout offsite sampling operations. Three field blank samples for metals analyses were carried throughout onsite operations. The blank samples consisted of deionized water.

To monitor the quality of equipment decontamination, rinsate samples were collected from the final rinse water used in decontamination. Three random rinsate samples were collected during the project.

5.3 Sample Analysis

Chemical and physical analyses were performed on soil samples collected during the wetland soil study. The analyses performed for this study included RCRA Appendix IX constituents, nutrients, and agricultural and physical parameters. These parameters are listed in Table 5-6, with corresponding reference methods. The parameters selected were intended to characterize the levels of naturally-occurring trace elements and to determine physical and chemical parameters. RCRA Appendix IX constituents include VOCs, semivolatile organic compounds, pesticides and herbicides, PCBs, and metals. These analyses are analogous to those typically run for RCRA/CERCLA waste unit characterizations at SRS.

As described in Section 5.2.3, the core opening process may have introduced fragments of the aluminum coring tube into the sample. An attempt was made to remove visible aluminum fragments from the samples; however, some fragments may have been missed. This would cause analytical results for aluminum to be biased high. Agricultural parameters (e.g., cation exchange capacity and pH) were measured to assess the bulk geochemical character of the soils. Samples were also analyzed for tritium; however, extensive radionuclide analysis was not undertaken in this investigation due to resource limitations.

A summary of parameters tested and a list of field and duplicate samples collected are presented for each soil grouping in Table 5-7. All analyses were conducted by Weston Analytics, Lionville, Pennsylvania. The laboratory did not analyze a portion of the onsite samples collected from soil grouping 5 during the initial sampling event. These samples were re-collected in September 1993 and analyzed by Weston Analytics (see Section 5.2).

5.4 Statistical Methods

A total of 95,302 analytical measurements of wetland soil samples representing 259 constituents were analyzed. The background wetland soils data are stored in a verified raw database (VRD) on a VAX maintained by the Environmental Protection Department's Environmental Monitoring Section. Appendix C provides some details regarding the database, including notes on application development, data validation, and the analysis used in its development.

5.4.1 Introduction

The VRD includes soil cores from each of the five soil groups (Table 5-1) from both onsite and offsite locations. This database includes all analytical information submitted by the laboratory, including the quality assurance/quality control (QA/QC) samples. Screening criteria were applied to the verified raw database to produce the final wetland soils database. All statistical analyses were performed using the final wetland soils database.

Using the final wetland soils database, summary statistics were produced for each analyte. The statistics were calculated for six groupings of the samples: (1) all onsite samples, (2) onsite samples separated by soil groups, (3) onsite samples by soil group separated by depth interval, (4) all offsite samples, (5) offsite samples by soil group, and (6) offsite samples by soil group by depth interval.

The following statistics were calculated for each of the six divisions: maximum, minimum, median, arithmetic mean, geometric mean, standard deviation, total number of samples, and percent of samples above detection (see tables in Appendices D and E).

No statistical comparison between the onsite and offsite samples was performed, as such an analysis is beyond the scope of this study, and would need to accommodate the complexities of environmental data.

5.4.2 Raw Database Verification

The analytical laboratory (Weston Analytics) submitted data for the wetlands soil project in hard copy and on electronic data diskettes (EDDs). The hard copies consisted of the validated data packages containing a case narrative, the results, and QA/QC information. The EDDs consisted of an ASCII computer file for each laboratory batch. The data were formatted into the AN92 data format to provide the information listed in Table 5-8. This dataset was modified to eliminate nonessential information. Information contained in the final database is presented in Table 5-9.

Each file was loaded onto a mainframe computer at SRS. The files were then merged to create six larger files to accommodate data review and validation activities. The names of the blind replicate samples were changed to the correct location number and were marked as replicate samples. Blind replicate samples were collected from eight locations (five onsite and three offsite). The offsite replicates for this study were collected from BGW009, BGW020, and BGW024, and the onsite replicates were collected from BGW036, BGW058, BGW066, BGW069, and BGW074.

Statistical Application Software (SAS) computer programs were run on each file to validate the data. The following quality control checks were made using the programs:

- Core name and sample dates were verified.
- Data entry errors were identified (i.e., incorrect methods and units).
- Sample holding times were verified.
- Result and analysis qualifiers were verified.

Suspected data entry errors were documented and submitted to Weston Analytics for verification or correction. No changes were made to the database until the laboratory documented the solution. All changes to the verified raw database were recorded in a logbook.

After all data entry errors had been resolved, the data were moved to a VAX and formatted into Oracle tables, where additional quality control checks and statistical analysis activities were performed. The additional data screening included identifying missing analyses and duplicate records. The analytical laboratory was notified of any data that were missing and responded by submitting an EDD for the particular analysis. Duplicate records were deleted from the verified raw database after the laboratory determined it had, in error, submitted the data twice.

5.4.3 Final Wetland Soils Database

The verified raw database contains, in addition to the measurements for soil samples, results for laboratory blank and spike samples, field rinsate samples, field and trip blank samples, and calibration and verification samples. These non-soil sample results are not relevant to the generation of summary statistics and were filtered from the verified raw database to produce the final wetland soils database. Samples with result and analysis qualifiers reported as "R" and "X" were screened from the final wetland soils database. Checks were also performed to verify the consistency and correctness of units. In cases where incorrect units were found, appropriate corrections were made. Unit consistency was accomplished in the final wetland soils database by converting all results reported in mg/kg to $\mu\text{g}/\text{kg}$ by multiplication of the result by 1,000 for nonradionuclides. Radionuclide results (tritium) were converted to pCi/g by multiplying results reported in pCi/mg by 1,000. CEC results were in units of milliequivalents per 100 grams (MEQ), pH results were in pH units, and percent solid and total organic carbon were reported in units of "PER" (percent of total).

The verified raw database consisted of 95,302 individual analytical results. The screening process used to generate the final wetland soils database eliminated 9,355 results. This yielded a total of 85,947 results in the final wetland soils database used for statistical analyses.

5.4.4 Processing of Analytical Results

Chemical analysis of environmental samples rarely produces results that conform to the nominal requirements of statistical analysis. In the simplest case, analytical results should provide a single concentration which exceeds the detection limit for each analyte for each sample. In this simple case, the application of routines to calculate maximum, minimum, arithmetic and geometric mean, and standard deviation are straightforward. However, few environmental sampling programs yield such results. With each complication, a procedure must be developed to provide data that can be used in the statistical computations. The goal of these procedures is to provide responsible, verifiable, and representative methods to prepare analytical data for use in statistical calculations. The following sections describe the complications encountered in the database for this project and the procedures used to resolve those complications.

5.4.4.1 Results Reported as Below the Limits of Detection

Not all analytical results exceeded the detection limit for a given analyte. In environmental samples, such as those collected for this study, the number of samples that exceed the analyte detection limits may range from the entire set of samples to none of the samples. If no samples exceeded the detection limit, then the analyte was dropped from further consideration because no useful information could be derived from further analysis. If all samples exceeded the detection limit, then the statistical treatment is straightforward, as mentioned above. However, if some of the samples exceeded the detection limit and some did not, then a procedure must be identified to process the data such that the statistical computations can be made responsibly.

Frequently, data from the wetland soils project were reported as below the limits of detection (LOD). Analytical results determined to be below the LOD are not considered reliable and are reported as the LOD value. Such data are said to be left censored. A common practice is to include these data in subsequent statistical analyses as LOD/2, which was the method chosen for this study. Use of the LOD/2 is intended to provide a "best guess" of the actual concentration, and allows data below the LOD to be included in the statistical analyses. Statistical analyses were performed only when 50 percent or more of the data for a given analyte were reported as above the LOD.

The value of results reported below the LOD is a function of the method detection limit, the dilution factor, and the percent solids in the sample (i.e., moisture content). Thus, the LOD is sample dependent, and the variation of the LOD among a group of samples for the same analyte can be large. In the final wetland soils database, there were instances where results reported as below the LOD were substantially larger than the largest result reported above the LOD for a given sample and analyte. To remove the influence of large results that were below the LOD, any result reported as below the LOD that exceeded the median detection limit was replaced (Figure 5-8). The replacement value was the median LOD result for the analyte for all onsite or offsite samples, as appropriate. The median detection limit was computed separately for onsite versus offsite samples, and the same value was used for all soil groups and depth categories for a particular analyte. For a given sample and analyte, results above detection were not replaced, nor were results reported as below the LOD if the result was smaller than the calculated median detection limit.

This procedure differs from that used in some risk analysis calculations where LOD data are replaced with LOD/2 regardless of magnitude; however, it serves to minimize the bias on the arithmetic and geometric means and standard deviation. It is expected that replacing large LOD values with the median detection limit will result in a decrease in the magnitude of the calculated means and standard deviation in distributions that are heavily left censored.

5.4.4.2 Field and Laboratory Replicates

Quality assurance protocols call for the analysis of field and laboratory replicate subsamples for approximately 10 percent of the soil samples. These subsamples provide multiple results for a single sample. The multiple results are not independent of each other, as they represent fractions of a homogeneous material. Thus, a process needs to be defined to reduce the multiple results into a single value for that sample. Once the single value is obtained, it can be used in statistical computations.

For the wetland soils study, all laboratory replicate and field duplicate measurements were averaged to obtain one value representing each analyte for each sample. If at least 50 percent of the individual measurements going into the average were above the LOD, the average was reported as above the LOD. Otherwise, the average was reported as below the LOD.

5.4.5 *Computation of Summary Statistics*

Summary statistics were computed using the final wetland soils database. The arithmetic and geometric averages and the standard deviation were computed only when more than 50 percent of the results were reported as above the LOD for a given analyte and summary group. The arithmetic and geometric averages and standard deviation estimates are considered biased when a substantial number of LOD results are reported for a given analyte and summary group. This can be true even if 50 percent or more of the results for a given analyte and summary group are reported as above the LOD. Minimum, maximum, and median values were calculated for all analytes and summary groups:

The arithmetic average was computed using the following equation:

$$\bar{Y}_g = \sum_{i=1}^{N_g} y_{gi} \div N_g \quad (\text{Eq. 1})$$

where:

y_{gi} = sample average for the i th sample of the g th summary group.

N_g = total number of samples in the g th summary group.

The standard deviation is given by the square root of the variance and the variance is computed by:

$$S_g^2 = \sum_{i=1}^{N_g} (y_{gi} - \bar{Y}_g)^2 \div (N_g - 1) \quad (\text{Eq. 2})$$

where:

S_g = standard deviation of the g th summary group.

The geometric mean is computed by (1) finding the average of the log transformed results for onsite or offsite for a given summary group for each analyte and site group and (2) converting the average back to the original units. The log transformed average is computed the same as in Equation 1 or :

$$\bar{Z}_g = \sum_{i=1}^{N_g} z_{gi} \div N_g \quad (\text{Eq. 3})$$

where:

z_{gi} = log transformed sample average for the i th sample of the g th summary group.

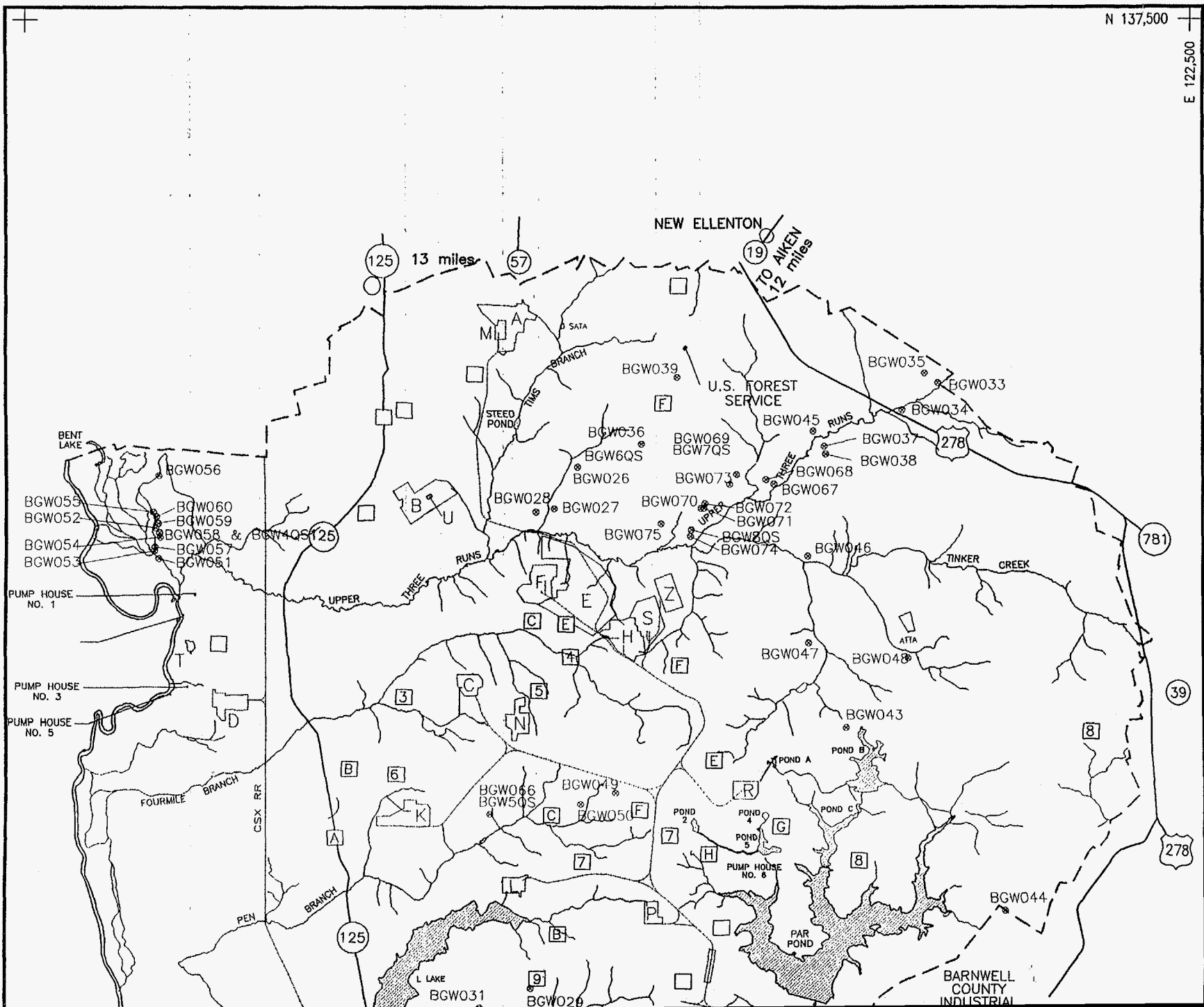
The geometric mean is given by:

$$GM_g = \exp(\bar{Z}_g) = \left(\prod_{i=1}^{N_g} Y_{gi} \right)^{1/N_g} \quad (\text{Eq. 4})$$

The maximum, minimum, and median result was determined for each summary group and analyte. If all results in a group were above the LOD, then the maximum, median, and minimum values were computed and reported without any qualifiers. If all results in a group were below the LOD, the maximum, median, and minimum values were computed and reported with a "<" symbol. In cases where results were reported above and below the LOD, the maximum and minimum values

were determined using all of the data for the group without considering the result qualifier. This approach gives the actual reported value for the three summary statistics, and can produce cases where the minimum result may be reported without a "<" symbol and the maximum result is reported with a "<" symbol. This counterintuitive result occurs infrequently. The median value was reported as above the LOD if 50 percent or more of the results were reported as above the LOD. Otherwise, the median value was reported with a "<" symbol."

In addition to the summary statistics, the total number of samples, number of samples reported as above the LOD, and the percent of samples reported as above the LOD were computed (see tables in Appendices D and E).



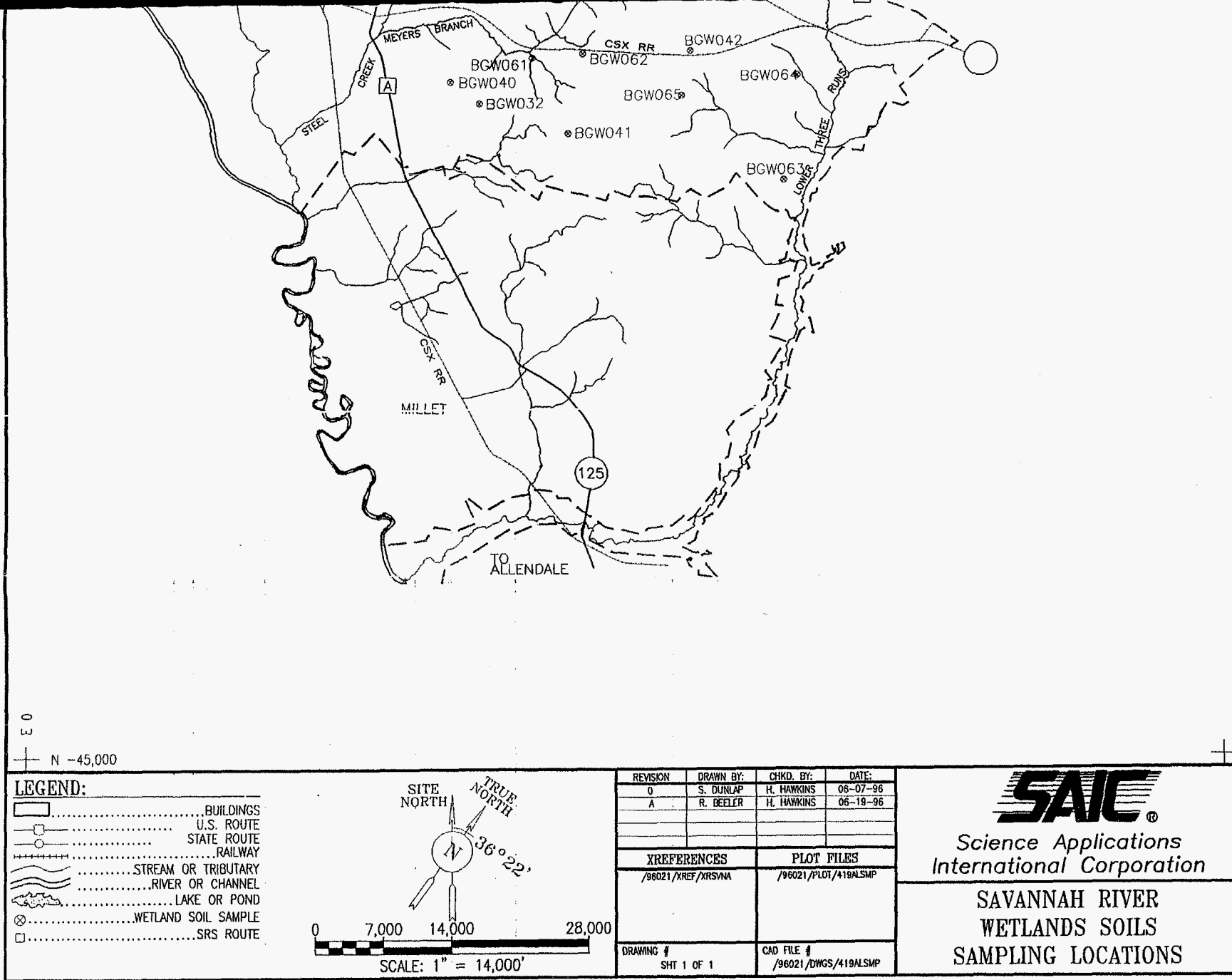


Figure 5-1. Onsite Sampling Locations

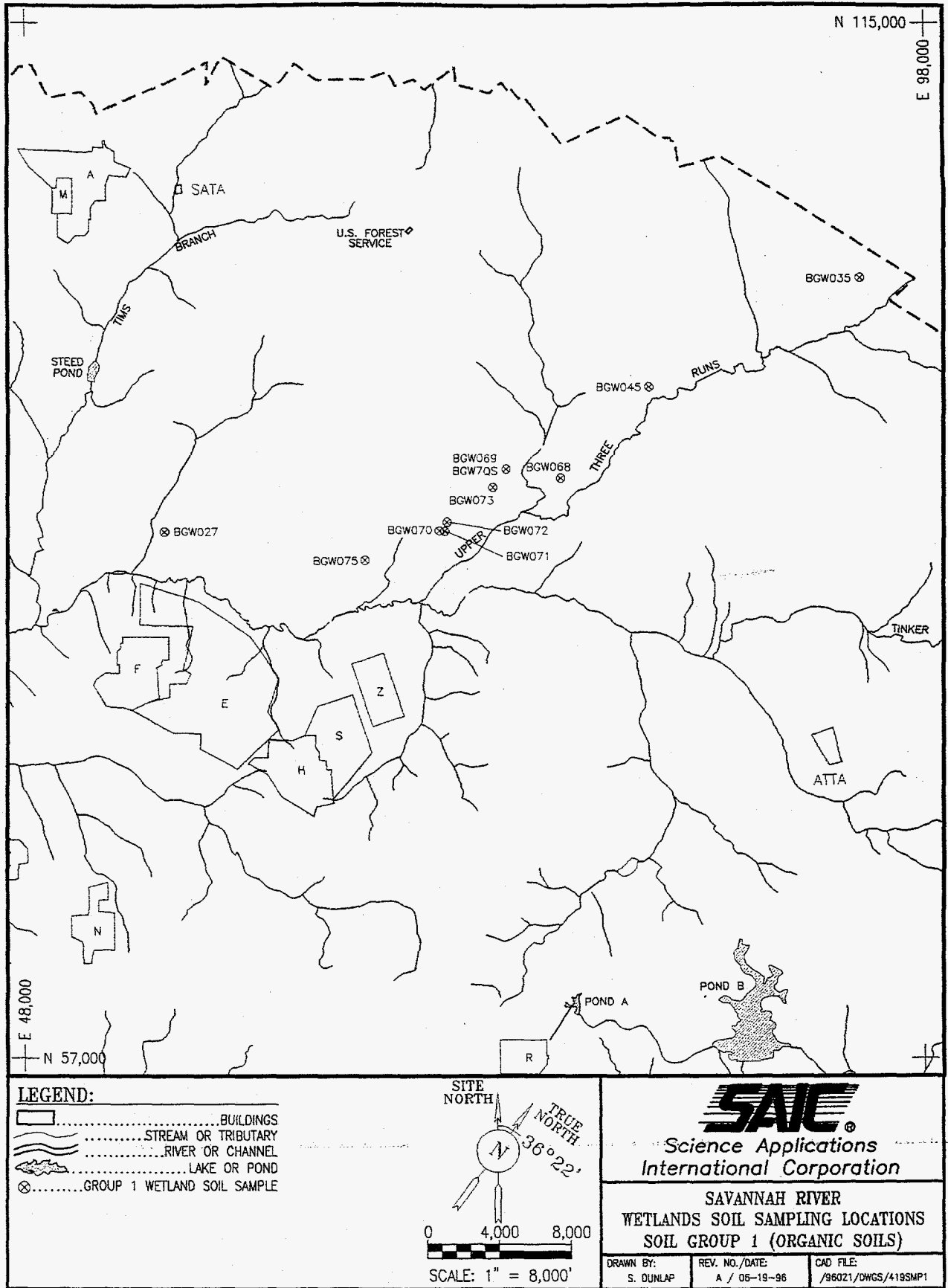


Figure 5-2. Onsite Sampling Locations for Soil Grouping 1 (Organic Soils)

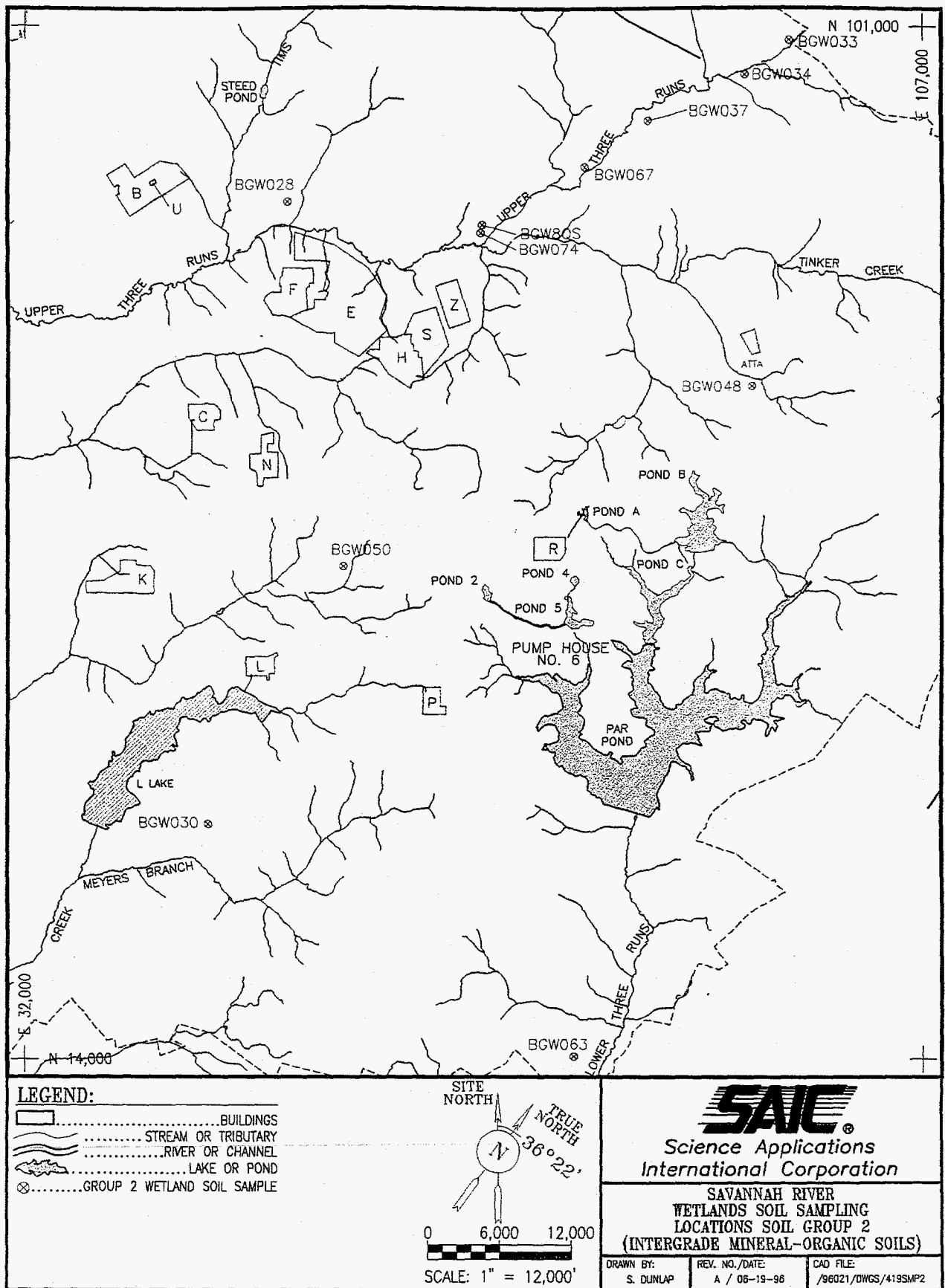


Figure 5-3. Onsite Sampling Locations for Soil Grouping 2 (Intergrade Mineral-Organic Soils)

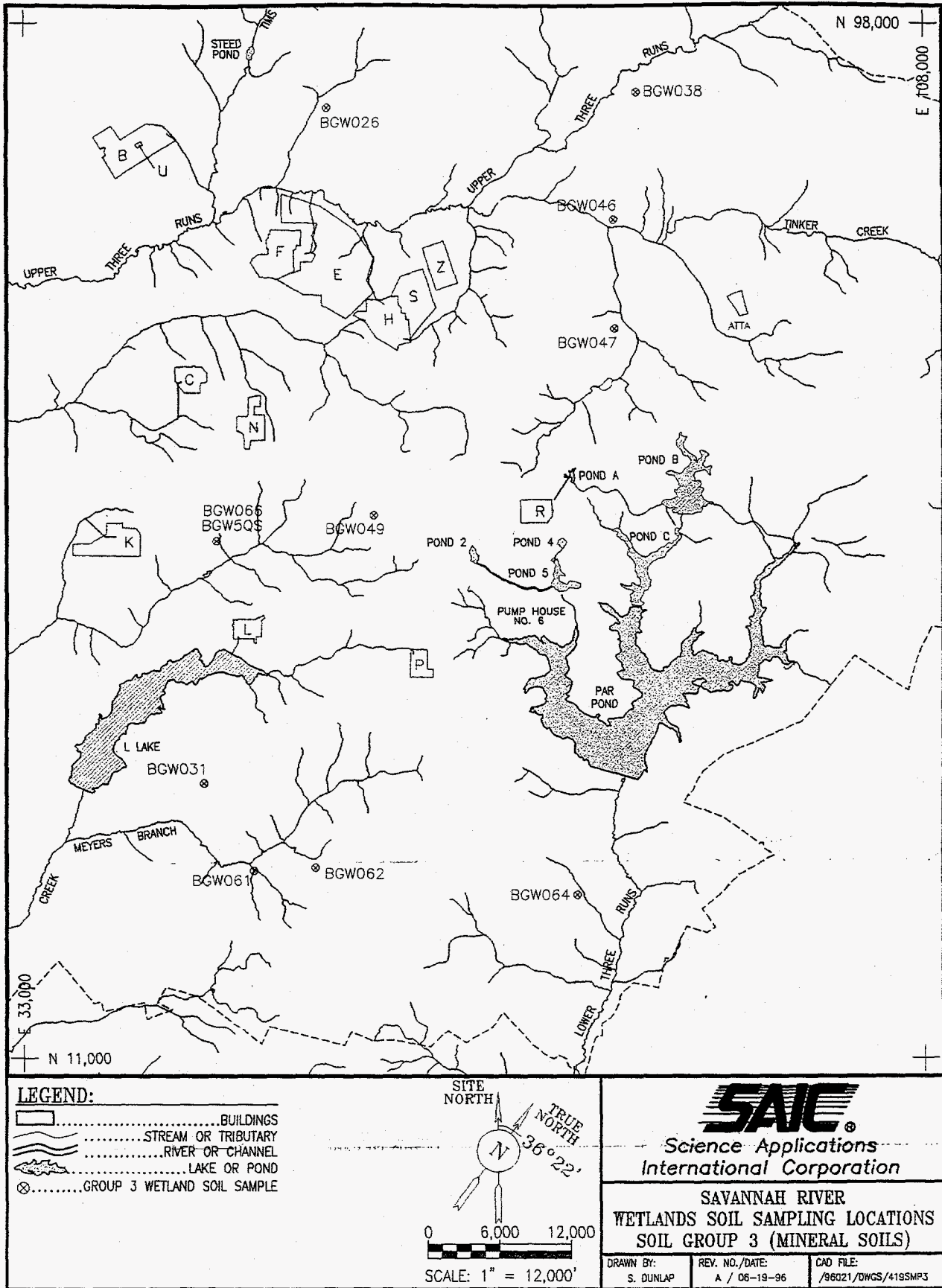


Figure 5-4. Onsite Sampling Locations for Soil Grouping 3 (Mineral Soils)

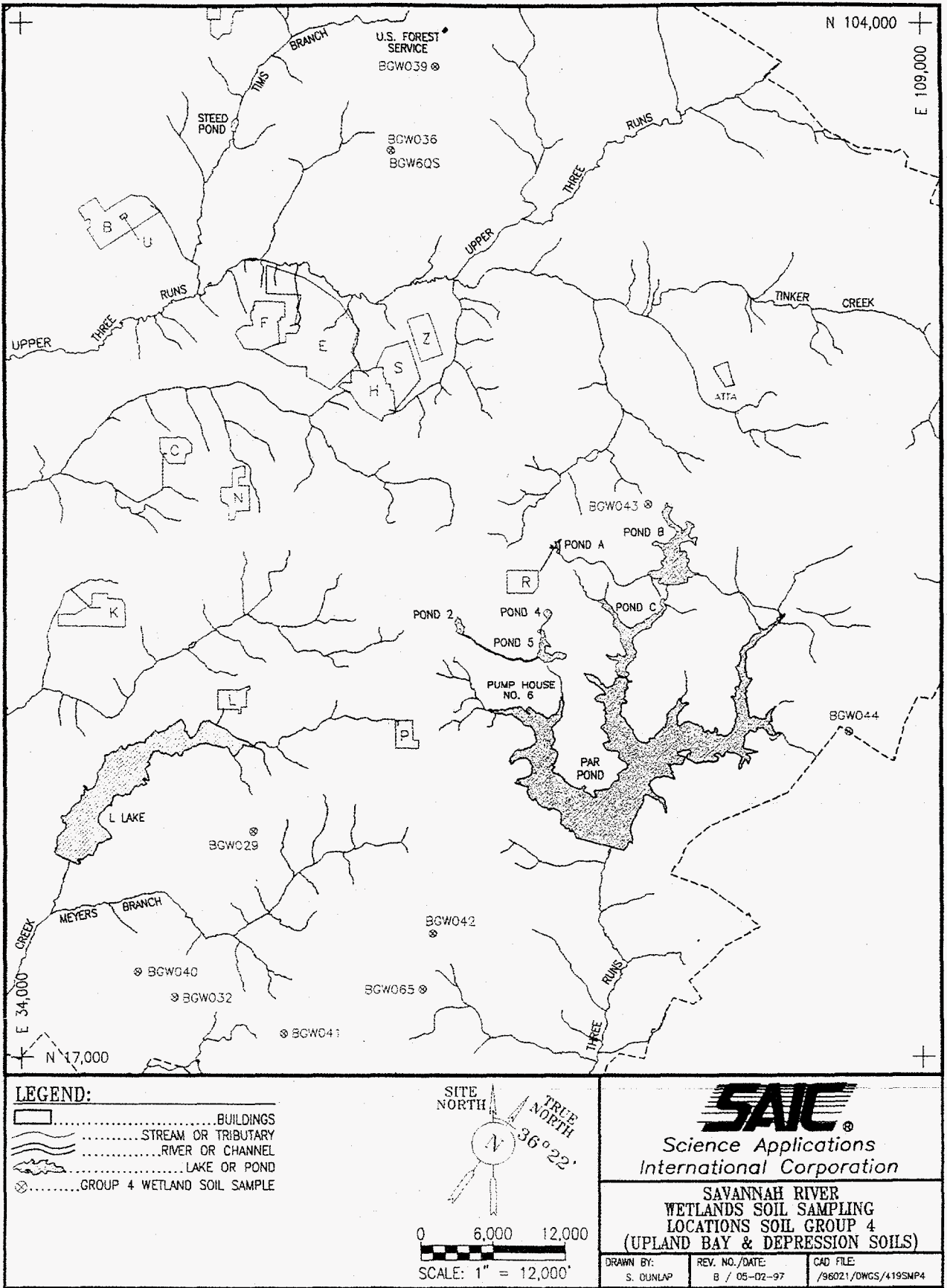


Figure 5-5. Onsite Sampling Locations for Soil Grouping 4
(Upland Bays and Depressional Soils)

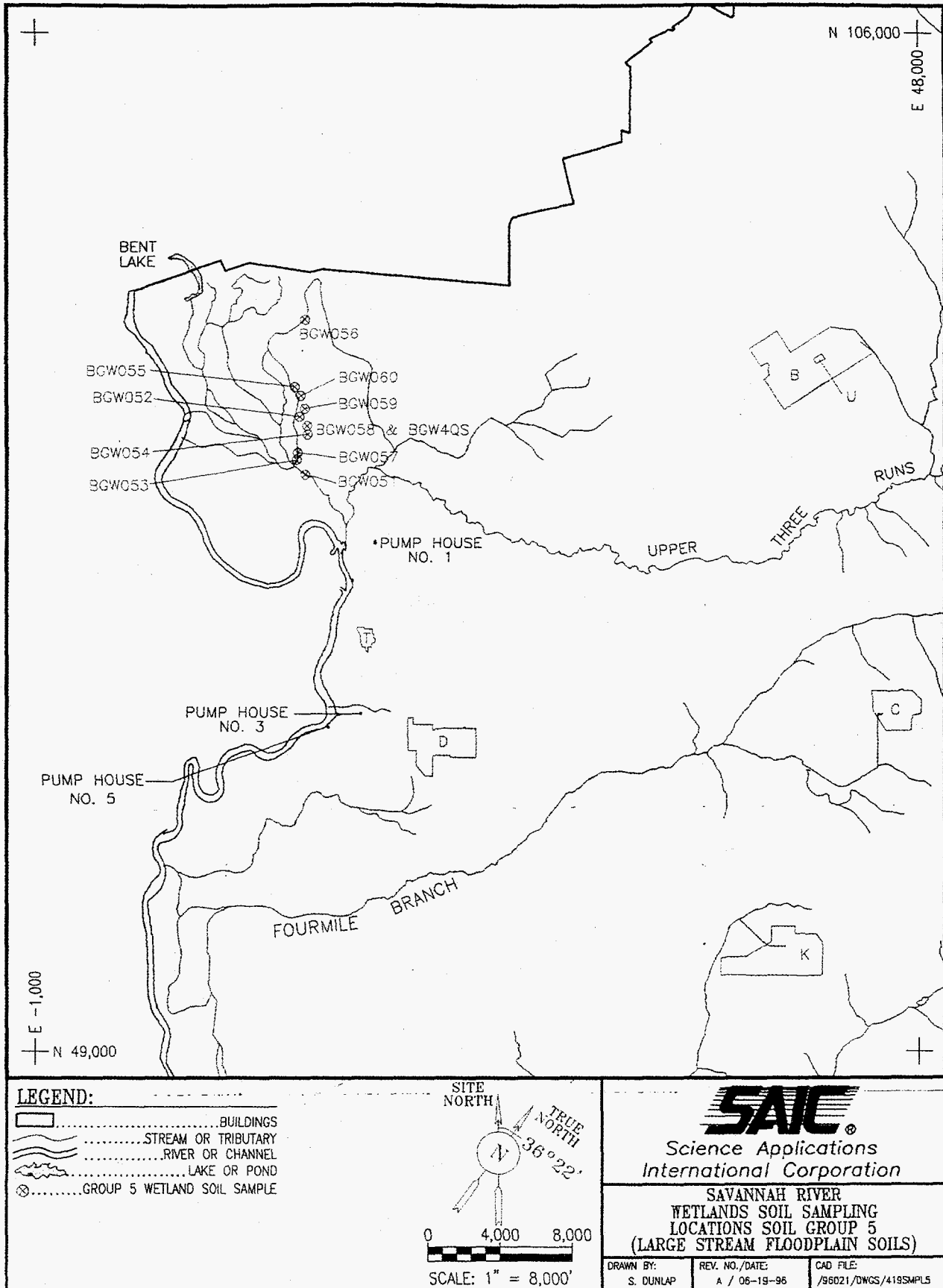
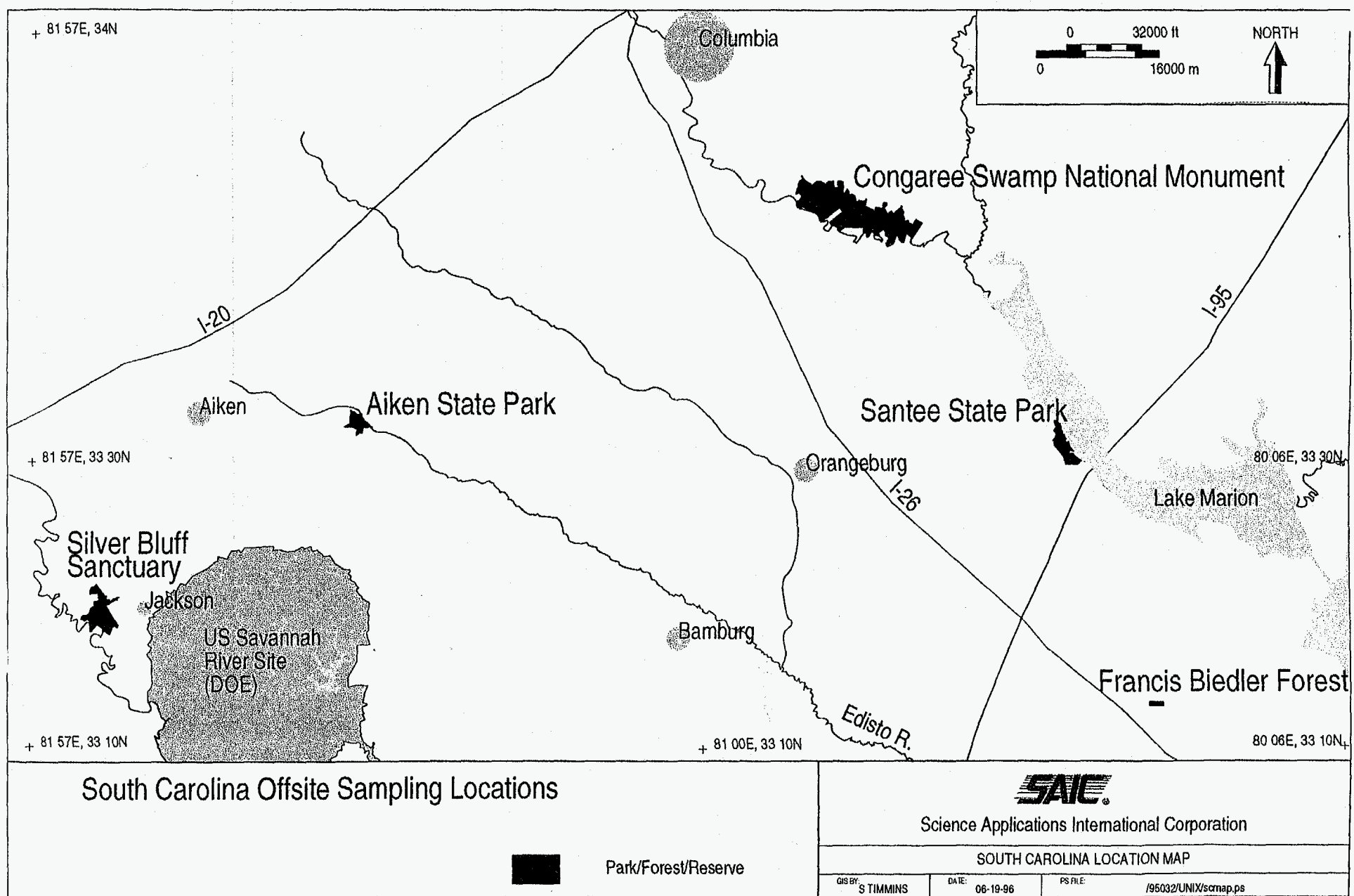


Figure 5-6. Onsite Sampling Locations for Soil Grouping 5
(Large Stream Floodplain Soils)

FIGURE 5-7. Offsite Sampling Locations



South Carolina Offsite Sampling Locations

■ Park/Forest/Reserve



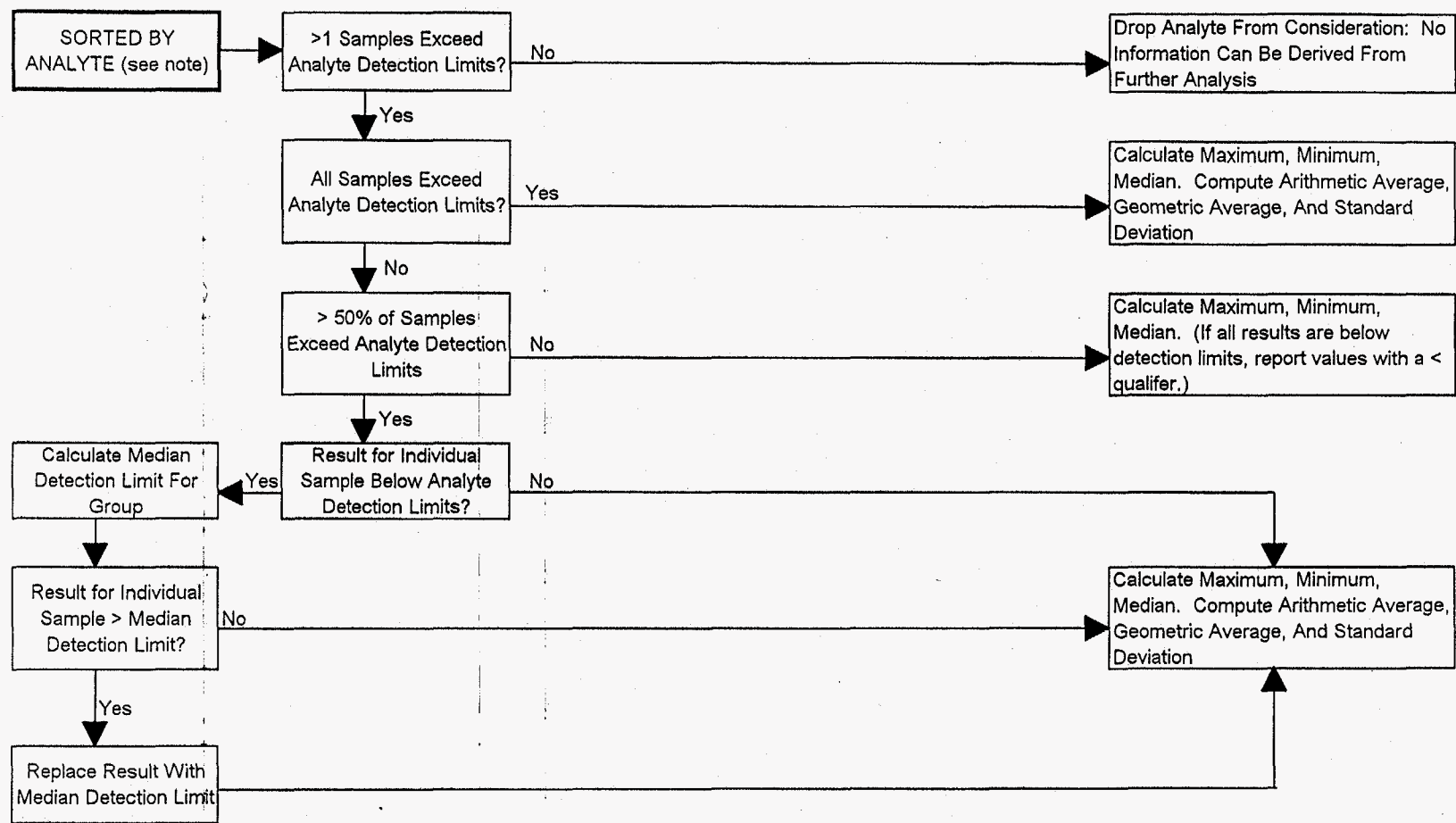
Science Applications International Corporation

SOUTH CAROLINA LOCATION MAP

GIS BY: S TIMMINS

DATE: 06-19-96

PS FILE: /95032/UNIX/scmap.ps



NOTE: PROCESS PERFORMED SEPARATELY FOR ONSITE AND OFFSITE DATA

21MAR97, JSS

Figure 5-8. Summary of Statistical Procedures for Processing of Analytical Results

Table 5-1. Wetland Soil Groupings

Soil Group	Broad Category
Group One - Dorovan, Other Histosols	Small Stream Floodplain - Organic Soils
Group Two - Pickney, Johnston	Small Stream Floodplain - Intergrade Mineral-Organic Soils
Group Three - Fluvaquents	Small Stream Floodplain - Mineral Soils
Group Four - Rembert, Ogeechee, Williman	Upland Bays and Depressional Soils
Group Five - Chastain, Tawcaw	Large Stream Floodplain Soils

Table 5-2. Soil Coring Coordinates for Onsite Sampling Locations

Vibracore Station	Soil Group	Sample Location	Latitude (Degrees-Minutes)	Longitude (Degrees-Minutes)
BGW026	3	Savannah River Site	33-19.30 N	81-41.41 W
BGW027	1	Savannah River Site	33-18.48 N	81-41.29 W
BGW028	2	Savannah River Site	33-18.25 N	81-41.56 W
BGW029	4	Savannah River Site	33-11.54 N	81-35.80 W
BGW030	2	Savannah River Site	33-10.64 N	81-36.50 W
BGW031	3	Savannah River Site	33-10.76 N	81-36.42 W
BGW032	4	Savannah River Site	33-09.04 N	81-35.21 W
BGW033	2	Savannah River Site	33-24.16 N	81-36.49 W
BGW034	2	Savannah River Site	33-23.42 N	81-36.74 W
BGW035	1	Savannah River Site	33-24.16 N	81-36.83 W
BGW036	4	Savannah River Site	33-20.27 N	81-40.64 W
BGW037	2	Savannah River Site	33-22.54 N	81-37.16 W
BGW038	3	Savannah River Site	33-22.19 N	81-36.96 W
BGW039	4	Savannah River Site	33-21.57 N	81-40.87 W
BGW040	4	Savannah River Site	33-09.03 N	81-35.94 W
BGW041	4	Savannah River Site	33-09.52 N	81-33.42 W
BGW042	4	Savannah River Site	33-11.86 N	81-32.44 W
BGW043	4	Savannah River Site	33-18.42 N	81-33.79 W
BGW044	4	Savannah River Site	33-17.38 N	81-28.93 W
BGW045	1	Savannah River Site	33-22.21 N	81-37.96 W
BGW046	3	Savannah River Site	33-20.41 N	81-36.52 W
BGW047	3	Savannah River Site	33-19.21 N	81-35.44 W
BGW048	2	Savannah River Site	33-20.01 N	81-33.61 W
BGW049	3	Savannah River Site	33-15.15 N	81-36.81 W
BGW050	2	Savannah River Site	33-14.64 N	81-37.25 W
BGW051	5	Savannah River Site	33-13.71 N	81-47.27 W
BGW052	5	Savannah River Site	33-14.13 N	81-47.69 W
BGW053	5	Savannah River Site	33-13.77 N	81-47.44 W
BGW054	5	Savannah River Site	33-14.02 N	81-47.51 W

Table 5-2. Soil Coring Coordinates for Onsite Sampling Locations (Continued)

Vibracore Station	Soil Group	Sample Location	Latitude (Degrees-Minutes)	Longitude (Degrees-Minutes)
BGW055	5	Savannah River Site	33-14.30 N	81-47.93 W
BGW056	5	Savannah River Site	33-14.86 N	81-48.28 W
BGW057	5	Savannah River Site	33-13.83 N	81-47.48 W
BGW058	5	Savannah River Site	33-14.08 N	81-47.57 W
BGW059	5	Savannah River Site	33-14.17 N	81-47.71 W
BGW060	5	Savannah River Site	33-14.27 N	81-47.82 W
BGW061	3	Savannah River Site	33-10.19 N	81-34.91 W
BGW062	3	Savannah River Site	33-10.73 N	81-34.13 W
BGW063	2	Savannah River Site	33-11.03 N	81-29.39 W
BGW064	3	Savannah River Site	33-12.57 N	81-30.40 W
BGW065	4	Savannah River Site	33-11.15 N	81-32.03 W
BGW066	3	Savannah River Site	33-13.57 N	81-38.63 W
BGW067	2	Savannah River Site	33-21.07 N	81-37.96 W
BGW068	1	Savannah River Site	33-21.05 N	81-38.14 W
BGW069	1	Savannah River Site	33-20.82 N	81-38.68 W
BGW070	1	Savannah River Site	33-19.99 N	81-38.87 W
BGW071	1	Savannah River Site	33-20.02 N	81-38.82 W
BGW072	1	Savannah River Site	33-20.10 N	81-38.86 W
BGW073	1	Savannah River Site	33-20.61 N	81-38.68 W
BGW074	2	Savannah River Site	33-19.49 N	81-38.70 W
BGW075	1	Savannah River Site	33-19.37 N	81-39.34 W
BGW4QS ^a	5	Savannah River Site	33-14.08 N	81-47.57 W
BGW5QS ^b	3	Savannah River Site	33-13.57 N	81-38.63 W
BGW6QS ^c	4	Savannah River Site	33-20.27 N	81-40.64 W
BGW7QS ^d	1	Savannah River Site	33-20.82 N	81-38.68 W
BGW8QS ^e	2	Savannah River Site	33-19.59 N	81-38.76 W

^a Duplicate core from location BGW058.

^b Duplicate core from location BGW066.

^c Duplicate core from location BGW036.

^d Duplicate core from location BGW069.

^e Duplicate core from location BGW074.

Table 5-3. Soil Coring Coordinates for Offsite Sampling Locations

Vibracore Station	Soil Group	Sample Location	Latitude (Degrees-Minutes)	Longitude (Degrees-Minutes)
BGW001	1	Aiken State Park	33-32.84 N	81-28.64 W
BGW002	3	Aiken State Park	33-32.92 N	81-28.86 W
BGW003	3	Aiken State Park	33-33.08 N	81-28.96 W
BGW004	4	Aiken State Park	33-33.28 N	81-29.39 W
BGW005	1	Aiken State Park	33-33.20 N	81-29.26 W
BGW006	1	Aiken State Park	33-33.26 N	81-29.31 W
BGW007	3	Aiken State Park	33-33.52 N	81-29.88 W
BGW008	2	Aiken State Park	33-33.58 N	81-29.18 W
BGW009	1	Congaree Monument	33-49.77 N	80-49.21 W
BGW010	5	Congaree Monument	33-49.10 N	80-48.81 W
BGW011	5	Congaree Monument	33-49.56 N	80-49.42 W
BGW012	5	Congaree Monument	33-49.56 N	80-49.42 W
BGW013	5	Congaree Monument	33-49.30 N	80-49.49 W
BGW014	2	Santee State Park	33-30.89 N	80-29.68 W
BGW015	4	Santee State Park	33-31.10 N	80-29.53 W
BGW016	4	Santee State Park	33-31.02 N	80-29.40 W
BGW017	2	Santee State Park	33-31.40 N	80-29.63 W
BGW018	1	Congaree Monument	33-49.76 N	80-49.17 W
BGW019	4	Francis Beidler Forest	33-13.31 N	80-21.25 W
BGW020	4	Francis Beidler Forest	33-13.12 N	80-21.25 W
BGW021	2	Jackson Audubon	33-19.41 N	81-50.15 W
BGW022	5	Jackson Audubon	33-19.10 N	81-52.13 W
BGW023	3	Jackson Audubon	33-19.58 N	81-51.77 W
BGW024	3	Jackson Audubon	33-21.13 N	81-51.88 W
BGW025	2	Jackson Audubon	33-19.06 N	81-51.01 W
BGW1QS ^a	4	Francis Beidler Forest	33-13.12 N	80-21.25 W
BGW2QS ^b	1	Congaree Monument	33-49.77 N	80-49.21 W
BGW3QS ^c	3	Jackson Audubon	33-21.13 N	81-51.88 W

^a Duplicate core from location BGW020.

^b Duplicate core from location BGW009.

^c Duplicate core from location BGW024.

Table 5-4. Particle Size Fractions Used in Lithologic Logging

Size Class	Size Range
Gravel- Cobble Pebble Granule	25.6 cm - 6.4 cm 6.4 cm - 0.4 cm 0.4 cm - 0.2 cm
Sand- Very Coarse and Coarse Medium Fine and Very Fine	0.2 cm - 0.05 cm 0.05 cm - 0.025 cm 0.025 cm - 0.00625 cm
Mud- Silt and Clay Sized Sediments	Finer than 0.00625 cm

Table 5-5. Sampling Intervals for Each Soil Grouping

Soil Group	Sampling Interval ID Code	Sampling Interval (in.)
1	A	0-20
	B	20-40
	C	40-60
	D	60-90
	E	90-120
2	A	0-20
	B	20-40
	C	40-60
	D	60-90
	E	90-120
3	A	A Horizon
	B	Bottom of A to 40
	C	40-60
	D	60-90
	E	90-120
4	A	A Horizon
	B	Bottom of A to 40
	C	40-60
	D	60-90
	E	90-120
5	A	A Horizon
	B	Bottom of A to 40
	C	40-60
	D	60-90
	E	90-120

Table 5-6. Analytical Methods

Parameter	Method	Reference*
Metals		
Aluminum	EPA 6010	A
Antimony	EPA 6010	A
Arsenic	EPA 7060	A
Barium	EPA 6010	A
Beryllium	EPA 6010	A
Cadmium	EPA 6010	A
Calcium	EPA 6010	A
Chromium	EPA 6010	A
Cobalt	EPA 6010	A
Copper	EPA 6010	A
Iron	EPA 6010	A
Lead	EPA 7421	A
Lithium	EPA 6010	A
Magnesium	EPA 6010	A
Manganese	EPA 6010	A
Mercury	EPA 7470	A
Nickel	EPA 6010	A
Potassium	EPA 6010	A
Selenium	EPA 7740	A
Silver	EPA 6010	A
Sodium	EPA 6010	A
Sulfide	EPA 376.2	B
Thallium	EPA 7841	A
Tin	EPA 6010	A
Vanadium	EPA 6010	A
Zinc	EPA 6010	A
Other Inorganics		
Fluoride	EPA 340.2	B
Nitrate + Nitrite	EPA 353.1	B
Nitrate (as Nitrogen)	EPA 353.1	B
Phosphates, Total (as Phosphorus)	EPA 365.2	B
Silicon	EPA 6010	A
Sulfate	EPA 375.4	B

Table 5-6. Analytical Methods (Continued)

Parameter	Method	Reference*
Organics		
Total Organic Carbon	EPA 415.1	B
Total Organic Halogens	EPA 9020 A	A
Appendix IX Volatiles	EPA 8240/8270	A
Appendix IX Semi-Volatiles	EPA 8080/EPA 8270	A
Appendix IX	EPA 8150	A
Pesticides/Herbicides		
Appendix IX Polychlorinated Biphenyls	EPA 8150	A
Appendix IX Dioxins/Furans	EPA 8280	A
Radiological		
Tritium	EPA 906.0	C
Agricultural		
Cation Exchange Capacity	EPA 9080	A
pH	EPA 9045	A
Percent Solids	ASTM 2216	D

* A - U.S. EPA. 1986. Test Methods for Evaluating Solid Waste (SW-846).
Volume I. Washington, DC.

B - U.S. EPA. 1983. Methods for Chemical Analysis of Water and Wastes.
EPA - 600/4-79-020. Environmental Monitoring and Support Laboratory, Cincinnati, OH.

C - U.S. EPA. 1980. Prescribed Procedures for Measurement of Radioactivity in Drinking
Water. EPA-600/4-80-032 (1980 update). Washington, DC.

D - American Society for Testing and Materials. 1994. 1994 Annual Book of ASTM
Standards. Volume 04.08 Soil and Rock. 01-040894-38. Philadelphia, PA.

Table 5-7. Sample Specifications for Soil Groupings

Parameter	Onsite			Offsite		
	Matrix	Field Samples	Duplicate Samples	Field Samples	Duplicate Samples	Total Samples
SOIL GROUPING 1						
Metals and Inorganic Ions	Soil	10	1	5	1	17
Organic Compounds	Soil	10	1	5	1	17
Tritium	Soil	10	1	5	1	17
Cation Exchange Capacity	Soil	10	1	5	1	17
Soil pH	Soil	10	1	5	1	17
Particle Size Analysis	Soil	10	1	5	1	17
SOIL GROUPING 2						
Metals and Inorganic Ions	Soil	10	1	5	0	16
Organic Compounds	Soil	10	1	5	0	16
Tritium	Soil	10	1	5	0	16
Cation Exchange Capacity	Soil	10	1	5	0	16
Soil pH	Soil	10	1	5	0	16
Particle Size Analysis	Soil	10	1	5	0	16
SOIL GROUPING 3						
Metals and Inorganic Ions	Soil	10	1	5	1	17
Organic Compounds	Soil	10	1	5	1	17
Tritium	Soil	10	1	5	1	17
Cation Exchange Capacity	Soil	10	1	5	1	17
Soil pH	Soil	10	1	5	1	17
Particle Size Analysis	Soil	10	1	5	1	17

Table 5-7. Sample Specifications for Soil Groupings (Continued)

Parameter	Onsite			Offsite		
	Matrix	Field Samples	Duplicate Samples	Field Samples	Duplicate Samples	Total Samples
SOIL GROUPING 4						
Metals and Inorganic Ions	Soil	10	1	5	1	17
Organic Compounds	Soil	10	1	5	1	17
Tritium	Soil	10	1	5	1	17
Cation Exchange Capacity	Soil	10	1	5	1	17
Soil pH	Soil	10	1	5	1	17
Particle Size Analysis	Soil	10	1	5	1	17
SOIL GROUPING 5						
Metals and Inorganic Ions	Soil	10	1	5	0	16
Organic Compounds	Soil	10	1	5	0	16
Tritium	Soil	10	1	5	0	16
Cation Exchange Capacity	Soil	10	1	5	0	16
Soil pH	Soil	10	1	5	0	16
Particle Size Analysis	Soil	10	1	5	0	16

**Table 5-8. Information Included on the Electronic Diskettes Provided by Weston Analytics
for the Background Wetland Soils Database (AN92 Format)**

Sample name	Laboratory sample number	Analytical result
Sample date	Laboratory replicate	Accuracy
Received date	Test name	Number of dilutions
Extraction date	Extraction/digestion method	Dilution factor
Extraction time	Analysis method	Instrument
Analysis date	Detection limit	Analyst
Analysis time	Result qualifier	Nominal concentration
Analysis batch	Analysis qualifier	Percent solids
Laboratory code	Bias	

Table 5-9. Information Included in the
Final Background Wetland Soils Database

Sample name	Test name
Sample date	Analysis method
Received date	Detection limit
Analysis date	Result qualifier
Analysis time	Analysis qualifier
Analysis batch	Analytical result
Laboratory code	Number of dilutions
Laboratory sample number	Dilution factor
Laboratory replicate	Percent solids

6.0 RESULTS

6.1 Current Study

Soil samples were analyzed to determine if any of the 259 analytes measured were present above detection limits (Figure 6-1). When the constituent concentration was less than detection, laboratory measurements were reported at the detection limit.

There were no reported measurements above detection for 162 analytes (Table 6-1). For 18 additional constituents, only one analytical result was above detection (Table 6-2). When multiple results for a single sample (duplicates and replicates) were averaged, four analytes had no results above detection in any soil grouping/depth interval (Table 6-3). Ten analytes had no results above detection in any soil grouping/depth interval onsite (Table 6-3).

For the remaining 64 analytes (Table 6-4), summary statistics for onsite and offsite locations are presented in Appendices D and E, respectively. The final wetland soils database is included in electronic format as Appendix F. The results of particle size analysis are presented in Appendix G. A compact disk included with this report contains electronic copies of the particle size analysis raw data files.

Geochemical results are summarized for each analyte, first for all samples and then by soil group and layer. The results are tabulated and presented in Appendices D (onsite) and E (offsite). The analyte groups are presented sequentially as they appear on Table 6-4: metals, other inorganics, organics, Appendix IX semivolatiles, Appendix IX pesticides/herbicides, Appendix IX dioxins/furans, radiological parameters, and agricultural parameters. The tables include the following information:

- Soil group and depth category (as appropriate)
- Number of samples in the sample group
- Number of samples exceeding the detection limit
- Percent of samples exceeding the detection limit
- Maximum result in sample group
- Median of sample group

- Minimum of sample group
- Arithmetic average of sample group
- Geometric average of sample group
- Standard deviation of sample group.

The geometric average and standard deviation were not calculated for CEC, pH, and percent solids.

For some samples, field duplicate and/or laboratory replicates were analyzed, and more than one analytical result was obtained for the same sample. These multiple results were averaged to obtain one value per sample (see Section 5.4.4.2).

For some parameters, a significant percentage of the analytical results were below the detection limit. In general, a value of one-half the detection limit was substituted for analytical results below the detection limit. Substitution of one-half of the detection limit is designed to provide a best estimate of the actual concentration present over the total "less than detection" population and is a standard method in waste unit characterization projects. This substitution affects the calculation of the summary statistics for any analyte that does not exceed the detection limit in all samples. In the tables, those parameters calculated for sample results that were predominantly below the detection limit are noted by a "<" symbol. Those parameters that were calculated for groups dominated by results above the detection limit are unmarked. The arithmetic average, geometric average, and standard deviation were calculated only if over 50 percent of the samples exceeded the detection limit.

The statistical methods used to generate the summary statistics tables are detailed in Section 5.4.

6.2 Onsite Results

Analysis of the samples collected from onsite locations yielded results above detection in all major analyte groups except Appendix IX PCBs. The summary statistics derived from the analyses are given in Appendix D. Among the analyte groups, the metals were the most commonly present at concentrations exceeding their analytical detection limits, which in turn means that their reported concentrations are the least affected by adjustments made to the database for the purposes of statistical computations. Conversely, the VOC and semivolatile organic compound groups included few individual analytes that were present above detection in even a few samples. Their

summary statistics were, therefore, dependent to a significant degree on the computational assumptions used; these assumptions are described in Section 5.4.

The following subsections describe each of the analyte groups and general patterns of their distribution in the soils collected for this study. The patterns described are preliminary; no rigorous trend analysis or statistical treatment has been applied to the study results to quantify trends in concentration distribution in wetland soils.

6.2.1 Metals

All of the metals analyzed were detected in onsite samples, and the majority (63%) were present above their respective detection limits (Table 6-5 and Appendix D). The depth distribution of metals exhibits three trends: (1) an increase in concentration with depth, (2) increased concentration in sample intervals A and E, and (3) decreased metals concentration with depth. The most common trend is an increase in metal concentration with depth. This trend is apparent for most of the metals and occurs in all soil groups, but is most marked in soil groups 1 and 5. Some of the variability in metals concentration may be due to the use of standard EPA methods for waste unit investigations. These methods do not result in complete dissolution of the soil matrix, which may substantially affect the measured concentration of soil framework constituents such as aluminum and silica. A more detailed discussion of this subject is presented in Section 7.3.

The representativeness of the reported aluminum concentrations may be limited because aluminum tubes were used for sample collection (Section 5.2.3), although precautions were taken to avoid contaminating the sample with aluminum fragments from the tube. If samples were contaminated by the sampling tube, the measured aluminum concentration would exceed the actual aluminum concentration in the soil by an unknown amount.

Arsenic, iron, and to a lesser extent, nickel and sodium appear to be concentrated at the upper (A) and lower (E) sample intervals with lower concentrations in the intervening intervals. This trend affects primarily soils of group 3 with some examples in soil group 2. For a few metals, concentrations decrease with depth; these include calcium, magnesium, manganese, potassium, and zinc in soil groups 2 and 3. No consistent depth trends are apparent for antimony, chromium, and mercury.

Metal concentrations in soil group 5 are higher than the other soil groups for all sample intervals. This increased concentration in soil group 5 is exhibited for all metals except cadmium, calcium, mercury, and selenium. Slightly higher metal concentrations may also be characteristic of soil group 4, but this trend appears less pronounced.

6.2.2 Other Inorganic Parameters

All "other inorganic parameters" (fluoride, nitrate + nitrite, nitrate as nitrogen, silicon, sulfate, and total phosphates) were detected in more than one onsite sample (Table 6-6 and Appendix D). The percent of samples exceeding the detection limit ranges from 2 percent for fluoride to 100 percent for silicon and total phosphates. Nitrate + nitrite, silicon, and phosphates show a general trend of decreasing concentration with depth, similar to that observed in the metal species described above. Nitrate as nitrogen decreases with depth in soil groups 1, 2, and 5.

In soil group 3, nitrate as nitrogen, sulfate, and total phosphates appear concentrated in the A and E sample intervals, with lower concentrations present in the intervening intervals. This type of distribution was also observed for metals in soil group 3.

Similar to the metals, concentrations of the other inorganic parameters are significantly higher in soil group 5. This higher concentration in the large stream floodplain soils is observed for all of the analytes except fluoride, which is present at low concentrations, and silicon, which is a dominant constituent of detrital particles in all wetland soils.

6.2.3 Organics

Organic parameters analyzed were total organic carbon (TOC), total organic halogens (TOH), and RCRA Appendix IX constituents.

Appendix IX organics analyzed were VOCs, semivolatile organic compounds, pesticides/herbicides, dioxins/furans, and PCBs. PCB results were eliminated in the screening process described in Section 6.1, and are not presented here. In general, TOH, VOCs, and semivolatile organic compounds are considered anthropogenic, and their presence is assumed to indicate possible site-specific contamination in the sample or possible laboratory induced contamination.

6.2.3.1 Total Organic Carbon and Total Organic Halogens

TOC was present above detection in nearly all of the samples (Table 6-7 and Appendix D). It showed a pronounced trend of decreasing concentration with depth for all of the soil groups except soil group 4, in which the trend is less distinct. The overall concentration of TOC appears to be slightly lower in soil groups 2 and 3.

TOH was present above the detection limit in only 3 percent of the samples, representing soil groups 1 and 3 (Table 6-7 and Appendix D). In these soils, there was no distinct distribution with depth.

6.2.3.2 Appendix IX Volatiles and Semivolatiles

As a group, the Appendix IX volatiles and semivolatiles were measured at concentrations above the detection limit in 19 percent of the samples analyzed (Table 6-7 and Appendix D). However, if the four most commonly observed analytes (acetone, dichloromethane, bis(2-ethylhexyl) phthalate, and di-n-butyl phthalate) are excluded, then the 18 remaining species exceeded the detection limit in only 4.5 percent of the samples. For these 18 species, the maximum results only slightly exceed the detection limit. The majority of results above detection are associated with soil group 1 (organic soils). No vertical trend is apparent for the 18 analytes.

Acetone, dichloromethane (methylene chloride), bis(2-ethylhexyl) phthalate, and di-n-butyl phthalate exceeded the detection limit in nearly all soil groups and depth intervals. There appears to be no association of any of these analytes with a particular soil group or depth interval. These compounds are commonly reported as laboratory artifacts.

6.2.3.3 Appendix IX Pesticides/Herbicides and Dioxins/Furans

Two pesticides/herbicides (2,4-dichlorophenoxyacetic acid and 2,4,5-T) and two dioxins/furans (hexachlorodibenzo-p-dioxins and pentachlorodibenzo-p-furans) were measured at levels exceeding detection limits (Table 6-7 and Appendix D). There may be an association of these analytes with soil groups 1 and 2, but this trend is difficult to evaluate due to the small number of results exceeding detection limits. There is no apparent vertical trend for any of the constituents.

6.2.4 Radiological Parameters

The only radiological parameter included in this study was tritium (Table 6-8 and Appendix D). Tritium was detected above its detection limit in less than 4 percent of the samples and did not exhibit any particular affinity for a soil group or sample interval.

6.2.5 Agricultural Parameters

The agricultural parameters included in this study are CEC, pH, and percent solids (Table 6-9 and Appendix D). CEC decreases with depth in all soil groups. In addition, CEC is slightly higher in soil groups 1 and 2, and distinctly greater in soil group 5. Cation exchange plays a role in determining the concentration of metals and other inorganics in many soils; this may explain the trending similarity in metals, other inorganics, and CEC.

Percent solids and pH are presented in Table 6-9 and Appendix D. These parameters may play an important role in the chemical state and mobility of many constituents. In general, pH and percent solids do not vary systematically either vertically or between soil groups. The average, maximum, minimum, and mean values for these constituents are included to provide a context in which to view the chemical data presented above.

6.3 Offsite Results

Collection and analysis of samples from selected offsite locations were performed to provide a context for the results from onsite samples. Thus, the results of the offsite analyses are intended to evaluate whether onsite samples represent nominal chemical and physical characteristics for wetland soils in the SRS area. In addition, the offsite analyses may be used to augment the background information offered by previous studies of wetlands which, as described above, offer a limited pool of information on wetland soil compositions.

Analysis of the samples collected from onsite locations yielded results above detection in all major analyte groups except Appendix IX PCBs. The summary statistics derived from the analyses are given in Tables 6-10 to 6-14 and Appendix E. Among the analyte groups, metals were the most commonly present at concentrations exceeding their analytical detection limits, which in turn means that their reported concentrations are the least affected by adjustments made to the database for the purposes of statistical computations. Conversely, the VOC and semivolatile organic

compound groups included few individual analytes that were present above detection in even a few samples. Their summary statistics were, therefore, dependent to a significant degree on the computational assumptions used; these assumptions are described in Section 5.4.

The patterns described below are preliminary; no rigorous trend analysis or statistical treatment has been applied to the study results to quantify trends in concentration distribution in wetland soils. Because the focus of this study is on onsite soils, the following discussion of offsite results is less detailed than the onsite discussion in Section 6.2.

6.3.1 *Metals*

All of the metals analyzed were detected in offsite samples, and the majority (62%) of the measurements exceeded the respective analyte detection limits (Table 6-10 and Appendix E). In general, soil groups 4 and 5 show an increase in metal concentration over all depth intervals. The elevation in soil group 5 is similar to that observed in onsite soils, and the elevation in soil group 4 is more pronounced than in the onsite soils. Within soil groups 1, 2, 3, and 5, there is a general trend of decreased metal concentration with depth, similar to that observed in the onsite soils. This trend is modified in soil group 2 by elevated concentration of some metals (cadmium, chromium, cobalt, selenium, and vanadium) in the C sample interval. The trend of decreasing concentration with depth is reversed in soil group 4, where metal concentrations tend to increase with depth. Increasing metal concentrations with depth were described in a study of SRS upland soils (Looney et al., 1990).

6.3.2 *Other Inorganic Parameters*

All "other inorganic parameters" (fluoride, nitrate as nitrogen, nitrate + nitrite, silicon, sulfate, and total phosphates) were detected in offsite samples (Table 6-11 and Appendix E). The percent of samples exceeding the detection limit ranges from 11 percent for fluoride to 100 percent for silicon and total phosphates. The distribution of other inorganic parameters is similar to that observed for metals, thus, concentrations decrease with depth in soil groups 1, 2, 3, and 5 and increase with depth in soil group 4. However, unlike the metals, the concentrations of other inorganic parameters in soil group 5 do not appear to be greater than in the other soil groups.

6.3.3 Organics

Organic parameters analyzed were TOC, TOH, and RCRA Appendix IX constituents. Appendix IX organics analyzed were VOCs, semivolatile organic compounds, pesticides/herbicides, dioxins/furans, and PCBs. PCB results were eliminated in the screening process described in Section 6.1, and are not presented here. In general, TOH, VOCs, and semivolatile organic compounds are considered anthropogenic, and their presence is assumed to indicate possible site-specific contamination in the sample or possible laboratory induced contamination.

6.3.3.1 Total Organic Carbon and Total Organic Halogens

TOC was present above detection in nearly all of the samples (Table 6-12 and Appendix E). Similar to both the offsite and onsite metals, TOC is present at higher concentrations in the samples from soil group 5 than in the other soil groups. TOC showed a pronounced trend of decreasing with depth in soil groups 1, 2, and 5. In soil group 3, TOC appears to be concentrated in the D sample interval, and in soil group 4 it appears concentrated in the upper (A) and lower (E) sample intervals.

TOH was not present above the detection limit in any of the offsite samples (Table 6-12 and Appendix E).

6.3.3.2 Appendix IX Volatiles and Semivolatiles

As a group, the Appendix IX volatiles and semivolatiles were measured at concentrations above the detection limit in 25 percent of the samples analyzed (Table 6-12 and Appendix E). This represents an increase over the onsite samples, which is due primarily to a wider suite of analytes being present at slightly greater, but still very low, concentrations in the offsite samples. The four most widely distributed analytes measured in the samples [acetone, dichloromethane, bis(2-ethylhexyl) phthalate, and di-n-butyl phthalate] represent 14 percent of the results above detection. As is the case in onsite samples, these analytes do not show any substantial depth-related pattern or association with any particular soil group.

The major difference between the offsite and onsite results for volatile and semivolatile organic compounds is that five species are present in substantial concentrations in the offsite samples that were rare or absent in the onsite samples. These species are 1,1,1-trichloroethane, methyl ethyl

ketone, tetrachloroethylene, toluene, and trichlorofluoromethane. Tetrachloroethane and toluene appear to decrease in concentration in the deeper sample intervals. For the remaining analytes, there does not appear to be any pattern to their distribution either within the sample intervals or in the different soil groups.

6.3.3.3 Appendix IX Pesticides/Herbicides and Dioxins/Furans

2,4,5-T and two dioxins/furans (hexachlorodibenzo-p-dioxins and pentachlorodibenzo-p-furans) were measured at levels exceeding their detection limits (Table 6-12 and Appendix E). There does not appear to be any consistent trend in their distribution; however, this is difficult to evaluate due to the small number of results exceeding detection limits. 2,4-Dichlorophenoxyacetic acid, present in a few onsite samples, does not exceed the detection limit in any offsite samples (Table 6-12).

6.3.4 *Radiological Parameters*

The only radiological parameter included in this study was tritium (Tables 6-13 and Appendix E). Tritium was detected above its detection limit in 20 percent of the samples. It appears primarily in soil groups 1, 2, and 3. The distribution and concentration of tritium in the offsite samples appear slightly greater than that measured in the onsite samples.

6.3.5 *Agricultural Parameters*

The agricultural parameters included in this study are CEC, pH, and percent solids (Table 6-14 and Appendix E). CEC decreases with depth in all soil groups. In addition, it is slightly elevated in soil groups 2, 4, and 5. Cation exchange plays a role in determining the concentration of metals and other inorganics in many soils; this may explain the similarity in distribution of metals, other inorganics, and CEC. However, the correlation of CEC and analyte concentration is not as marked in the offsite samples as in the onsite samples.

Percent solids and pH are presented in Table 6-14 and Appendix E. These parameters may play an important role in the chemical state and mobility of many constituents. The average, maximum, minimum, and mean values for these constituents are included to provide a context in which to view the chemical data presented above. In general, the pH and percent solids in offsite and onsite samples are very similar.

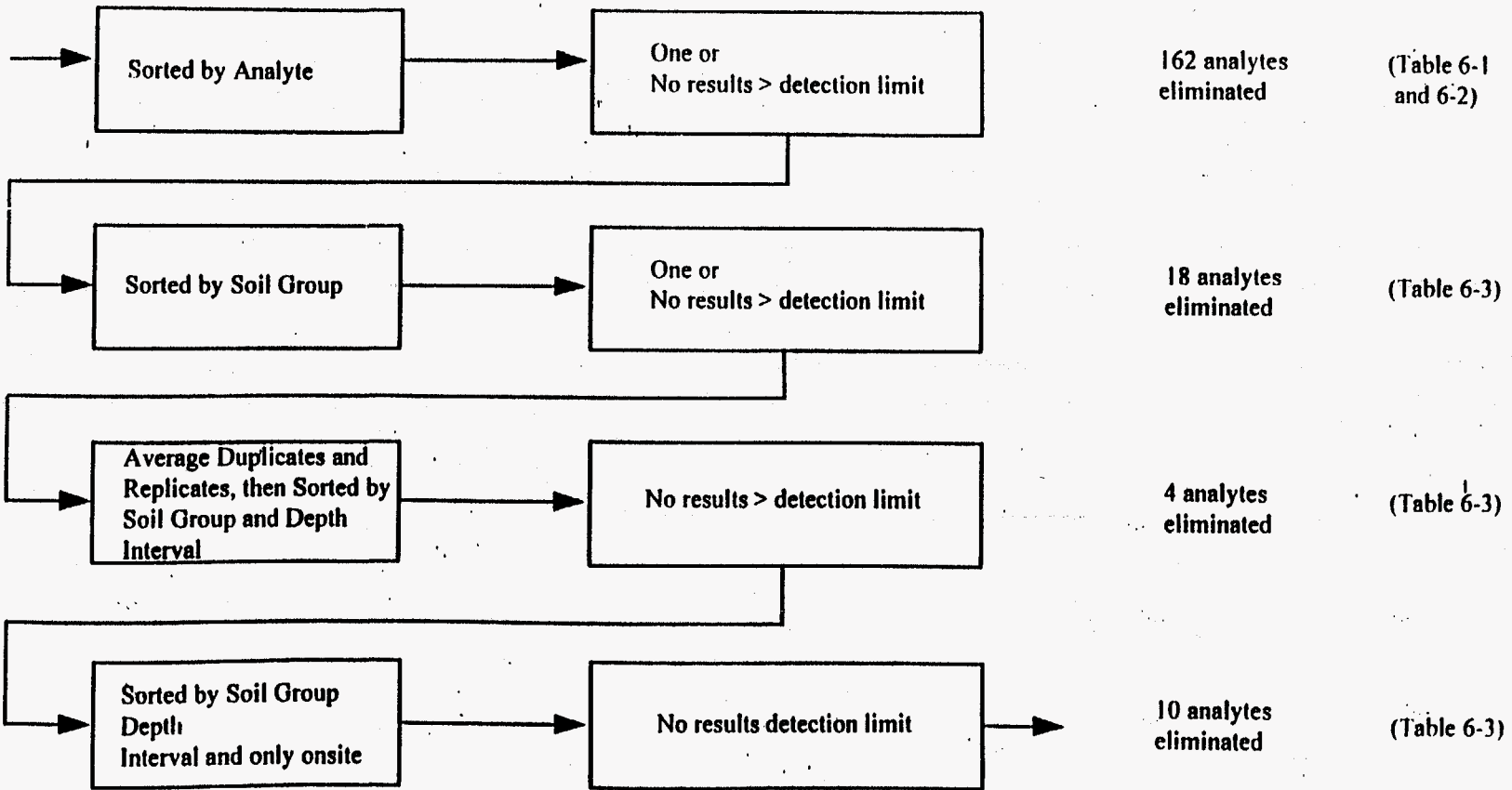


Figure 6-1. Data Screening Process for Statistical Analysis

Table 6-1. Constituents with No Results Above Detection in Any of the Soil Samples

Constituent	Total No. of Analyses
1,1-Dichloroethane	366
1,2,3-Trichloropropane	366
1,2,4-Trichlorobenzene	290
1,2-Dibromo-3-chloropropane	366
1,2-Dibromoethane	366
1,2-Dichlorobenzene	312
1,2-Dichloropropane	367
1,3,5-Trinitrobenzene	312
1,3-Dichlorobenzene	312
cis-1,3-Dichloropropene	366
trans-1,3-Dichloropropene	366
1,3-Dinitrobenzene	312
1,4-Dichlorobenzene	290
1,4-Dioxane	312
1,4-Naphthoquinone	312
1-Naphthylamine	312
2,3,4,6-Tetrachlorophenol	312
2,4,5-Trichlorophenol	312
2,4,6-Tribromophenol (surr)	312
2,4-Dichlorophenol	312
2,4-Dimethyl phenol	312
2,4-Dinitrophenol	312
2,4-Dinitrotoluene	290
2,6-Dichlorophenol	312
2,6-Dinitrotoluene	312
2-Acetylaminofluorene	312
2-Chlorophenol	290
2-Chloronaphthalene	312
2-Hexanone	366
2-Methylnaphthalene	312
o-Cresol (2-Methylphenol)	319
2-Nitroaniline	312
2-Naphthylamine	312
2-Nitrophenol	312
2-Picoline	312
3,3-Dichlorobenzidine	312
3,3-Dimethylbenzidine	312

Table 6-1. Constituents with No Results Above Detection in Any of
the Soil Samples (Continued)

Constituent	Total No. of Analyses
3-Methylcholanthrene	312
3-Nitroaniline	312
4,6-Dinitro-ortho-cresol	312
4-Aminobiphenyl	312
4-Bromophenyl phenyl ether	312
4-Chloroaniline	312
para-Chloro-meta-cresol	290
4-Chlorophenyl phenyl ether	312
p-Dimethylaminoazobenzene	312
4-Methyl-2-pentanone	366
4-Nitroaniline	312
4-Nitrophenol	290
7,12-Dimethylbenz(a)anthracene	312
a,a-Dimethylphenethylamine	313
alpha-Benzene hexachloride	332
alpha-Chlordane	309
Acrolein	366
Acrylonitrile	366
Acenaphthene	290
Acenaphthylene	312
Aniline	312
Anthracene	312
Aramite	312
Allyl chloride	366
Bis(2-Chloroethoxy) methane	312
Bis(2-Chloroisopropyl) ether	272
Bis(2-Chloroethyl) ether	312
Benzo(a) anthracene	312
Benzo(b) fluoranthene	312
Benzo(g,h,i)perylene	312
Benzo(k)fluoranthene	312
Bromochloromethane	366
Benzyl alcohol	312
Chloroethene (vinyl chloride)	366
Chloroethane	365
Dichlorodifluoromethane	366

Table 6-1. Constituents with No Results Above Detection in Any of
the Soil Samples (Continued)

Constituent	Total No. of Analyses
Dibromomethane (methylene bromide)	366
Bromomethane (methyl bromide)	366
Chloromethane (methyl chloride)	366
Acetonitrile (methyl cyanide)	366
Bromoform	366
Chrysene	312
Pentachlorobenzene	312
Pentachloronitrobenzene	319
Hexachlorobenzene	312
Hexachlorocyclopentadiene	312
Hexachloroethane	312
Chlorobenzilate	312
Chlordane	23
Chloroprene	366
Cyanide	296
Dibenzo(a,h)anthracene	313
delta-Benzene hexachloride	333
Dibromochloromethane	366
Diethyl phthalate	312
Diallate	312
Diazinon	311
Dibenzofuran	312
Dimethoate	313
Disulfoton	313
Dieldrin	302
Dimethyl phthalate	312
Diphenylamine	312
Ethyl methanesulfonate	312
Endosulfan I	333
Endosulfan II	334
Endosulfan sulfate	334
Famphur	313
Fluorene	312
gamma-Chlordane	309
Hexachlorobutadiene	312
Hexachlorophene	312

Table 6-1. Constituents with No Results Above Detection in Any of
the Soil Samples (Continued)

Constituent	Total No of Analyses
Hexachloropropene	312
Heptachlor	301
Heptachlor epoxide	334
Indeno(1,2,3-c,d)pyrene	312
Iodomethane (Methyl Iodide)	366
Isosafrole	312
Isobutyl alcohol	366
Isodrin	332
Isophorone	312
gamma-Benzene hexachloride (Lindane)	301
Methacrylonitrile	366
Methyl Methanesulfonate	312
Methoxychlor	334
Methapyrilene	312
Naphthalene	312
Nitrobenzene	312
N-Nitrosodimethylamine	312
N-Nitrosodi-n-butylamine	312
N-Nitrosodi-propylamine	290
N-Nitrosodiethylamine	312
N-Nitrosomethylethylamine	312
N-Nitrosomorpholine	312
N-Nitrosodiphenylamine	312
N-Nitrosopiperidine	312
N-Nitrosopyrrolidine	312
4-Nitroquinoline-1-oxide	312
5-Nitro-o-toluidine	312
o-Toluidine	312
p-Bromofluorobenzene	1
PCB 1016	334
PCB 1221	334
PCB 1232	334
PCB 1242	334
PCB 1248	334
PCB 1254	334
PCB 1260	334
p-Phenylenediamine	312

Table 6-1. Constituents with No Results Above Detection in Any of
the Soil Samples (Continued)

Constituent	Total No of Analyses
Phenacetin	312
Phenanthrene	312
Phorate	313
Pronamide	312
Propionitrile	366
Parathion ethyl	313
Parathion methyl	292
Safrole	312
2-sec-Butyl-4,6-dinitrophenol	312
Sulfotepp	313
trans-1,4-Dichloro-2-butene	366
1,2,4,5-Tetrachlorobenzene	312
1,1,1,2-Tetrachloroethane	366
o,o,o-Triethyl phosphorothionate	313
Thionazin	292
Toxaphene	334

Table 6-2. Constituents with Only One Result Above Detection
Over All Soil Samples

Constituent	Total No. of Analyses	Number Above Detection
1,2-Dichloroethylene	366	1
m-Cresol (3-methylphenol)	121	1
Aldrin	302	1
beta-Benzene hexachloride	332	1
Chloroform	366	1
Chlorobenzene	336	1
Endrin aldehyde	334	1
Endrin	302	1
Pentachlorophenol	311	1
p,p-DDD	334	1
p,p-DDT	303	1
p-Terphenyl-d14	1	1
Pentachlorodibenzo-p-dioxin isomers	292	1
Pyrene	290	1
Styrene	366	1
2,3,7,8 - TCDD	296	1
Tetrachlorodibenzo-p-furan isomers	217	1
Tetrachlorodibenzo-p-dioxin isomers	294	1

Table 6-3. Constituents with No Results Above Detection by Soil Grouping
and Sampling Depth

No Results Above Detection in Any Soil Group/Depth Interval After Averaging Replicates and Duplicates
Benzene Carbon tetrachloride 2,4,5 - TP (Silvex) Vinyl acetate
No Detects in Any Soil Group/Depth Interval Onsite
1,1 - Dichloroethylene 1,2 - Dichloroethane Acetophenone Benzoic acid Di-n-octyl phthalate Ethylbenzene p,p - DDE 1,1,2,2 - Tetrachloroethane Trichloroethylene Pentachlorodibenzo-p-dioxin isomers

Table 6-4. Constituents with One or More Detects Onsite

Metals	Organics
Aluminum	Total Organic Carbon
Antimony	Total Organic Halogens
Arsenic	<u>Appendix IX Volatiles</u>
Barium	Acetone
Beryllium	Carbon Disulfide
Cadmium	Dichloromethane
Calcium	Ethyl methacrylate
Chromium	Methyl ethyl ketone
Cobalt	Methyl methacrylate
Copper	Pentachloroethane
Iron	Tetrachloroethylene
Lead	1,1,1-Trichloroethane
Lithium	1,1,2-Trichloroethane
Magnesium	Toluene
Manganese	Trichlorofluoromethane
Mercury	Xylenes
Nickel	<u>Appendix IX Semivolatiles</u>
Potassium	Benzo (a) pyrene
Selenium	Bis (2-ethylhexyl) phthalate
Silver	Butylbenzyl phthalate
Sodium	Di-n-butylphthalate
Sulfide	Fluoranthene
Thallium	Kepone
Tin	m,p-Cresol
Vanadium	p-Cresol (4-Methyl phenol)
Zinc	Phenol
Other Inorganics	Pyridine
Fluoride	<u>Appendix IX Pesticides/Herbicides</u>
Nitrate (as Nitrogen)	2,4-Dichlorophenoxyacetic acid
Nitrate + Nitrite	2,4,5-T
Phosphates, Total (as Phosphorus)	<u>Appendix IX Dioxins/Furans</u>
Silicon	Hexachlorodibenzo-p-dioxin isomers
Sulfate	Hexachlorodibenzo-p-furan isomers
	Pentachlorodibenzo-p-furan isomers
	Radiological Parameters
	Tritium
	Agricultural Parameters
	Cation Exchange Capacity
	pH
	Percent Solids

Table 6-5. Summary Statistics for Metals (Onsite Samples)

Analyte	Units	No. of Samples	No. Above Det.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
Aluminum	µg/kg	249	249	100	52,050,000.00	3,840,000.00	65,600.00	7,814,565.33	3,927,992.32	9,716,535.62
Antimony	µg/kg	249	23	9.24	15,800.00	<2,560.00	<1,300.00	1,518.32	1,279.30	
Arsenic	µg/kg	249	106	42.57	3,700.00	<245.00	<130.00	443.02	239.14	
Barium	µg/kg	249	231	92.77	1,840,000.00	15,700.00	390.00	53,234.14	17,792.80	131,497.19
Beryllium	µg/kg	249	140	56.22	4,110.00	185.00	<52.20	537.08	192.30	774.89
Cadmium	µg/kg	249	90	36.14	4,200.00	<25.2500	<15.4000	110.38	24.83	
Calcium	µg/kg	249	241	96.79	60,700,000.00	71,300.00	3,720.00	443,199.85	78,958.17	3,849,144.38
Chromium	µg/kg	249	237	95.18	58,100.00	6,600.00	324.00	11,124.35	7,026.15	11,346.89
Cobalt	µg/kg	249	135	54.22	49,900.00	404.00	<221.00	2,431.05	663.30	5,574.65
Copper	µg/kg	249	221	88.76	39,200.00	2,100.00	270.00	4,862.48	2,487.32	6,613.41
Iron	µg/kg	249	249	100	52,000,000.00	692,000.00	12,300.00	4,630,905.35	889,402.33	8,689,473.61
Lead	µg/kg	249	247	99.2	48,100.00	3,900.00	200.00	7,025.31	3,983.08	8,427.03
Lithium	µg/kg	245	125	51.02	36,100.00	343.50	<211.00	4,099.38	984.52	7,750.33
Magnesium	µg/kg	249	240	96.39	3,470,000.00	64,600.00	2,132.50	309,641.56	75,417.76	607,003.22
Manganese	µg/kg	249	241	96.79	2,530,000.00	4,800.00	<225.00	53,919.12	7,014.63	190,451.73
Mercury	µg/kg	249	24	9.64	740.00	<75.30	<23.00	42.57	36.30	
Nickel	µg/kg	249	125	50.2	32,100.00	950.00	<688.00	3,012.11	1,429.66	4,476.77
Potassium	µg/kg	249	124	49.8	1,495,000.00	<104,000.00	<32,100.00	195,720.31	87,414.30	
Selenium	µg/kg	249	85	34.14	13,000.00	<237.5000	<154.00	458.80	212.17	
Silver	µg/kg	249	67	26.91	3,900.00	<469.00	<174.00	387.32	268.66	
Sodium	µg/kg	249	217	87.15	520,000.00	26,900.00	<1,770.00	49,190.74	24,634.96	55,729.55
Sulfide	µg/kg	129	13	10.08	2,080.00	<315.50	<100.00	179.73	158.14	
Thallium	µg/kg	249	28	11.24	1,900.00	<244.00	<154.00	172.27	136.77	
Tin	µg/kg	245	93	37.96	28,800.00	<4510.00	<194.00	2,987.32	2,194.66	
Vanadium	µg/kg	249	231	92.77	144,000.00	6,900.00	<187.00	20,858.28	7,432.04	29,637.91
Zinc	µg/kg	249	244	97.99	100,000.00	4,000.00	<359.00	12,415.89	5,064.67	19,965.22

Table 6-6. Summary Statistics for Other Inorganic Parameters (Onsite Samples)

Analyte	Units	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
Fluoride	µg/kg	249	6	2.41	11,900.00	<4,855.00	<2,510.00			
Nitrate + Nitrite	µg/kg	249	240	96.39	10,300,000.00	311,000.00	19,600.00	975,123.93	326,720.70	1,477,669.73
Nitrate as Nitrogen	µg/kg	129	73	56.59	3,510.00	375.00	127.00	611.07	564.53	732.05
Silicon	µg/kg	249	249	100	2,730,000.00	364,000.00	24,100.00	451,024.23	324,330.61	385,973.57
Sulfate	µg/kg	249	32	12.85	220,000.00	<15,800.00	<1,450.00			
Total Phosphates (as P)	µg/kg	249	249	100	830,000.00	57,400.00	519.00	122,097.44	66,190.90	159,047.98

Table 6-7. Summary Statistics for Organics (Onsite Samples)

Analyte	Units	No of Samples	No. Above Detect	Percent Above Detect	Maximum	Average	Geometric Average	Median	Minimum	Standard Deviation
Total Organic Carbon	µg/kg	249	247	99.2	90,400,000.00	20,191,801.67	9,294,281.72	15,900,000.00	<32,300.00	17,311,275.59
Total Organic Halogens	µg/kg	249	7	2.81	67,300.00	12,978.92	12,578.62			
Acetone	µg/kg	129	123	95.35	392.50	54.47	35.34	35.65	3.75	57.47
Carbon Disulfide	µg/kg	129	2	1.55	<8.50	3.15	3.14			
Dichloromethane	µg/kg	129	122	94.57	153.75	28.00	19.44	23.50	1.46	22.53
Ethyl Methacrylate	µg/kg	129	2	1.55	565.63	201.64	189.89			
Fluoranthene	µg/kg	129	3	2.33	<422.00	200.79	198.71			
Methyl Ethyl Ketone	µg/kg	129	7	5.43	49.20	7.38	6.65			
Methyl Methacrylate	µg/kg	129	2	1.55	565.75	201.76	190.00			
Pentachloroethane	µg/kg	129	2	1.55	565.75	201.76	190.00			
1,1,1-Trichloroethane	µg/kg	129	3	2.33	6.48	3.20	3.16			
1,1,2-Trichloroethane	µg/kg	129	2	1.55	6.98	3.16	3.14			
Tetrachloroethylene	µg/kg	129	10	7.75	129.50	5.46	3.55			
Toluene	µg/kg	129	9	6.98	17.10	3.44	3.25			
Trichlorofluoromethane	µg/kg	129	11	8.53	41.65	3.94	3.36			
Xylenes	µg/kg	129	1	0.78	10.38	3.23	3.16			
Benzo(a)Pyrene	µg/kg	129	14	10.85	1,390.00	229.70	214.53			
Bis(2-ethylhexyl) Phthalate	µg/kg	129	91	70.54	38,850.00	720.15	258.54	207.50	42.80	3,444.21
Butylbenzyl Phthalate	µg/kg	129	1	0.78	<423.50	202.54	200.98			
Di-n-butyl Phthalate	µg/kg	129	101	78.29	459.00	148.12	131.12	137.00	40.20	73.93
Kepone	µg/kg	129	5	3.88	542.00	13.87	9.80			
m,p-Cresol	µg/kg	44	1	2.27	<432.00	207.11	206.18			
p-Cresol (4-methylphenol)	µg/kg	89	3	3.37	<420.00	203.76	202.95			
Phenol	µg/kg	129	3	2.33	<422.00	200.77	198.47			
Pyridine	µg/kg	129	23	17.83	<449.50	198.04	190.26			
2,4-Dichlorophenoxyacetic acid	µg/kg	128	3	2.34	<114.00	38.81	32.32			
2,4,5-T	µg/kg	128	19	14.84	63.50	20.03	15.94			
Hexachlorodibenzo-p-dioxins	µg/kg	113	4	3.54	0.70	< 0.1000	< 0.0000	0.06	0.05	

Table 6-8. Summary Statistics for Radiological Parameters (Onsite Samples)

Analyte	Units	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
Tritium	pCi/g	129	5	3.88	15.33	<7.45	<2.10	3.28	3.07	

Table 6-9. Summary Statistics for Agricultural Parameters (Onsite Samples)

Analyte	Units	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
Cation Exchange Capacity	meq	249	249	100	194.00	8.49	0.10	13.32	7.12	17.20
pH	pH	249	249	100	8.25	4.93	4.00	5.01	NA	NA
Percent Solids	PER	249	249	100	93.55	77.90	19.40	71.90	NA	NA

Table 6-10. Summary Statistics for Metals (Offsite Samples)

Analyte	Units	No. of Samples	No. Above Det.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
Aluminum	µg/kg	125	125	100	29,600,000.00	3,535,000.00	176,000.00	5,454,824.00	3,445,466.85	5,525,633.93
Antimony	µg/kg	125	9	7.2	6,460.00	<2,260.00	<1,630.00	1,233.43	1,138.58	
Arsenic	µg/kg	125	55	44	5,990.00	<221.00	<22.00	452.56	217.86	
Barium	µg/kg	125	124	99.2	227,500.00	11,400.00	280.00	33,437.63	13,279.68	53,109.65
Beryllium	µg/kg	124	71	57.26	4,655.00	110.50	<52.10	421.48	148.69	756.77
Cadmium	µg/kg	125	22	17.6	480.00	<23.00	<16.80	33.22	15.78	
Calcium	µg/kg	125	125	100	120,500,000.00	67,500.00	4,600.00	2,149,744.29	80,233.32	15,098,265.98
Chromium	µg/kg	125	125	100	100,000.00	5,900.00	620.00	10,721.93	6,517.35	12,923.66
Cobalt	µg/kg	125	87	69.6	26,500.00	834.00	<191.00	1,876.41	693.71	3,471.88
Copper	µg/kg	125	117	93.6	27,200.00	1,800.00	<214.00	4,057.23	2,045.40	5,591.89
Iron	µg/kg	125	125	100	45,700,000.00	534,000.00	13,100.00	3,835,662.40	782,703.23	7,872,979.08
Lead	µg/kg	125	113	90.4	33,900.00	3,225.00	330.00	5,401.05	3,468.76	6,037.05
Lithium	µg/kg	125	73	58.4	19,000.00	1,342.50	<214.00	2,568.60	1,440.77	3,468.39
Magnesium	µg/kg	125	124	99.2	5,300,000.00	57,000.00	<1,840.00	354,736.16	83,058.81	773,740.57
Manganese	µg/kg	125	122	97.6	1,570,000.00	3,730.00	<224.00	41,656.05	5,490.83	156,847.46
Mercury	µg/kg	125	17	13.6	300.00	<74.30	<55.00	51.71	41.02	
Nickel	µg/kg	125	54	43.2	17,900.00	<1,170.00	<744.00	2,215.26	1,098.02	
Potassium	µg/kg	125	64	51.2	3,930,000.00	57,025.00	<42,400.00	183,350.27	76,074.71	422,866.50
Selenium	µg/kg	125	34	27.2	4,100.00	<226.00	<168.00	296.52	171.92	
Silver	µg/kg	125	12	9.6	10,000.00	<448.00	<174.00	299.45	205.28	
Sodium	µg/kg	125	123	98.4	957,000.00	36,300.00	<6,600.00	57,237.37	35,720.66	95,191.66
Sulfide	µg/kg	125	2	1.6	422.00	<305.00	<267.00	151.99	150.59	
Thallium	µg/kg	125	15	12	650.00	<225.00	54.00	138.91	123.31	
Tin	µg/kg	125	52	41.6	48,200.00	<2,730.00	<187.00	3,099.73	1,554.06	
Vanadium	µg/kg	125	119	95.2	113,000.00	5,395.00	<237.00	14,772.83	5,597.20	22,355.16
Zinc	µg/kg	125	124	99.2	79,400.00	4,400.00	<253.00	10,620.55	5,382.08	15,692.53

Table 6-11. Summary Statistics for Other Inorganic Parameters (Offsite Samples)

Analyte	Units	No. of Cores	No. Above Det.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average
Fluoride	µg/kg	125	14	11.2	818,500.00	<5,360.00	<3,630.00		
Nitrate as Nitrogen	µg/kg	125	61	48.8	3,390.00	<612.00	299.00		
Nitrate + Nitrite	µg/kg	125	120	96	4,840,000.00	173,000.00	<19,700.00	671,852.80	213,169.02
Silicon	µg/kg	125	125	100	3,890,000.00	457,000.00	79,000.00	571,323.07	420,313.59
Sulfate	µg/kg	125	24	19.2	394,500.00	<15,150.00	<13,400.00		
Total Phosphates (as P)	µg/kg	125	125	100	69,800,000.00	41,400.00	7,300.00	786,758.23	52,107.35

Table 6-12. Summary Statistics for Organics (Offsite Samples)

Analyte	Units	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
Total Organic Carbon	µg/kg	125	124	99.2	122,000,000.00	12,800,000.00	<100,000.00	17,383,386.87	6,960,070.70	17,693,724.36
Total Organic Halogens	µg/kg	125	0	0	<25,000.00	<25,000.00	<23,400.00	12,478.40	12,477.94	
1,1,1-Trichloroethane	µg/kg	125	32	25.6	67.70	<6.05	4.20	6.89	4.15	
1,1,2-Trichloroethane	µg/kg	125	0	0	<6.05	<6.05	<5.48	2.95	2.95	
Acetone	µg/kg	125	123	98.4	1,630.50	108.50	6.36	170.69	83.56	238.82
Carbon Disulfide	µg/kg	125	10	8	33.20	<6.05	3.54	3.69	3.23	
Dichloromethane	µg/kg	125	117	93.6	1,991.50	66.50	1.16	153.03	42.50	295.05
Ethyl Methacrylate	µg/kg	123	0	0	<396.00	<396.00	<22.40	177.76	151.04	
Methyl Ethyl Ketone	µg/kg	125	26	20.8	114.00	<12.10	6.28	9.94	7.47	
Methyl Methacrylate	µg/kg	123	0	0	<396.00	<396.00	<22.40	177.88	151.41	
Pentachloroethane	µg/kg	125	0	0	<401.00	<401.00	<360.00	195.80	195.70	
Tetrachloroethylene	µg/kg	125	44	35.2	320.00	<5.95	2.64	11.88	4.71	
Toluene	µg/kg	125	63	50.4	107.00	3.00	1.45	6.88	4.19	12.44
Trichlorofluoromethane	µg/kg	125	33	26.4	58.45	<10.50	2.20	5.27	4.56	
Xylenes	µg/kg	125	12	9.6	53.44	<6.00	1.22	3.67	3.10	
Benzo(a)Pyrene	µg/kg	125	14	11.2	586.00	<396.00	40.80	201.73	194.93	
Bis(2-ethylhexyl)phthalate	µg/kg	125	119	95.2	10,900.00	415.00	41.00	779.54	380.42	1,335.01
Butylbenzyl Phthalate	µg/kg	125	0	0	<400.00	<400.00	<360.00	195.22	195.12	
Di-n-butyl Phthalate	µg/kg	125	87	69.6	488.00	74.80	37.10	115.17	93.12	75.05
Fluoranthene	µg/kg	125	0	0	<400.00	<400.00	<360.00	195.22	195.12	
Kepon	µg/kg	125	1	0.8	<18.20	<18.20	1.20	7.24	6.84	
m,p-Cresol	µg/kg	40	1	2.5	<404.00	<403.00	65.30	191.92	186.84	
p-Cresol (4-Methylphenol)	µg/kg	40	1	2.5	<411.00	<408.50	116.00	196.51	195.73	
Phenol	µg/kg	125	1	0.8	<402.00	<402.00	62.30	194.64	193.81	
Pyridine	µg/kg	125	0	0	<767.00	<764.50	<360.00	337.91	327.59	
2,4-Dichlorophenoxyacetic ac	µg/kg	125	0	0	<115.00	<115.00	<22.00	47.51	41.96	
2,4,5-T	µg/kg	125	4	3.2	<114.50	<113.50	<11.00	44.09	34.81	
Hexachlorodibenzo-p-dioxins	µg/kg	96	4	4.17	4.10	< 0.1000	< 0.1000	0.14	0.06	
Pentachlorodibenzo-p-furans	µg/kg	111	3	2.7	1.00	< 0.1000	< 0.1000	0.06	0.05	

Table 6-13. Summary Statistics for Radiological Parameters (Offsite Samples)

Analyte	Units	No. of Cores	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
Tritium	pCi/gm	125	25	20	17.64	<10.68	0.02	4.40	2.06	

Table 6-14. Summary Statistics for Agricultural Parameters (Offsite Samples)

Analyte	Units	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Average	Geometric Average	Median	Minimum	Standard Deviation
Cation Exchange Capacity	µg/kg	125	125	100	48.95	11.93	8.17	9.39	0.22	9.82
pH	pH	125	125	100	8.17	5.07	NA	4.88	3.92	NA
Percent Solids	PER	125	125	100	91.65	76.53	NA	81.97	28.00	NA

7.0 DISCUSSION

7.1 Metals, Inorganics, and Radionuclides

There are two broad trends in metal and inorganic constituent concentrations in the study soils: (1) the concentration of metals and inorganic constituents is slightly higher in soil group 4 and distinctly higher in soil group 5, and (2) within a soil group, metals and inorganic constituent concentrations decrease with depth. Both of these trends are reflected in the soil's CEC, which generally decreases with increasing depth. Exceptions to these broad trends include an increase in constituent concentrations with depth in offsite soil group 4 samples and increased concentrations of some analytes in the surface (sample interval A) and deepest (sample interval E) intervals in soil groups 2 and 3.

Tritium exhibits no distribution pattern either vertically or between soil groups.

7.2 Organics

A full suite of organic analytes including volatile and semivolatile organic compounds was investigated in this study. This is a much more extensive suite than in most background studies of wetlands. In general, the distribution of VOCs and semivolatile organic compounds was irregular and sporadic; only a few of analytes exceeded the detection limit in more than 10 percent of the samples (Tables 6-7 and 6-12). Only four of the VOCs and semivolatile organic compounds [acetone, dichloromethane (methylene chloride), bis(2-ethylhexyl) phthalate, and di-n-butyl phthalate] were reported as exceeding detection in a large percentage of the samples. All of these are common laboratory artifacts.

It is possible that some of the reported concentrations of VOCs and semivolatile organic compounds do reflect the presence of these analytes in the wetland soils. No previous studies are available with which to compare the VOC and semivolatile organic compounds data, so it is difficult to evaluate whether the concentrations measured in this study are anomalous or nominal for wetland soils. The presence of these compounds may also be indicative of site-specific contamination even though sampling locations were carefully selected to minimize this possibility.

Three pesticides/herbicides (hexachlorodibenzo-p-dioxins, pentachlorodibenzo-p-furans, and 2,4,5-T) exceeded the detection limit in 10 to 20 percent of the samples. These analytes may be

related to industrial or past agricultural activities at the site or upstream of the sample collection point.

7.3 Other Studies

Table 7-1 provides summary data from published studies for background levels of chemicals in wetland soils. These data are derived from regional, national, and global studies. Consultation with experts in the field of metal concentrations in soils confirmed that information on background concentrations of chemicals in wetland soils is very limited (Adriano, 1996). For example, Reddy and Gale (1994) cite "characterization of wetland soils" as one of the three major research needs in the area of wetland science.

The most extensive review of geochemical characteristics of wetlands was prepared by Vymazal (1995) and includes more than 5,500 references. Much of the regional, national, and global data in Table 7-1 are based on this review, which also includes information on levels of macronutrients, micronutrients, and other elements in wetland soils.

Gambrell (1994), in his review of processes affecting the mobility and plant availability of trace and toxic metals in wetlands, notes that metals tend to be retained more strongly in wetland soils than in upland soils. However, metal concentrations and metal mobilization-immobilization processes vary according to a number of physical and chemical properties of wetland soils: texture (proportion of sand, silt, and clay), redox potential, pH, organic matter content, salinity, and the presence of other chemical components such as carbonates and sulfides. Studies have shown trace and toxic metals to be less mobile under wetland than upland conditions because, as oxidized soils are flooded and become anaerobic or reducing, the pH tends toward neutrality, favoring low metal solubility. This near-neutral pH, which generally ranges from about 6.5 to 7.5, is a much smaller pH range than found for upland soils. Soil pH and redox potential have been correlated with the chemical form and distribution of cadmium, mercury, lead, and zinc in sediments from Alabama and Louisiana.

In addition to the differences in wetland and upland soil chemical and microbial processes affecting nutrient transformation and metal mobility and bioavailability, the degradation of pesticides, petroleum hydrocarbons, and industrial organics is very different in wetland soils compared with upland soils (DeLaune et al., 1990; Gambrell, 1994; Gambrell et al., 1991a and b; Gambrell and

Patrick, 1988). It is generally assumed that background or reference levels for these anthropogenic organics are zero or below detection levels.

Pardue et al. (1992) point out that elevated toxic metal concentrations in Louisiana coastal wetlands are obscured by natural heterogeneity in baseline levels. "Normal" baseline concentrations may vary as a result of differences in sediment composition or wetland type; coastal wetlands in Louisiana may be salt marshes, coastal bays, swamps, bottomland hardwood forests, or natural levees. These diverse environments produce a significant natural heterogeneity due in part to variation in physical and chemical properties of the soil (Pardue et al., 1992). Consequently, it is often difficult to determine whether constituent variability is naturally occurring or a result of anthropogenic influence.

Chee and Vitt (1989) examine the correlations between vegetation and chemical gradients in nonforested fens. The subsurface fen peats are characterized by mean calcium contents of 17,426 mg/kg and magnesium contents of 1,719 mg/kg, with fen waters of pH 5.3 to 7.1. Laubhan (1995) also compares wetland soil macronutrients and vegetation as part of an analysis of the effects of prescribed burns on soil structure, macronutrients, and vegetation cover. He found that soil pH, organic matter content, neutralizable acidity, CEC and concentrations of phosphorus, potassium, calcium and nitrate-nitrogen did not differ among control sites and sites burned in spring and summer.

Many of the reports consulted for this review provide background levels in the context of reference values for study of other wetland characteristics or processes. As a result of the various locales, research and sampling methods, and study purposes, uniform comparisons are not possible. The data in Table 7-1 do provide, however, a reasonable reference for comparison with data collected at the SRS.

Table 7-2 provides a comparison between the results reported from this study, a study of unimpacted upland soils at SRS (Looney et al, 1990), and regional, national, and global wetland studies. The bulk geochemistry of soil samples analyzed for this study is generally similar to that reported in both the SRS upland and the regional, national, and global literature. The closest correlation seems to be with the SRS upland soils; the majority of the bulk geochemistry analytes (metals, other inorganics, agricultural parameters, and radionuclides) are present in similar concentrations in both wetland and upland soils. This similarity is not surprising, as both soils are derived from basically the same parent material. Exceptions are magnesium, manganese, and

phosphate, all of which are present in higher concentrations in the wetland soils than in the upland soils (Looney et al., 1990). These exceptions are likely due to the differences between upland soil and wetland soil formation processes.

The concentrations of constituents measured in this study tend to be slightly to substantially lower than those reported in regional, national, and global wetland studies (Table 7-2). The lower concentrations reported in this study may be attributed to a difference in the analytical methods used rather than any systematic difference in wetland soil chemistry. In addition, some regional/national studies may have been conducted on soils impacted by recent agricultural activities.

Standard EPA analytical methods were used in this study. These methods are the same as those used in waste unit characterizations under RCRA and/or CERCLA programs. This selection was intentional, and was made to ensure that the results from this study would be comparable to existing or future site characterizations of wetland soils.

However, the standard EPA methods are designed for studies in which the primary interest is in detection and quantification of trace amounts of constituents that typically are located in pore spaces or bound loosely to the surface of soil particles. For this reason, the standard EPA protocols use dissolution solely by nitric acid for sample extraction; this method will result in partial dissolution, and results will vary according to the mineralogy and chemistry of the particular particle being processed as well as duration and execution of the extraction process. This incomplete dissolution thus preferentially extracts more soluble non-silicates, relatively soluble silicates, and constituents that occur near the surfaces of refractory silicates (such as quartz or kaolinite).

Soil samples typically include accessory minerals such as monazite, zircon, magnetite, or hornblende. These minerals constitute a small percentage of the sample but may contain a significant proportion of the trace elements present in the bulk sample. Under a standard EPA extraction, such minerals may be only partially dissolved. This partial dissolution may result in more variable major, minor, and trace element concentrations than if the sample were completely dissolved. Because the regional, national, and global studies typically include complete dissolution of the soil, the compatibility of those data to the data derived from this study may be limited.

There is no difference in the analytical methods used for the samples from onsite versus offsite locations in this study. Thus, the onsite results should be directly comparable to offsite results. In general, the onsite and offsite results indicate that there is no substantial difference in the type, general distribution, or concentration of the analyzed constituents between the two areas. This suggests that (1) the onsite wetland soils selected for this study do represent soils that are not impacted by local activities, and (2) the onsite and offsite data are sufficiently similar to allow the two data sets to be combined to determine the baseline composition for unimpacted wetland soils both at SRS and regionally. Prior to combining the two data sets, a detailed statistical comparison would need to be completed and the results of that comparison evaluated.

7.4 Summary

This study focused on characterizing the natural geochemical and physical properties of wetland soils occurring on the SRS. The data presented in Section 6 show the results of sample analysis. These results define background properties for wetland soils at SRS, which may be used to investigate future sample locations for evidence of impact from facility operations. In addition, the similarity in methods used for this study and those used in RCRA/CERCLA waste unit investigations may make it possible to incorporate data from studies into the background wetland soils database, as appropriate. In this manner, the data set used for wetland soils characterization may be expanded and refined over time.

Table 7-1. Summary Data for Background Levels of Analytes in Wetland Soils from
Published Studies

Element	Location	Arithmetic Mean (ppm)	Range (ppm)	Source
Aluminum (in sediment)		77,000.00		Jackson (1993)
Arsenic		6.00	0.1-40	Bowen (1966)
Arsenic		1-50		Svedelius (1908)
Arsenic		5-10	0.1-40	National Academy of Sciences (1977)
Arsenic		<0.1-95		Kabata-Pendias and Pendias (1992)
Arsenic		2,470.00		Kabata-Pendias and Pendias (1992)
Arsenic (in sediment)		22.00		Jackson (1993)
Barium (in sediment)		140.00		Jackson (1993)
Beryllium (in sediment)		2.00		Jackson (1993)
Boron		2-100		Stevenson (1986) and Swaine (1955)
Boron		20	2-270	Bowen (1979)
Boron		<1-467		Kabata-Pendias and Pendias (1992)
Bromine		10.00	1-110	Bowen (1979)
Bromine		<0.5-515		Kabata-Pendias and Pendias (1992)
Cadmium		0.35	0.01-2	Bowen (1979)
Cadmium		0.01-4.0		Kabata-Pendias and Pendias (1992)
Calcium		13,700 - 15,000	7,000 - 500,000	Bowen(1966), Bowen(1979)
Calcium		5,700-12,700		Mitsch and Gosselink (1986)
Calcium (in sediment)		7,100.00		Jackson (1993)
Calcium (peat)	0 Feet	14,018.00		Chee and Vitt (1989)
Calcium (peat)	30 Feet	17,426.00		Chee and Vitt (1989)
Carbon		20,000.00	7,000 - 500,000	Bowen (1966), Bowen (1979)
Carbon (carbonate in sediment)		400.00		Jackson (1993)
Carbon (organic in sediment)		33,100.00		Jackson (1993)
Carbon (total in sediment)		33,900.00		Jackson (1993)

Table 7-1. Summary Data for Background Levels of Analytes in Wetland Soils from
Published Studies (Continued)

Element	Location	Arithmetic Mean (ppm)	Range (ppm)	Source
Cerium (in sediment)		75.00		Jackson (1993)
Chlorine		56-1806		Kabata-Pendias and Pendias (1992)
Chlorine		100.00	8-1,800	Bowen (1979)
Chromium		1-1384		Kabata-Pendias and Pendias (1992)
Chromium		5-1000		Swaine (1955)
Chromium		70.00	5-1,500	Bowen (1979)
Chromium		100	5-3,000	Bowen (1966)
Chromium (in sediment)		77.00		Jackson (1993)
Cobalt		1-40		Swaine (1955)
Cobalt		0.1-122		Kabata-Pendias and Pendias (1992)
Cobalt		1-300		Stevenson (1986)
Cobalt (in sediment)		10.00		Jackson (1993)
Copper		1-323		Kabata-Pendias and Pendias (1992)
Copper		30.00	2-250	Bowen (1979)
Copper		2-100		Tansley (1939)
Copper (in sediment)		19.00		Jackson (1993)
Gallium (in sediment)		17.00		Jackson (1993)
Iodine		5.00	0.1-25	Bowen (1979)
Iodine		0.06-41		Kabata-Pendias and Pendias (1992)
Iron		2,000 - 550,000		Bowen (1966), Bowen (1979)
Iron		200 - 100,000		Stevenson (1986)
Iron (in sediment)		41,000.00		Jackson (1993)
Iron (Peat)	0 Feet	1,074.00		Chee and Vitt (1989)
Iron (Peat)	30 Feet	880.00		Chee and Vitt (1989)
Lanthanum (in sediment)		35.00		Jackson (1993)
Lead		16.00		Shukla and Leland (1973)
Lead		35.00	2-300	Bowen (1979)
Lead		1.5-286		Kabata-Pendias and Pendias (1992)
Lead		2-30,000		Bowen (1966)
Lead (in sediment)		25.00		Jackson (1993)

Table 7-1. Summary Data for Background Levels of Analytes in Wetland Soils from
Published Studies (Continued)

Element	Location	Arithmetic Mean (ppm)	Range (ppm)	Source
Lithium (in sediment)		70.00		Jackson (1993)
Magnesium		5,000.00	400 - 9,000	Bowen (1966), Bowen (1979)
Magnesium		1219-2770		Mitsch and Gosselink (1986)
Magnesium (in sediment)		87,000.00		Jackson (1993)
Magnesium (peat)	0 Feet	2,222.00		Chee and Vitt (1989)
Magnesium (peat)	30 Feet	1,791.00		Chee and Vitt (1989)
Manganese		7 - 9,200		Whittaker (1969)
Manganese		200 - 3,000		Swaine (1955)
Manganese		1,000.00	20 - 10,000	Bowen (1966), Bowen (1979)
Manganese		20 - 6,000		Stevenson(1986)
Manganese (in sediment)		340.00		Jackson (1993)
Mercury		0.06	0.01-0.5	Bowen (1979)
Mercury		0.07		Craig (1980)
Mercury		0.004-5.8		Kabata-Pendias and Pendias (1992)
Mercury		<54		Kabata-Pendias and Pendias (1992)
Mercury		<500		Craig (1980)
Molybdenum		1.20	0.1-40	Bowen (1979)
Molybdenum		0.013-17.8		Kabata-Pendias and Pendias (1992)
Molybdenum		0.2-5		Stevenson (1974), Swaine (1955)
Neodymium (in sediment)		32.00		Jackson (1993)
Nickel		40.00	10-1,000	Bowen (1966)
Nickel		5-500		Swaine (1955)
Nickel		0.2-660		Kabata-Pendias and Pendias (1992)
Nickel		<26000		Kabata-Pendias and Pendias (1992)
Nickel (in sediment)		23.00		Jackson (1993)
Niobium (in sediment)		10.00		Jackson (1993)
Nitrogen		1,000 - 2,000	200 - 5,000	Bowen (1966), Bowen (1979)
Phosphorus		800.00	35 - 5,300	Bowen (1979)
Phosphorus		50-203		Mitsch and Gosselink (1986)
Phosphorus (peat)	0 Feet	1,916.00		Chee and Vitt (1989)
Phosphorus (peat)	30 Feet	1,263.00		Chee and Vitt (1989)

Table 7-1. Summary Data for Background Levels of Analytes in Wetland Soils from
Published Studies (Continued)

Element	Location	Arithmetic Mean (ppm)	Range (ppm)	Source
Phosphorus (sediment)		800.00		Jackson (1993)
Potassium		14,000.00	80 - 37,000	Bowen (1966), Bowen (1979)
Potassium		98-230		Mitsch and Gosselink (1986)
Potassium (in sediment)		11,000.00		Jackson (1993)
Potassium (Peat)	0 Feet	1,597.00		Chee and Vitt (1989)
Potassium (Peat)	30 Feet	403.00		Chee and Vitt (1989)
Selenium		0.005-4		Kabata-Pendias and Pendias (1992)
Selenium		0.20	0.01-2	Bowen (1966)
Silicon		330,000.00	250,000-410,000	Bowen (1979)
Sodium		5,000.00	150-25,000	Bowen (1979)
Sodium (in sediment)		24,000.00		Jackson (1993)
Sodium (peat)	0 Feet	737.00		Chee and Vitt (1989)
Sodium (peat)	30 Feet	214.00		Chee and Vitt (1989)
Sulfur		700.00	30 - 1,600	Bowen (1966), Bowen (1979)
Sulfur (in sediment)		8,400.00		Jackson (1993)
Vanadium		0.7-530		Kabata-Pendias and Pendias (1992)
Vanadium		90-100	3-500	Bowen (1979)
Vanadium (in sediment)		110.00		Jackson (1993)
Ytterbium (in sediment)		2.00		Jackson (1993)
Yttrium (in sediment)		17.00		Jackson (1993)
Zinc		10 - 300		Swaine (1955)
Zinc		40 - 58		Hodgson (1963)
Zinc		50.00	10 - 300	Bowen (1966)
Zinc		90.00	1 - 900	Bowen (1979)
Zinc		2-250		Stevenson (1986)
Zinc		3-762		Kabata-Pendias and Pendias (1992)
Zinc (in sediment)		65.00		Jackson (1993)

The concentrations of constituents measured in these published studies may not be directly comparable to those reported reported in this study. The differences in concentrations may be attributed to a difference in analytical methods used rather than any systematic difference in wetland soil chemistry.

Table 7-2. Comparison of Onsite Sample Results to Literature Review and SRS Upland Soils Study

Analyte (units = ppm)	This Study			Literature Review (see Table 6-10) Average In Sediment	SRS Upland Soils Study (Looney et al., 1990)		
	Average	Maximum	Minimum		Average	Maximum	Minimum
Aluminum	7,814.57	52,050.00	65.60	77,000.00	11,697.41	53,530.00	715.00
Antimony	1.52	15.80	1.30	No Data	<10.60	15.20	5.53
Arsenic	0.44	3.70	0.13	22.00	<2.00	15.20	0.50
Barium	53.23	1,840.00	0.39	140.00	16.43	77.40	0.94
Beryllium	0.54	4.11	0.05	2.00	<0.40	<1.00	<0.12
Cadmium	0.11	4.20	0.02		<0.60	1.19	0.12
Calcium	443.20	60,700.00	3.72	7,100.00	No Data		
Chromium	11.12	58.10	0.32	77.00	16.41	105.10	1.31
Cobalt	2.43	49.90	0.22	10.00	<1.50	5.27	0.46
Copper	4.86	39.20	0.27	19.00	3.94	14.12	0.36
Iron	4,630.91	52,000.00	12.30	41,000.00	13,341.32	79,600.00	885.90
Lead	7.03	48.10	0.20	25.00	5.14	16.67	<1.00
Lithium	4.10	36.10	0.21	70.00	<10.00	19.87	<10.00
Magnesium	309.64	3,470.00	2.13	87,000.00	133.76	759.40	12.87
Manganese	53.92	2,530.00	0.23	340.00	27.71	498.20	<1.60
Mercury	0.04	0.74	0.02		<0.10	0.89	<0.01
Nickel	3.01	32.10	0.69	23.00	4.12	17.90	0.11
Potassium	195.72	1,495.00	32.10	11,000.00	<180.00	1,118.00	28.60
Selenium	0.46	13.00	0.15		<0.40	<4.00	<0.20
Silver	0.39	3.90	0.17	No Data	<1.00	1.80	0.01
Sodium	49.19	520.00	1.77	24,000.00	61.08	760.00	<7.00
Sulfide	0.18	2.08	0.10	No Data	No Data		
Thallium	0.17	1.90	0.15	No Data	<1.50	<2.00	<1.00
Tin	2.99	28.80	0.19	No Data	No Data		
Vanadium	20.86	144.00	0.19	110.00	27.80	72.11	3.61
Zinc	12.42	100.00	0.36	65.00	12.39	267.00	1.80
Fluoride	2.33	11.90	2.51	No Data	<1.25	4.30	<0.25
Nitrate + Nitrite	975.12	10,300.00	19.60	No Data	No Data		
Nitrate as Nitrogen	0.81	3.51	0.13		1.79	44.40	<0.10
Silicon	451.02	2,730.00	24.10	330,000.00	No Data		
Sulfate	14.62	220.00	1.45	No Data	8.69	25.10	1.00
Total Phosphates	122.10	830.00	0.52	800.00	<5.00	13.70	<0.25
Total Organic Carbon	1,661.42	90,400.00	0.00	33,100.00	1,725.43	14,493.00	32.00
Total Organic Halogens	12.98	67.30	20.00	No Data	<10.00	17.40	<10.00

Table 7-2. Comparison of Onsite Sample Results to Literature Review and SRS Upland Soils Study

Analyte (units = ppm)	This Study			Literature Review (see Table 6-10)	SRS Upland Soils Study (Looney et al., 1990)		
	Average	Maximum	Minimum	Average In Sediment	Average	Maximum	Minimum
1,1,1-Trichloroethane	0.00	0.01	0.00	No Data	No Data		
1,1,2-Trichloroethane	0.00	0.01	0.00	No Data	No Data		
Acetone	0.05	0.39	0.00	No Data		1.60	0.04
Carbon Disulfide	0.00	0.01	0.00	No Data	No Data		
Dichloromethane	0.03	0.15	0.00	No Data		0.07	0.00
Ethyl Methacrylate	0.20	0.57	0.06	No Data	No Data		
Fluoranthene	0.20	0.42	0.04	No Data	No Data		
Methyl Ethyl Ketone	0.01	0.05	0.00	No Data	No Data		
Methyl Methacrylate	0.20	0.57	0.06	No Data	No Data		
Pentachloroethane	0.20	0.57	0.06	No Data	No Data		
Tetrachloroethylene	0.01	0.13	0.00	No Data	No Data		
Toluene	0.00	0.02	0.00	No Data	No Data		
Trichlorofluoromethane	0.00	0.04	0.00	No Data	No Data		
Xylenes	0.00	0.01	0.01	No Data	No Data		
Benzo(a)Pyrene	0.23	1.39	0.15	No Data	No Data		
Bis(2-ethylhexyl) Phthalate	0.72	38.85	0.04	No Data		4.80	0.01
Butylbenzyl Phthalate	0.20	0.42	0.04	No Data	No Data		
Di-n-butyl Phthalate	0.15	0.46	0.04	No Data	No Data		
Kepone	0.01	0.54	0.01	No Data	No Data		
m,p-Cresol	0.21	0.43	0.13	No Data	No Data		
p-Cresol (4-methylphenol)	0.20	0.42	0.20	No Data	No Data		
Phenol	0.20	0.42	0.05	No Data	No Data		
Pyridine	0.20	0.45	0.03	No Data	No Data		
2,4-Dichlorophenoxyacetic acid	0.04	0.11	0.01	No Data	No Data		
2,4,5-T	0.02	0.06	0.01	No Data	No Data		
Hexachlorodibenzo-p-dioxins	0.00	0.00	0.00	No Data	No Data		
Pentachlorodibenzo-p-furans	0.00	0.00	0.00	No Data	No Data		
Cation Exchange Capacity	0.01	0.19	0.00	No Data	No Data		
Tritium (pCi/gm)	0.00	0.02	0.00	No Data	No Data		

Geochemical and Physical Properties of Wetland Soils
at the Savannah River Site

WSRC-TR-96-0115, Final
May 1997

THIS PAGE INTENTIONALLY LEFT BLANK

8.0 REFERENCES

- Adriano, D.C. 1996. Personal communication with E. Burress, SAIC, June 11.
- American Society for Testing and Materials. 1994. *1994 Annual Book of ASTM Standards*. Volume 04.08 Soil and Rock. 01-040894-38. Philadelphia, PA.
- Bowen, H.J.M. 1966. *Trace Elements in Biochemistry*. Academic Press, London.
- Bowen, H.M.J. 1979. *Environmental Chemistry of the Elements*. Academic Press, London.
- Brady, Nyle C. 1984. *The Nature and Properties of Soil*. 9th ed., MacMillan Publishing Co., New York, NY.
- Buol, S.W., F.D. Hole, and R.J. McCracken. 1980. *Soil Genesis and Classification*. 2nd ed., Iowa State University Press, Ames, IA.
- Buoma, J. 1983. "Hydrology and Soil Genesis of Soils with Aquic Moisture Regimes." In *Pedogenesis and Soil Taxonomy*, Vol. I, Concepts and Interactions, L. P. Wilding, N.E. Smack, and G. F. Hall, eds. Elsevier Science Publishers, B.V., Amsterdam.
- CERCLA. 1980. Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), as amended, 42 U.S.C. sect. 9601 et seq., Washington, D.C.
- Chee, W-L and D.H. Vitt. 1989. "The Vegetation, Surface Water Chemistry and Peat Chemistry of Moderate-Rich Fens in Central Alberta, Canada." *Wetlands* 9(2): 227-261.
- Craig, P.J. 1980. "Metal Cycles and Biological Methylation." In *The Handbook of Environmental Chemistry*, Vol. I, Part A, The Natural Environment and the Biogeochemical Cycles, Hutzinger, O. (ed.), Springer-Verlag, New York.
- DeLaune, R.D., R.P. Gambrell., J.H. Pardue, and W.H. Patrick, Jr. 1990. "Fate of Petroleum Hydrocarbons and Toxic Organics in Louisiana Coastal Environments." *Estuaries* 13: 72-80.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.
- Gambrell, R.P. 1994. "Trace and Toxic Metals in Wetlands — A Review." *J. Environ. Qual.* 23: 883-891.
- Gambrell, R.P., and W.H. Patrick. 1978. "Chemical and Microbiological Properties of Anaerobic Soils and Sediments." In *Plant Life in Anaerobic Environments*, D.D. Hook and R.M.M. Crawford, eds., Ann Arbor Sci. Pub. Inc., Ann Arbor, MI.

- Gambrell, R.P., and W.H. Patrick, Jr. 1988. "The Influence of Redox Potential on the Environmental Chemistry of Contaminants in Soils and Sediments." p. 319-333. In D.D. Hook (ed.) *Plant Life in Anaerobic Environments*. Ann Arbor Science, Ann Arbor, MI.
- Gambrell, R.P., R.D. DeLaune, and W.H. Patrick, Jr. 1991a. "Redox Processes in Soils Following Oxygen Depletion." p. 101-117. In M.B. Jackson et al. (ed.) *Plant Life Under Oxygen Deprivation*. SPB Academic Publishing, The Hague, Netherlands.
- Gambrell, R.P., J.B. Wiesepape, W.H. Patrick, Jr. and M.C. Duff. 1991b. "The Effects of pH, Redox, and Salinity on Metal Release from a Contaminated Sediment." *Water Air Soil Pollut.* 57-58: 359-367.
- Hodgson, J.F. 1963. "Chemistry of Micronutrient Elements in Soils." *Adv. Agronomy* 15:119.
- Kabata-Pendias, A., and H. Pendias. 1992. *Trace Elements in Soils and Plants*. 2nd ed., CRC Press, Boca Raton, FL.
- Jackson, Larry L. (editor). 1993. *Biogeochemical Studies of the Salt Marsh and a Barrier Island at Cape Romain National Wildlife Refuge, South Carolina*. Open File Report 93-303, U.S. Department of the Interior - U.S. Geological Survey, Denver, CO.
- Laubhan, M.K. 1995. "Effects of Prescribed Fire on Moist-Soil Vegetation and Soil Macronutrients." *Wetlands* 15(2): 159-166.
- Looney, B.B., C.A. Eddy, M. Ramdeen, J. Pickett, V. Rogers, M.T. Scott, and P.A. Shirley. 1990. *Geochemical and Physical Properties of Soils and Shallow Sediments at the Savannah River Site* (U). WSRC-RP-90-1031. Westinghouse Savannah River Company, Savannah River Site, Aiken, SC. August 31, 1990.
- Mitsch, W.J. and J.G. Gosselink. 1986. *Wetlands*. Van Nostrand Reinhold Company, New York, NY.
- National Academy of Sciences. 1977. *Arsenic*. Committee on Medical and Biologic Effects of Environmental Pollutants. Washington, D.C.
- Pardue, J.H., R.D. DeLaune, and W.H. Patrick, Jr. 1992. "Heavy Metals in the Environment. Metal to Aluminum Correlation in Louisiana Coastal Wetlands: Identification of Elevated Metal Concentrations." *J. Environ. Qual.* 21: 539-545.
- RCRA. 1976. Resource Conservation and Recovery Act (Solid Waste Disposal Act), as amended, 42 U.S.C. sect. 6901 et seq., Washington, D.C.
- Reddy, K.R. and P.M. Gale. 1994. "Wetland Processes and Water Quality: A Symposium Overview." *J. Environ. Qual.* 23:875-887.
- Reed, P.B. 1988. "National List of Plant Species that Occur in Wetlands: National Summary." *Biol. Rpt.* 88(24). U.S. Fish and Wildlife Service, Washington, D.C.

Rogers, V.A. 1990. *Soil Survey of Savannah River Plant Area. Parts of Aiken, Barnwell, and Allendale Counties, South Carolina*. U.S. Department of Agriculture, Soil Conservation Service. In cooperation with U.S. Department of Energy; U.S. Department of Agriculture Forest Service; South Carolina Agricultural Experiment Station; and South Carolina Land Resources Conservation Commission.

Shukla, S.S., and H.V. Leland. 1973. "Heavy Metals: A Review of Lead." *Journal of Water Pollution Control Federation* 45: 1319.

Soil Survey Staff. 1975. *Soil Taxonomy, A Basic System of Soil Classification for Making and Interpreting Soil Surveys*. Agriculture Handbook No. 436. U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C.

Stevenson, F.J. 1986. *Cycles of Soil. Carbon, Nitrogen, Phosphorus, Sulfur, Micronutrients*. John Wiley and Sons, New York, NY.

Svedelius, N. 1908. "Über den Bau und die Entwicklung der Florideengattung *Martensia*." *Vet. Akad. Handl. Bot.* 43, Stockholm.

Swaine, D.J. 1955. *The Trace-Element Content of Soils*. Tech Common. 48, Commonwealth Bureau of Soil Science, Commonwealth Agricultural Bureaux, England.

Tansley, A.G. 1939. *The British Islands and Their Vegetation*. 2nd ed., Cambridge University Press, London.

USDA. 1981. *National Survey Soil Manual*.

U.S. EPA. 1980. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*. EPA-600/4-80-032 (1980 update). Washington, D.C.

U.S. EPA. 1983. *Methods for Chemical Analysis of Water and Wastes*. EPA-600/4-79-020. Environmental Monitoring and Support Laboratory, Cincinnati, OH.

U.S. EPA. 1986. *Test Methods for Evaluating Solid Waste (SW-846)*. Volume I. Washington, D.C.

Vymazal, J. 1995. *Algae and Element Cycling in Wetlands*. CRC Press, Boca Raton, FL.

Whittaker, R.H. 1969. "New Concept of Kingdoms of Organisms." *Science* 163: 150.

Wilding, L.P., N.E. Smeck, and G.F. Hall. 1983. *Pedogenesis and Soil Taxonomy, Vol. II, The Soil Orders*. Elsevier Science Publishers, B.V., Amsterdam.

WSRC. 1992. *Characterization of the Geochemical and Physical Properties of Wetland Soils on the Savannah River Site*. Field Report. WSRC-TR-92-576. Prepared by Metcalf & Eddy for Westinghouse Savannah River Company, Savannah River Site, Aiken, SC. November 1992.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A

Core Logs

Appendix A - Core Logs

The paragraphs below provide a guide to the information contained in Appendix A. The first paragraph describes the calculation of sample intervals for cores where compaction occurred. The second paragraph defines the terms (eg. compaction, recovery) used in the core logs.

Calculations

Calculations were performed for each core to correct for compaction, which was averaged over the entire length of the core. The following example calculation was prepared for core BGW 008.

Core BGW 008 (A) compacted 6.5 inches, or 5 percent ($6.5/132 = 5\%$). Each sample interval was assumed to compact to 95 percent of its original length. Accordingly, each sample interval was multiplied by 0.95, which divides the compaction proportionally over each sample interval. The calculations for core BGW 008 were as follows:

<u>Interval (in)</u>		<u>Compaction Factor</u>		<u>Corrected Interval (in)</u>
0 - 20	x	0.95	=	0 - 19
20 - 40	x	0.95	=	19 - 38
40 - 60	x	0.95	=	38 - 57
60 - 90	x	0.95	=	57 - 86
90 - 120	x	0.95	=	86 - 114

Definitions

The following terms appear on the eighty-three core logs contained in Appendix A.

CLIENT - This task was completed by Metcalf & Eddy, Inc. and Athena Technologies, Inc. for Westinghouse Savannah River Company

TIME - Time core was collected

PROJECT - Background Wetlands Soils Study

CORE DATE - Date core was collected

CORE DEPTH - Total inches of penetration by the aluminum vibracoring sample tube

COMPACTION - Compaction (inches and percent) of the soil core within the aluminum tube

RECOVERY - Length of soil core retrieved (core depth minus compaction and loss of material from bottom of core). For cores collected by vibracore and hand auger, recovery for both methods is provided (eg. BGW 003 - RECOVERY - 67"/120" (vibracore/auger))

LOG DATE - Date core was opened, sampled, and described (lithologic log) by geologist

CORE COORDINATES - Latitude and longitude of core sampling location as measured with Global Positioning System (GPS)

LOGGER - Initials of geologist that prepared lithologic description

RSK Richard S. Keenan
WJS Walter J. Sexton

CORE # - Predesignated core location number

SAMPLE INTERVAL - Sample depths in inches for Core A and Core B for sample intervals A through E, accounting for compaction. For cores collected by hand auger, only one core (A) was collected, with no compaction.

SOIL PROFILE - Graphical representation of soil core that was logged and sampled (Core A or Core B). Depth of graphical description may exceed depth of deepest sampling interval.

DESCRIPTION - Lithologic description of soil core that was sub-sampled for chemical analysis.

COLLECTED BY - Initials of field crew present when samples were collected

WJS Walter J. Sexton
MAB Michael A. Bise
GWS Glenn W. Christiansen
RSK Richard S. Keenan
VR Vergil Rogers
PS Philip Sexton
KD Kenneth Dixon

WEATHER CONDITIONS - Qualitative description of weather when samples were collected

LOCATION - General description on sampling location (eg. Aiken State Park)

SOIL GROUP - Soil group 1-5 (Table 1)

Table 1. Particle Size Fractions Used in Lithologic Logging

Size Class	Size Range
Gravel - Cobble	25.6 cm - 6.4 cm
Pebble	6.4 cm - 0.4 cm
Granule	0.4 cm - 0.2 cm
Sand - Very Coarse and Coarse	0.2 cm - 0.05 cm
Medium	0.05 cm - 0.025 cm
Fine and Very Fine	0.025 cm - 0.00625 cm
Mud - Silt and Clay Sized Sediments	Finer than 0.00625 cm

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.		Time 10:15	
PROJECT Background Wetlands Soils Study			CORE DATE 07/28/92		
CORE DEPTH A: 129" B: 122"		COMPACTION A: 9"/7% B: 13"/11%		RECOVERY A: 109" B: 106"	LOG DATE 07/28/92
CORE COORDINATES 33° 32.84N/ 81° 28.64W			LOGGER RSK	CORE # BGW 001	
Sample Interval (feet)		Soil Profile	DESCRIPTION		
Core B	Core A	Core A			
0-18" A 1	0-19" A		0-14" Organic layer- peat, abundant fine roots, little sand at bottom, black, mostly fine organic matter		
18-36" B 2	19-37" B		14-27" Grading from sandy peat to organic rich sand, abundant fine roots, few random large roots, black grading to dark brown		
36-53" C 4	37-56" C		27-42" Muddy sand, medium brown, mostly fine sand, few very small roots		
53-80" D 6	56-84" D		42-84" Fine to coarse clean sand to 48", muddy sand fine to 84" with mud lense at 57-59", sandy mud at 67-75", medium brown grading to light grey, organic rich dark brown lense at 48"		
80-107" E 8	84-111" E		84" to Bottom of Core - Clean white poorly sorted fine to very coarse sand 84-99", 99" to bottom is dark brown, increasing in fine organic material, fine sand with 2" coarse sand stringer		
109"	Bottom of Core	Bottom of Core	Bottom of Core 109"		
COLLECTED BY MAB, GWC, WJS, RSK					
WEATHER CONDITIONS Sunny, 85°					
LOCATION Aiken State Park			SOIL GROUP Group 1		

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:30

PROJECT Background Wetlands Soils Study CORE DATE 07/28/92

DEPTH A: 121" B: 120" COMPACTION A: 25"/21% B: 23"/19% RECOVERY A: 97" B: 94" LOG DATE 07/29/92

CORE COORDINATES 33°32.92N/ 81°28.86W LOGGER RSK CORE # BGW 002

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-6" A	0-6" A	3333	0-3" Black large and fine organic matter, peat
6-32" B	6-32" B	33	3-14" Medium brown (3-6") to light brown fine to medium sand, several spots of fine organic material and roots
32-48" C	32-47" C		14-21" Light brown fine to medium sand, very little mud
48-73" D	47-71" D		21-46" Fine to medium sand with few coarse grains and little mud grading to poorly sorted fine to very coarse sand with gravel up to 2 cm, increasing mud content with depth, 36-46" approximately 50/50 sand/mud
73-97" E	71-95" E		46-58" Fine to coarse clean light grey sand, little mica
			58-78" Poorly sorted fine to coarse sand, light orange, moderate mica content (little more than 46-58")
			78" to Bottom of Core - Well sorted fine sand, medium orange, abundant mica (more than above), very little mud mixed with sand at 88-97", color change to light grey at 95-97"
			Bottom of Core 97", 8'1"

COLLECTED BY MAB, GWC

WEATHER CONDITIONS Mostly cloudy, hot, 90+

LOCATION Aiken State Park SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:30

PROJECT Background Wetlands Soils Study CORE DATE 07/29/92

CORE DEPTH A: 81" B: 68" COMPACTION A: 12"/15% B: 9"/13% RECOVERY A: 120" B: 63" LOG DATE 07/30/92

CORE COORDINATES 33°33.08N/ 81°28.96W LOGGER RSK CORE # BGW 003

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-17" A	0-17" A		0-11" Black organic rich sand with abundant roots, etc., sand is fine to medium 11-17" Light brown muddy sand, few roots
17-35" B	17"-34" B		17-38" Mottled muddy sand clump of pine needles at 18", increasing mud content with depth, sand is fine to medium, few coarse grains, mostly fine
35-52" C	34-51" C		38" to Bottom of Core - Mottled sandy mud to mottled hard mud, below 51" >95% mud, abundant mica
52-76" D	51-90" D		Bottom of Core 67", 5" 7"
76-104" E	90-120" E		Remainder collected by hand auger. Sample D - Mud with little very fine sand, mottled appearance Sample E - Poorly sorted fine to very coarse sand with very little mud

COLLECTED BY MAB, WJS, GWC

WEATHER CONDITIONS Clear, hot

LOCATION Aiken State Park SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 12:30

PROJECT Background Wetlands Soils Study CORE DATE 07/29/92

DEPTH COMPACTION RECOVERY LOG DATE
 A: 138" B: 139" A: 14"/10% B: 11"/8% A: 127.5" B: 125" 07/30/92

CORE COORDINATES 33°33.28N/ 81°29.38W LOGGER RSK CORE # BGW 004




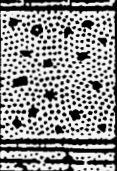

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-15" A	0-15" A	0-15" A	0-15" Black sandy peat, very high fine organic content, abundant roots, etc., at top, decreasing with depth, sand is fine to medium, abundant fine roots throughout
15-37" B	15-36" B	15-36" B	15-29" Decreasing organic content with depth, little rooted throughout, less abundant than 0-15", color from black to medium brown, little mud, sand is fine to medium with few coarse grains
37-55" C	36-54" C	36-54" C	29-62" Mixed sand and mud, increasing mud content with depth, sand is fine to medium, mud seam at 49-51" and 60-62", increase in mica content from 49-62", mostly mud from 49-62", large root at 52"
55-83" D	54-81" D	54-81" D	62-69" Increase in fine organic material, fine to coarse sand with little fine organics, medium brown, slush texture, sharp contact with above mud
83-110" E	81-108" E	81-108" E	69-74" Black hard packed organic fine material mixed with sand 74" to Bottom of Core - Mostly clean sands, fine to medium, coarse sand layers 90-92", 99-100", 105-106", and 109-116", mud seams at 104-104.5", 120-124", rest sand, few zones of fine muddly sands divided by clean white sand layers, bottom 3" muddly fine to coarse sand
Bottom of Core 127.5", 10'7.5"			

COLLECTED BY MAB, WJS, GWC, VR

WEATHER CONDITIONS Clear, hot

LOCATION Aiken State Park SOIL GROUP Group 4

ATHENA CORE LOG	CLIENT Westinghouse Savannah River Co.	Time 13:30
PROJECT Background Wetlands Soils Study	CORE DATE 07/27/92	
JRE DEPTH A: 144" B: 132"	COMPACTION A: 32"/20% B: 24"/18%	RECOVERY A: 87" B: 88"
CORE COORDINATES 33°33.20N/ 81°29.26W		LOG DATE 07/27/92
LOGGER RSK		CORE # BGW 005

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0			
0-16" A 1	0-16" A		0-7" Black rooted organic rich, mostly organic, some mud 7-23" Black mixed organics with some scattered sand, sand content increases with depth
16-33" B 2	16-31" B		23-32" Tan, one layer root organics decreasing
33-49" C 3	31-47" C		32-36" Light grey sand, mixed grain sizes, some mud (mostly fine sand), poorly sorted 36-42" Light brown coarse sand 42-47" Light grey sand, some mud, mixed grain sized sands (mostly fine)
4			47-60" Light brown coarse sand, some granule sized gravel
49-14" D 5	47-70" D		60" to Bottom of Core - Light grey, mostly A mud, some rooting at top, only a slight amount of very fine sand
6			
74-98" E 7	70-94" E		Bottom of Core 87", 7'3"
8			* Appears that we lost a coarse sand from the base of core.
9			
10			

COLLECTED BY MAB, GWC, WJS

WEATHER CONDITIONS Sunny, very hot

LOCATION Aiken State Park	SOIL GROUP Group 1
---------------------------	--------------------

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:30

PROJECT Background Wetlands Soils Study CORE DATE 07/29/92

CORE DEPTH A: 139" B: 138" COMPACTION A: 30"/22% B: 33"/24% RECOVERY A: 88" B: 85" LOG DATE 07/30/92

CORE COORDINATES 33°33.26N/ 81°29.31W LOGGER RSK CORE # BGW 006

Sample Interval (feet)		Soil Profile		DESCRIPTION
Core B	Core A	Core A		
0-15" A 1	0-16" A	3 3 3 3 3 3 3		0-35" Black peat/abundant roots etc., fine to medium sand mixed in from 27-35" increasing with depth
16-30" 2	16"-31" B	3 3 3 3 3 3		
30-46" C 3	31-47" C	3 3 3 3 3 3		35-40" Dark brown muddy fine to medium sand with few coarse grains 40-55" Clean fine to coarse sand, fining down
46-68" D 5	47-70" D	3 3 3 3 3 3 3 3		55-83" Mostly mud, large root at 57", fine organics mixed in 55-62", little very fine sand mixed with mud and abundant mica 77-83"
68-91" E 7	70-94" E	3 3 3 3 3 3 3 3		83" to Bottom of Core - Well sorted fine sand (clean) Bottom of Core 88", 7'4"
8				
9				
10				

COLLECTED BY MAB, WJS, GWC

WEATHER CONDITIONS Clear, hot, and 90°

LOCATION Aiken State Park SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:00

PROJECT Background Wetlands Soils Study CORE DATE 07/27/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 138" B: 120" A: 26"/19% B: 30"/25% A: 109" B: 89" 07/27/92

CORE COORDINATES 33°33.52N/ 81°29.88W LOGGER RSK CORE # BGW 007

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A 1	0-16" A		0-24" Black, top 12" mostly organics, very little mud or sand present, peat, sand content increasing with depth, mixed sand sizes, rooted from top to bottom
16-30" B 2	16-32" B		24-30" Brown mixed mud and sand, mixed grain sizes, rooted
30-45" C 3	32-49" C		30-49" Tan sand, coarsens down from fine to medium to a coarse sand
45-68" D 5	49-73" D		49-73" Medium gray/tan, coarse sand, some granule sized gravel, poorly sorted
68-90" E 7	73-97" E		73-85" Brown to medium gray, medium sand at top to gravel lag from 79-84", granules and pebbles
			85-104" Light gray, some rooting, a muddy very fine sand
			104" to Bottom of Core - Gray/tan, coarse sand, poorly sorted
			Bottom of Core 109", 9'1"

COLLECTED BY MAB, GWC, WJS

WEATHER CONDITIONS Sunny, clear, hot

LOCATION Aiken State Park SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 09:00

PROJECT Background Wetlands Soils Study CORE DATE 07/29/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 132" B: 120" A: 6.5"/5% B: 5.5"/5% A: 120" B: 111" 07/30/92

CORE COORDINATES 33°33.58N/ 81°29.18W LOGGER RSK CORE # BGW 008

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0			
0-19" A	0-19" A		0-18" Peat, black fine organic matter, heavily rooted to 6"
19-38" B	19-38" B		18-22" Mixed fine sand, mud, fine organics 20-36" Dark grey organic rich mud, moderate amount of roots, soft texture 18-27", more dense from 27-36"
38-57" C	38-57" C		36-43" Light brown mud, some fine organics and roots 43-71" Medium brown muddy fine sand with fine organics, very large wood fragments from 44-63", mica rich muddy sand
57-86" D	57-86" D		71-84" Clean fine to coarse poorly sorted sand, coarsening down with pebbles at 83-84"
86-114" E	86-114" E		84-87" Light brown well sorted fine sand, mica rich 87-111" Poorly sorted clean fine to coarse sand, very coarse with pebbles and little fine organics from 87-90" and 98-100", couple of roots and very coarse sand at 109-111", quartz piece 3 cm in diameter at 111"
111"			111" to Bottom of Core - Semi consolidated muddy sand/gravel at 111-113", 113" to bottom light color fine to medium mica rich muddy sand
Bottom of Core			Bottom of Core 120", 10'

COLLECTED BY MAB, WJS, GWC, VR

WEATHER CONDITIONS Clear, approximately 85°

LOCATION Aiken State Park SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:45

PROJECT Background Wetlands Soils Study CORE DATE 08/03/92

DEPTH: A: 144" B: 144" COMPACTION: A: 44"/30% B: 35"/24% RECOVERY: A: 101" B: 106" LOG DATE: 08/05/92

CORE COORDINATES 33°49.77N/ 80°49.21W LOGGER WJS CORE # BGW 009

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core A	Core B	Core B	
0-14" A	0-15" A		0-6" Dark grey, rooted orangic rich mud/peat 6-20" Black, rooted mostly organics, peat
14-28" B	15-20" B		20-30" Dark grey, rooted muddy sand, sand poorly sorted
28-41" C	30-46" C		30-42" Medium grey, medium to coarse sand, clean
41-62" D	46-68" D		42-48" Grey, mud, rooted, one large root 48-71" Tan, coarse sand, scattered gravel, clean (granules)
62-83" E	68-91" E		71-72" Grey thin mud 72-81" White, coarse sand, scattered gravel (granules), clean 81-82" Brown, thin organic rich mud
			82" to Bottom of Core - White and grey, one orange band at 88", coarse grained poorly sorted sand, some scattered small gravel (granules and pebbles), clean
			Bottom of Core 106", 8'10"

COLLECTED BY WJS, MAB, PS, VR

OTHER CONDITIONS Rain, ~80, very wet!

LOCATION Congaree National Mon. SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:15

PROJECT Background Wetlands Soils Study CORE DATE 08/02/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 143" B: 149" A: 24"/17% B: 27"/18% A: 118" B: 121" 08/03/92

CORE COORDINATES 33°49.10N/ 80°48.81W LOGGER RSK CORE # BGW 010

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0			
0-10" A	0-18" A		0-3" Dark brown heavily rooted organic rich mud 3-18" Soft mud mottled from 3-9", grey 9-18", decreasing organics with depth, rooted material increases again at 14-18"
18-33" B	10-33" B		18-34" Heavily rooted organic rich grey mud, few wood fragments and stems
33-49" C	33-50" C		34-77" Soft grey mud, moderate rooting, mostly fine fibric roots, large wood fragment 39-43", slight increase in rooted material from 57-77", abundant wood fragments at 69-72"
49-74" D	50-75" D		77-85" Grey mud with abundant fine rooted material, firmer texture than 34-77"
74-98" E	75-100" E		85-87" Poorly sorted fine to very coarse sand stringer 87-92" Black muddy peat, wood fragments, stems, leaves, roots, etc., very little mud, no sand
92"			92" to Bottom of Core - Poorly sorted fine to very coarse sand, little mud mixed in from 92-99", clean from 99" to Bottom, up to pea size gravel
10			Bottom of Core 118", 9'10"

COLLECTED BY WJS, GWC, RSK, KD

WEATHER CONDITIONS Partly cloudy, humid, 85-90°

LOCATION Congaree National Mon. SOIL GROUP Group 5

A CORE LOG

CLIENT Westinghouse Savannah River Co.

Time 13:00

PROJECT Background Wetlands Soils Study

CORE DATE 08/02/92

RE DEPTH

COMPACTION

RECOVERY

LOG DATE

A: 135" B: 67"

A: 30"/22% B: 18"/27%

A: 103" B: 47"

08/03/92

CORE COORDINATES 33°49.56N/ 80°49.42W

LOGGER RSK

CORE # BGW 011

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A	0-16" A		0-4" Medium brown organic rich mud with abundant roots 4-16" Light grey to light brown mud with moderate rooting, less roots than 0-4", soft mud
16-29" B	16-31" B		16-38" At 16" dark grey mud with abundant roots and organic material, decreasing organic content with depth, medium size roots throughout
29-44" C	31-47" C		38-90" Muddy peat, abundant very large wood fragments, much of wood is same diameter as core, 81-90" smaller wood fragments, roots, etc., 38-81" also contains abundant roots and small wood fragments
44-66" D	47-70" D		
66-88" E	70-94" E		
			90" to Bottom of Core - Light grey well sorted fine muddy sand, few wood fragments
			Bottom of Core 103", 8'7"

COLLECTED BY GWC, RSK, WJS

WEATHER CONDITIONS Partly cloudy, 85-90°

LOCATION Congaree National Mon.

SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:30

PROJECT Background Wetlands Soils Study CORE DATE 08/02/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 27" B: 20" A: 0"/0% B: 0"/0% A: 120" B: 19" 08/03/92

CORE COORDINATES 33°49.56N/ 80°49.42W LOGGER RSK CORE # BGW 012

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-20" A	0-20" A		0 - Bottom of Core - Medium brown hard packed mud, moderate rooting at top 3", decreasing organics with depth
20-40" B			Bottom of Core 27", 2'3"
40-60" C			Additional samples (B, C, and D) by hand auger and E sample by pushing barrel into hole and extracting. Volatiles sampled in field for B, C, and D. Notes on sediments below 27". B sample - Medium brown hard packed mud, few roots C sample - Medium brown to mottled light mud, few small roots, softer than above, wet
60-90" D			D sample - Well sorted fine sand, light grey to light brown, mica rich E core sample - Clean well sorted fine mica rich sand, notable heavy mineral bands, orange color bands on light grey sand, bottom 8" slight increase in grain size, color to orange
90-120" E			

COLLECTED BY WJS, GWC, RSK, VR, KD

OTHER CONDITIONS Overcast, light rain, 80-85°

LOCATION Congaree National Mon. SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:45

PROJECT Background Wetlands Soils Study CORE DATE 08/03/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 : 62" B: A: 5"/8% B: A: 120" B: 08/05/92

CORE COORDINATES 33°49.30N/ 80°49.49W LOGGER RSK CORE # BGW 013

Sample Interval (feet)	Soil Profile		DESCRIPTION
	Core A	Core A	
0-10" A			0-13" Orange rooted mud, abundant roots in the top 6", then fewer roots
13-24"			13-24" Grey - mud - tight, some scattered rooting
18-37" B			24-53" Grey with orange dots - 1 to 2 mm in size, mud, orange dots are iron stained, beginning of iron concretion, random rooting
37-55" C			53" to Bottom of Core - Light grey with random orange dots, mud with scattered sand (fine grained)
55-83" D			Bottom of Core 57", 4'9"
83-110" E			D and E samples collected by hand auger. D sample - same as 53" to Bottom of Core E sample - dark to medium grey, mixed sand and mud, sand sizes from fine to coarse

COLLECTED BY WJS, MAB

OTHER CONDITIONS Clear, 90+

LOCATION Congaree National Mon. SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:30

PROJECT Background Wetlands Soils Study CORE DATE 08/04/92

DEPTH COMPACTION RECOVERY LOG DATE
 A: 92" B: 95" A: 5"/5% B: 5"/5% A: 87" B: 93" 08/06/92

CORE COORDINATES 33°30.89N/ 80°29.68W LOGGER RSK CORE # BGW 014

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-19" A 1	0-19" A	0-3" 3-3" 3-3" 3-3"	0-5" Dark brown fine organic matter/little mud heavily rooted, scattered very fine sand 5-11" Fine organic material mixed with fine sand, dark brown, more than 50% sand, little rooting
19-38" B	19-38" B		11-38" Brown to light grey sand, mud content decreases with depth, sand is clean from 21-37", sand is fine
38-57" C 4	38-57" C		38-62" Hard packed muddy sand, increasing mud content with depth, very hard packed from 53-62", >50% mud 53-62", sand is fine grain to 53", 53-62" sand is fine to coarse, light grey
57-85" D 6	57-85" D		62" to Bottom of Core - Light grey sandy mud, very tight packed, sand is fine to coarse, greater than 50% mud
85-114" E 8	85-114" E		Bottom of Core 87", 7'3"

COLLECTED BY GWC, RSK

WEATHER CONDITIONS Partly cloudy, 79°

LOCATION Santee State Park SOIL GROUP Group 2

ATHENA CORE LOG

CLIENT Westinghouse Savannah River Co.

Time 13:00

PROJECT Background Wetlands Soils Study

CORE DATE

08/04/92

CORE DEPTH

COMPACTION

RECOVERY

LOG DATE

A: 70" B: 65"

A: 3 3/4% B: 1 1/2%

A: 120" B: 63"

08/06/92

CORE COORDINATES 33° 31.10N/ 80° 29.53W

LOGGER RSK

CORE # BGW 015

Sample Interval
(feet)Soil
Profile

Core B

Core A

Core A

DESCRIPTION

Sample Interval (feet)	Core B	Core A	Core A	DESCRIPTION
0-6"	A	0-6"	A	0-2" Black root mat, fine organics
6-39"	B	6-38"	B	2-6" Black to medium brown organic rich sand, decreasing organic content with depth 6-22" Medium brown muddy fine to medium sand, few roots from 6-10"
39-59"	C	38-58"	C	22-39" Medium brown to grey hard packed sandy mud, small wood fragment at 24", sand content decreases with depth 39-57" Hard packed mud, grey and light tan with orange iron stains, very little very fine sand scattered throughout
59-88"	D	58-90"	D	57" to Bottom of Core - Light tan hard packed mud with very little very fine scattered sand, decayed root trace (brown) Bottom of Core 66", 5'6"
88-118"	E	86-120"	E	D and E samples collected by hand auger. Description: D Sample: same as 57" to bottom E Sample: Light grey muddy sand, much less mud than above, mostly sand, fine to medium sand
10				

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Hot, clear, humid, ~ 95°

LOCATION Santee State Park

SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:00

PROJECT Background Wetlands Soils Study CORE DATE 08/04/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 101" B: 91" A: 1"/1% B: 0"/0% A: 99" B: 92" 08/06/92

CORE COORDINATES 33°31.02N/ 80°29.40W LOGGER RSK CORE # BGW 016

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-20"	0-20"	1-52' 2-32' 3-32'	0-8" Black fine organic matter heavily rooted to 6"
20-40"	20-40"	3-32' 4-32'	8-34" Black to dark brown mixed mud, fine organic matter with very little sand in areas, 20-24" increase in sand and small roots, 30-32" same as 20-24"
40-59"	40-59"	5-32' 6-32'	34-45" Gradational transition from above to light grey mud, this section moderately rooted, transition zone shows mixed appearance of the organic rich sediments and light grey mud
59-89"	59-89"	7-32' 8-32'	45-81" Light grey hard packed mud with very little very fine scattered sand
89-119"	89-119"	9-32' 10-32'	81" to Bottom of Core - Hard packed light grey mud with orange iron staining
			Bottom of Core 99", 8'3"
			Additional E sample collected by hand auger.

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Partly cloudy, hot

LOCATION Santee State Park SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 18:00

PROJECT Background Wetlands Soils Study CORE DATE 08/04/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 58" B: 56" A: 14"/24% B: 14"/25% A: 91" B: 40" 08/06/92

CORE COORDINATES 33°31.40N/ 80°29.63W LOGGER RSK CORE # BGW 017

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-15" A	0-15" A	32-37	0-4" Black fine organic material heavily rooted, scattered fine sand 4-17" Black to dark grey mixed sand and mud/fine organics, sand is fine with few medium grains, few roots
15-30" B	15-30" B	37-42	17-25" Fine to medium sand with increasing mud content with depth
30-45" C	30-46" C	42-45"	25" to Bottom of Core - Hard packed mud with scattered fine to very coarse sand, light grey to orange iron stained at 42-45", few random small roots
45-68" D	46-69" D	45"-3'9"	orange Bottom of Core 45", 3'9"
68-90" E	69-91" E		D and E samples collected by hand auger. D Sample - Light to dark orange mixed sand and mud, - 50/50 sand/mud, sand is fine to very coarse E Sample - Dark orange muddy sand, more sand, less mud than D sample, scattered roots, sand is fine to medium mostly finer grains than D sample
8			
9			
10			

COLLECTED BY RSK, GWC

WEATHER CONDITIONS Clear, hot, 90+

LOCATION Santee State Park SOIL GROUP Group 2

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.		Time 08:20	
PROJECT Background Wetlands Soils Study			CORE DATE 08/03/92		
CORE DEPTH A: 142" B: 142"		COMPACTION A: 19"/13% B: 19"/13%		RECOVERY A: 121" B: 123"	
LOG DATE 08/05/92					
CORE COORDINATES 33°49.76N/ 80°49.17W			LOGGER WJS		CORE # BGW 018
Sample Interval (feet)		Soil Profile		DESCRIPTION	
Core B	Core A	Core A			
0	0			0-7" Dark brown, rooted organic rich mud/peat, scattered fine sand	
0-17" A 1	0-17" A			7-18" Grey, rooted sand mostly fine grained, some mud	
17-34" B	17-34" B			18-30" Grey, some rooting but not as much as above, mixed mud and sand, ~ 50/50, fairly tight, fine to medium grained sand	
3				30-55" Grey, muddy sand, mostly fine sand, one very large root	
34-52" C	34-51" C			55-66" Tan/grey, mostly a coarse sand, some mud	
4				66-72" Grey, pure mud	
52-78" D	51"-77" D			72-96" Tan and orange, coarse sand, some small gravel, one thin black peat/mud layer at 7', clean no mud	
6				black	
7				96-101" Grey, pure mud	
78-104" E	77-102" E			101" to Bottom of Core - White/tan, coarsening down interval, medium to coarse sand down to mixed sand and gravel (granules to very small pebbles), clean no mud	
8				Bottom of Core 121", 10'1"	
9					
10					
COLLECTED BY WJS, MAB, PS, VR					
WEATHER CONDITIONS Rain, cool					
LOCATION Congaree National Mon.			SOIL GROUP Group 1		

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.		Time 11:00	
PROJECT Background Wetlands Soils Study			CORE DATE 07/30/92		
CORE DEPTH A: 116" B: 103"		COMPACTION A: 4"/5% B: 9"/9%		RECOVERY A: 106" B: 96"	
LOG DATE 07/31/92					
CORE COORDINATES 33°13.31N/ 80°21.25W			LOGGER WJS		CORE # BGW 019
Sample Interval (feet)		Soil Profile		DESCRIPTION	
Core B	Core A	Core A			
0	0	3 4 1 1		0-5" Dark brown, rooted fine sand, some organics	
0-10" A	0-10" A			5-16" Grey, fine sand well sorted, clean down	
1					
10-36" B	10-38" B			16-32" Mottled orange/tan, hard, mostly clay mixed with some sand	
2					
3				32-57" Mottled orange/tan, softer and more sand, 50/50 mud/sand, fine sand content increases with depth	
36-55" C	38-57" C				
4					
5				57-78" Tan, muddy sand, gravel content at base of core, both flat and round pebbles	
55-82" D	57-86" D				
6					
7				78-101" Green at the top, brown at the base, possibly burrowed, infilled with mud and sand, most of section is a muddy sand	
82-109" E	86-114" E				
9				101" to Bottom of Core - Green, muddy fine sand, shell fragments	
10				Bottom of Core 106", 8'10"	
COLLECTED BY MAB, WJS, VR					
WEATHER CONDITIONS Clear, hot, humid					
LOCATION Francis Biedler Forest			SOIL GROUP Group 4		

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:15

PROJECT Background Wetlands Soils Study CORE DATE 07/30/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 116" B: 120" A: 6"/5% B: 20"/17% A: 110" B: 100" 07/31/92

CORE COORDINATES 33°13.12N/ 80°21.30W LOGGER RSK CORE # BGW 020

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-10" A	0-10" A	0-5" 5-11"	0-5" Dark brown, rooted organic rich, mixed fine sand and mud 5-11" Brown, rooted mixed fine sand with a little mud and organics
10-38" B	10-38" B	11-24" 24-64"	11-24" Brown, well sorted fine sand, only very slight amounts of mud and organics 24-64" Mottled muddy sand, mud decreases down this interval from a sandy mud (fine sand) to a muddy sand at 64", orange/tan and grey
38-50" C	38-57" C	57-86"	64-89" Light grey muddy fine sand
50-75" D	57-86" D	86-114"	89-100" Orange and tan mud, one fine sand stringer
75-100" E	86-114" E		Sharp contact - brown 3" thick above contact 100" to Bottom of Core - Yellow/green muddy sand, (fine sand), some white flakes, shell fragments?
			Bottom of Core 110", 9'2"

COLLECTED BY MAB, WJS, VR

WEATHER CONDITIONS Clean, hot, and humid

LOCATION Francis Biedler Forest SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 13:30

PROJECT Background Wetlands Soils Study CORE DATE 07/22/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 ∴ 153" B: A: 52"/34% B: A: 99" B: 07/22/92

CORE COORDINATES 33°19.41N/ 81°50.15W LOGGER RSK CORE # BGW 021

Sample Interval (feet)	Soil Profile	DESCRIPTION
0	Core A	
0-22" A		0-55" Black organic rich sand, sand is fine, heavily rooted at top 2", random roots throughout - thin fibric to wood fragments, increasing sand content with depth, sand is fine grain, abundant fine organic matter
20-40" B		
40-60" C		
60-80" D		55-63" Fine to medium sand with little organics mixed in, medium size mica fragments, sand coarsens down
80-99" E		63" to Bottom of Core - Fine to very coarse orange sand, series of coarsening down sands, typical 6" fine to a fine to very coarse bottom 2" - little mud mixed with sand, moderate medium size mica flakes
		Bottom of Core 99", 8'3"
10		

COLLECTED BY RSK, MAB, GWC

OTHER CONDITIONS Partly cloudy, approximately 90°

LOCATION Jackson Audobon SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 13:45

PROJECT Background Wetlands Soils Study CORE DATE 08/06/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 156" B: A: 35"/22% B: A: 115" B: 08/07/92

CORE COORDINATES 33°19.10N/ 81°52.13W LOGGER WJS CORE # BGW 022

Sample Interval (feet)		Soil Profile	DESCRIPTION
	Core A	Core A	
0	0-9" A		0-9" Rust/brown - rooted compact mud, friable, brittle
1	9-18" B		9-18" Orange - mud - feels like silt, some rooting not as brittle, harder than A
2	18-32" B		18-32" Yellow/orange, mottled mud, yellow and orange, some rooting, but less than above, very tight
3	32-54" C		32-54" Orange, hard very fine sand, some mud, approximately 20%, some cementation
4	37-47" C		
5	47-64" D		54-82" Yellow fine sand, well sorted, lots of mica, clean sand
6	64-85" E		
7			82" to Bottom of Core - Yellow with orange zones, medium to coarse sand grading down to mixed sand and small gravel (granules and small pebbles) at bottom half of this interval, clean sand
8			
9			
10			Bottom of Core 115", 9'7" * Double entry core, compaction % different @ different intervals

COLLECTED BY MAB, WJS

WEATHER CONDITIONS Overcast, ~ 85°

LOCATION Jackson Audobon SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:30

PROJECT Background Wetlands Soils Study CORE DATE 07/23/92

DEPTH COMPACTION RECOVERY LOG DATE
 A: 132" B: 108" A: 32"/24% B: 27"/25% A: 100" B: 82" 07/23/92

CORE COORDINATES 33°19.58N/ 81°51.77W LOGGER RSK CORE # BGW 023

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-10" A	0-10" A	3-3	0-4" Black fine organic material with abundant small to medium size roots
10-30" B 2	10-30" B	3-1	4-36" Fine sand with fine organic material, few small to medium roots, decreasing Organic material with depth
30-45" C	30-45" C	3-1	36-52" Light grey clean fine to medium sand, slight coarsening downward trend
45-68" D 5	45-68" D	3-1	52-63" Coarse to very coarse sand with up to 1/2" gravel, slight increase in fine organic material, medium brown
68-90" E 7	68-90" E	3-1	63-73" Fining down sand from medium to coarse at 63" to fine well sorted at 73", light orange, mud lense at 65-66", abundant mica in mud and fine sand
		3-1	73-87" Coarse to very coarse sand and pea gravel, two beds of pea gravel (76-77" and 84-87"), light orange grades to dark orange with depth, pea gravel bed at 76-77' has little rafted organic material mixed in
		3-1	87" to Bottom of Core - Light orange mud seam 87-90", interbedded mud seams and sandy muds, mottled at bottom, mostly mud
		3-1	Bottom of Core 100", 8'4"

COLLECTED BY MAB, GWC

OTHER CONDITIONS Mostly cloudy, 90+

LOCATION Jackson Audobon SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 15:00

PROJECT Background Wetlands Soils Study CORE DATE 07/22/92

DEPTH A: 132" B: _____ COMPACTION A: 7"/5% B: _____ RECOVERY A: 124" B: _____ LOG DATE 07/23/92

CORE COORDINATES 33°21.13N/ 81°51.88W LOGGER RSK CORE # BGW 024

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0	0-8" A	7-3 -3-2	0-8" Abundant organic fine material, abundant fine roots to stems and wood fragments, black
1		7-3	8-14" Fine sand with little fine organics mixed in, few roots and wood fragments, dark grey
2	8-38" B		14-72" Fine sand with little mud mixed in with depth, few iron concretions, light grey 2" band of clean coarse sand at 50", significant increase in mud content from 45-72"
3			
4	38-57" C		
5			
6	57-85" D		72" to Bottom of Core - Fine sand with little mud grading to clean fine-coarse sand, color bedding light grey to white to light orange/black alternating randomly, color bands 1mm to several cm thick, little mica, bottom = clean sand
7			
8	85-114" E		
9			
10			Bottom of Core 124", 10'4"

COLLECTED BY RSK, GWC, MAB

WEATHER CONDITIONS Cloudy, ~90, storms approaching

LOCATION Jackson Audobon SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:00

PROJECT Background Wetlands Soils Study CORE DATE 07/23/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 132" B: 120" A: 28"/21% B: 24"/20% A: 103.5" B: 96" 07/24/92

CORE COORDINATES 33°19.06N/ 81°51.01W LOGGER RSK CORE # BGW 025

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A	0-16" A	3-7 3-7 3-7	0-10" Fine organic material heavily rooted to 3", increasing fine sand content, decreasing fine organic material with depth, few roots to 7", color from black to light grey grading
16-32" B	16-32" B	21-24 32-48	10-48" Clean fine sand with few roots and mud lense at 21-24", little iron staining from 32-48", sands are fine to medium
32-48" C	32-48" C	3	
48-71" D	48-71" D		48-65" Poorly sorted fine to very coarse sand, pebbles and gravel up to 2 cm from 61-65", sands are clean, light grey
71-95" E	71-95" E		65" to Bottom of Core - Clean sands, mostly fine to coarse sand poorly sorted, light orange, couple beds of pebbles and gravel up to 3 cm at 83-84", 99-100", 90-93", abundant mica 95-97", manganese (many small) concretions from 99-103"
			Bottom of Core 103", 8'7"

COLLECTED BY GWC, MAB

OTHER CONDITIONS Cloudy, rain

LOCATION Jackson Audobon SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 13:20

PROJECT Background Wetlands Soils Study CORE DATE 08/24/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 120" B: 119" A: 12"/10% B: 11"/9% A: 106.5"B: 106.5" 08/26/92

CORE COORDINATES 33°19.30N/ 81°41.41W LOGGER WJS CORE # BGW 026

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-12" A	0-12" A		0-7" Brown rooted mud, top is pure mud, some sand (fine) at 7" 7-19" Tan (mottled), some rooting (larger than above), mostly sand poorly sorted, very little mud
12-36" B	12-36" B		19-40" Dark grey, muddy sand, fine roots at the top of the interval, larger roots down interval, sand moderately sorted
36-55" C	36-54" C		40-46" Black mud, rooted 46-90" Medium grey, muddy sand, ~30% mud, 70% sand, poorly sorted, some small gravel, pebbles, random rooting, gravel content increases with depth, sand fairly uniform, medium
55-82" D	54-81" D		
82-109" E	81-108" E		90-103" Light grey/white, tight muddy sand, medium poorly sorted 103" to Bottom of Core - Orange, tight muddy sand, medium poorly sorted Bottom of Core 106.5", 8'10.5"
10			

COLLECTED BY WJS, MAB, GWC

WEATHER CONDITIONS Sunny, windy, ~85°

LOCATION Savannah River Site SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 15:00

PROJECT Background Wetlands Soils Study CORE DATE 09/08/92

DEPTH COMPACTION RECOVERY LOG DATE
 A: 132" B: 144" A: 9"/7% B: 21"/15% A: 123.5" B: 121" 09/10/92

CORE COORDINATES 33°18.48N/ 81°41.29W LOGGER WJS CORE # BGW 027

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-17" A	0-19" A		0-55" Black, top 4" heavily rooted, remainder of the interval is rooted very organic rich mixed mud and sand, probably not a peat, sand size varies fine to coarse but mud/organics dominate this interval
17-34" B	19-37" B		
34-51" C	37-56" C		
51-77" D	56-84" D		55-69" Mottled black and tan, sand with organic stained zones, sand is poorly sorted fine to coarse 69-76" Tan, interbedded medium, fine, coarse sand beds
77-102" E	84-112" E		76-78" Tan, pure mud 78-104" Tan, clean sand throughout, mostly medium to coarse sand, some random scattered small gravels - granules/small pebbles
			104" to Bottom of Core - Orange/tan, mixed grain sizes from fine sand to small gravel granules, some mud at base of interval, clean sand at top of interval, 120-123" tan mud
			Bottom of Core 123.5", 10'3.5"

COLLECTED BY MAB, GWC

WEATHER CONDITIONS Hot, humid, 90's

LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:30

PROJECT Background Wetlands Soils Study CORE DATE 08/24/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 132" B: 132" A: 3"/2% B: 10"/8% A: 133" B: 122" 08/26/92

CORE COORDINATES 33°18.25N/ 81°41.56W LOGGER WJS CORE # BGW 028

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-10" A	0-20" A	0-12"	Black, rooted organic rich, very little sand at the top, sand increasing down interval, some mud
10-18" B	20-39" B	12-32"	Black, muddy sand, medium, rooted, but not as densely as 0-12", and larger roots
18-37" B	39-59" C	32-50"	Brown, mostly sand, medium to coarse, some rooting (large roots), ~ 10 to 15% mud
37-55" C	59-88" D	50-57"	Tan, tight sandy mud, assorted sand sizes, very sharp contact at the top of interval
55-83" D	88-110" E	57-60"	Tan, very tight mud, no sand
83-110" E		60-72"	Black at base of interval, grey at top, rooted within the bottom 2/3 of interval, mud - soft no sand
		72-89"	Black muddy sand grading into a cleaner sand, sand is medium to coarse
		89-106"	Tan to orange, very poorly sorted sand, some mixed gravels (granules and pebbles), sand is clean
		106" - Bottom of Core - 106-120"	white hard muddy sand at top of interval, from 120-133" less mud, mostly sand, sand is fine grained and well sorted
		Bottom of Core 133", 11'2"	

COLLECTED BY WJS, MAB, GWC

WEATHER CONDITIONS Partly cloudy, windy, ~85°

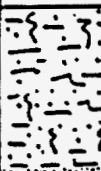




LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:30

PROJECT Background Wetlands Soils Study CORE DATE 08/31/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 124" B: 114" A: 14"/11% B: 23"/20% A: 109" B: 95" 09/10/92

CORE COORDINATES 33°11.54N/ 81°35.80W LOGGER WJS CORE # BGW 029

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A	0-16" A		0-5" Brown, rooted organic rich, leaves and peat material abundant, no sand, some mud 5-16" Grey to black, grey upper zone near pure mud, darker zone, more organics but still mud, random sand, some rooting
16-32" B	16-36" B		16-18" Tan, fairly clean sand, ~10% mud 18-28" Tan, tight mud, some scattered fine sand 28-32" Near white medium sand, moderate sorting, clean
32-48" C	36-56" C		32-48" Light tan to brown compact slightly muddy sand, mostly fine sand, some mixed clay spots 48-56" Tan, medium sand above and below loose
48-72" D	53-80" D		56-68" Tan, tight muddy sand, fine sand, ~10% mud 68-86" Dark tan, mixed mud and sand, 30% mud, 70% sand (fine sand)
72-96" E	80-107" E		86-92" Grey, tight mud, scattered sand, fine grained 92" to Bottom of Core - Dark grey, muddy sand, soft sands are mixed grain sizes
9			Bottom of Core 109", 9'1"

COLLECTED BY WJS, MAB, GWC

WEATHER CONDITIONS Sunny, warm, ~85°

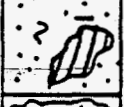

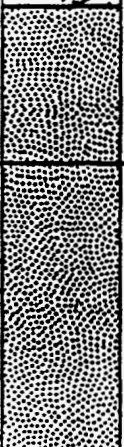
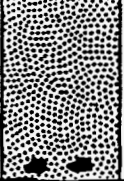
LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:00

PROJECT Background Wetlands Soils Study CORE DATE 08/20/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 144" B: 142" A: 22"/15% B: 15"/11% A: 121" B: 118" 08/20/92

CORE COORDINATES 33°10.64N/ 81°36.50W LOGGER RSK CORE # BGW 030

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-18" A	0-17" A	? . ? - ? . - - ? - ? - ? - ? - ? .	0-16" Black organic material with very little mud, little scattered fine sand at top, increasing with depth, brown sand stringer 9-10", abundant fine roots 16-43" Dark brown sand little mud mixed in, moderate root content, large wood fragment at 38-43"
18-32" B	17-34" B	- . ? . ? . ? . ? . ? . ? . ? .	
36-55" C	34-51" C	? 	43-63" Dark brown moderately rooted fine sand with very little mud
53-80" D	51-77" D		63-77" Light brown clean fine sand with few scattered medium grains
80-107" E	77-102" E		77-118" Clean well sorted fine sand, light orange 77-81", white 81-118"
			118" to Bottom of Core - Light orange muddy fine sand, couple of pieces of well rounded gravel up to 3 cm. Bottom of Core 121", 10'1"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Cloudy, 78°

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:45

PROJECT Background Wetlands Soils Study CORE DATE 08/20/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 130" B: 133" A: 4"/3% B: 10"/8% A: 121" B: 113" 08/22/92

CORE COORDINATES 33°10.76N/ 81°36.42W LOGGER RSK CORE # BGW 031

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core A	Core B	Core B	
0-19" A	0-19" A	? ? ? ? ? ? ? ? ? ? ? ? ? ? ?	0-19" Black organic rich fine sand, abundant rooting to 7", moderate rooting to 19"
19-39" B	19-37" B	? ? ? ? ? ? ? ? ? ? ? ? ? ? ?	19-37" Dark brown organic rich fine sand to 34", abundant root/wood fragment content, 34-37" fine to medium sand, less fine organics, large wood fragments
39-58" C	37-55" C	? ? ? ? ? ? ? ? ? ? ? ? ? ? ?	37-41" Medium brown fine well sorted mud mixed with sand, mostly sand, medium size wood fragment, few pebbles at 41" 41-53" Light brown well sorted fine sand with very little mud, few scattered thin fibrous roots, one medium size root
58-87" D	55-83" D	? ? ? ? ? ? ? ? ? ? ? ? ? ? ?	53" - Bottom of Core - Light green fine well sorted sand with little mud, few scattered roots to 86", 86" to bottom scattered broken shell fragments (calcium carbonate), possibly marine, slight increase in mud content below 107", (2) 1" thick air pockets at 94" and 98", little cementation of green sand between 88" and 100"
87-116" E	83-110" E	? ? ? ? ? ? ? ? ? ? ? ? ? ? ?	Bottom of Core 114", 9'6", Core B used due to large air pockets in Core A

COLLECTED BY WJS, MAB

WATHER CONDITIONS Cloudy, 80°

LOCATION Savannah River Site SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 09:15

PROJECT Background Wetlands Soils Study CORE DATE 08/18/92

DEPTH: 21" B: _____ COMPACTION: A: 5"/24% B: _____ RECOVERY: A: 120" B: _____ LOG DATE: 08/19/92

CORE COORDINATES 33°09.04N/ 81°35.21W LOGGER RSK CORE # BGW 032

Sample Interval (feet)	Soil Profile	DESCRIPTION
0		
0-6" A		0-6" Dark brown heavily rooted organic rich mud, 0-1" root mat
6-17"		6" to Bottom of Core - Light brown dewatered mud
17-1'5"		Bottom of Core
B		B Sample - Light brown sand mixed with mud, orange, red, and black discolorations, portions are mostly mud, portions mostly sand, overall greater than 50% mud
40-60" C		C Sample - Light grey sandy mud, some orange mottling, sand is fine to very coarse, few granules, greater than 50% mud
D		D Sample - Mottled orange and light grey sandy mud, wet scattered few roots, sand is fine to very coarse
60-90" D		E Sample - Orange and light grey mottled sandy mud, more orange, less light grey than sample D, sand is fine to very coarse
90-120" E		
10		

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Overcast, cool, 72°

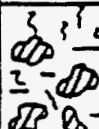



LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 09:00

PROJECT Background Wetlands Soils Study CORE DATE 08/12/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 129" C: 138" A: 36"/28% C: 48"/35% A: 72" C: 85" 08/13/92

CORE COORDINATES 33° 24.16N/ 81° 36.49W LOGGER RSK CORE # BGW 033

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core A	Core C	Core C	
0-13" A	0-14" A	? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ?	0-17" Black sapric peat, (fine organic material), little fine rooting
13-26" B	14-29" B		17-34" Dark brown muddy peat, abundant fine roots, large wood fragments
26-39" C	29-43" C		34-37" Black gradational sand/peat transition, from dark brown/black peat to clean white well sorted very fine sand
39-59" D	43-65" D		37-42" White well sorted very fine sand 42" to Bottom of Core - Poorly sorted orange fine to very coarse sand, pebbles, and gravel up to 1.5 cm
59-72" E	65-86" E		Bottom of Core 72", 6'0"
7			
8			
9			
10			

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Hot, humid, clear

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.	Time 08:30
PROJECT Background Wetlands Soils Study		CORE DATE 08/13/92	
CORE DEPTH A: 138" B: 132"		COMPACTION A: 47"/34% B: 44"/33%	RECOVERY A: 91" B: 85"
			LOG DATE 08/13/92
CORE COORDINATES 33°23.42N/ 81°36.74W		LOGGER RSK	CORE # BGW 034

Sample Interval (feet)		Soil Profile		DESCRIPTION
Core B	Core A	Core A		
0-13" A	0-13" A	{ } { } { } { } { } { } { } { } { } { } { } { }		0-32" Black sandy peat, dark black with moderate rooting to 13", 13-32" little lighter color, scattered wood fragments, heavily rooted
13-27" B	13-26" B	? ? ? ? ? ? ? ? ? ? ? ?		
27-40" C	26-40" C	? ? ? ? ? ? ? ? ? ? ? ?		32-48" Clean light grey fine to coarse sand, mostly fine to medium
40-60" D	40-59" D	? ?		48-56" Clean fine to very fine sand, granules and pebbles 56-58" Clean well sorted fine sand 58-68" Poorly sorted fine to very coarse clean sand, scattered abundant granules and pebbles, 1" wide clean well sorted fine sand stringer at 65"
60-80" E	59-79" E	? ?		68-74" Dark orange poorly sorted fine to very coarse sand with pebbles and granules 74-87" Well sorted fine sand, clean, white to 77", yellow from 77-80", orange from 80-87"
7				87" to Bottom of Core - Fine to medium sand with scattered coarse grains, black, organic rich 87-88", dark orange 88" to bottom
8				Bottom of Core 91", 7'7"
9				
10				

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Cool, overcast

LOCATION Savannah River Site	SOIL GROUP Group 2
------------------------------	--------------------

ATHENA CORE LOG

CLIENT Westinghouse Savannah River Co.

Time 13:30

PROJECT Background Wetlands Soils Study

CORE DATE 08/12/92

E DEPTH
A: 159" B: 156"

COMPACTION
A: 41"/26% B: 18"/12%

RECOVERY
A: 111" B: 139"

LOG DATE
08/13/92

CORE COORDINATES 33°24.16N/ 81°36.83W

LOGGER WJS

CORE # BGW 035

Sample Interval (feet)

Soil Profile

Core B	Core A	Core A	DESCRIPTION
0			
0-18" A	0-15" A		0-10" Dark brown - mostly organics (peat-hemic) rooted throughout, random sand grain, possibly some mud
18-35" B	15-30" B		10-48" Black - rooted/woody material present throughout, sand content increases with depth in this interval, possibly some mud very organic rich
35-53" C	30-44" C		
53-79" D	44-67" D		48-63" Brown, rooted, mixed mud and organics and sand (fine), roots look more in situ
79-106" E	67-89" E		63-65" White sand mostly medium grained, some assorted sizes, fine and coarse 65" to Bottom of Core - Orange, medium sand only a minor amount of mud present, most common between 6 and 7 ft., occasional very coarse sand to small gravel piece present (granule in size), good clean sand at the base of the core
			Bottom of Core 111", 9'3"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Hot, humid, clear

LOCATION Savannah River Site

SOIL GROUP Group 1

ATHENA CORE LOG

CLIENT Westinghouse Savannah River Co.

Time 13:30

PROJECT Background Wetlands Soils Study

CORE DATE 08/25/92

CORE DEPTH

120" B:

COMPACTION

A: 8"/6% B:

RECOVERY

A: 120" B:

LOG DATE

08/26/92

CORE COORDINATES 33°20.27N/ 81°40.64W

LOGGER WJS

CORE # BGW 036

Sample Interval
(feet)Soil
Profile

Core A

Core A

DESCRIPTION

0-12"

A

0-11" Black highly rooted rich organic layer, possibly a peat, soft/wet/dark (black), mixed fine sand and mud

1

12-40"

B

11-40" Light tan tight mud with minor amounts of sand, blue grayish in tone toward bottom of interval, sand lense was encountered within interval

2

3

40-60"

C

40-60" Medium grey with some orange mottling, muddy, sand (mostly medium)

4

5

60-90"

D

60-90" Mottled tan/grey, a little white with orange mottling, white sediment is muddier than the tan/grey, tan/grey has abundant medium sand

6

7

90-120"

E

90" to Bottom of Core - Light tan, mostly mud, some fine sand, occasional large mica flakes

8

9

Bottom of Core 120", 10'0"

10

COLLECTED BY WJS, MAB, GWC

CONDITIONS Partly cloudy, windy, pleasant

LOCATION Savannah River Site

SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:00

PROJECT Background Wetlands Soils Study CORE DATE 08/21/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 139" B: 140" A: 45"/32% B: 48"/34% A: 61" B: 90" 08/22/92

CORE COORDINATES 81°22.54N/ 81°37.16W LOGGER RSK CORE # BGW 037

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core A	Core B	Core B	
0			
0-14" A 1	0-14" A		0-1" Black peat/root mat 1-14" Dark brown organic rich sand, sand is fine to medium with very few scattered coarse grains, moderate rooting
14-27" B 2	14-27" B		14-23" Soft black mixed medium and fine organic material, heavily rooted, soupy texture 19-23"
27-41" C 3	27-41" C		23-27" Dark brown well sorted organic rich sand, few roots 27-52" Clean well sorted fine sand, light grey, 2 bands of black organic rich sand at 35-37" and 42-46", sand size varies in places, 28-33" fine to medium, 33-47" well sorted fine (1/2" band of sand at 38" up to granule size), 47-50" poorly sorted sand with granules and pebbles, 50-52" well sorted fine
41-61" D 5	41-61" D		52" to Bottom of Core - Dark orange poorly sorted sand with granules, pebbles, and gravel up to 2 cm.
61-82" E 6	61-82" E		
7			
8			Bottom of Core 90", 7'6"
9			Core B was used due to loss of material from Core A
10			

COLLECTED BY WJS, MAB

ATHER CONDITIONS Cloudy, ~70°

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG

CLIENT Westinghouse Savannah River Co.

Time 10:15

PROJECT Background Wetlands Soils Study

CORE DATE 08/24/92

CORE DEPTH
A: 115" B: 120"

COMPACTION
A: 15"/13% B: 12"/10%

RECOVERY
A: 102" B: 107"

LOG DATE
08/26/92

CORE COORDINATES 33°22.19N/ 81°36.96W.

LOGGER WJS

CORE # BGW 038

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0	0-20"	0-20"	0-5" Dark brown, abundant wood/roots, mixed fine sand/mud
1	A	A	5-20" Tan, clean sand, sand coarsens from fine to coarse, some very coarse sand at 17-20"
			20-26" Dark grey, muddy sand, medium, some rooting
2	20-36"	20-35"	26-34" Tan, medium going to coarse sand down interval, clean sand, some cross bedding
3	B	B	34-52" Tan with dark grey zones, mostly sand, coarsening down, medium/fine to coarse to very coarse
4	36-54"	35-52"	large root
5	D	D	52-74" Brown grading to tan, top 2" = organic rich mud/peat, one well developed coarse sand filled burrow, interval is generally a muddy fine sand
6			74" to Bottom of Core - Light tan until 8', then a green/grey very tight, a fairly uniform muddy fine sand, once the color changes to green/grey shell/carbonate fragments were present
7	E	E	
8	81-108"	78-108"	
9			Bottom of Core 102", 8'6"
10			

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Cloudy, cool

LOCATION Savannah River Site

SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:30

PROJECT Background Wetlands Soils Study CORE DATE 09/01/92

E DEPTH COMPACTION RECOVERY LOG DATE
 A: 43" B: 43" A: 5"/12% B: 3.5"/8% A: 120" B: 39" 09/02/92

CORE COORDINATES 33°21.57N/ 81°40.87W LOGGER WJS CORE # BGW 039

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-9" A	0-9" A	2-2-2 -2-2-2	0-9" Black, rooted, sand content increasing down interval but mostly mud/organics, sand is poorly sorted, mixed (fine to coarse)
9-37" B	9-35" B	[Soil Profile Diagram]	9-22" Brown going to grey, muddy sand, no rooting, sand mostly medium grained moderately sorted, small gravel lag at 22" 22" to Bottom of Core - Grey, tight, similar to 43-60"
			Bottom of Core 35", 2'11"
37-55" C	35-60" C	[Soil Profile Diagram]	Hand augered samples C, D, and E Sample C - Grey, 50% mud, 50% sand, some rooting, mixed sand sizes (fine to coarse)
55-83" D	60-90" D	[Soil Profile Diagram]	Sample D - Grey and orange mottled, top of interval was grey, sandy with mud, fine to very fine sand, lower portion of interval similar to 90-120"
			Sample E - Orange mottled, A mud with random coarse sand to granule size clasts
83-110" E	90-120" E	[Soil Profile Diagram]	

COLLECTED BY WJS, GWC

WEATHER CONDITIONS Sunny, warm

LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:30

PROJECT Background Wetlands Soils Study CORE DATE 08/19/92

E DEPTH COMPACTION RECOVERY LOG DATE
 ...: 20" B: 18" A: 2"/10% B: 2"/11% A: 120" B: 16" 08/20/92

CORE COORDINATES 33°09.03N/ 81°35.94W LOGGER RSK CORE # BGW 040

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-9 A	0-9" A		0-3" Dark brown heavily rooted sandy mud 3-9" Dark brown mud with scattered fine sand and roots
9-36" B	9-18" B		9" to Bottom of Core - Light brown hard packed mud, few scattered roots Bottom of Core 18", 1'6"
			B Sample - Light grey sandy mud with little red mottled color
	40-60" C		C Sample - Light grey and red mottled mud, little orange mottling also
			D Sample - Mixed light grey, orange mud, little mica, few scattered fine roots and little scattered sand
	60-90" D		E Sample - Mixed light grey, orange sand and mud, around 50/50 sand/mud
	90-120" E		

COLLECTED BY WJS, RSK

WEATHER CONDITIONS Cloudy, cool, 75°

LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 13:00

PROJECT Background Wetlands Soils Study CORE DATE 08/18/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 32" B: A: 11"/34% B: A: 120" B: 08/19/92

CORE COORDINATES 33°09.52N/ 81°33 42W LOGGER RSK CORE # BGW 041

Sample Interval (feet)	Soil Profile	DESCRIPTION
0	Core A	
0-8"	Core A	0-8" Black muddy peat, abundant roots to 5", more compact with depth
1	Core A	8-18" Light grey hard packed mud, little scattered fine sand
2	Core A	18" to Bottom of Core - Hard packed light grey muddy sand with large pebbles and gravel up to 4 cm
3	Core A	Bottom of Core 20", 1'8"
4	Core A	Some augered B sample, same as 18" - Bottom.
40-60"	Core A	C Sample - Hard packed sandy mud, fine to very course sand and pebbles, light grey with iron concretions forming
5	Core A	D Sample - Light grey sandy mud, mostly fine sand, few scattered fine roots, early iron concretions
60-90"	Core A	E Sample - Light grey and light orange sandy mud, sand is mostly fine
7	Core A	
8	Core A	
90-120"	Core A	
9	Core A	
10	Core A	

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Sunny, 85°

LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.		Time 15:00	
PROJECT Background Wetlands Soils Study			CORE DATE 08/19/92		
CORE DEPTH A: 44.5" B: 40.5"		COMPACTION A: 4"/10% B: 4.5"/11%		RECOVERY A: 120" B: 35"	
LOG DATE 08/20/92					
CORE COORDINATES 33°11.86N/ 81°32.44W			LOGGER RSK	CORE # BGW 042	
Sample Interval (feet)		Soil Profile			
Core B	Core A	Core A	DESCRIPTION		
0-6" A	0-6" A	0-4"	0-4" Black heavily rooted mixed mud/peat, little scattered very fine sand		
1		4-23"	4-23" Grey mud with few scattered fine roots		
6-36" B	6-36" B	23" to Bottom of Core	23" to Bottom of Core - Grey muddy sand		
3	C	Bottom of Core	Bottom of Core		
4	36-60" C	39", 3'3"	39", 3'3"		
5		C Sample	C Sample - Dark grey sandy mud, sand is fine to medium, little rooting, stems and detritis		
6	60-90" D	D Sample	D Sample - Hard packed sandy mud, fine to coarse sand - light grey, little rooting, stems, detritis		
7		E Sample	E Sample - Hard packed, some same as D sample, some orange sandy mud, less sand than D sample, sand is fine-coarse		
8					
9	90-120" E				
10					
COLLECTED BY WJS, MAB					
OTHER CONDITIONS Partly cloudy, 78°					
LOCATION Savannah River Site			SOIL GROUP Group 4		

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:00

PROJECT Background Wetlands Soils Study CORE DATE 09/09/92

E DEPTH COMPACTION RECOVERY LOG DATE
 A: 70" B: 66" A: 6"/9% B: 19"/29% A: 120" B: 46" 09/10/92

CORE COORDINATES 33°18.42N/ 81°33.79W LOGGER WJS CORE # BGW 043

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-8" A	0-8" A		0-8" Dark grey, slightly muddy fine sand, some rooting but not dense
8-28" B	8-36" B		8-24" Grey, muddy fine sand, uniform
24-39" 2			24-39" Mottled tan and orange with grey, tight muddy sand, sand is fine grained
28-43" C	36-55" C		39" to Bottom of Core - Grey, tight muddy sand, fine sand, mud content increasing
43-90" D	55-90" D		Bottom of Core 63", 5'3"
90-120" E	90-120" E		Samples D and E collected with hand auger. Sample D - Light grey, some yellow/orange mottling, a sandy mud, mostly mud, sand is fine to very fine Sample E - Light grey, same as sample D

COLLECTED BY MAB, GWC

WEATHER CONDITIONS Sunny, warm, ~85°

LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:00

PROJECT Background Wetlands Soils Study CORE DATE 09/03/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 42" B: 37" A: 4"/10% B: 2"/5% A: 120" B: 35" 09/04/92

CORE COORDINATES 33°17.38N/ 81°28.93W LOGGER WJS CORE # BGW 044

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-11" A	0-11" A	0-11"	0-4" Black, rooted slightly muddy sand, fine 4-11" Dark grey, slightly muddy fine sand
11-38" B	11-36" B	11-36"	11-30" Light grey, slightly muddy fine sand, moderately sorted
		30" to Bottom of Core - Grey, some orange mottling, very tight muddy sand, sand is fine to medium grained, moderately well sorted	
	36-60" C	36-60"	Bottom of Core 38", 3'2"
			Hand augered for samples C, D, and E
			Sample C - Grey, some orange mottling, very tight muddy sand, sand is fine to medium grained, moderately well sorted
	60-90" D	60-90"	Sample D - Light grey with orange to yellow mottling, muddy sand, sand is medium grained and moderately well sorted
			Sample E - Light grey with orange mottling, muddy sand thats slightly more coarse grained than the remainder of the sample site
	90-120" E	90-120"	
10			

COLLECTED BY WJS, GWC

WEATHER CONDITIONS Stormy, ~85°

LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG

CLIENT Westinghouse Savannah River Co.

Time 09:45

PROJECT Background Wetlands Soils Study

CORE DATE 08/25/92

RE DEPTH
A: 141" B: 141"

COMPACTION
A: 19"/14% B: 30"/21%

RECOVERY
A: 106" B: 99"

LOG DATE
08/26/92

CORE COORDINATES 33°22.21N/ 81°37.96W

LOGGER WJS

CORE # BGW 045

Sample Interval (feet)

Soil Profile

Core B
0-16"
A
1

Core A
0-17"
A

Core A

DESCRIPTION

0-16" Black, most probably a peat, extensively rooted with very little grit/sand

16-32"
B
2

17-34"
B

16-72" Brown, extensively rooted (with large roots), mud with organics and some scattered sands

32-47"
C
3

34-52"
C

47-71"
D
5

52-77"
D

72-91" Brown, rooted mud with a little sand at the top of the interval, small roots

71-95"
E
7

77-103"
E

91-98" Light tan, muddy sand, ~50/50, sharp contact at 91"

98" to Bottom of Core - Orange at base, light tan at top, medium sand very clean, some scattered small gravel (pebbles)

Bottom of Core
106", 8'10"

COLLECTED BY MAB, GWC

WEATHER CONDITIONS Clear, warm, humid, ~80°

LOCATION Savannah River Site

SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:30

PROJECT Background Wetlands Soils Study CORE DATE 08/25/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 120" B: 120" A: 7"/6% B: 8"/7% A: 112" B: 112" 08/28/92

CORE COORDINATES 33°20.41N/ 81°36.52W LOGGER WJS CORE # BGW 046

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A	0-16" A		0-16" Dark grey, mottled, some rooting, darker mottled zones are muddy, lighter zones are fairly clean sand, sands are mostly medium to fine grained but mixed
16-37" B	16-38" B		16-30" Medium grey, clean medium sand with some mixed sands, coarse and fine 30-48" Medium grey, hard muddy sand, mostly medium sand but some gravel (pebbles and granules) and mixed sands
37-56" C	38-56" C		48-58" White, muddy sand, more sand than above but still hard sand is finer and better sorted
56-84" D	56-85" D		58-64" White, very tight mud, one root, a little sand, fine 64-72" White, muddy sand, similar to 48-58" 72-82" White, mixed gravel, sand, mud, small gravel (pebbles and granules) and mixed sands in a mud matrix, very sharp contact at 82"
84-112" E	85-112" E		82" to Bottom of Core - Orange/yellow mottled, mostly a hard packed mud, some scattered sand (medium to fine)
10			Bottom of Core 112", 9'4"

COLLECTED BY WJS, MAB, GWC

WEATHER CONDITIONS Cloudy, humid, ~80°

LOCATION Savannah River Site SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 15:30

PROJECT Background Wetlands Soils Study CORE DATE 09/02/92

DEPTH 141" B: 138" COMPACTION A: 15"/11% B: 4"/3% RECOVERY A: 126" B: 134" LOG DATE 09/03/92

CORE COORDINATES 33°19.21N/ 81°35.44W LOGGER WJS CORE # BGW 047

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A	0-16" A		0-16" Dark grey, rooted but decreases with depth, fine to medium slightly muddy sand
16-39" B	16-36" B		16-36" Medium grey, slightly muddy fine to medium sand, some mixed gravel, granules, and small pebbles
39-58" C	36-53" C		36-64" White to medium grey with dark grey bands, interval is banded with small gravel, coarse and medium sand, gravel is well rounded, mid section of the interval is cross-bedded, clean, no mud
58-87" D	53-80" D		64-76" Yellow, well sorted medium sand, some mud but essentially clean
87-116" E	80-107" E		76-89" Yellow, mixed medium sand and gravel, gravel (granules and pebbles), very little mud
			89-98" Yellow/brown, mud, organic/brown stringer
			98" to Bottom of Core - mixed banded colors, sandy zones orange, mud zones tan, organics rust/brown, entire interval is interbedded sands, fine to medium (occasional gravel), and mud with organic stringers
			Bottom of Core 126", 10'6"

COLLECTED BY WJS, MAB, GWC

WEATHER CONDITIONS Sunny, warm

LOCATION Savannah River Site SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:00

PROJECT Background Wetlands Soils Study CORE DATE 08/20/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 141" B: A: 8"/6% B: A: 136" B: 08/22/92

CORE COORDINATES 33°20.01N/ 81°33.61W LOGGER RSK CORE # BGW 048

Sample Interval (feet)	Soil Profile	DESCRIPTION
Core A	Core A	
0		
0-19"		0-3" Black mixed mud and fine organic matter with abundant roots, little fine scattered sand
A		3-34" Black grading to dark grey organic rich sand, moderate fine rooting throughout, sand is well sorted fine, few scattered pebbles and small gravel up to 1.5 cm.
1		
19-38"		wood fragment
B		34-44" Light grey sand, sand is mostly fine with moderate granules and pebbles throughout, no medium to coarse sand, mud, clastics, gravel up to 2 cm well rounded
2		
38-56"		44-61" Light grey to light green fine sand mixed with little mud, mud content increases with depth
C		
3		
56-85"		61-101" Interbedded sands and muddy sands, mostly orange, some white clean sand bands, some dark brown to black organic rich bands, this section >50% sand, probably >75% sand, noticeable cross beds
D		
4		
5		
6		
85-113"		101" to Bottom of Core - Interbedded muds and sands, mostly muds, distinct crossbeds, brown, orange, black banding, increasing mud, decreasing sand bands with depth
E		
7		
8		
9		
10		Bottom of Core 136", 11'4"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Partly cloudy, ~85°

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.		Time 17:00	
PROJECT Background Wetlands Soils Study			CORE DATE 08/31/92		
CORE DEPTH A: 120" B: 60"		COMPACTION A: 18"/15% B: 12"/20%		RECOVERY A: 101" B: 50"	
LOG DATE 09/02/92					
CORE COORDINATES 33°15.15N/ 81°36.81W			LOGGER WJS	CORE # BGW 049	
Sample Interval (feet)		Soil Profile		DESCRIPTION	
Core B	Core A	Core A			
0	0-9"	0-9"		0-9" Black, organic rich, abundant plant material, some mud, no sand	
1	9-32"	9-34"		9-20" Dark grey, mixed mud/sand - 50/50, sands are poorly sorted fine to coarse, rooted	
2	32-48"	34-51"		20-55" Grey, hard compact, muddy sand, mixed sands and some small gravel - granules, some large roots	
3	48-72"	51-77"		55-90" Grey grading to tan, muddy sand, soft with hard spots, gravel content increasing and size increasing, small pebbles	
4	72-96"	77-102"		90" to Bottom of Core - Tan, very tight mud with mixed sands (fine to coarse) and random gravel (granules)	
5				Bottom of Core	
6				101", 8'5"	
7					
8					
9					
10					
COLLECTED BY WJS, MAB, GWC					
WEATHER CONDITIONS Sunny, warm					
LOCATION Savannah River Site			SOIL GROUP 3		

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:30

PROJECT Background Wetlands Soils Study CORE DATE 08/31/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 56" B: 72" A: 3"/5% B: 8"/11% A: 50.5" B: 64" 09/03/92

CORE COORDINATES 33°14.64N/ 81°37.25W LOGGER WJS CORE # BGW 050

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core A	Core B	Core B	
0-19" A 1	0-18" A		0-6" Dark brown, rooted mud, no sand, organic rich 6-24" Grey, muddy sand, some rooting, medium sized roots, sand is medium grained
19-38" B 3	18-36" B		24-48" Mottled orange and medium grey, muddy sand, more mud than interval above, large roots, sand is medium with small gravel, granular
38-57" C 4	36-50" C		48-64" Grey, mixed mud/assorted sands (fine, medium, and coarse) and gravel, gravel is a combination of granules and small pebbles
57-90" D 6	53-90" D		64" to Bottom of Core - Tan, similar to the above interval except that the gravel now contains large pebbles and possibly small cobbles as well as the smaller gravels, tight interval
8			Bottom of Core Large pebbles and cobbles 90", 7'6" refusal met - end borehole
9			Cored from 0-64", Augered from 64-90"
10			

COLLECTED BY WJS, MAB

OTHER CONDITIONS Sunny, warm, ~92°

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:00

PROJECT Background Wetlands Soils Study CORE DATE 08/09/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 122" B: 121" A: 22"/18% B: 12"/10% A: 101" B: 109" 08/10/92

CORE COORDINATES 33°13.71N/ 81°47.27W LOGGER RSK CORE # BGW 051

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-15" A 1	0-18" A		0-18" Medium brown muddy peat, abundant roots, stems, leaves mixed with brown mud, soupy mud texture
15-36" B 2	10-33" B		18-31" Black fibric peat, very little mud mixed in, black
36-54" C 3	33-49" C		31-51" Soft grey mud with abundant fine roots and few wood fragments
54-81" D 5	49-74" D		51-53" Grey mud mixed with fine sand 53" to Bottom of Core - Mud soft at 53", increasingly more compact with depth to hard packed at around 90", scattered fine roots and wood fragments more abundant from 73-78", color is grey to 73", grey-green from 73" to bottom with iron staining more noticeable with depth, abundant mica from 98" to bottom, fewer roots with depth
81-108" E 8	74-98" E		
			Bottom of Core 101", 8'5"

COLLECTED BY GWC, RSK

WEATHER CONDITIONS Sunny, hot, 90+

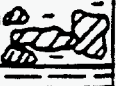

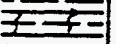
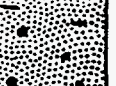
LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:45

PROJECT Background Wetlands Soils Study CORE DATE 08/10/92

E DEPTH COMPACTION RECOVERY LOG DATE
 A: 133" B: 136" A: 13"/10% B: 21"/15% A: 120" B: 114" 08/12/92

CORE COORDINATES 33°14.13N/ 81°47.69W LOGGER RSK CORE # BGW 052

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A	0-16" A	- ? - ? ? - ? ? - ? ? - ?	0-11" Brown soft soupy mud with abundant roots/ leaves and stems 11-16" Brown slightly muddy fine sand 16-42" Brown mud with abundant roots, stems, leaves, etc., several large wood fragments 33-42", firmer texture than 0-11"
16-34" B	16-36" B	- ? - ? ? - ? ? - ? ? - ? ? - ?	Large wood fragments
34-51" C	36-54" C		42-106" Grey mud with moderate rooting, couple of large wood fragments around 67-69", light grey to 69", dark grey 69-106", mud is more compact with depth
51-77" D	54-81" D		Wood
77-102" E	81-108" E		
106" to Bottom of Core			106" to Bottom of Core - 106-108" mixed tight packed sand and mud, light grey, 108" to bottom clean orange fine to medium sand
Bottom of Core			Bottom of Core 120", 10'0"

COLLECTED BY WJS, MAB

OTHER CONDITIONS Hot, humid, 90-95°

LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 18:00

PROJECT Background Wetlands Soils Study CORE DATE 08/09/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 ∴ 144" B: 141" A: 13"/9% B: 10"/7% A: 129" B: 127" 08/10/92

CORE COORDINATES 33°13.77N/ 81°47.44W LOGGER RSK CORE # BGW 053

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-6"	0-6"		0-3" Brown muddy peat 3-6" Brown mud with abundant roots
6-37" B	6-36" B		6-69" Mottled mud with very little scattered fine sand and moderately fine rooting grades to mottled well sorted fine sand mixed with little mud, significant decrease in mud and increase in sand in the 33-37" zone, abundant iron concretions forming @ 41-50", little fine roots throughout, couple of larger roots/stems
37-56" C	36-55" C		69" to Bottom of Core - Grey muddy sand mostly fine, coarsens at 81" to a fine to medium sand with very little mud, color change from grey to orange abrupt around 100", few coarse grains toward bottom
56-84" D	55-82" D		
84-112" E	82-109" E		Grey Orange
10			Bottom of Core 129", 10'9"

COLLECTED BY GWC, RSK

OTHER CONDITIONS Clear, hot, 90 °

LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 12:00

PROJECT Background Wetlands Soils Study CORE DATE 08/11/92

DEPTH 142" B: 141" COMPACTION A: 14"/10% B: 14"/10% RECOVERY A: 125.5" B: 125" LOG DATE 08/12/92

CORE COORDINATES 33°14.02N/ 81°47.51W LOGGER RSK CORE # BGW 054

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-16" A	0-16" A		0-8" Soft brown mud with abundant fine roots 8-16" Brown mud to grey mud with moderate fine root content 16-68" Mixed sand and mud, increasing sand with depth, very little sand at 16", moderate fine root content decreasing with depth, large wood fragments at 49-57"
16-36" B	16-36" B		
36-54" C	36-54" C		
54-81" D	54-81" D		68" to Bottom of Core - Slightly muddy sand, grain size is highly variable, few zones of fine sand at 68-72", 82-87", rest is poorly sorted fine to very coarse sand with pebbles and gravel up to 2 cm, 68-70" is light grey, rest is dark orange
81-108" E	81-108" E		
108-142"			Bottom of Core 125", 10'5"

COLLECTED BY WJS, MAB, KD

WEATHER CONDITIONS Clear, hot, humid, ~92°

LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:45

PROJECT Background Wetlands Soils Study CORE DATE 08/09/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 120" B: 114" A: 15"/13% B: 25"/22% A: 100" B: 90" 08/10/92


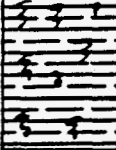




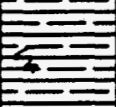


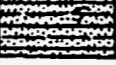

CORE COORDINATES 33°14.30N/ 81°47.93W LOGGER RSK CORE # BGW 055

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-22" A 1	0-22" A		0-22" Soft brown gelatinous mud with abundant roots, stems, etc.
22-31" B	22-35" B		22-31" Dark brown slightly muddy fibric peat
31-47" C	35-52" C		31-39" Grey sandy mud, scattered roots/stems 39-61" Grey mud, little sand mixed in, decreasing with depth, scattered fine roots
47-70" D	52-78" D		61-72" Muddy fine to medium sand, hard packed, few fine roots, sand is fine to medium grain
70-94" E	78-104" E		72-78" Hard packed dark grey mud
			78" to Bottom of Core - Light grey slightly muddy fine to medium sand 78-80", abrupt color change to orange at 80", fine to medium clean sand coarsening down to very coarse and up to 2 cm size gravel at 91-95", 95" to bottom fine well sorted sand with very little mud and moderate mica content
			Bottom of Core 100", 8'4"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Hot, clear, 90°

LOCATION Savannah River Site SOIL GROUP Group 5

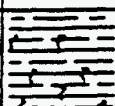


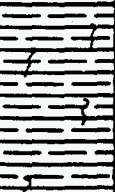

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.		Time 12:30	
PROJECT Background Wetlands Soils Study			CORE DATE 08/09/92		
CORE DEPTH A: 128" B: 99"		COMPACTION A: 8"/6% B: 12"/12%		RECOVERY A: 120" B: 88"	
LOG DATE 08/10/92					
CORE COORDINATES 33°14.86N/ 81°48.28W			LOGGER RSK		CORE # BGW 056
Sample Interval (feet)		Soil Profile			
Core B	Core A	Core A	DESCRIPTION		
0-9" A	0-9" A		0-9" Soft black gelatinous muddy peat to 7", 7-9" dark brown muddy peat, firmer texture than 0-7", more mud than 0-7"		
1 9-35" B	9-30" B		9-18" Soft brown mud with abundant fibric roots and few larger roots/stems 18-24" Mottled brown/grey mud with moderate roots and stems, more firm than 9-18"		
2			24-41" Mottled orange and grey mud with scattered roots, mostly grey in color		
3					
4 35-53" C	30-56" C		41-96" Mottled orange and grey mud, early stages of iron concretions throughout, scattered roots, little mica, mostly orange in color		
5 53-79" D	56-85" D				
6					
7 79-106" E	85-113" E				
8			96" to Bottom of Core - Mottled orange and grey mud with very little fine sand mixed in, slight increase in sand content with depth, little mica, mostly orange in color		
9					
10			Bottom of Core 120", 10'0"		
COLLECTED BY GWC, RSK					
WEATHER CONDITIONS Sunny, clear, 78°					
LOCATION Savannah River Site			SOIL GROUP Group 5		

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:00

PROJECT Background Wetlands Soils Study CORE DATE 08/11/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 59" B: 58" A: 9"/15% B: 13"/22% A: 120" B: 43.5" 08/12/92

CORE COORDINATES 33°13.83N/ 81°47.48W LOGGER RSK CORE # BGW 057

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-11" A	0-11" A		0-11" Soft brown mud with abundant fine roots and stems
11-31" B	11-34" B		11-23" Mixed brown and grey mud, little fine rooting to 16", firmer texture than 0-11"
23-47" C	23-51" C		23" to Bottom of Core - 23-24" mottled brown, light brown, grey hard packed mud, little fine organics mixed in in spots, 34" to bottom mottled brown, light brown hard dewatered mud
			Bottom of Core 51", 4'3"
60-90" D	60-90" D		Samples D and E collected with hand auger. Sample D - Mottled hard mud, grey, brown, few fine roots.
			Sample E - Mottled hard mud, same as D sample.
90-120" E	90-120" E		

COLLECTED BY WJS, MAB, KD

WEATHER CONDITIONS Clear, humid, 88°

LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 13:20

PROJECT Background Wetlands Soils Study CORE DATE 08/10/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 144" B: 141" A: 40"/28% B: 32"/30% A: 106" B: 106" 08/12/92

CORE COORDINATES 33°14.08N/ 81°47.57W LOGGER RSK CORE # BGW 058

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-15" A	0-15" A	?	0-26" Soupy brown mud with abundant roots/stems, etc., may be a muddy peat, less mud 21-26"
15-28" B	15-29" B	?	26-48" Light grey mud, abundant roots, stems 26-33", very little roots 33-48"
29-46" C	29-43" C	?	48-63" Gelatinous texture, light grey mixed sand and mud, sand content increasing with depth
43-59" D	43-65" D	?	63-84" Clean fine sand to medium at 63-75", fine to very coarse sand from 75-84", color change from light grey 63-75" to light orange 75-84", up to 1 cm size pebbles
59-92" E	65-86" E	?	84-96" Dark orange fine sand, scattered medium and coarse sand grains
			96" to Bottom of Core - Fine to very coarse orange sand with up to 2 cm size gravel
			Bottom of Core 106", 8'10"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Clear, hot, humid

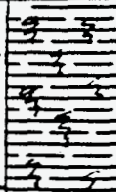
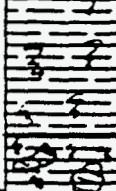

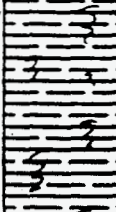
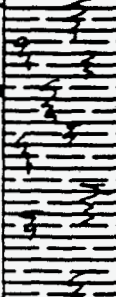
LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:45

PROJECT Background Wetlands Soils Study CORE DATE 08/09/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 131" B: 136" A: 14"/11% B: 15"/11% A: 116" B: 121" 08/11/92

CORE COORDINATES 33°14.17N/ 81°47.71W LOGGER RSK CORE # BGW 059

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-18" A 1	0-18" A		0-30" Soft brown mud with abundant fine roots, stems, leaves, etc.
18-36" B	18-36" B		30-38" Black fibric peat with little brown mud and large wood fragments
36-53" C 4	36-53" C		38" to Bottom of Core - Light grey mud with moderate roots to 69", large wood fragments @ 52-56", color change at 69" to dark grey mud, firmer texture with depth to very hard packed at bottom of core, moderate root content throughout, color change to light grey at 111", few large stems at bottom of core
53-80" D 6	53-80" D		Color change
80-107" E 8	80-107" E		Color change
10			Bottom of Core 116", 9'8"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Hot, clear, humid, 90+

LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 12:00

PROJECT Background Wetlands Soils Study CORE DATE 08/17/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 ...: 144" B: 144" A: 14"/10% B: 18"/12% A: 129.5"B: 124.5" 08/19/92

CORE COORDINATES 33° 10.19N/ 81° 34.91W LOGGER RSK CORE # BGW 061

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-13" A	0-13" A	?	0-5" Dark brown heavily rooted mud 5-13" Black mixed fine organics, mud and little fine rooting, scattered fine sand
13-35" B	13-36" B	?	13-24" Dark brown sand with very little mud, little rooting, sand is mostly fine, 14-16" fine to coarse sand with granules and a couple of pebbles, couple wood fragments - 24" 24-53" Grey mixed sand and mud, sand is fine to coarse, moderate root/wood fragment content, soft texture, close to 50/50 sand/mud
35-53" C	36-54" C	?	
53-79" D	54-81" D	?	53-97" Mostly clean fine to medium sand, orange to 73", white at 73-97", 61-62" is fine to coarse sand perched on top of 1" thick white mud lense, 1/2" thick pebble/coarse lag at 73", 93-96", white soft mud seam with little scattered sand
79-106" E	81-108" E	?	97-115" Clean fine to very coarse sand, white, sand only at 113-115" 115-126" Hard packed brown mud, scattered organics 126" to Bottom of Core - Dark brown hemic peat
			Bottom of Core 129.5", 10'9.5"

COLLECTED BY RSK, GWC

OTHER CONDITIONS Overcast, warm, 80-85°

LOCATION Savannah River Site SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:30

PROJECT Background Wetlands Soils Study CORE DATE 08/17/92

JORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 144" B: 145" A: 7"/5% B: 6"/4% A: 134" B: 138" 08/19/92

CORE COORDINATES 33°10.73N/ 81°34.13W LOGGER RSK CORE # BGW 062

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-19"	0-19"	1-2-3	0-3" Muddy black peat, heavily rooted 3-48" Black organic rich sand, abundant rooting and fine organics, few wood fragments, decreasing organics, increasing sand content with depth
19-38"	19-38"	4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19	
38-58"	38-57"	20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145	48-68" Mixed light grey sand and mud, mostly mud at 48" grading to mostly sand at 68" (coarsening down), sand is fine grain, little rooting, 1 large root from 54-58"
58-86"	57-86"		68-78" Light grey fine to medium sand clean, medium size root 78-86" Very fine sand 78-81", mixed very fine sand and mud 81-86", little mica, light grey
86-115"	86-114"		86" to Bottom of Core - Clean orange sand well sorted fine to 97", coarsening down, 87" - bottom fine to very coarse sand, scattered organic fragments
			Bottom of Core 134", 11'2"

COLLECTED BY RSK/GWC

WEATHER CONDITIONS Cloudy, warm, humid, 78°

LOCATION Savannah River Site SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:15

PROJECT Background Wetlands Soils Study CORE DATE 08/17/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 127" B: 141" A: 9"/7% B: 3"/2% A: 117" B: 132" 08/18/92

CORE COORDINATES 33°11.03N/ 81°29.39W LOGGER RSK CORE # BGW 063

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-20" A 1	0-19" A		0-42" Black mixed sand and organic material, organics are mostly fine, little rooting throughout, moderate root content to 6"
20-39" B 3	19-37" B		
39-59" C 4	37-56" C		42-77" Mixed grey fine sand and black organic rich sand, few scattered roots
59-88" D 6	56-84" D		
88-118" E 8	84-117" E		77-89" Hard packed muddy fine sand, white/light orange mottled
			89" to Bottom of Core - Clean fine sand, fine to medium sand below 102", orange to light orange color, weathered in situ quartz and feldspar at 106", feldspar fragments up to 1/2 cm in size at 105" - bottom in situ weathered quartz and feldspar fragments
10			Bottom of Core 117", 9'9"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Cloudy, humid, ~85°

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG	CLIENT Westinghouse Savannah River Co.	Time 16:30
PROJECT Background Wetlands Soils Study		CORE DATE 08/17/92
RE DEPTH A: 148.5" B: 123"	COMPACTION A: 6"/4% B: 9"/7%	RECOVERY A: 143" B: 89"
		LOG DATE 08/19/92
CORE COORDINATES 33°12.57N/ 81°30.40W		LOGGER RSK CORE # BGW 064
Sample Interval (feet)	Soil Profile	DESCRIPTION
Core B	Core A	Core A
0	0	
0-12" A	D-12" A	?-?-? ?-?-? ?-?-? ?-?-?
		0-12" Black muddy peat, abundant roots, very little mixed fine sand 8-12"
1		
12-37" B	12-38" B	
		12-41" Dark brown mixed mud, fine organics, sand-mostly sand, moderate fine rooting, couple of medium size roots, 26-29" increased mud content
3		
37-56" C	38-58" C	
		41-60" Medium brown muddy sand, few wood fragments, few fine roots
5		
56-84" D	58-86" D	
		60-72" Clean white fine well sorted sand, abundant wood fragments
6		
		72-80" Clean white well sorted fine sand
7		
		80-84" Poorly sorted fine to very coarse sand, granules and pebbles
8		
84-112" E	86-115" E	
		84" to Bottom of Core - Light grey mixed sand and mud, sand is mostly fine to medium with scattered coarse sand and up to pebble size clasts, increasing mud with depth to about 25", decreasing mud content below 125", overall greater than 50% sand
9		
10		
		Bottom of Core 143", 11'11"
COLLECTED BY RSK, GWC		
WEATHER CONDITIONS Cloudy, warm, ~85°		
LOCATION Savannah River Site	SOIL GROUP Group 3	

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:45

PROJECT Background Wetlands Soils Study CORE DATE 08/17/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 40" B: 38" A: 2"/5% B: 4"/10% A: 120" B: 34" 08/18/92

CORE COORDINATES 33°11.15N/ 81°32.03W LOGGER RSK CORE # BGW 065

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-7" A	0-7" A		0-7" Brown rooted (little) mud, 0-1" root mat, mostly mud
7-36" B	7-36" B		7-15" Light brown mud with very little scattered sand 15-28" muddy fine to medium sand, few scattered coarse grains
			28" to Bottom of Core - Light grey very hard mud, little black and red mottled coloring
			Bottom of Core 36", 3'0"
	40-60" C		Samples C, D, and E collected using hand auger. Sample C - Light grey to dark orange mud, little red/black mottled coloring in grey mud, hard packed
	60-90" D		Sample D - Dark orange to light orange tight packed dewatered mud, little white/red mottled coloring
	90-120" E		Sample E - Moist mixed white, red, orange mud, hard packed

COLLECTED BY WJS, MAB

OTHER CONDITIONS Cloudy, humid, - 85°

LOCATION Savannah River Site SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:45

PROJECT Background Wetlands Soils Study CORE DATE 08/18/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 139" B: 133" A: 10"/7% B: 14"/10% A: 125" B: 120" 08/20/92

CORE COORDINATES 33°13.57N/ 81°38.63W LOGGER RSK CORE # BGW 066

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0	0-9"	0-9"	0-9" Light brown fine sand, few roots, root mat, 0-2" 9-30" Dark brown to black muddy peat, little mud
A	A	A	
1			
2	9-36"	9-37"	30-56" Dark grey fine sand with fine organics and mud mixed in, decreasing with depth
B	B	B	
3			
4	36-54"	37-56"	56-77" Light grey sand with moderate mud mixed in
C	C	C	
5			
6	54-81"	56-84"	77-88" Light grey sand with mud mixed in, less sand than 56-77"
D	D	D	
7			88-107" White well sorted fine muddy sand
8	81-108"	84-112"	107" to Bottom of Core - Dark orange well sorted fine muddy sand
E	E	E	
9			
10			Bottom of Core 126", 10'6"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Hot, humid, clear, 92°

LOCATION Savannah River Site SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 12:30

PROJECT Background Wetlands Soils Study CORE DATE 09/02/92

MOISTURE DEPTH COMPACTION RECOVERY LOG DATE
 A: 120" B: 128" A: 19%/16% B: 27%/21% A: 101" B: 95" 09/04/92

CORE COORDINATES 33°21.07N/ 81°37.96W LOGGER WJS CORE # BGW 067

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0	0-17"	-3-3	0-9" Dark brown, rooted organic rich mud
0-16" A 1	A	-3-3	9-42" Black, rooted, fewer and larger roots than above, organic rich muddy sand, assorted grain sizes fine to very course, some small gravel
16-32" B	17-34" B	-3-3	
32-47" C	34-50" C	-3-3	42-64" Brown, slightly muddy medium sand, rooted large roots
47-71" D	50-76" D	-3-3	
71-95" E	76-101" E	-3-3	64" to Bottom of Core - Poorly sorted clean mixed sand and gravel, sand of all grain sizes mixed with mostly pea gravel (small well rounded pebbles)
			Bottom of Core 101", 8'5"

COLLECTED BY WJS, MAB, GWC:

WEATHER CONDITIONS Sunny, warm

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:00

PROJECT Background Wetlands Soils Study CORE DATE 09/01/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 149" B: 139" A: 21"/14% B: 14"/10% A: 116.5" B: 112" 09/02/92

CORE COORDINATES 33°21.05N/ 81°38.14W LOGGER WJS CORE # BGW 068

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-18" A	0-17" A		0-12" Black, rooted, close to a peat, some scattered sand pockets/burrows, possibly mud, abundant plant material 12-43" Black, rooted, sand content increasing, sands are random in size, not as organic rich, mud present
18-36" B	17-34" B		
36-54" C	34-52" C		43-56" Brown, muddy sand, sand is mostly medium, some rooting
54-81" D	52-77" D		56-60" Tan, rooted mud, soft 60-78" Orange tan, sand of all sizes mixed with small gravel, mostly granules, clean, very little mud
81-106" E	77-103" E		78-96" Banded orange and white, cross bedded, well sorted fine sand, clean
			96" to Bottom of Core - Orange, poorly sorted sand mixed with some small gravel, some mud but basically clean, thin fine sand at base of core
			Bottom of Core 116.5", 9'8.5"

COLLECTED BY WJS, GWC

WEATHER CONDITIONS Sunny, warm, ~85°

LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 16:15

PROJECT Background Wetlands Soils Study CORE DATE 08/27/92

DEPTH COMPACTION RECOVERY LOG DATE
 A: 132" B: 124" A: 20"/15% B: 20"/16% A: 109" B: 103" 08/29/92

CORE COORDINATES 33°20.82N/ 81°38.68W LOGGER RSK CORE # BGW 069

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0	0-17"		0-11" Black to dark brown muddy peat
0-17" A 1	A		11-50" Black mixed sand, mud, fine organics moderately rooted, few large wood fragments 24-41", sand is mostly fine with scattered coarse-granular grains, >50% sand, appears to be more fine organics than mud
17-34" B	17-34" B		50-53" Grey mixed fine organics, fine sand with a couple of very coarse grains, moderate rooting
3 34-50" C	34-51" C		53-64" Clean white fine to very coarse sand, up to pebble size clasts (subangular)
4 50-76" D	51-77" D		64-77" White clean well sorted fine sand
6 76-101" E	77-102" E		77" to Bottom of Core - Orange fine to medium sand (mostly fine sand)
8 9			Bottom of Core 109", 9'1"
10			

COLLECTED BY WJS, MAB

WATHER CONDITIONS Clear, hot, ~90°

LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:30

PROJECT Background Wetlands Soils Study CORE DATE 08/27/92

DEPTH COMPACTION RECOVERY LOG DATE
 A: 150" B: 158" A: 36"/24% B: 39"/25% A: 99" B: 107" 08/30/92

CORE COORDINATES 33°19.99N/ 81°38.87W LOGGER RSK CORE # BGW 070

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-15" A 1	0-15" A	33333	0-4" Dark brown peat, stems, leaves, roots, etc. 4-54" Black hemic peat with little fine sand scattered throughout section, may be a little mud
15-30" B 2	15-30" B		
30-46" C 3	30-46" C		
45-67" D 5	46-68" D		54-78" Mixed fine to medium sand and fine organics, moderate rooting, may be a little mud, black, more sand than 4-54", >50% sand
67-90" E 7	68-91" E		78-86" Black mixed organics, little mud and fine sand with scattered very coarse-granular grains, much less sand than 54-78", mostly organics 86" to Bottom of Core - Clean grey fine to coarse sand and sand granules
99"			Bottom of Core 99", 8'3"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Sunny, ~80°

LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 09:00

PROJECT Background Wetlands Soils Study CORE DATE 08/27/92

E DEPTH COMPACTION RECOVERY LOG DATE
 A: 146" B: 156" A: 23"/16% B: 29"/19% A: 120" B: 125" 08/28/92

CORE COORDINATES 33°20.02N/ 81°38.82W LOGGER WJS CORE # BGW 071

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0	0-17"		0-6" Black, abundant rooting and wood, most probably a peat, possibly some mud
1	0-16" A		6-36" Black, very organic rich, possibly a peat, sand content increases down this interval, rooting plus abundant wood material present
2	16-32" B		36-64" Dark brown, organic rich muddy sand, rooted, large roots, sand is mostly fine grained
3	32-49" C		64-76" Tan, muddy fine sand, some random rooting and coarse sand
4	49-73" D		76-94" Tan, well sorted fine sand, clean
5	73-97" E		94-116" White, very coarse sand, with scattered small gravels (granules/pebbles)
6	76-101" E		116" to Bottom of Core - Tan, muddy very coarse sand
7			Bottom of Core 120", 10'0"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Sunny, ~80°







LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 12:30

PROJECT Background Wetlands Soils Study CORE DATE 08/27/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 146" B: 150" A: 24"/16% B: 19"/13% A: 121" B: 132" 08/28/92

CORE COORDINATES 33°20.10N/ 81°38.86W LOGGER WJS CORE # BGW 072

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-17" A	0-17" A		0-6" Brown, abundant wood and rooted, most probably a peat 6-48" Black, mixed sand, assorted sizes - fine, medium, coarse, rooted, organic rich, possibly mud or peat
17-34" B	17-34" B		
34-50" C	34-50" C		
50-76" D	50-76" D		48-84" Brown, muddy rooted sand, poorly sorted sand of mixed sizes - medium, fine, coarse, rooting is less than above, this horizon is much sandier than the 6-48" interval
76-101" E	76-101" E		84-108" Orange, very coarse sand with some granules and small pebbles, clean sand
108" to Bottom of Core			108" to Bottom of Core - White, tight 30% mud/70% sand, sand is assorted sizes but mostly fine to medium Bottom of Core 121", 10'1"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Cloudy, cool

LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.		Time 14:45	
PROJECT Background Wetlands Soils Study			CORE DATE 08/27/92		
CORE DEPTH A: 121" B: 117"		COMPACTION A: 4"/3% B: 5"/4%		RECOVERY A: 113" B: 110"	
LOG DATE 08/29/92					
CORE COORDINATES 33°20.61N/ 81°38.68W			LOGGER RSK		CORE # BGW 073
Sample Interval (feet)		Soil Profile		DESCRIPTION	
Core B	Core A	Core A			
0-19" A	0-19" A			0-7" Dark brown peat- roots, stems, leaves, etc. 7-27" Light brown fine sand clean at 7", gradual increase in mud content with depth, at 27" muddy fine sand	
19-39" B	19-39" B			27-53" Black organic rich sand, >50% sand fine with scattered coarse-granular grains, several large roots, moderate fine rooting	
39-50" C	39-50" C			53-63" Light brown fine to medium clean sand	
58-87" D	58-87" D			63-74" Orange well sorted fine sand with very little mud mixed in	
74-89" E	74-89" E			74-89" Interbedded sands, beds of well sorted fine sand, fine to coarse sand, and fine to very coarse up to granular sand, all orange with very little mud	
87-116" E	87-116" E			89" to Bottom of Core - Mottled orange and yellow tightly packed muddy fine sand, scattered well rounded granular quartz	
Bottom of Core 113", 9'5"					
COLLECTED BY WJS, MAB					
WEATHER CONDITIONS Sunny, 85°					
LOCATION Savannah River Site			SOIL GROUP Group 1		

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:30

PROJECT Background Wetlands Soils Study CORE DATE 09/08/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 126" B: 122" A: 22"/17% B: 28"/23% A: 99" B: 85" 09/10/92

CORE COORDINATES 33° 19.49N/ 81° 38.70W LOGGER WJS CORE # BGW 074

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-15" A	0-17" A		0-12" Dark brown, rooted organic rich slightly sandy mud, fine sand
15-31" B	17-33" B		12-35" Dark grey, random rooting muddy sand, not as organic or muddy as above, some random large sand grains
31-46" C	33-50" C		35-55" Grey, muddy sand, some rooting but random, still abundant mud, some tan mottling, muddy zones
46-69" D	50-75" D		55-60" Brown slightly muddy well sorted fine sand, random rooting
69-92" E	75-100" E		60" to Bottom of Core - Tan, clean sand with random small gravel granules, some banding of grain sizes that range from medium to very coarse, this represents cross-bedding
			Bottom of Core 99", 8'3"

COLLECTED BY MAB, GWC

WEATHER CONDITIONS Sunny, cool

LOCATION Savannah River Site SOIL GROUP Group 2

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 14:00

PROJECT Background Wetlands Soils Study CORE DATE 09/09/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 120" B: 120" A: 23"/19% B: 20"/17% A: 93" B: 101" 09/10/92

CORE COORDINATES 33° 19.37N / 81° 39.34W LOGGER WJS CORE # BGW 075

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core A	Core B	Core B	
0-16" A	0-17" A		0-11" Black, rooted organic rich, looks like a peat, no sand, mud
16-32" B	17-35" B		11-48" Black, rooted throughout, organic rich muddy sand throughout, sand content increases with depth, sand mostly fine to medium but larger sands are randomly present, sand increases with depth
32-49" C	33-50" C		
49-73" D	50-75" D		48-57" White, mostly a medium sand, clean, random large sand grain to granule
73-97" E	75-100" E		57" to Bottom of Core - Bright orange, clean sands and small gravel, granules - pronounced, cross-bedding at 70-80" - layers/beds of coarse sand and gravel (granules) mixed with medium sand beds, some heavy minerals present
			Bottom of Core 101", 8'5"

COLLECTED BY MAB, GWC

WEATHER CONDITIONS Sunny, warm, ~85°

LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 15:00

PROJECT Background Wetlands Soils Study CORE DATE 07/30/92

SAMPLE DEPTH COMPACTION RECOVERY LOG DATE
A: 120" B: 116" A: 24"/20% B: 6"/5% A: 95" B: 109" 07/31/92

CORE COORDINATES 33°13.12N/ 80°21.30W LOGGER RSK CORE # BGW 1QS

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-10" A	0-10" A	3 3 3 3 7 3 3	0-3" Fine organics, stems, roots, mixed fine sand and mud 3-10" Increasing sand content, decreasing organic content, couple of large roots, heavily rooted to 7"
10-30" B	10-32" B		10-24" Well sorted fine sand with fine organics and little mud mixed in, mostly sand, dark brown 24-63" Mottled sandy mud to 38" grading to mottled muddy sand 38-63", decreasing mud content with depth
30-57" C	32-40" C		
57-86" D	40-72" D		63-85" Clean light color, well sorted fine sand, few medium grains toward bottom of this interval
86-114" E	72-96" E		85" to Bottom of Core - Hard packed mud, orange grades to dark brown to dark green mud with little very fine sand mixed
86-114" E			Bottom of Core 95", 7'11"

COLLECTED BY MAB, WJS, VR

WEATHER CONDITIONS Clear, hot, and humid

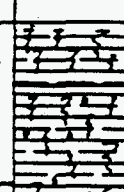
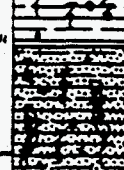

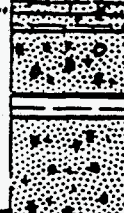
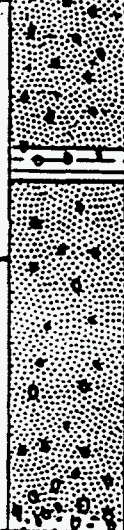
LOCATION Francis Biedler Forest SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:30

PROJECT Background Wetlands Soils Study CORE DATE 08/03/92

JRE DEPTH COMPACTION RECOVERY LOG DATE
 A: 144" B: 142" A: 31"/21% B: 24"/16% A: 124" B: 112" 08/05/92

CORE COORDINATES 33°49.77N/ 80°49.21W LOGGER WJS CORE # BGW 2QS

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-17" A	0-16" A		0-6" Dark grey, rooted, orangic/peat, maybe some mud 6-20" Black, rooted orangic/peat, mixed with some mud and sand
17-34" B	16-32" B		20-32" Dark grey, rooted muddy sand, mixed grain sizes large roots 32-48" Tan, coarse to fine sand, some large roots, a little mud
34-50" C	32-47" C		48-54" Grey rooted mud, some sand 54-60" Assorted grain sizes
50-76" D	47-71" D		60-62" Tan to white ore orange band at 75" 62-86" Black organic rich mud/peat
76-101" E	71-95" E		88" to Bottom of Core - White, some orange, coarse sand grading down to mixed sand and small gravel (granules and occasional pebbles)
10			Bottom of Core 124", 10'4"

COLLECTED BY WJS, MAB, PS, VR

WATHER CONDITIONS Rain, ~80, very wet!

LOCATION Congaree National Mon. SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 10:30

PROJECT Background Wetlands Soils Study CORE DATE 08/06/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 144" B: 144" A: 16"/11% B: 17"/11% A: 124" B: 124" 08/07/92

CORE COORDINATES 33°21.13N/ 81°51.88W LOGGER WJS CORE # BGW 3QS

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-10" A	0-10" A		0-10" Dark brown, rooted organic rich top 6" more organic rich, some mud, random sand grains
10-36" B	10-36" B		10-26" Medium grey, poorly sorted sand, mostly fine to medium, but some coarser, some rooting, just a little mud
36-53" C	36-53" C		26-64" Light grey mud/sand, ~ 40% mud and 60% sand, sand mostly fine grained, fairly hard, compact, large mica flakes
53-80" D	53-80" D		one moderately sized root 64-78" Light grey interbedded fine to medium and coarser sand, fairly clean, only 5-10% mud
80-107" E	80-107" E		78" to Bottom of Core - Mixed color bands - white, yellow, and grey, this section of the core is cross bedded, some of the cross beds have a dip angle, sediments are coarse sand, clean some scattered small gravel, clean sand
			Bottom of Core 124", 10'4"

COLLECTED BY MAB, WJS

WEATHER CONDITIONS Overcast, temperate, ~ 80-85, rain likely

LOCATION Jackson Audobon SOIL GROUP Group 3

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 15:00

PROJECT Background Wetlands Soils Study CORE DATE 08/10/92

CORE DEPTH COMPACTION RECOVERY LOG DATE
 A: 144" B: 144" A: 32"/22% B: 36"/25% A: 107" B: 106" 08/12/92

CORE COORDINATES 33°14.08N/ 81°47.57W LOGGER RSK CORE # BGW 4QS

Sample Interval (feet)		Soil Profile		DESCRIPTION
Core B	Core A	Core A		
0-15" A 1	0-15" A	?	?	0-30" Brown soupy mud with abundant fine roots, stems, leaves, etc., few large roots, top 2" has very little mud
15-30" B 2	15-30" B	?	?	
30-45" C 3	31-47" C	?	?	30-37" Black muddy fibric peat, little mud 37-72" Grey mud soft at 37", more compacted with depth, little rooting throughout, 46-48" abundant roots/stems, large wood fragment, little sand mixed with mud 57-72"
45-67" D 5	47-70" D			
67-90" E 7	70-94" E			72-82" Grey muddy sand, sand is fine to medium grain, little mud 82" to Bottom of Core - Clean fine to coarse sand - white, gradual color change to orange at 95", very coarse sand to pebbles and pea gravel 90-95", few scattered stems/wood fragments
9				Bottom of Core 107", 8'11"
10				

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Clear, hot, humid

LOCATION Savannah River Site SOIL GROUP Group 5

ATHENA CORE LOG

CLIENT Westinghouse Savannah River Co.

Time 17:30

PROJECT Background Wetlands Soils Study

CORE DATE 08/18/92

CORE DEPTH
A: 123" B: 132"COMPACTION
A: 14"/11% B: 17"/13%RECOVERY
A: 112" B: 112"LOG DATE
08/20/92

CORE COORDINATES 33°13.57N/ 81°38.63W

LOGGER RSK

CORE # BGW 5QS

Sample Interval (feet)		Soil Profile		DESCRIPTION
Core B	Core A	Core A		
0-12" A	0-12" A			0-12" Light brown fine sand, few roots, 0-2" fibric root mat
12-35" B	12-36" B			12-16" Brown organic rich mud 16-17" Dark brown hemic peat 17-19" Light brown fine to medium clean sand 19-30" Black to dark brown peat, little scattered fine sand in places, 19-24" moderate mud content
35-52" C	36-53" C			30-54" Sand mixed with fine organics and mud, large wood fragment 41-47", black to dark grey
52-72" D	53-80" D			54-67" Grey fine sand with very little mixed in mud, couple of wood fragments
72-104" E	80-107" E			67-83" Light grey mixed sand and mud, increasing mud content with depth
				83-101" White hard packed sand with very little mud mixed in, sharp contact
				101" to Bottom of core - Dark orange hard packed slightly muddy sand
				Bottom of Core 112", 9'4"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Hot, humid, clear, 92°

LOCATION Savannah River Site

SOIL GROUP Group 3

ATHENA CORE LOG		CLIENT Westinghouse Savannah River Co.	Time 14:40
PROJECT Background Wetlands Soils Study		CORE DATE 08/25/92	
CORE DEPTH A: 120" B: _____		COMPACTION A: 0"/0% B: _____	
RECOVERY A: 120" B: _____		LOG DATE 08/26/92	
CORE COORDINATES 33°20.27N/ 81°40.64W		LOGGER WJS	CORE # BGW 6QS

Sample Interval (feet)	Soil Profile	DESCRIPTION
Core A	Core A	
0		
0-10" A		0-8" Black, rooted organic rich maybe a peat
1		
10-40" B		8-16" Tan, grading to a green/blue grey, mostly a tight mud, some scattered sand (mixed sizes) 16-40" Light grey (once mixed), mixed mud and assorted sands, fine, medium, coarse, random gravel, one sand lense encountered while coring
2		
3		
40-60" C		40-60" Tan with orange mottled, mixed mud and sand, sand is mostly medium
4		
5		
60-90" D		60-90" Same as 40-60", some lighter colored muddy sand mixed in
6		
7		
8		
90-120" E		90" to Bottom of Core - Light tan, very tight mixed mud and sand, sand mostly medium, some large mica flakes
8		
9		
10		Bottom of core 120", 10'0"

COLLECTED BY WJS, MAB, GWC	
WEATHER CONDITIONS Partly cloudy, windy, pleasant	
LOCATION Savannah River Site	SOIL GROUP Group 4

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:00

PROJECT Background Wetlands Soils Study CORE DATE 08/28/92

DEPTH A: 132" B: 132" COMPACTION A: 26"/20% B: 22"/17% RECOVERY A: 106" B: 99" LOG DATE 08/29/92

CORE COORDINATES 33°20.82N/ 81°38.68W LOGGER RSK CORE # BGW 7QS

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-17" A	0-16" A	0-7" ? ? ? 7-47" ?	0-7" Black muddy peat 7-47" Black to dark grey mixed mud, sand and fine organics moderately rooted, this section >50% sand, mostly fine with scattered coarse-granular sand
17-33" B	16-32" B	16-32" ?	
33-50" C	32-48" C	32-48" ?	
50-75" D	48-72" D	47-51" ? 51-57" ? 57-72" ?	47-51" Grey fine to medium sand with few roots and fine organics 51-57" Clean white fine to medium sand with scattered coarse grains 57-72" Clean white well sorted fine sand, little mica
75-100" E	72-96" E	72" to Bottom of Core	72" to Bottom of Core - Clean white to light orange (darkens with depth) fine to medium sand
		Bottom of Core	Bottom of Core 106", 8'10"

COLLECTED BY WJS, MAB

WEATHER CONDITIONS Partly cloudy, breezy, mid 80's

LOCATION Savannah River Site SOIL GROUP Group 1

ATHENA CORE LOG CLIENT Westinghouse Savannah River Co. Time 11:45

PROJECT Background Wetlands Soils Study CORE DATE 09/08/92

RE DEPTH COMPACTION RECOVERY LOG DATE
 A: 130" B: 132" A: 32"/25% B: 34"/26% A: 96" B: 71" 09/10/92

CORE COORDINATES 33°19.59N/ 81°38.76W LOGGER WJS CORE # BGW 8QS

Sample Interval (feet)		Soil Profile	DESCRIPTION
Core B	Core A	Core A	
0-15" A 1	0-15" A		0-45" Black, organic content and mud content decreases down interval, essentially a muddy sand, sand mostly fine grained but some larger sand grains, rooted throughout but more so at the top, sand content increases with depth
15-30" B 2	15-30" B		
30-45" C 3	30-45" C		
45-51" D 4	45-68" D		45-51" Tan, well sorted, fine to very fine sand
51-53" D 5			51-53" Black, pure mud, some rooting
53-69" D 5			53-69" Brown, mostly medium and coarse sand, some organics, basically a clean sand, some random granule size gravel, random large roots
69" to Bottom of Core E 6	68-90" E		69" to Bottom of Core - Tan, coarse sand mixed with small gravel, granules and pebbles, clean
Bottom of Core 96", 8'0"			Bottom of Core 96", 8'0"

COLLECTED BY MAB, GWC

OTHER CONDITIONS Sunny, warm

LOCATION Savannah River Site SOIL GROUP Group 2

APPENDIX B

Field Activities Logs

ATHENA FIELD ACTIVITIES LOG

DATE 07/28/92 TIME 10:15 PERSONNEL GWC, WJS, MAB, RSK

STATION I.D. BGW 001 . LAT/LON 33° 32.84N/ 81° 28.64W
 LOCATION Aiken State Park . SOIL GROUP Group 1

WEATHER CONDITIONS Sunny, approximately 85°

CORE NOTES

CORE A	PENETRATION 129"	RECOVERY 109"	COMPACTION 9"
CORE B	PENETRATION 122"	RECOVERY 106"	COMPACTION 13"

CORE SITE COMMENTS
 Long walk from lake

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS
 Tie flagging tape higher, longitude and latitude taken from dock.

ATHENA FIELD ACTIVITIES LOG

DATE 07/28/92 TIME 11:30 PERSONNEL MAB, GWC

STATION I.D. BGW 002 . LAT/LON 33° 32.92N/ 81° 28.86W
 LOCATION Aiken State Park . SOIL GROUP Group 3

WEATHER CONDITIONS Hot, overcast, and humid!

CORE NOTES

CORE A	PENETRATION 121"	RECOVERY 97"	COMPACTION 25"
CORE B	PENETRATION 120"	RECOVERY 94"	COMPACTION 23"

CORE SITE COMMENTS
 Core A and B: hard fought, long hard walk from lake.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS
 Longitude and latitude taken from end of dock on pond.

ATHENA FIELD ACTIVITIES LOG

DATE 07/29/92 TIME 14:30 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 003 . LAT/LON 33° 33.08N/ 81° 28.96W
 LOCATION Aiken State Park . SOIL GROUP Group 3

WEATHER CONDITIONS Hot, clear

CORE NOTES

CORE A	PENETRATION 81"	RECOVERY 67"	COMPACTION 12"
--------	-----------------	--------------	----------------

CORE B	PENETRATION 68"	RECOVERY 63"	COMPACTION 9"
--------	-----------------	--------------	---------------

CORE SITE COMMENTS

Tight clay; penetration refused for A and B. Hand auger collection of D and E samples. VOA samples collected on site.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/29/92 TIME 12:30 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 004 . LAT/LON 33° 33.28N/ 81° 29.39W
 LOCATION Aiken State Park . SOIL GROUP Group 4

WEATHER CONDITIONS Hot, clear

CORE NOTES

CORE A	PENETRATION 138"	RECOVERY 127.5"	COMPACTION 14"
--------	------------------	-----------------	----------------

CORE B	PENETRATION 139"	RECOVERY 125"	COMPACTION 11"
--------	------------------	---------------	----------------

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/27/92 TIME 13:30 PERSONNEL MAB, WJS, GWC

STATION I.D. BGW 005 . LAT/LON 33° 33.20N/ 81° 29.26W
 LOCATION Aiken State Park . SOIL GROUP Group 1

WEATHER CONDITIONS Clear, very hot

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 87"	COMPACTION 32"
--------	------------------	--------------	----------------

CORE B	PENETRATION 132"	RECOVERY 88"	COMPACTION 24"
--------	------------------	--------------	----------------

CORE SITE COMMENTS

Lost some core on recovery; A - lost 21", B - lost 16"

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/29/92 TIME 10:30 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 006 . LAT/LON 33° 33.26N/ 81° 29.31W
 LOCATION Aiken State Park . SOIL GROUP Group 1

WEATHER CONDITIONS Clear and hot

CORE NOTES

CORE A	PENETRATION 139"	RECOVERY 88"	COMPACTION 30"
--------	------------------	--------------	----------------

CORE B	PENETRATION 138"	RECOVERY 85"	COMPACTION 33"
--------	------------------	--------------	----------------

CORE SITE COMMENTS

Core A - lost 18" from bottom, B - lost 21" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/27/92 TIME 11:00 PERSONNEL GWC, WJS, MAB

STATION I.D. BGW 007 . LAT/LON 33° 33.52N/ 81° 29.88W
 LOCATION Aiken State Park . SOIL GROUP Group 3

WEATHER CONDITIONS Clear and hot

CORE NOTES

CORE A	PENETRATION 138"	RECOVERY 109"	COMPACTION 26"
--------	------------------	---------------	----------------

CORE B	PENETRATION 120"	RECOVERY 89"	COMPACTION 30"
--------	------------------	--------------	----------------

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/29/92 TIME 09:00 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 008 . LAT/LON 33° 33.58N/ 81° 29.18W
 LOCATION Aiken State Park . SOIL GROUP Group-2

WEATHER CONDITIONS Clear, 85°

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 120"	COMPACTION 6.5"
--------	------------------	---------------	-----------------

CORE B	PENETRATION 120"	RECOVERY 111"	COMPACTION 5.5"
--------	------------------	---------------	-----------------

CORE SITE COMMENTS

Core A - lost 6" from bottom, B - lost 1-2" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/03/92 TIME 10:45 PERSONNEL WJS, MAB

STATION I.D. BGW 009 . LAT/LON 33° 49.77N/ 80° 49.21W
 LOCATION Congaree National Mon. . SOIL GROUP Group 1

WEATHER CONDITIONS Clear, hot, 90°

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 101"	COMPACTION 44"
CORE B	PENETRATION 144"	RECOVERY 106"	COMPACTION 35"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/02/92 TIME 16:15 PERSONNEL WJS, RSK, GWC, VR, KD

STATION I.D. BGW 010 . LAT/LON 33° 49.10N/ 80° 48.81W
 LOCATION Congaree National Mon. . SOIL GROUP Group 5

WEATHER CONDITIONS Partly cloudy, humid, 85-90°

CORE NOTES

CORE A	PENETRATION 143"	RECOVERY 118"	COMPACTION 24"
CORE B	PENETRATION 149"	RECOVERY 121"	COMPACTION 27"

CORE SITE COMMENTS

Long walk from access road. Heavy rain about 20 minutes prior to start work at this site.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/02/92 TIME 13:00 PERSONNEL GWC, RSK, WJS

STATION I.D. BGW 011 . LAT/LON 33° 49.56N/ 80° 49.42W
 LOCATION Congaree National Mon. . SOIL GROUP Group 5

WEATHER CONDITIONS Partly cloudy, ~90°

CORE NOTES

CORE A	PENETRATION 135"	RECOVERY 103"	COMPACTION 30"
CORE B	PENETRATION 67"	RECOVERY 47"	COMPACTION 18"

CORE SITE COMMENTS

Core 'C' penetrate 120", compact 89", recover 29". Abundant wood encountered at this site. Large wood hindered or stopped all attempts. Core C plugged with wood. Core B stopped by wood.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

Continued from core site comments: Core A - wood in core.

ATHENA FIELD ACTIVITIES LOG

DATE 08/02/92 TIME 11:30 PERSONNEL GWC, WJS, RSK, VR, KD

STATION I.D. BGW 012 . LAT/LON 33° 49.56N/ 80° 49.42W
 LOCATION Congaree National Mon. . SOIL GROUP Group 5

WEATHER CONDITIONS Overcast, light rain, 80-85°

CORE NOTES

CORE A	PENETRATION 27"	RECOVERY 27"	COMPACTION 0
CORE B	PENETRATION 20"	RECOVERY 19"	COMPACTION 0

CORE SITE COMMENTS

Tight clay - poor penetration. Hand auger samples B, C, D and field subsample volatiles. Push core for sample E.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/03/92 TIME 14:45 PERSONNEL WJS, MAB

STATION I.D. BGW 013 . LAT/LON 33° 49.30N/ 80° 49.49W
 LOCATION Congaree National Mon. . SOIL GROUP Group 5

WEATHER CONDITIONS Clear, 90°

CORE NOTES

CORE A	PENETRATION 62"	RECOVERY 57"	COMPACTION 5"
--------	-----------------	--------------	---------------

CORE B	PENETRATION	RECOVERY	COMPACTION
--------	-------------	----------	------------

CORE SITE COMMENTS

Rest of intervals collected with hand auger. Samples in two bags, field VOA's collected. 2 bags - 60-90", 90-120".

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/04/92 TIME 14:30 PERSONNEL RSK, GWC

STATION I.D. BGW 014 . LAT/LON 33° 30.89N/ 80° 29.68W
 LOCATION Santee State Park . SOIL GROUP Group 2

WEATHER CONDITIONS Partly cloudy, 90+

CORE NOTES

CORE A	PENETRATION 92"	RECOVERY 87"	COMPACTION 5"
--------	-----------------	--------------	---------------

CORE B	PENETRATION 95"	RECOVERY 93"	COMPACTION 5"
--------	-----------------	--------------	---------------

CORE SITE COMMENTS

More than one hour to locate core site.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/04/92 TIME 13:00 PERSONNEL WJS, MAB

STATION I.D. BGW 015 . LAT/LON 33° 31.10N/ 80° 29.53W
 LOCATION Santee State Park . SOIL GROUP Group 4

WEATHER CONDITIONS Hot, clear, 96, humid

CORE NOTES

CORE A	PENETRATION 70"	RECOVERY 66"	COMPACTION 3"
CORE B	PENETRATION 65"	RECOVERY 63"	COMPACTION 1"

CORE SITE COMMENTS
 Augered down 10'4" 70-90"
 (2 sample bags) 90-120"

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/04/92 TIME 16:00 PERSONNEL WJS, MAB

STATION I.D. BGW 016 . LAT/LON 33° 31.02N/ 80° 29.40W
 LOCATION Santee State Park . SOIL GROUP Group 4

WEATHER CONDITIONS Hot!

CORE NOTES

CORE A	PENETRATION 101"	RECOVERY 99"	COMPACTION 1"
CORE B	PENETRATION 91"	RECOVERY 92"	COMPACTION 0"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/04/92 | TIME 18:00 | PERSONNEL RSK, GWC

STATION I.D. BGW 017 . LAT/LON 33° 31.40N/ 80° 29.63W
 LOCATION Santee State Park . SOIL GROUP Group 2

WEATHER CONDITIONS Clear, 90+

CORE NOTES

CORE A	PENETRATION 58"	RECOVERY 45"	COMPACTION 14"
--------	-----------------	--------------	----------------

CORE B	PENETRATION 56"	RECOVERY 40"	COMPACTION 14"
--------	-----------------	--------------	----------------

CORE SITE COMMENTS

More than one hour to locate core site. D and E samples collected using hand auger, field VOA's collected.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/03/92 | TIME 08:20 | PERSONNEL WJS, MAB

STATION I.D. BGW 018 . LAT/LON 33° 49.76N/ 80° 49.17W
 LOCATION Congaree National Mon. . SOIL GROUP Group 1

WEATHER CONDITIONS Rain

CORE NOTES

CORE A	PENETRATION 142"	RECOVERY 121"	COMPACTION 19"
--------	------------------	---------------	----------------

CORE B	PENETRATION 142"	RECOVERY 123"	COMPACTION 19"
--------	------------------	---------------	----------------

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/30/92 TIME 11:00 PERSONNEL WJS, MAB, VR

STATION I.D. BGW 019 . LAT/LON 33° 13.31N/ 80° 21.25W
 LOCATION Francis Biedler Forest . SOIL GROUP Group 4

WEATHER CONDITIONS Partly cloudy, hot

CORE NOTES

CORE A	PENETRATION 116" *	RECOVERY 106	COMPACTION 4" *
--------	--------------------	--------------	-----------------

CORE B	PENETRATION 103"	RECOVERY 96"	COMPACTION 9"
--------	------------------	--------------	---------------

CORE SITE COMMENTS

* Double entries at each site due to hard clays. Penetration # is total depth of penetration. Compaction measured on 1st attempt.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/30/92 TIME 14:15 PERSONNEL MAB, WJS, VR

STATION I.D. BGW 020 . LAT/LON 33° 13.12N/ 80° 21.25W
 LOCATION Francis Biedler Forest . SOIL GROUP Group 4

WEATHER CONDITIONS Partly cloudy, 90+

CORE NOTES

CORE A	PENETRATION 116"	RECOVERY 110"	COMPACTION 6"
--------	------------------	---------------	---------------

CORE B	PENETRATION 120"	RECOVERY 100"	COMPACTION 20"
--------	------------------	---------------	----------------

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/22/92 TIME 13:30 PERSONNEL RSK, GWC, MAB

STATION I.D. BGW 021 . LAT/LON 33° 19.41N/ 81° 50.15W
 LOCATION Jackson Audobon . SOIL GROUP Group 2

WEATHER CONDITIONS Partly cloudy, ~90°

CORE NOTES

CORE A	PENETRATION 153"	RECOVERY 99"	COMPACTION 52"
CORE B	PENETRATION	RECOVERY	COMPACTION

CORE SITE COMMENTS
 Penetrated to 153" to insure ample sample volume, subsampled 07/22/92.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS
 20" minimum core sample interval to fill all jars.

ATHENA FIELD ACTIVITIES LOG

DATE 08/06/92 TIME 13:45 PERSONNEL WJS, MAB

STATION I.D. BGW 022 . LAT/LON 33° 19.10N/ 81° 52.13W
 LOCATION Jackson Audobon . SOIL GROUP Group 5

WEATHER CONDITIONS Overcast, 85°

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 53"	COMPACTION 58"
CORE B	PENETRATION 45"	RECOVERY 42"	COMPACTION 3"

CORE SITE COMMENTS
 Core A - lost 9" from end. Core B - reentered same hole, penetrated 13 ft., 73" recovered, compaction 32". Core B at 2: lost 7" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/23/92 TIME 10:30 PERSONNEL MAB, GWC

STATION I.D. BGW 023 . LAT/LON 33° 19.58N/ 81° 51.77W
 LOCATION Jackson Audobon . SOIL GROUP Group 3

WEATHER CONDITIONS Mostly cloudy, ~90°

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 100"	COMPACTION 32"
--------	------------------	---------------	----------------

CORE B	PENETRATION 108"	RECOVERY 82"	COMPACTION 27"
--------	------------------	--------------	----------------

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/22/92 TIME 15:00 PERSONNEL GWC, MAB, RSK

STATION I.D. BGW 024 . LAT/LON 33° 21.13N/ 81° 51.88W
 LOCATION Jackson Audobon . SOIL GROUP Group 3

WEATHER CONDITIONS Mostly clear, ~95°

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 124"	COMPACTION 7"
--------	------------------	---------------	---------------

CORE B	PENETRATION	RECOVERY	COMPACTION
--------	-------------	----------	------------

CORE SITE COMMENTS
 Subsampled 07/23/92

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/23/92 TIME 16:00 PERSONNEL MAB, GWC

STATION I.D. BGW 025 . LAT/LON 33° 19.06N/ 81° 51.01W
 LOCATION Jackson Audobon . SOIL GROUP Group 2

WEATHER CONDITIONS Cloudy/rain, 85-90°

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 104"	COMPACTION 28"
CORE B	PENETRATION 120"	RECOVERY 96"	COMPACTION 24"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 07/30/92 TIME 15:00 PERSONNEL WJS, MAB, VR

STATION I.D. BGW 1QS . LAT/LON 33° 13.12N/ 80° 21.25W
 LOCATION Francis Biedler . SOIL GROUP Group 4

WEATHER CONDITIONS Clear, humid, 90+

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 95"	COMPACTION 24"
CORE B	PENETRATION 116"	RECOVERY 109"	COMPACTION 6"

CORE SITE COMMENTS
 Duplicate of site BGW 020.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/03/92 TIME 11:30 PERSONNEL WJS, MAB

STATION I.D. BGW 2QS . LAT/LON 33° 49.77N/ 80° 49.21W
 LOCATION Congaree National Mon. . SOIL GROUP Group 1

WEATHER CONDITIONS Clear, hot, ~95°

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 124"	COMPACTION 31"
--------	------------------	---------------	----------------

CORE B	PENETRATION 142"	RECOVERY 112"	COMPACTION 24"
--------	------------------	---------------	----------------

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/06/92 TIME 10:30 PERSONNEL WJS, MAB

STATION I.D. BGW 3QS . LAT/LON 33° 21.13N/ 81° 51.88W
 LOCATION Jackson Audobon . SOIL GROUP Group 3

WEATHER CONDITIONS Overcast, a cool 82, about to rain

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 124"	COMPACTION 16"
--------	------------------	---------------	----------------

CORE B	PENETRATION 144"	RECOVERY 124"	COMPACTION 17"
--------	------------------	---------------	----------------

CORE SITE COMMENTS

What a beautiful day for vibracoring! 2 A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/24/92 TIME 13:20 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 026 . LAT/LON 33°19.30N/ 81°41.41W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Sunny, windy, ~85°

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 106.5"	COMPACTION 12"
CORE B	PENETRATION 119"	RECOVERY 106.5"	COMPACTION 11"

CORE SITE COMMENTS
 (2) A soils were taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE / / TIME : PERSONNEL

STATION I.D. _____ . LAT/LON _____
 LOCATION _____ . SOIL GROUP _____

WEATHER CONDITIONS

CORE NOTES

CORE A	PENETRATION	RECOVERY	COMPACTION
CORE B	PENETRATION	RECOVERY	COMPACTION

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/08/92 TIME 15:00 PERSONNEL MAB, GWC

STATION I.D. BGW 027 . LAT/LON 33° 18.48N/ 81° 41.29W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Hot, humid, 90's

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 123.5"	COMPACTION 9"
CORE B	PENETRATION 144"	RECOVERY 121"	COMPACTION 21"

CORE SITE COMMENTS
 Core B lost 2" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/24/92 TIME 14:30 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 028 . LAT/LON 33° 18.25N/ 81° 41.56W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Partly cloudy, windy, ~85°

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 133"	COMPACTION 3"
CORE B	PENETRATION 132"	RECOVERY 122"	COMPACTION 10"

CORE SITE COMMENTS
 (2) A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/31/92 | TIME 10:30 | PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 029 . LAT/LON 33° 11.54N/ 81° 35.80W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Sunny, warm, ~85°

CORE NOTES

CORE A	PENETRATION 124"	RECOVERY 109"	COMPACTION 14"
CORE B	PENETRATION 114"	RECOVERY 95"	COMPACTION 23"

CORE SITE COMMENTS
 6-7" standing water, Core A - lost 5" from bottom of core.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/20/92 | TIME 10:00 | PERSONNEL WJS, MAB

STATION I.D. BGW 030 . LAT/LON 33° 10.64N/ 81° 36.50W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Cloudy, 78°

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 121"	COMPACTION 22"
CORE B	PENETRATION 142"	RECOVERY 118"	COMPACTION 15"

CORE SITE COMMENTS
 Core B taken August 21, 1992 due to low sample volume for "C" interval in Core A (large wood plug). 1 "A" soil horizon collected.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/20/92 TIME 11:45 PERSONNEL WJS, MAB

STATION I.D. BGW 031 . LAT/LON 33° 10.76N/ 81° 36.42W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Cloudy, 80°

CORE NOTES

CORE A	PENETRATION 130"	RECOVERY 121"	COMPACTION 4"
CORE B	PENETRATION 133"	RECOVERY 113"	COMPACTION 10"

CORE SITE COMMENTS
 Core B - lost 19" out of bottom during recovery. Core A - notable air/water pockets. Two cores collected.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/18/92 TIME 09:15 PERSONNEL WJS, MAB

STATION I.D. BGW 032 . LAT/LON 33° 09.04N/ 81° 35.21W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Overcast, cool, 72°

CORE NOTES

CORE A	PENETRATION 21"	RECOVERY 17"	COMPACTION 5"
CORE B	PENETRATION	RECOVERY	COMPACTION

CORE SITE COMMENTS
 Core A too hard, will auger B core. Took two A cores and one A and B short core.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/12/92 | TIME 09:00 | PERSONNEL WJS, MAB

STATION I.D. BGW 033 . LAT/LON 33° 24.16N/ 81° 36.49W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Hot, humid, clear

CORE NOTES

CORE A	PENETRATION 129"	RECOVERY 72"	COMPACTION 36"
--------	------------------	--------------	----------------

CORE B	PENETRATION 124"	RECOVERY 0	COMPACTION 50"
--------	------------------	------------	----------------

CORE SITE COMMENTS

Core B - no recovery. Core A - 20" lost from bottom on recovery. Very coarse/gravel. Core C - penetrated 138", compacted 48", recovered 85", lost 4" from bottom during recovery.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/13/92 | TIME 08:30 | PERSONNEL WJS, MAB

STATION I.D. BGW 034 . LAT/LON 33° 23.42N/ 81° 36.74W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Cool, overcast

CORE NOTES

CORE A	PENETRATION 138"	RECOVERY 91"	COMPACTION 47"
--------	------------------	--------------	----------------

CORE B	PENETRATION 132"	RECOVERY 85"	COMPACTION 44"
--------	------------------	--------------	----------------

CORE SITE COMMENTS

Core B - lost 4" from bottom during recovery.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/12/92 TIME 13:30 PERSONNEL WJS, MAB

STATION I.D. BGW 035 . LAT/LON 33° 24.16N/ 81° 36.83W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Hot, humid, clear

CORE NOTES

CORE A	PENETRATION 159"	RECOVERY 111"	COMPACTION 41"
CORE B	PENETRATION 156"	RECOVERY 139"	COMPACTION 18"

CORE SITE COMMENTS
 Core A - lost 6" from bottom during recovery.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/25/92 TIME 13:30 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 036 . LAT/LON 33° 20.27N/ 81° 40.64W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Partly cloudy, windy, pleasant

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 120"	COMPACTION 8"
CORE B	PENETRATION	RECOVERY	COMPACTION

CORE SITE COMMENTS
 A and B cores were driven down with a hammer. Auger started at 20" and continued to 120". (2) A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/21/92 TIME 10:00 PERSONNEL WJS, MAB

STATION I.D. BGW 037 . LAT/LON 33° 22.54N/ 81° 37.16W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Cloudy, ~70°

CORE NOTES

CORE A	PENETRATION 139"	RECOVERY 61"	COMPACTION 45"
--------	------------------	--------------	----------------

CORE B	PENETRATION 140"	RECOVERY 90"	COMPACTION 48"
--------	------------------	--------------	----------------

CORE SITE COMMENTS

2 cores and 2 "A" soil horizons collected. Core A - lost 32" from bottom. Core B - lost 1" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/24/92 TIME 10:15 PERSONNEL WJS, MAB

STATION I.D. BGW 038 . LAT/LON 33° 22.19N/ 81° 36.96W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Cloudy, cool

CORE NOTES

CORE A	PENETRATION 115"	RECOVERY 102"	COMPACTION 15"
--------	------------------	---------------	----------------

CORE B	PENETRATION 120"	RECOVERY 107"	COMPACTION 12"
--------	------------------	---------------	----------------

CORE SITE COMMENTS

(2) A soils were taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/01/92 TIME 11:30 PERSONNEL WJS, GWC

STATION I.D. BGW 039 . LAT/LON 33° 21.57N/ 81° 40.87W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Sunny, warm, ~80°

CORE NOTES

CORE A	PENETRATION 43"	RECOVERY 35"	COMPACTION 5"
CORE B	PENETRATION 43"	RECOVERY 39"	COMPACTION 3.5"

CORE SITE COMMENTS
 A & B hammered down with sledge hammer, augered C, D, and E.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/19/92 TIME 11:30 PERSONNEL WJS, MAB

STATION I.D. BGW 040 . LAT/LON 33° 09.03N/ 81° 35.94W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Cloudy, cool, ~75°

CORE NOTES

CORE A	PENETRATION 20"	RECOVERY 18"	COMPACTION 2"
CORE B	PENETRATION 18"	RECOVERY 16"	COMPACTION 2"

CORE SITE COMMENTS
 Cores A and B were driven down with sledge hammer, (2) A soils were taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/18/92 TIME 13:00 PERSONNEL WJS, MAB

STATION I.D. BGW 041 . LAT/LON 33° 09.52N/ 81° 33.42W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Sunny, 85°

CORE NOTES

CORE A	PENETRATION 32"	RECOVERY 20"	COMPACTION 11"
--------	-----------------	--------------	----------------

CORE B	PENETRATION	RECOVERY	COMPACTION
--------	-------------	----------	------------

CORE SITE COMMENTS

Only one small vibracore - rest of core was augered. Took 3 A and B cores.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/19/92 TIME 15:00 PERSONNEL WJS, MAB

STATION I.D. BGW 042 . LAT/LON 33° 11.86N/ 81° 32.44W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Partly cloudy, ~84°

CORE NOTES

CORE A	PENETRATION 44.5"	RECOVERY 39"	COMPACTION 4.5"
--------	-------------------	--------------	-----------------

CORE B	PENETRATION 40.5"	RECOVERY 35"	COMPACTION 4.5"
--------	-------------------	--------------	-----------------

CORE SITE COMMENTS

Cores A and B were driven down with a sledge hammer.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/09/92 TIME 10:00 PERSONNEL MAB, GWC

STATION I.D. BGW 043 . LAT/LON 33° 18.42N/ 81° 33.79W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Sunny, warm, ~85°

CORE NOTES

CORE A	PENETRATION 70"	RECOVERY 63"	COMPACTION 6"
CORE B	PENETRATION 66"	RECOVERY 46"	COMPACTION 19"

CORE SITE COMMENTS
 2-3" in surrounding water augered intervals D and E in hole B.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/03/92 TIME 16:00 PERSONNEL WJS, GWC

STATION I.D. BGW 044 . LAT/LON 33° 17.38N/ 81° 28.93W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Stormy, breezy, ~85°

CORE NOTES

CORE A	PENETRATION 42"	RECOVERY 38"	COMPACTION 4"
CORE B	PENETRATION 37"	RECOVERY 35"	COMPACTION 2"

CORE SITE COMMENTS
 Standing water 6-10", wide open surroundings, (1) A horizon taken,
 Core B -> hard to drive in.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/25/92 TIME 09:45 PERSONNEL MAB, GWC

STATION I.D. BGW 045 . LAT/LON 33° 22.21N/ 81° 37.96W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Clear, warm, humid, 80°

CORE NOTES

CORE A	PENETRATION 141"	RECOVERY 106"	COMPACTION 19 "
--------	------------------	---------------	-----------------

CORE B	PENETRATION 141"	RECOVERY 99"	COMPACTION 30"
--------	------------------	--------------	----------------

CORE SITE COMMENTS

Core A - lost 14" from bottom. Core B - lost 11" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/25/92 TIME 11:30 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 046 . LAT/LON 33° 20.41N/ 81° 36.52W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Cloudy, humid, 80°

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 112"	COMPACTION 7"
--------	------------------	---------------	---------------

CORE B	PENETRATION 120"	RECOVERY 112"	COMPACTION 8"
--------	------------------	---------------	---------------

CORE SITE COMMENTS

Core A - good penetration to 9'. 9-10' very hard to get!

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/02/92 | TIME 15:30 | PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 047 . LAT/LON 33° 19.21N/ 81° 35.44W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Sunny, warm

CORE NOTES

CORE A	PENETRATION 141"	RECOVERY 126"	COMPACTION 15"
CORE B	PENETRATION 138"	RECOVERY 134"	COMPACTION 4"

CORE SITE COMMENTS
 No A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/20/92 | TIME 16:00 | PERSONNEL WJS, MAB

STATION I.D. BGW 048 . LAT/LON 33° 20.01N/ 81° 33.61W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Partly cloudy, ~85°

CORE NOTES

CORE A	PENETRATION 141"	RECOVERY 136"	COMPACTION 8"
CORE B	PENETRATION	RECOVERY	COMPACTION

CORE SITE COMMENTS
 (1) core taken and (1) "A" soil horizon.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/31/92 TIME 17:00 PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 049 . LAT/LON 33° 15.15N/ 81° 36.81W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Sunny, warm

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 101"	COMPACTION 18"
CORE B	PENETRATION 60"	RECOVERY 50"	COMPACTION 12"

CORE SITE COMMENTS
 6-8" standing water (swamp), (2) A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/31/92 TIME 14:30 PERSONNEL WJS, MAB

STATION I.D. BGW 050 . LAT/LON 33° 14.64N/ 81° 37.25W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Sunny, warm, 92°

CORE NOTES

CORE A	PENETRATION 56"	RECOVERY 50.5"	COMPACTION 3"
CORE B	PENETRATION 72"	RECOVERY 64"	COMPACTION 8"

CORE SITE COMMENTS
 2 vibracore attempts (A & B), 2 auger attempts (A & B), refused both times.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/09/92 | TIME 16:00 | PERSONNEL GWC, RSK

STATION I.D. BGW 051 . LAT/LON 33° 13.71N/ 81° 47.27W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Sunny, hot, ~95°

CORE NOTES

CORE A	PENETRATION 122"	RECOVERY 101"	COMPACTION 22"
CORE B	PENETRATION 121"	RECOVERY 109"	COMPACTION 12"

CORE SITE COMMENTS
 Many roots encountered and cut through.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/10/92 | TIME 10:45 | PERSONNEL WJS, MAB

STATION I.D. BGW 052 . LAT/LON 33° 14.13N/ 81° 47.69W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Hot, humid, 90-95 °

CORE NOTES

CORE A	PENETRATION 133"	RECOVERY 120"	COMPACTION 13"
CORE B	PENETRATION 136"	RECOVERY 114"	COMPACTION 21"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/09/92 TIME 18:00 PERSONNEL GWC, RSK

STATION I.D. BGW 053 . LAT/LON 33° 13.77N/ 81° 47.44W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Clear, hot, 90+

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 129"	COMPACTION 13"
CORE B	PENETRATION 141"	RECOVERY 127"	COMPACTION 10"

CORE SITE COMMENTS
 Extremely hard retrieval.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/11/92 TIME 12:00 PERSONNEL WJS, MAB, KD-

STATION I.D. BGW 054 . LAT/LON 33° 14.02N/ 81° 47.51W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Clear, hot, humid, 92°

CORE NOTES

CORE A	PENETRATION 142"	RECOVERY 125.5"	COMPACTION 14"
CORE B	PENETRATION 141"	RECOVERY 125"	COMPACTION 14"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/09/92 TIME 11:45 PERSONNEL WJS, MAB

STATION I.D. BGW 055 . LAT/LON 33° 14.30N/ 81° 47.93W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Hot, clear, ~90°

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 100"	COMPACTION 15"
CORE B	PENETRATION 114"	RECOVERY 90"	COMPACTION 25"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/09/92 TIME 12:30 PERSONNEL GWC, RSK

STATION I.D. BGW 056 . LAT/LON 33° 14.86N/ 81° 48.28W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Sunny, hot, 90+

CORE NOTES

CORE A	PENETRATION 128"	RECOVERY 120"	COMPACTION 8"
CORE B	PENETRATION 99"	RECOVERY 88"	COMPACTION 12"

CORE SITE COMMENTS

Standing water 6-8" deep. Compaction measurements + or - 2" due to difficulty measuring water/ground depth. Slow steady penetration below 5 feet.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/11/92 TIME 10:00 PERSONNEL WJS, MAB, KD

STATION I.D. BGW 057 . LAT/LON 33° 13.83N/ 81° 47.48W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Clear, hot, humid, 88°

CORE NOTES

CORE A	PENETRATION 59"	RECOVERY 51"	COMPACTION 9"
CORE B	PENETRATION 58"	RECOVERY 43.5"	COMPACTION 13"

CORE SITE COMMENTS

Core A - lost 2" from bottom, rest of sample was collected by hand auger.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/10/92 TIME 13:20 PERSONNEL WJS, MAB

STATION I.D. BGW 058 . LAT/LON 33° 14.08N/ 81° 47.57W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Clear, hot, humid

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 106"	COMPACTION 40"
CORE B	PENETRATION 141"	RECOVERY 106"	COMPACTION 32"

CORE SITE COMMENTS

Core B -> lost 3" from bottom on retrieval.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/09/92 TIME 16:45 PERSONNEL WJS, MAB

STATION I.D. BGW 059 . LAT/LON 33° 14.17N/ 81° 47.71W
LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Hot, clear, humid, 90+

CORE NOTES

CORE A PENETRATION 131" RECOVERY 116" COMPACTION 14"

CORE B PENETRATION 136" RECOVERY 121" COMPACTION 15"

CORE SITE COMMENTS

Failed Core B attempt, additional core taken on 8/10/92 at 0900 -> B core.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/09/92 TIME 14:30 PERSONNEL WJS, MAB

STATION I.D. BGW 060 . LAT/LON 33° 14.27N/ 81° 47.82W
LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Hot, clear, ~95°

CORE NOTES

CORE A PENETRATION 133" RECOVERY 106" COMPACTION 22"

CORE B PENETRATION 126" RECOVERY 111" COMPACTION 15"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/17/92 | TIME 12:00 | PERSONNEL RSK, GWC

STATION I.D. BGW 061 .. LAT/LON 33° 10.19N/ 81° 34.91W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Overcast, warm 80-85°

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 129.5"	COMPACTION 14"
--------	------------------	-----------------	----------------

CORE B	PENETRATION 144"	RECOVERY 124.5"	COMPACTION 18"
--------	------------------	-----------------	----------------

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/17/92 | TIME 14:30 | PERSONNEL RSK, GWC

STATION I.D. BGW 062 .. LAT/LON 33° 10.73N/ 81° 34.13W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Overcast, warm, 85°

CORE NOTES

CORE A	PENETRATION 144	RECOVERY 134"	COMPACTION 7"
--------	-----------------	---------------	---------------

CORE B	PENETRATION 145"	RECOVERY 138"	COMPACTION 6"
--------	------------------	---------------	---------------

CORE SITE COMMENTS
 Abundant roots between 0-5 feet of core B.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/17/92 | TIME 16:15 | PERSONNEL WJS, MAB

STATION I.D. BGW 063 . LAT/LON 33° 11.03N/ 81° 29.39W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Cloudy, humid, ~80°

CORE NOTES

CORE A	PENETRATION 127"	RECOVERY 117"	COMPACTION 9"
CORE B	PENETRATION 141"	RECOVERY 132"	COMPACTION 3"

CORE SITE COMMENTS
 Big cores, heavy too!

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/17/92 | TIME 16:30 | PERSONNEL RSK, GWC

STATION I.D. BGW 064 . LAT/LON 33° 12.57N/ 81° 30.40W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Cloudy, warm, humid, ~85°

CORE NOTES

CORE A	PENETRATION 148.5"	RECOVERY 143"	COMPACTION 6"
CORE B	PENETRATION 123"	RECOVERY 89"	COMPACTION 9"

CORE SITE COMMENTS
 Core B - lost 27" from bottom during recovery.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/17/92 | TIME 10:45 | PERSONNEL WJS, MAB

STATION I.D. BGW 065 . LAT/LON 33° 11.15N/ 81° 32.03W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Cloudy, humid, ~80°

CORE NOTES

CORE A	PENETRATION 40"	RECOVERY 36"	COMPACTION 2"
CORE B	PENETRATION 38"	RECOVERY 34"	COMPACTION 4"

CORE SITE COMMENTS

Core A - augered between 40-60", cored down to 78" (18" section of A), 78-90" augered, 90-120" augered. Core B - only one core - 34".

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/18/92 | TIME 16:45 | PERSONNEL WJS, MAB

STATION I.D. BGW 066 . LAT/LON 33° 13.57N/ 81° 38.63W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS hot, humid, clear, 92°

CORE NOTES

CORE A	PENETRATION 139"	RECOVERY 125"	COMPACTION 10"
CORE B	PENETRATION 133"	RECOVERY 120"	COMPACTION 14"

CORE SITE COMMENTS

(2) "A" soil horizon samples collected.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/02/92 | TIME 12:30 | PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 067 . LAT/LON 33° 21.07N/ 81° 37.96W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Sunny, warm

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 101"	COMPACTION 19"
CORE B	PENETRATION 128"	RECOVERY 95"	COMPACTION 27"

CORE SITE COMMENTS
 Lost 3" out of bottom of Core A. Lost 5" out of bottom of Core B.
 No A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/01/92 | TIME 14:00 | PERSONNEL WJS, GWC

STATION I.D. BGW 068 . LAT/LON 33° 21.05N/ 81° 38.14W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Sunny, warm, ~85°

CORE NOTES

CORE A	PENETRATION 149"	RECOVERY 116.5"	COMPACTION 21"
CORE B	PENETRATION 139"	RECOVERY 112"	COMPACTION 14"

CORE SITE COMMENTS
 13" lost from bottom of Core A. 13" lost from bottom of Core B.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS
 Very difficult to get to!

ATHENA FIELD ACTIVITIES LOG

DATE 08/27/92 | TIME 16:15 | PERSONNEL WJS, MAB

STATION I.D. BGW 069 . LAT/LON 33° 20.82N/ 81° 38.68W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Clear, hot, 90's

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 109"	COMPACTION 20"
CORE B	PENETRATION 124"	RECOVERY 103"	COMPACTION 20"

CORE SITE COMMENTS
 Core A - lost 2" out of bottom. Core B - lost 2" out of bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/27/92 | TIME 10:30 | PERSONNEL WJS

STATION I.D. BGW 070 . LAT/LON 33° 19.99N/ 81° 38.87W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Sunny, ~80°

CORE NOTES

CORE A	PENETRATION 150"	RECOVERY 99"	COMPACTION 36"
CORE B	PENETRATION 158"	RECOVERY 107"	COMPACTION 39"

CORE SITE COMMENTS
 Core A - lost 14" from bottom. Core B - lost 9" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/27/92 TIME 09:00 PERSONNEL WJS, MAB

STATION I.D. BGW 071 . LAT/LON 33° 20.02N/ 81° 38.82W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Sunny, ~80°

CORE NOTES

CORE A	PENETRATION 146"	RECOVERY 120"	COMPACTION 23"
CORE B	PENETRATION 156"	RECOVERY 125"	COMPACTION 29"

CORE SITE COMMENTS
 No A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/27/92 TIME 12:30 PERSONNEL WJS, MAB

STATION I.D. BGW 072 . LAT/LON 33° 20.10N/ 81° 38.86W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Sunny, ~85°

CORE NOTES

CORE A	PENETRATION 146"	RECOVERY 121"	COMPACTION 24"
CORE B	PENETRATION 150"	RECOVERY 132"	COMPACTION 19"

CORE SITE COMMENTS

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/27/92 TIME 14:45 PERSONNEL WJS, MAB

STATION I.D. BGW 073 . LAT/LON 33° 20.61N/ 81° 38.68W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Sunny, ~85°

CORE NOTES

CORE A	PENETRATION 121"	RECOVERY 113"	COMPACTION 4"
CORE B	PENETRATION 117"	RECOVERY 110"	COMPACTION 5"

CORE SITE COMMENTS
 Core A lost 4" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/08/92 TIME 10:30 PERSONNEL MAB, GWC

STATION I.D. BGW 074 . LAT/LON 33° 19.49N/ 81° 38.70W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Sunny, cool

CORE NOTES

CORE A	PENETRATION 126"	RECOVERY 99"	COMPACTION 22"
CORE B	PENETRATION 122"	RECOVERY 85"	COMPACTION 28"

CORE SITE COMMENTS
 Latitude and longitude taken 250 ft. from stake at 30 degrees. Core A lost 7" from bottom. Core B lost 10" from bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/09/92 | TIME 14:00 | PERSONNEL MAB, GWC

STATION I.D. BGW 075 . LAT/LON 33°19.37N/ 81°39.34W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Sunny, Warm, ~85°

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 93"	COMPACTION 23"
CORE B	PENETRATION 120"	RECOVERY 101"	COMPACTION 20"

CORE SITE COMMENTS
 Lost 6.5" from bottom of Core A. Lost 2" from bottom of Core B.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/10/92 | TIME 15:00 | PERSONNEL WJS, MAB

STATION I.D. BGW 4QS . LAT/LON 33°14.08N/ 81°47.57W
 LOCATION Savannah River Site . SOIL GROUP Group 5

WEATHER CONDITIONS Clear, hot, humid

CORE NOTES

CORE A	PENETRATION 144"	RECOVERY 107"	COMPACTION 32"
CORE B	PENETRATION 144"	RECOVERY 106"	COMPACTION 36"

CORE SITE COMMENTS
 Core A -> lost 4" from bottom on retrieval. Duplicate coring site (same as BGW 058).

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/18/92 | TIME 17:30 | PERSONNEL WJS, MAB

STATION I.D. BGW 5QS . LAT/LON 33° 13.57N/ 81° 38.63W
 LOCATION Savannah River Site . SOIL GROUP Group 3

WEATHER CONDITIONS Hot, humid, clear

CORE NOTES

CORE A	PENETRATION 123"	RECOVERY 112"	COMPACTION 14"
CORE B	PENETRATION 132"	RECOVERY 112"	COMPACTION 17"

CORE SITE COMMENTS
 (2) "A" soil horizon samples collected.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/25/92 | TIME 14:40 | PERSONNEL WJS, MAB, GWC

STATION I.D. BGW 6QS . LAT/LON 33° 20.27N/ 81° 40.64W
 LOCATION Savannah River Site . SOIL GROUP Group 4

WEATHER CONDITIONS Partly cloudy, windy, pleasant

CORE NOTES

CORE A	PENETRATION 120"	RECOVERY 120"	COMPACTION 0"
CORE B	PENETRATION	RECOVERY	COMPACTION

CORE SITE COMMENTS
 A and B cores were driven with hammer. Auger started at 20". (2) A soils taken.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 08/28/92 TIME 11:00 PERSONNEL WJS, MAB

STATION I.D. BGW 7QS . LAT/LON 33°20.82N/ 81° 38.68W
 LOCATION Savannah River Site . SOIL GROUP Group 1

WEATHER CONDITIONS Partly cloudy, breezy, mid 80's

CORE NOTES

CORE A	PENETRATION 132"	RECOVERY 106"	COMPACTION 26"
CORE B	PENETRATION 132"	RECOVERY 99"	COMPACTION 22"

CORE SITE COMMENTS
 Core A - lost 3" out of bottom. Core B - lost 12" out of bottom.

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

ATHENA FIELD ACTIVITIES LOG

DATE 09/08/92 TIME 11:45 PERSONNEL MAB, GWC

STATION I.D. BGW 8QS . LAT/LON 33°19.59N/ 81° 38.76W
 LOCATION Savannah River Site . SOIL GROUP Group 2

WEATHER CONDITIONS Sunny, warm

CORE NOTES

CORE A	PENETRATION 130"	RECOVERY 96"	COMPACTION 32"
CORE B	PENETRATION 132"	RECOVERY 71"	COMPACTION 34"

CORE SITE COMMENTS
 Lost 28" from bottom of Core B. Core A - water pockets within core; lost undetermined amount from bottom. Core B - left in ground (tripod trouble).

EQUIPMENT NOTES (failures, replacements, repairs etc.)

COMMENTS/SUGGESTIONS

APPENDIX C

Background Wetland Soils Database Notes

SCOPE OF WORK for the Background Wetland Soils Database for the Environmental Sciences Section

1.0 INTRODUCTION

The Environmental Sciences Section (ESS) within SRTC has collected soil samples from locations both within the Savannah River Site boundaries and outside of those boundaries. They have received the analyses of these samples from Weston Laboratories, Inc. and have asked the Technical Computing Section to assist them in building a system to store, access and analyze these data. We are currently building a Background Wetland Soils Database for ESS. This system will assist in the automated collection, review, storage and dissemination of soil samples data analyzed by Weston Laboratories.

2.0 SCOPE

2.1 General Scope

The Technical Computing Section has built a relational database to hold the soils data received from Weston Laboratories, Inc. The data consists of ASCII formatted flat files of record length 197 bytes and approximately 1/2 million records. Due to the volume of records received, Oracle has been chosen as the relational database of choice on a VAX/VMS system. The particular VAX which is being used for development and maintenance of the software is a VAX 6000 maintained by Information Systems Engineering (ISE) and owned by EPD-EAS (Environmental Protection Department's Environmental Analysis Section). We are currently completing the system development, loading the data, and performing some data qualification using Oracle. Further data qualification and statistical analyses will be performed by the Applied Statistics Group using SAS and is not included in this scope of work. An interface between the Oracle application and SAS will be established for this work.

2.2 Constraints

We have received a majority of the data from Weston Laboratories, Inc., however, it has been found that approximately 2000 records are missing. We are as of yet unsure if the analyses have been completed by the laboratory, or if the samples were not analyzed at all (in which case they would probably have exceeded their holding time and are not able to be analyzed).

There are a few constraints in loading the data into an Oracle supported format. Oracle recognizes a field with no entry as a null field. In some cases the value should actually be blank as opposed to null (no value) to facilitate matching of fields between records.

These null fields must be replaced with blanks. Also some of the data fields contain a single decimal point with no other value, and are rejected by Oracle. The decimal point must be replaced with a blank prior to loading into Oracle.

2.3 Detailed Scope

The scope of the Background Wetland Soils Database for the Environmental Sciences Section is defined by the following individual task descriptions:

- Task 1. Complete the loading of all of the wetland soils data into Oracle tables.
- Task 2. Complete the data screening activities using Structured Query Language which will include, but not be limited to:
 - a. Consistent test names
 - b. Consistent laboratory codes
 - c. Check that sample date is prior to analysis date
 - d. Check that extraction date is prior to analysis date
 - e. Check that each record has a batch id
 - f. Verify that all result and analysis qualifiers are valid
 - g. Verify that all quality assurance codes are valid
 - h. Verify that percentages used in the percent solids field are between 0 and 100
 - i. Check for consistency in well names
 - j. Identify duplicate data
- Task 3. Facilitate the generation of the final report on the wetland soils data.
- Task 4. Document, per specific quality assurance requirements, all software development activities including users' and programmers' manuals.

The responsibility for each of these tasks is specified below.

- Task 1. The Technical Computing Section will work with the Environmental Sciences Section to complete the loading of all data into Oracle tables.
- Task 2. The Technical Computing Section will complete all data screening activities which have not currently been completed by the Environmental Sciences Section.
- Task 3. The Environmental Sciences Section, Applied Statistics Group and Technical Computing Section will all facilitate the completion of the final report on the wetlands soils data.
- Task 4. The Technical Computing Section will be responsible for generating all necessary documents to satisfy both quality assurance requirements and users' and maintainers' needs.

3.0 REFERENCES

Grove, Connie R. SCS-PMG-93-0022: "Screening and Qualification of the Wetland Soils Data": *A memo to Kenneth Dixon and Carol L. Cummins*; May 26, 1993.

Grove, Connie R. "Background Wetland Soils Database Preliminary Scope / Cost Estimate": *A memo to Russ R. Beckmeyer, R. Cary Tuckfield, K. Dixon, Carol L. Cummins and John Gladden*; May 18, 1993.

**Background Wetland Soils Database
Timeline of Development and Data Analysis Activities**

28 March 1994

Page 1

May/June 1993

- Development of preliminary scope of work and cost estimate.
- Requirements refined through memos between ESS and E&SC (then NRTSC) concerning data validation to be performed by each organization.
- Data validation performed by ESS.

July /August 1993

- Received initial test data.
- Continued data validation performed by ESS.
- Created Oracle table structure in accordance with the AN92 data format.
- Requested by ESS to identify missing test results.
- Created Oracle table structures for the data used to look for missing tests.
- Populated data structures used for missing tests analysis.
- Corrections to test names and task well names as directed by ESS.
- Iterative data analysis to identify missing tests.
- Completed analysis for missing tests.

September 1993

- Received modified data.
- Populated the AN92 Oracle data structure.
- Added a data file code field to the Oracle table to identify which data file the data originated from.

October 1993

- C program written to perform data validation.
- Data validation performed.

January/February 1994

- Oracle 6.0 migrated to Oracle 7.0.
- Worked with IRM and Oracle to solve system problems introduced by the migration.
- The Oracle application was moved from the "development" environment to the "acceptance" environment.
- Analysis to identify duplicate data records. Exact duplicates as well as duplicates based on a subset of the fields as determined by ESS were identified and removed from the database.

March 1994

- Analysis to identify possible laboratory replicate coding errors.
- Updated the Oracle database, per ESS to correct laboratory replicate coding errors.
- Development of applicable documentation.

ESS WETLAND SOILS DATABASE
DATABASE DESIGN NOTES

C. Grove
May 2, 1994

Page 1

Background:

The data received from the vendor laboratory was formatted according to the Site AN92 analytical data format. ESS loaded the data onto the IBM mainframe and performed initial data validation. Results from this analysis indicated that some test results were missing from the data sets. E&SC was asked to aid in finding the tests which were missing from the data. This was accomplished by creating Oracle tables containing key information for the tests which were supposed to be performed and for the tests which were performed. Programs were written to identify missing test results for each task. The results were communicated to the vendor by ESS and additional data was received, validated, and added to the Oracle table. Next, further data validation on the field level was accomplished through a C program called `fix_file.c` written by E&SC. ESS then requested that a search be made for possible duplicate data records. The data ESS received from the vendor was on numerous diskettes arriving in many batches. It was thought that ESS may have unknowingly received duplicate data files on the diskettes and concatenated all of the data into the files on the IBM. While the search for duplicate data was ongoing E&SC uncovered further data records which were similar but differed in a few fields which ESS decided to also segregate from the main data file. The data was downloaded into ASCII format and a series of C programs was developed to identify exact duplicates and near duplicates. 4134 exact and 11107 near duplicates were identified and pulled out of the main data file. The resulting file was loaded back into Oracle and is contained in a table called `Bkgd_soils_tbl`. The duplicate records are stored in Oracle tables called `Bkgd_exact_dups` and `Bkgd_near_dups`, and have the same structure as the main `Bkgd_soils_tbl` table. Lastly, E&SC was requested to identify possible laboratory replicate coding errors. The results of this analysis were reviewed by ESS and the decision was made to retain this data in the database.

Database Structure:

The structure of the database follows the AN92 Site analytical data format.

SQL> describe bkgd_soils_tbl;

Name	Null?	Type
WELL_LOC_ID		VARCHAR2(6)
WELL_DEPTH		VARCHAR2(2)
WELL_OTHER_ID		VARCHAR2(2)
DUP_ID		VARCHAR2(1)
SECND_ID		VARCHAR2(1)
COC_NUM		VARCHAR2(5)
SAMPLE_DATE		DATE
RECEIVED_DATE		DATE
EXTRACTION_DATE		DATE
EXTRACTION_TIME		NUMBER(4)
ANALYSIS_DATE		DATE
ANALYSIS_TIME		NUMBER(4)
ANAL_BATCH_ID		VARCHAR2(6)
LAB_CODE		VARCHAR2(2)
LAB_SAMPLE_ID		VARCHAR2(15)

ESS WETLAND SOILS DATABASE
DATABASE DESIGN NOTES

C. Grove
May 2, 1994

Page 2

LAB_REPLICATE_NUM	NUMBER(1)
TEST_NAME	VARCHAR2(10)
EXTRACTION_MTHD_ID	VARCHAR2(13)
ANAL_MTHD_ID	VARCHAR2(13)
DETECTION_LIM_NUM	NUMBER
RESULT_QLF_CODE	VARCHAR2(3)
ANAL_QLF_CODE	VARCHAR2(3)
BIAS_CODE	VARCHAR2(1)
ANAL_RESULT_NUM	NUMBER(11,5)
ANAL_RESULT_UNIT	VARCHAR2(4)
ACCURACY_NUM	NUMBER(8,5)
RESIDUAL_WT_NUM	NUMBER(4)
NUM_DILUTIONS_NUM	NUMBER(1)
DILUTIONS_FACT_NUM	NUMBER(6,2)
INSTRUMENT_ID	VARCHAR2(2)
ANALYST_ID	VARCHAR2(3)
STD_CONCNTRT_NUM	NUMBER(8,2)
RECEIPT_DATE	DATE
EPA_QUALITY_LEVEL_ID	VARCHAR2(2)
FRACTION_NUM	NUMBER(4)
SOLIDS_PERC	NUMBER(5,1)
BOTTLE_NUM	NUMBER(10)
DATA_FILE_CODE	VARCHAR2(1)

Procedure to create the ESS background wetland soils table:

- 1.) Drop existing table:
Drop table bkgd_soils_tbl;
- 2.) Create table structure:
@create_bkgd_soils_tbl.sql;
- 3.) Load data into bkgd_soils_tbl:

For each data file: (yyy = edd, edd2, edd3, edd4, edd5, edd6, gfc, pp, tma)

In SQL*Plus
 - a.) Drop existing temporary table:
Drop table temp_soils_tbl;
 - b.) Create temporary table structure:
@create_temp_soils_tbl.sql
Using SQL*Load
 - c.) Load data to temporary table from a data file:
sqlload / control=create_bkgd_yyy.ctl

ESS WETLAND SOILS DATABASE
DATABASE DESIGN NOTES

C. Grove
May 2, 1994

Page 3

In SQL*Plus

- d.) If data load is successful, move data from temp_soils_tbl into
bkgd_soils_tbl.
@update_bkgd_yyy.sql
- e.) Repeat steps a.) - d.) for each data file.

Notes:

- Data was originally ftp'd from Carol Cummins IBM account: O8072.edit.data
- Data for edd must be loaded first. The edd update program inserts data and the subsequent update programs append data.
- The SQL*Load program generates a .log file each time it is run and a .bad file if it is unable to load records.
- A file code has been added to the bkgd_soils_tbl structure to facilitate deleting and re-inserting data for a specific data file. The file codes are as follows:

Data File	Data File Code
edddata	1
edd2data	2
edd3data	3
edd4data	4
edd5data	5
edd6data	6
gfcdata	G
ppdata	P
tmadata	T

ESS WETLAND SOILS DATABASE
FINDING TESTS THAT WERE NOT PERFORMED

C. Grove
22 July 1993

Page 1

1.) Tests that were supposed to be performed:

Tables	SQL File	Control File	Data file
Task27_1 Well_name Char(10)	create_task27_1.sql	create_task27_wells.ctf	tsk27smp.dat
Task36_1 Well_name Char(10)	create_task36_1.sql	create_task36_wells.ctf	tsk36smp.dat
Task37_1 Well_name Char(10)	create_task37_1.sql	create_task37_wells.ctf	tsk37smp.dat
Interval Letter Char(1)	create_interval.sql		
Task27_wells Well_name Char(10) Letter Char(1)	create_task27_wells.sql		
Task36_wells Well_name Char(10) Letter Char(1)	create_task36_wells.sql		
Task37_wells Well_name Char(10) Letter Char(1)	create_task37_wells.sql		
Task27_tests Description Varchar(50) Test_code Varchar(10)	create_task27_tests.sql	create_task27_tests.ctf	task27cd.dat
Task36_tests Description Varchar(50) Test_code Varchar(10)	create_task36_tests.sql	create_task36_tests.ctf	task36cd.dat
Task37_tests Description Varchar(50) Test_code Varchar(10)	create_task37_tests.sql	create_task37_tests.ctf	task37cd.dat

ESS WETLAND SOILS DATABASE
FINDING TESTS THAT WERE NOT PERFORMED

C. Grove
22 July 1993

Page 2

Task27_tests-desired create_task27_tests_desired.sql
Well_name Char(10)
Letter Char(1)
Test_code Varchar(10)

Task36_tests-desired create_task36_tests_desired.sql
Well_name Char(10)
Letter Char(1)
Test_code Varchar(10)

Task37_tests-desired create_task37_tests_desired.sql
Well_name Char(10)
Letter Char(1)
Test_code Varchar(10)

2.) Tests that were performed:

Tables	SQL File	Control File	Data file
Tests_perf	create_tests_perf.sql	create_edd_tests_perf.ctf	eddtst.dat
Well_name Varchar(10)		create_edd2_tests_perf.ctf	edd2tst.dat
Letter Char(1)		create_edd3_tests_perf.ctf	edd3tst.dat
test_code Varchar(10)		create_edd4_tests_perf.ctf	edd4tst.dat
		create_tma_tests_perf.ctf	tmatst.dat
		create_gfc_tests_perf.ctf	gfctst.dat
		create_pp_tests_perf.ctf	pptst.dat

3.) PROCEDURE: (xx = 27, 36, 37)

A.) Create task well name files:

- 1.) Drop temporary tables:
Drop table taskxx_1
- 2.) Create temporary table structures:
@create_taskxx_1.sql
- 3.) Load data into Taskxx_1 tables:
SQLLOAD / control=create_taskxx_1.ctf

ESS WETLAND SOILS DATABASE
FINDING TESTS THAT WERE NOT PERFORMED

C. Grove
22 July 1993

Page 3

- 4.) Drop existing well name tables:
Drop table taskxx_wells;
 - 5.) Create well name table structure:
@create_taskxx_wells.sql
- B.) Create test name files:
- 1.) Drop test name files:
Drop table taskxx_tests;
 - 2.) Create test name table structures:
@create_taskxx_tests.sql
 - 3.) Load data into test name tables:
SQLLOAD / control=create_taskxx_tests;
- C.) Create tests desired tables:
- 1.) Drop existing tests desired tables:
Drop table taskxx_tests_desired;
 - 2.) Create tests desired tables from well name and test name tables:
@create_taskxx_tests_desired.sql;
 - 3.) Set null dup fields to blank:
UPDATE taskxx_tests_desired SET dup = ' ' WHERE dup IS NULL;
- D.) Create tests performed table:
- 1.) Drop existing tests performed table:
Drop table tests_perf;
 - 2.) Create table tests performed structure:
@create_tests_perf.sql
 - 3.) Load data into tests performed table:
(yyy = edd, edd2, edd3, edd4, gfc, pp, tma)
SQLLOAD / control=create_yyy_tests_perf.ctl
 - 4.) Set null dup field to blank:
UPDATE tests_perf SET dup = ' ' WHERE dup IS NULL;

(If you don't set dup to blank where it is null in tests_perf and taskxx_tests_desired, the records will not match because NULL is no value and cannot be matched.)

ESS WETLAND SOILS DATABASE
FINDING TESTS THAT WERE NOT PERFORMED

C. Grove
22 July 1993

Page 4

E.) Determine which data is missing (ie. desired but not performed)

- 1.) Drop temporary tables:
Drop tables ess_temp1;
Drop table ess_temp2;
Drop table ess_temp3;
- 2.) Drop missing data tables:
Drop table taskxx_missing_tests;
- 3.) Run procedure to find missing data:
@find_taskxx_errors

==> Missing data will be in tables taskxx_missing_tests

Westinghouse Savannah River Company
INTER-OFFICE MEMORANDUM

EPD-TES-94-0011

Tuesday, March 29, 1994

To: C. R. Grove
From: G. A. Rhoades
Subject: Wetland Soils Data

The removal of the duplicate records in the Wetland Soils Database was accomplished using programs written in C to scan and process the ASCII text file generated by the ORACLE database server. A total of four programs were written and the functionality of each is described below.

rdup

Scans the ASCII data file searching for exact duplicate records. Unique records are written to the file unique.dat and duplicates are written to the file duplicate.dat. The original data file is not modified.

srdup

Scans the ASCII data file searching for near duplicates. Near duplicate records are identified by the field descriptions contained in the data file fields.dat. Each field description consists of the field's starting position (0 being the first position) and length. Unique records are written to the file unique.dat and duplicates are written to the file duplicate.dat. The original data file is not modified.

sidup

Provides the same functionality as srdup while generating the additional data file sid.dat which contains all instances of duplicate records (i.e. each duplicate plus the original record).

lerror

Scans the ASCII data file searching for lab replicate errors. Lab replicate errors are records which are duplicate records based on the WELL_LOC_ID, WELL_DEPTH, SAMPLE_DATE, and TEST_DATE fields and not properly identified as replicates using the LAB_REPLICATE_ID and DUPLICATE_ID fields. Lab replicates are written to the data file error.dat. The original data file is not modified.

qlerror

Provides the same functionality as lerror with the additional qualification that a lab replicate error will not have a "Q" in the ANAL_QLF_CODE field.

The Wetland Soils data was processed as follows:

- the Wetland Soils database contained records with a WELL_LOC_ID of "LB " and "LB". All records containing a WELL_LOC_ID of "LB" were changed to "LB ".
- rdup was run with the entire Wetland Soils ASCII file (asoil.dat) as input. The unique records extracted were renamed to soil-exact.dat and the duplicate records were renamed to exact_dup.dat.
- srdup was run against soil-exact.dat using the following eleven fields chosen by ESS:
 - WELL_LOC_ID (starting position = 0, length = 6)
 - WELL_DEPTH (starting position = 6, length = 2)
 - DUP_ID (starting position = 10, length = 1)
 - SAMPLE_DATE (starting position = 17, length = 9)
 - ANALYSIS_DATE (starting position = 64, length = 9)

- ANALYSIS_TIME (starting position = 73, length = 20)
- ANAL_BATCH_ID (starting position = 93, length = 6)
- LAB_SAMPLE_ID (starting position = 101, length = 15)
- LAB_REPLICATE_NUM (starting position = 116, length = 20)
- TEST_NAME (starting position = 136, length = 10)
- ANAL_RESULT_NUM (starting position = 199, length = 20)

The field information was stored in the file fields.dat. The unique records extracted were renamed to soil-exact-near.dat. The duplicate records were renamed to near_dup.dat.

- sidup was run against asoil.dat and soil-exact.dat. The output was inspected by ESS and was not saved.
- lerror was run against soil-exact-near.dat using the following fields chosen by ESS:
 - WELL_LOC_ID (starting position = 0, length = 6)
 - WELL_DEPTH (starting position = 6, length = 2)
 - SAMPLE_DATE (starting position = 17, length = 9)
 - TEST_NAME (starting position = 136, length = 10)

2518 lab replicate errors were discovered and stored in the error.dat data file. Per ESS, records identified as lab blanks were removed from the error.dat file. The remaining lab replicate errors were stored in error-lb.dat.

- qlerror was run against the soil-exact-near.dat using the following fields chosen by ESS:
 - WELL_LOC_ID (starting position = 0, length = 6)
 - WELL_DEPTH (starting position = 6, length = 2)
 - SAMPLE_DATE (starting position = 17, length = 9)
 - TEST_NAME (starting position = 136, length = 10)

852 lab replicate errors were discovered and stored in the qerror.dat data file. Per ESS, records identified as lab blanks were removed from the qerror.dat file. The remaining lab replicate errors were stored in qerror-lb.dat.

APPENDIX D

Onsite Analytical Results

Onsite Analytical Results

Metals

D-1	Summary Statistics for Aluminum (by Soil Group and Depth)	1
D-2	Summary Statistics for Antimony (by Soil Group and Depth)	2
D-3	Summary Statistics for Arsenic (by Soil Group and Depth)	3
D-4	Summary Statistics for Barium (by Soil Group and Depth)	4
D-5	Summary Statistics for Beryllium (by Soil Group and Depth)	5
D-6	Summary Statistics for Cadmium (by Soil Group and Depth)	6
D-7	Summary Statistics for Calcium (by Soil Group and Depth)	7
D-8	Summary Statistics for Chromium (by Soil Group and Depth)	8
D-9	Summary Statistics for Cobalt (by Soil Group and Depth)	9
D-10	Summary Statistics for Copper (by Soil Group and Depth)	10
D-11	Summary Statistics for Iron (by Soil Group and Depth)	11
D-12	Summary Statistics for Lead (by Soil Group and Depth)	12
D-13	Summary Statistics for Lithium (by Soil Group and Depth)	13
D-14	Summary Statistics for Magnesium (by Soil Group and Depth)	14
D-15	Summary Statistics for Manganese (by Soil Group and Depth)	15
D-16	Summary Statistics for Mercury (by Soil Group and Depth)	16
D-17	Summary Statistics for Nickel (by Soil Group and Depth)	17
D-18	Summary Statistics for Potassium (by Soil Group and Depth)	18
D-19	Summary Statistics for Selenium (by Soil Group and Depth)	19
D-20	Summary Statistics for Silver (by Soil Group and Depth)	20
D-21	Summary Statistics for Sodium (by Soil Group and Depth)	21
D-22	Summary Statistics for Sulfide (by Soil Group and Depth)	22
D-23	Summary Statistics for Thallium (by Soil Group and Depth)	23
D-24	Summary Statistics for Tin (by Soil Group and Depth)	24
D-25	Summary Statistics for Vanadium (by Soil Group and Depth)	25
D-26	Summary Statistics for Zinc (by Soil Group and Depth)	26

Other Inorganic Parameters

D-27	Summary Statistics for Fluoride (by Soil Group and Depth)	27
D-28	Summary Statistics for Nitrate as Nitrogen (by Soil Group and Depth)	28
D-29	Summary Statistics for Nitrate + Nitrite (by Soil Group and Depth)	29

Other Inorganic Parameters (Continued)

D-30	Summary Statistics for Phosphates as Phosphorus (by Soil Group and Depth).....	30
D-31	Summary Statistics for Silicon (by Soil Group and Depth)	31
D-32	Summary Statistics for Sulfate (by Soil Group and Depth)	32

Organics

D-33	Summary Statistics for Total Organic Carbon (by Soil Group and Depth).....	33
D-34	Summary Statistics for Total Organic Halogens (by Soil Group and Depth)	34
D-35	Summary Statistics for Acetone (by Soil Group and Depth)	35
D-36	Summary Statistics for Carbon Disulfide (by Soil Group and Depth).....	36
D-37	Summary Statistics for Dichloromethane (by Soil Group and Depth).....	37
D-38	Summary Statistics for Ethyl Methacrylate (by Soil Group and Depth)	38
D-39	Summary Statistics for Methyl Ethyl Ketone (by Soil Group and Depth).....	39
D-40	Summary Statistics for Methyl Methacrylate (by Soil Group and Depth)	40
D-41	Summary Statistics for Pentachloroethane (by Soil Group and Depth)	41
D-42	Summary Statistics for Tetrachloroethylene (by Soil Group and Depth).....	42
D-43	Summary Statistics for 1,1,1-Trichloroethane (by Soil Group and Depth).....	43
D-44	Summary Statistics for 1,1,2-Trichloroethane (by Soil Group and Depth).....	44
D-45	Summary Statistics for Toluene (by Soil Group and Depth)	45
D-46	Summary Statistics for Trichlorofluoromethane (by Soil Group and Depth)	46
D-47	Summary Statistics for Xylenes (by Soil Group and Depth).....	47
D-48	Summary Statistics for Benzo(a)pyrene (by Soil Group and Depth)	48
D-49	Summary Statistics for Bis(2-ethylhexyl)phthalate (by Soil Group and Depth).....	49
D-50	Summary Statistics for Butylbenzyl Phthalate (by Soil Group and Depth)	50
D-51	Summary Statistics for Di-n-butyl Phthalate (by Soil Group and Depth).....	51
D-52	Summary Statistics for Fluoranthene (by Soil Group and Depth).....	52
D-53	Summary Statistics for Kepone (by Soil Group and Depth)	53
D-54	Summary Statistics for m,p-Cresol (by Soil Group and Depth).....	54
D-55	Summary Statistics for p-Cresol (4-Methylphenol) (by Soil Group and Depth).....	55
D-56	Summary Statistics for Phenol (by Soil Group and Depth)	56
D-57	Summary Statistics for Pyridine (by Soil Group and Depth)	57
D-58	Summary Statistics for 2,4-Dichlorophenoxyacetic Acid (by Soil Group and Depth).....	58
D-59	Summary Statistics for 2,4,5-T (by Soil Group and Depth).....	59

Organics (Continued)

D-60 Summary Statistics for Hexachlorodibenzo-p-dioxin Isomers (by Soil
Group and Depth)..... 60

Radiological Parameters

D-61 Summary Statistics for Tritium (by Soil Group and Depth) 61

Agricultural Parameters

D-62 Summary Statistics for Cation Exchange Capacity (by Soil Group and Depth) 62
D-63 Summary Statistics for pH (by Soil Group and Depth)..... 63
D-64 Summary Statistics for Percent Solids (by Soil Group and Depth)..... 64

Table D-1. Summary Statistics for Aluminum (Onsite by Soil Group and Depth)

Aluminum
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	18,000,000.00	3,065,000.00	1,730,000.00	5,485,000.00	3,922,565.31	5,542,960.00
	B	10	10	100.00	12,000,000.00	3,505,000.00	1,670,000.00	4,627,000.00	3,653,829.60	3,572,111.26
	C	10	10	100.00	7,620,000.00	2,885,000.00	1,450,000.00	3,865,000.00	3,279,807.15	2,342,212.87
	D	10	10	100.00	8,850,000.00	1,148,500.00	171,000.00	2,335,300.00	1,107,781.93	2,872,765.18
	E	10	10	100.00	8,050,000.00	843,500.00	65,600.00	1,900,060.00	601,620.64	2,524,361.34
	All	50	50	100.00	18,000,000.00	2,495,000.00	65,600.00	3,642,472.00	2,109,201.10	3,681,018.20
2	A	10	10	100.00	22,200,000.00	2,535,000.00	790,000.00	4,502,000.00	2,814,669.20	6,335,864.06
	B	10	10	100.00	15,200,000.00	2,080,000.00	937,000.00	4,308,700.00	2,997,278.87	4,458,488.93
	C	10	10	100.00	4,650,000.00	2,315,000.00	172,000.00	2,500,200.00	1,921,171.30	1,401,613.50
	D	10	10	100.00	9,430,000.00	1,094,500.00	343,000.00	2,489,700.00	1,344,169.88	2,879,923.07
	E	9	9	100.00	4,910,000.00	533,000.00	199,500.00	1,371,944.44	720,877.78	1,782,082.71
	All	49	49	100.00	22,200,000.00	2,070,000.00	172,000.00	3,068,438.78	1,765,996.52	3,889,995.58
3	A	10	10	100.00	14,300,000.00	3,955,000.00	888,000.00	5,523,466.67	3,664,906.65	4,781,022.84
	B	10	10	100.00	9,400,000.00	2,455,000.00	816,000.00	3,833,600.00	2,714,051.28	3,265,669.34
	C	10	10	100.00	6,740,000.00	3,070,000.00	339,000.00	3,120,700.00	2,281,101.45	2,169,020.52
	D	10	10	100.00	6,870,000.00	2,205,000.00	456,000.00	2,895,600.00	2,215,329.26	2,088,634.39
	E	10	10	100.00	8,920,000.00	2,450,000.00	1,120,000.00	3,038,100.00	2,383,351.03	2,297,621.11
	All	50	50	100.00	14,300,000.00	2,630,000.00	339,000.00	3,682,293.33	2,604,296.17	3,124,755.19
4	A	10	10	100.00	32,500,000.00	11,115,000.00	1,910,000.00	13,286,000.00	9,847,867.25	9,644,026.59
	B	10	10	100.00	12,830,000.00	6,220,000.00	2,970,000.00	7,079,000.00	6,235,406.28	3,669,330.70
	C	10	10	100.00	11,400,000.00	5,485,000.00	1,770,000.00	6,321,000.00	5,400,029.01	3,344,592.48
	D	10	10	100.00	10,100,000.00	5,195,000.00	1,870,000.00	5,254,500.00	4,763,915.16	2,365,302.95
	E	10	10	100.00	9,970,000.00	4,195,000.00	2,000,000.00	4,819,000.00	4,173,567.14	2,683,556.72
	All	50	50	100.00	32,500,000.00	5,767,500.00	1,770,000.00	7,351,900.00	5,805,171.68	5,795,384.24
5	A	10	10	100.00	52,050,000.00	35,400,000.00	18,500,000.00	33,012,500.00	31,175,386.95	11,163,116.66
	B	10	10	100.00	48,700,000.00	29,275,000.00	7,380,000.00	25,261,000.00	21,037,655.14	14,194,521.99
	C	10	10	100.00	31,500,000.00	20,225,000.00	3,075,000.00	18,064,500.00	14,668,418.13	9,677,787.74
	D	10	10	100.00	30,100,000.00	18,650,000.00	2,690,000.00	17,542,000.00	13,636,803.88	9,496,931.43
	E	10	10	100.00	31,700,000.00	9,215,000.00	2,620,000.00	12,284,000.00	8,883,338.99	9,897,346.67
	All	50	50	100.00	52,050,000.00	20,250,000.00	2,620,000.00	21,232,800.00	16,341,663.34	12,824,136.97

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Sample collection included the use of an aluminum core tube - these results may be elevated due to contamination by the sample tool.

Table D-2. Summary Statistics for Antimony (Onsite by Soil Group and Depth)

Antimony
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	0	0.00	<2,550.00	<2,560.00	<2,380.00			
	B	10	0	0.00	<2,550.00	<2,560.00	<1,760.00			
	C	10	0	0.00	<2,550.00	<2,325.00	<1,910.00			
	D	10	0	0.00	<2,550.00	<1,860.00	<1,590.00			
	E	10	0	0.00	<2,550.00	<1,767.50	<1,640.00			
	All	50	0	0.00	<2,550.00	<2,360.00	<1,590.00			
2	A	10	1	10.00	2,580.00	<2,560.00	<2,250.00			
	B	10	1	10.00	6,090.00	<2,560.00	<2,155.00			
	C	10	1	10.00	3,630.00	<2,560.00	<1,920.00			
	D	10	1	10.00	4,910.00	<2,560.00	<1,890.00			
	E	9	2	22.22	3,510.00	<2,560.00	<1,780.00			
	All	49	6	12.24	6,090.00	<2,560.00	<1,780.00			
3	A	10	2	20.00	6,380.00	<2,560.00	<1,830.00			
	B	10	1	10.00	2,135.00	<2,300.00	<1,600.00			
	C	10	1	10.00	2,940.00	<2,357.50	<1,650.00			
	D	10	1	10.00	<2,550.00	<2,205.00	<1,670.00			
	E	10	0	0.00	<2,550.00	<2,100.00	<1,440.00			
	All	50	5	10.00	6,380.00	<2,250.00	<1,440.00			
4	A	10	0	0.00	<2,550.00	<2,435.00	<1,820.00			
	B	10	1	10.00	<2,550.00	<2,175.00	<1,580.00			
	C	10	1	10.00	15,800.00	<2,220.00	<1,650.00			
	D	10	1	10.00	3,310.00	<2,330.00	<1,300.00			
	E	10	2	20.00	4,900.00	<2,405.00	<1,530.00			
	All	50	5	10.00	15,800.00	<2,323.33	1,300.00			
5	A	10	3	30.00	9,570.00	<2,560.00	<2,560.00			
	B	10	0	0.00	<2,550.00	<2,560.00	<2,340.00			
	C	10	1	10.00	5,130.00	<2,560.00	<2,240.00			
	D	10	1	10.00	4,960.00	<2,560.00	<1,860.00			
	E	10	2	20.00	12,600.00	<2,560.00	<1,910.00			
	All	50	7	14.00	12,600.00	<2,560.00	<1,860.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-3. Summary Statistics for Arsenic (Onsite by Soil Group and Depth)

Arsenic
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	2	20.00	2,080.00	<245.00	<245.00			
	B	10	1	10.00	330.00	<245.00	<195.00			
	C	10	2	20.00	520.00	<245.00	<216.00			
	D	10	2	20.00	360.00	<245.00	<180.00			
	E	10	3	30.00	753.00	<236.00	<189.00			
	All	50	10	20.00	2,080.00	<245.00	<180.00			
2	A	10	4	40.00	1,180.00	<245.00	<230.00			
	B	10	2	20.00	550.00	<245.00	<231.00			
	C	10	1	10.00	266.25	<239.00	<222.00			
	D	10	2	20.00	679.00	<245.00	<205.00			
	E	9	3	33.33	1,100.00	<227.50	201.00			
	All	49	12	24.49	1,180.00	<245.00	201.00			
3	A	10	6	60.00	2,200.00	350.50	220.00	746.77	403.60	778.77
	B	10	2	20.00	532.00	<245.00	<130.00			
	C	10	1	10.00	420.00	<240.50	<197.00			
	D	10	1	10.00	401.00	<227.75	<181.00			
	E	10	4	40.00	3,700.00	<244.50	<193.00			
	All	50	14	28.00	3,700.00	<245.00	<130.00			
4	A	10	8	80.00	1,910.00	550.00	<245.00	683.97	477.64	601.55
	B	10	5	50.00	1,070.00	220.75	<165.00	306.68	207.00	301.08
	C	10	5	50.00	2,210.00	186.25	<154.00	529.85	276.72	684.15
	D	10	6	60.00	3,050.00	289.13	<178.00	596.23	305.12	895.39
	E	10	6	60.00	2,050.00	284.00	<237.00	521.85	311.02	629.59
	All	50	30	60.00	3,050.00	320.00	<154.00	527.71	304.00	636.45
5	A	10	10	100.00	3,400.00	1,980.00	998.00	1,986.80	1,885.51	670.17
	B	10	9	90.00	2,400.00	902.50	240.00	899.38	648.94	660.73
	C	10	7	70.00	1,800.00	396.88	<231.00	585.55	369.92	550.81
	D	10	7	70.00	1,300.00	283.13	200.00	448.08	308.90	395.66
	E	10	7	70.00	1,500.00	390.50	<219.00	539.58	360.91	493.65
	All	50	40	80.00	3,400.00	727.00	200.00	891.88	550.29	788.21

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-4. Summary Statistics for Barium (Onsite by Soil Group and Depth)

Barium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	79,900.00	39,550.00	5,400.00	41,025.00	31,883.23	23,916.33
	B	10	10	100.00	68,600.00	9,850.00	1,600.00	16,900.00	10,241.38	19,634.38
	C	10	10	100.00	44,500.00	6,975.00	1,800.00	13,305.00	8,071.90	13,905.52
	D	10	10	100.00	33,800.00	2,200.00	410.00	7,052.00	2,856.17	10,555.78
	E	10	10	100.00	39,400.00	1,850.00	390.00	6,682.50	2,149.73	12,116.10
	All	50	50	100.00	79,900.00	8,250.00	390.00	16,992.90	6,947.25	20,526.02
2	A	10	8	80.00	79,200.00	12,662.50	3,900.00	19,350.00	13,796.06	21,660.82
	B	10	8	80.00	44,600.00	10,075.00	1,300.00	12,440.50	7,659.50	12,749.11
	C	10	9	90.00	39,000.00	7,255.00	1,200.00	13,528.50	7,768.42	13,788.06
	D	10	8	80.00	61,900.00	3,900.00	1,200.00	10,650.50	4,692.38	18,440.15
	E	9	8	88.89	71,000.00	2,160.00	700.00	11,550.00	3,247.07	22,798.20
	All	49	41	83.67	79,200.00	8,650.00	700.00	13,543.78	6,694.51	17,726.96
3	A	10	9	90.00	97,150.00	21,350.00	4,700.00	29,662.50	19,008.07	29,529.40
	B	10	9	90.00	37,750.00	12,700.00	3,300.00	13,835.00	11,049.15	9,835.03
	C	10	9	90.00	41,600.00	10,500.00	4,100.00	13,099.00	10,218.89	11,085.72
	D	10	9	90.00	76,200.00	9,350.00	1,570.00	17,088.00	10,267.88	21,973.97
	E	10	9	90.00	108,000.00	16,200.00	2,310.00	25,023.50	15,215.28	30,333.29
	All	50	45	90.00	108,000.00	12,137.50	1,570.00	19,741.60	12,737.56	22,394.83
4	A	10	9	90.00	131,000.00	90,550.00	<24,150.00	81,027.50	65,993.88	43,320.70
	B	10	9	90.00	78,900.00	39,500.00	<23,000.00	44,075.00	38,296.43	21,677.96
	C	10	9	90.00	43,800.00	20,650.00	6,100.00	22,362.50	19,328.96	11,831.33
	D	10	9	90.00	28,400.00	15,250.00	10,600.00	16,135.00	15,310.18	5,514.03
	E	10	9	90.00	33,200.00	11,425.00	5,200.00	13,548.00	11,750.21	8,151.42
	All	50	45	90.00	131,000.00	21,950.00	5,200.00	35,429.60	24,478.19	33,505.56
5	A	10	10	100.00	1,840,000.00	180,000.00	110,500.00	345,975.00	220,627.91	526,863.29
	B	10	10	100.00	354,000.00	185,500.00	51,200.00	175,940.00	146,428.20	101,101.06
	C	10	10	100.00	198,000.00	126,750.00	27,700.00	116,290.00	98,404.55	59,311.67
	D	10	10	100.00	258,000.00	94,350.00	13,000.00	128,610.00	95,436.26	88,839.10
	E	10	10	100.00	284,000.00	110,000.00	15,000.00	131,530.00	84,071.88	105,312.22
	All	50	50	100.00	1,840,000.00	141,500.00	13,000.00	179,669.00	120,596.00	253,903.97

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-5. Summary Statistics for Beryllium (Onsite by Soil Group and Depth)

Beryllium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	9	90.00	2,700.00	770.00	<102.50	1,018.83	715.39	781.97
	B	10	10	100.00	1,500.00	690.00	110.00	703.10	542.84	444.94
	C	10	9	90.00	1,900.00	724.00	<102.50	771.23	497.14	655.59
	D	10	4	40.00	1,200.00	<102.38	<61.70			
	E	10	3	30.00	2,900.00	<102.50	<52.20			
	All	50	35	70.00	2,900.00	515.00	<52.20	643.19	300.81	690.15
2	A	10	5	50.00	2,690.00	93.13	<73.00	382.65	130.36	816.41
	B	10	4	40.00	1,580.00	<102.50	<74.10			
	C	10	3	30.00	360.00	<102.50	<62.00			
	D	10	4	40.00	850.00	<102.50	<60.40			
	E	9	3	33.33	1,100.00	<102.50	<66.10			
	All	49	19	38.78	2,690.00	<102.50	<60.40			
3	A	10	5	50.00	950.00	85.63	<91.40	255.31	126.33	319.55
	B	10	4	40.00	524.00	<102.50	<70.30			
	C	10	3	30.00	420.00	<101.75	<71.30			
	D	10	1	10.00	390.00	<98.40	<69.90			
	E	10	4	40.00	660.00	<100.95	<66.20			
	All	50	17	34.00	950.00	<102.50	<66.20			
4	A	10	7	70.00	560.00	284.50	<70.40	280.27	189.85	201.18
	B	10	3	30.00	220.60	<101.75	<68.30			
	C	10	3	30.00	313.00	<100.10	<69.80			
	D	10	3	30.00	590.00	<102.50	<72.10			
	E	10	3	30.00	500.00	<102.50	<69.20			
	All	50	19	38.00	590.00	<102.50	<68.30			
5	A	10	10	100.00	3,540.00	1,900.00	1,055.50	1,846.05	1,714.99	760.20
	B	10	10	100.00	3,260.00	2,130.00	390.00	1,867.00	1,485.59	1,092.94
	C	10	10	100.00	2,750.00	1,115.00	185.00	1,303.60	999.44	841.64
	D	10	10	100.00	2,290.00	1,095.00	250.00	1,092.25	897.68	652.05
	E	10	10	100.00	4,110.00	788.00	250.00	1,342.80	890.23	1,319.72
	All	50	50	100.00	4,110.00	1,230.00	185.00	1,490.34	1,152.68	975.87

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-6. Summary Statistics for Cadmium (Onsite by Soil Group and Depth)

Cadmium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	3	30.00	190.00	<25.25	<25.25			
	B	10	0	0.00	<25.25	<25.25	<19.50			
	C	10	4	40.00	100.00	<24.92	<19.80			
	D	10	2	20.00	110.00	<21.95	<18.00			
	E	10	1	10.00	92.00	<22.50	<15.70			
	All	50	10	20.00	190.00	<25.25	<15.70			
2	A	10	4	40.00	4,200.00	<25.25	<23.00			
	B	10	8	80.00	3,400.00	109.50	<23.50	656.27	127.31	1,208.03
	C	10	8	80.00	4,000.00	39.25	<22.90	695.59	81.54	1,412.18
	D	10	4	40.00	320.00	<24.82	19.40			
	E	9	3	33.33	69.00	<21.80	<17.40			
	All	49	27	55.10	4,200.00	28.31	<17.40	386.50	44.26	1,028.52
3	A	10	2	20.00	105.00	<25.25	<23.90			
	B	10	3	30.00	96.00	<25.17	<19.30			
	C	10	3	30.00	68.00	<25.25	<19.70			
	D	10	3	30.00	74.15	<25.25	<18.10			
	E	10	3	30.00	37.30	<25.25	<19.30			
	All	50	14	28.00	105.00	<25.25	<18.10			
4	A	10	6	60.00	309.00	37.25	<23.80	76.24	39.97	95.08
	B	10	2	20.00	110.00	<23.00	<16.50			
	C	10	3	30.00	339.00	<24.70	<15.40			
	D	10	3	30.00	140.00	<23.95	<17.80			
	E	10	4	40.00	370.00	<24.38	<16.60			
	All	50	18	36.00	370.00	<24.75	<15.40			
5	A	10	5	50.00	164.00	45.01	<25.25	73.90	40.61	68.52
	B	10	5	50.00	293.00	28.56	<25.25	91.66	42.40	106.15
	C	10	4	40.00	292.00	<25.25	<25.25			
	D	10	3	30.00	150.00	<25.25	<24.50			
	E	10	4	40.00	286.00	<25.25	<21.90			
	All	50	21	42.00	293.00	<25.25	<21.90			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-7. Summary Statistics for Calcium (Onsite by Soil Group and Depth)

Calcium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	598,000.00	221,500.00	41,800.00	260,315.00	199,172.29	175,122.93
	B	10	10	100.00	266,000.00	46,500.00	16,600.00	82,800.00	55,034.80	80,001.85
	C	10	10	100.00	556,000.00	31,300.00	9,860.00	97,496.00	42,030.95	167,130.46
	D	10	10	100.00	87,900.00	18,500.00	10,400.00	28,160.00	22,840.32	23,159.41
	E	10	10	100.00	81,000.00	17,800.00	6,640.00	28,014.00	21,161.12	24,860.36
	All	50	50	100.00	598,000.00	32,700.00	6,640.00	99,357.00	46,723.49	139,886.03
2	A	10	10	100.00	1,090,000.00	43,750.00	20,300.00	176,330.00	73,630.26	329,684.83
	B	10	9	90.00	2,170,000.00	31,525.00	21,400.00	266,335.00	53,947.57	672,388.21
	C	10	9	90.00	1,400,000.00	30,000.00	6,250.00	208,340.00	44,231.29	442,909.64
	D	10	9	90.00	1,520,000.00	29,950.00	3,720.00	277,316.00	42,001.22	540,751.41
	E	9	8	88.89	2,210,000.00	17,600.00	3,780.00	402,184.44	36,041.78	800,057.80
	All	49	45	91.84	2,210,000.00	32,600.00	3,720.00	263,323.88	48,705.80	556,152.17
3	A	10	10	100.00	150,000.00	52,250.00	21,300.00	62,763.33	53,703.94	39,227.53
	B	10	9	90.00	100,600.00	22,800.00	8,750.00	37,115.00	26,452.22	32,090.06
	C	10	9	90.00	269,000.00	22,500.00	8,600.00	50,740.00	26,411.73	79,014.08
	D	10	9	90.00	1,280,000.00	28,300.00	7,300.00	243,761.00	40,055.56	475,242.53
	E	10	10	100.00	60,700,000.00	58,050.00	5,450.00	6,335,915.00	127,375.96	19,112,478.68
	All	50	47	94.00	60,700,000.00	35,200.00	5,450.00	1,346,058.87	45,331.81	8,572,870.29
4	A	10	9	90.00	473,000.00	122,000.00	<24,200.00	188,470.00	123,929.37	161,022.73
	B	10	10	100.00	282,000.00	107,125.00	28,200.00	115,595.00	91,930.76	78,371.72
	C	10	10	100.00	741,000.00	102,000.00	49,900.00	184,710.00	126,512.03	210,061.21
	D	10	10	100.00	668,000.00	113,750.00	25,300.00	183,930.00	123,054.25	191,340.60
	E	10	10	100.00	586,000.00	129,500.00	52,800.00	202,700.00	145,083.62	173,817.01
	All	50	49	98.00	741,000.00	110,000.00	<24,200.00	175,081.00	120,808.19	164,979.55
5	A	10	10	100.00	1,330,000.00	466,000.00	302,000.00	588,525.00	531,992.45	310,247.18
	B	10	10	100.00	943,000.00	308,000.00	77,500.00	340,780.00	270,446.66	245,552.95
	C	10	10	100.00	456,000.00	156,500.00	59,900.00	182,090.00	150,143.14	119,558.02
	D	10	10	100.00	425,500.00	164,575.00	66,900.00	218,585.00	173,171.29	144,633.66
	E	10	10	100.00	1,020,000.00	216,000.00	73,250.00	312,925.00	230,621.35	288,496.68
	All	50	50	100.00	1,330,000.00	259,500.00	59,900.00	328,581.00	243,878.54	266,885.73

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-8. Summary Statistics for Chromium (Onsite by Soil Group and Depth)

Chromium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	12,900.00	3,650.00	2,000.00	5,137.00	4,274.62	3,507.19
	B	10	10	100.00	16,400.00	4,995.00	1,900.00	6,089.00	4,615.46	4,708.80
	C	10	10	100.00	16,000.00	5,150.00	1,900.00	6,584.00	5,381.29	4,451.12
	D	10	10	100.00	15,000.00	4,000.00	785.00	4,738.50	3,570.73	4,001.42
	E	10	10	100.00	16,700.00	3,050.00	324.00	4,382.40	2,618.84	4,719.56
	All	50	50	100.00	16,700.00	3,900.00	324.00	5,386.18	3,975.33	4,207.18
2	A	10	8	80.00	20,000.00	3,315.00	1,400.00	5,104.00	3,747.81	5,455.04
	B	10	8	80.00	18,900.00	4,540.00	2,700.00	5,963.00	4,731.22	5,018.86
	C	10	9	90.00	13,000.00	5,500.00	2,450.00	6,145.00	5,078.26	3,867.99
	D	10	9	90.00	30,000.00	6,030.00	1,880.00	8,827.00	5,981.62	8,987.16
	E	9	8	88.89	25,200.00	5,870.00	815.00	7,991.11	5,263.45	7,643.53
	All	49	42	85.71	30,000.00	5,100.00	815.00	6,781.84	4,896.47	6,320.24
3	A	10	10	100.00	14,700.00	5,100.00	1,400.00	6,135.67	4,910.87	4,037.45
	B	10	9	90.00	11,200.00	3,450.00	1,800.00	4,615.00	3,803.92	3,124.72
	C	10	10	100.00	16,000.00	4,155.00	2,400.00	5,831.50	4,922.46	4,142.17
	D	10	10	100.00	8,380.00	5,207.50	2,500.00	5,290.50	4,847.34	2,162.72
	E	10	9	90.00	20,400.00	3,650.00	1,700.00	5,448.50	4,030.16	5,521.31
	All	50	48	96.00	20,400.00	4,700.00	1,400.00	5,464.23	4,475.89	3,830.16
4	A	10	9	90.00	26,400.00	9,750.00	3,100.00	11,704.67	9,426.82	7,404.40
	B	10	9	90.00	15,400.00	8,200.00	<4,610.00	9,130.50	7,884.68	4,610.34
	C	10	10	100.00	19,900.00	9,700.00	2,300.00	10,210.00	8,293.10	6,190.58
	D	10	10	100.00	26,700.00	7,290.00	2,300.00	10,308.00	8,258.10	7,454.68
	E	10	9	90.00	21,100.00	6,345.00	3,700.00	8,156.50	6,707.99	5,590.41
	All	50	47	94.00	26,700.00	8,575.00	2,300.00	9,901.93	8,066.18	6,198.37
5	A	10	10	100.00	54,450.00	38,500.00	23,550.00	36,892.50	35,855.12	9,073.16
	B	10	10	100.00	58,100.00	36,150.00	13,800.00	31,750.00	28,474.38	14,648.72
	C	10	10	100.00	40,200.00	26,450.00	8,650.00	25,075.00	22,531.18	10,889.63
	D	10	10	100.00	40,400.00	27,200.00	5,500.00	25,515.00	22,563.74	10,710.59
	E	10	10	100.00	41,800.00	18,200.00	3,700.00	20,771.00	15,960.06	13,677.87
	All	50	50	100.00	58,100.00	29,150.00	3,700.00	28,000.70	24,190.62	12,822.90

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-9. Summary Statistics for Cobalt (Onsite by Soil Group and Depth)

Cobalt
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	7	70.00	2,400.00	1,500.00	<547.00	1,267.05	935.81	828.11
	B	10	5	50.00	1,100.00	486.75	<354.00	559.20	456.06	348.61
	C	10	6	60.00	1,600.00	542.50	<246.00	623.73	472.64	470.00
	D	10	5	50.00	860.00	240.25	267.00	401.68	335.34	257.97
	E	10	6	60.00	760.00	341.75	270.00	402.90	350.88	218.47
	All	50	29	58.00	2,400.00	495.00	<246.00	650.91	473.23	560.73
2	A	10	4	40.00	990.00	<547.00	<268.00			
	B	10	0	0.00	<547.00	<547.00	<272.00			
	C	10	2	20.00	860.00	<546.75	<227.00			
	D	10	2	20.00	3,900.00	<547.00	<221.00			
	E	9	3	33.33	9,100.00	<547.00	<228.00			
	All	49	11	22.45	9,100.00	<547.00	<221.00			
3	A	10	6	60.00	2,400.00	623.42	<337.00	960.78	617.44	874.22
	B	10	3	30.00	1,600.00	<482.50	<258.00			
	C	10	5	50.00	1,500.00	386.25	<262.00	546.13	404.36	460.14
	D	10	5	50.00	1,100.00	302.25	<256.00	462.08	358.45	362.27
	E	10	6	60.00	1,800.00	346.75	<243.00	599.88	431.74	522.39
	All	50	25	50.00	2,400.00	273.50	<243.00	612.87	413.62	584.52
4	A	10	6	60.00	2,640.00	462.17	408.00	842.43	564.83	865.33
	B	10	4	40.00	615.00	<448.50	<251.00			
	C	10	3	30.00	2,720.00	<518.50	<237.00			
	D	10	4	40.00	1,700.00	<541.50	<251.00			
	E	10	5	50.00	1,400.00	338.75	<388.50	542.58	435.48	393.49
	All	50	22	44.00	2,720.00	<547.00	<237.00			
5	A	10	10	100.00	28,800.00	14,600.00	7,850.00	14,952.50	13,737.41	6,562.76
	B	10	10	100.00	49,900.00	13,450.00	2,200.00	15,510.00	11,338.32	13,430.60
	C	10	10	100.00	28,200.00	7,175.00	786.75	8,882.18	5,401.19	8,399.90
	D	10	9	90.00	14,250.00	3,155.00	<547.00	5,461.85	3,330.19	4,788.29
	E	10	9	90.00	16,200.00	1,950.00	<547.00	3,845.15	1,897.14	5,150.20
	All	50	48	96.00	49,900.00	9,000.00	<547.00	9,730.34	5,560.35	9,295.22

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-10. Summary Statistics for Copper (Onsite by Soil Group and Depth)

Copper
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	12,100.00	2,800.00	1,100.00	4,363.00	3,245.86	3,721.49
	B	10	10	100.00	6,940.00	2,100.00	880.00	2,601.00	2,068.32	1,918.83
	C	10	10	100.00	4,800.00	1,535.00	910.00	2,123.00	1,830.17	1,336.92
	D	10	10	100.00	3,990.00	1,300.00	570.00	1,727.08	1,280.44	1,230.30
	E	10	10	100.00	4,470.00	775.00	270.00	1,428.28	867.77	1,522.34
All	50	50	100.00	12,100.00	1,565.00	270.00	2,448.47	1,686.71	2,311.94	
2	A	10	8	80.00	8,200.00	1,400.00	890.00	2,107.00	1,617.13	2,201.64
	B	10	7	70.00	11,400.00	1,755.00	<586.00	3,401.30	2,020.07	3,866.54
	C	10	8	80.00	<3,420.00	1,505.00	628.00	1,718.50	1,515.26	914.13
	D	10	6	60.00	15,000.00	1,475.00	386.00	2,524.10	1,156.40	4,440.13
	E	9	7	77.78	<3,210.00	1,080.00	505.00	1,138.67	924.36	695.95
All	49	36	73.47	15,000.00	1,600.00	386.00	2,199.12	1,407.21	2,868.76	
3	A	10	9	90.00	7,800.00	1,755.00	840.00	2,756.67	2,034.85	2,299.36
	B	10	8	80.00	<3,420.00	1,360.00	560.00	1,354.70	1,116.26	884.71
	C	10	8	80.00	6,700.00	925.00	<586.00	1,603.88	1,082.91	1,661.22
	D	10	9	90.00	<3,420.00	1,030.00	781.00	1,343.10	1,239.59	610.93
	E	10	8	80.00	<3,420.00	1,499.75	<620.00	1,449.05	1,204.19	673.75
All	50	42	84.00	7,800.00	1,395.00	560.00	1,701.48	1,297.10	1,481.89	
4	A	10	9	90.00	18,000.00	8,870.00	2,100.00	8,658.33	6,989.12	5,042.58
	B	10	9	90.00	5,455.00	2,700.00	1,500.00	2,844.50	2,568.37	1,354.18
	C	10	9	90.00	9,010.00	2,575.00	830.00	3,292.00	2,624.48	2,427.13
	D	10	9	90.00	4,270.00	2,500.00	1,100.00	2,627.50	2,392.96	1,098.33
	E	10	8	80.00	11,400.00	2,882.50	<580.00	3,117.50	2,051.69	3,150.78
All	50	44	88.00	18,000.00	2,905.00	<580.00	4,107.97	2,970.53	3,670.02	
5	A	10	10	100.00	36,650.00	24,400.00	14,950.00	23,582.50	22,531.17	7,343.76
	B	10	10	100.00	39,200.00	16,775.00	5,600.00	17,705.00	14,821.69	10,830.32
	C	10	10	100.00	15,400.00	9,812.50	3,000.00	9,441.50	8,362.06	4,360.73
	D	10	9	90.00	20,000.00	8,650.00	<1,290.00	9,222.50	6,639.19	6,136.85
	E	10	10	100.00	20,000.00	7,165.00	2,000.00	9,059.00	6,228.60	7,261.61
All	50	49	98.00	39,200.00	12,300.00	<1,290.00	13,802.10	10,292.01	9,323.49	

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-11. Summary Statistics for Iron (Onsite by Soil Group and Depth)

Iron
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	7,070,000.00	431,500.00	198,000.00	1,302,875.00	621,939.35	2,123,195.24
	B	10	10	100.00	564,000.00	65,000.00	18,100.00	148,280.00	81,800.37	178,138.83
	C	10	10	100.00	369,000.00	67,675.00	12,300.00	120,135.00	73,261.40	122,256.27
	D	10	10	100.00	2,090,000.00	203,575.00	21,600.00	540,905.00	198,714.55	717,830.43
	E	10	10	100.00	3,650,000.00	770,500.00	37,900.00	1,347,600.00	555,924.37	1,509,417.45
	All	50	50	100.00	7,070,000.00	263,375.00	12,300.00	691,959.00	210,341.41	1,282,687.23
2	A	10	10	100.00	2,810,000.00	475,500.00	250,000.00	911,550.00	644,714.49	878,925.24
	B	10	10	100.00	518,000.00	151,100.00	31,400.00	184,960.00	134,270.75	151,846.38
	C	10	10	100.00	787,000.00	93,500.00	32,700.00	236,810.00	140,116.45	257,225.76
	D	10	10	100.00	13,900,000.00	312,000.00	60,650.00	2,149,665.00	531,027.34	4,332,642.41
	E	9	9	100.00	8,160,000.00	1,660,000.00	16,000.00	3,275,666.67	1,208,744.08	3,143,857.58
	All	49	49	100.00	13,900,000.00	309,500.00	16,000.00	1,312,466.33	369,803.12	2,595,505.93
3	A	10	10	100.00	5,365,000.00	1,540,000.00	160,000.00	2,121,700.00	1,152,284.86	1,922,204.47
	B	10	10	100.00	1,090,000.00	367,500.00	43,300.00	403,580.00	244,511.96	345,168.08
	C	10	10	100.00	799,000.00	228,250.00	44,000.00	312,050.00	245,525.15	212,944.76
	D	10	10	100.00	1,810,000.00	313,750.00	57,100.00	576,400.00	315,108.94	615,950.29
	E	10	10	100.00	9,800,000.00	1,117,250.00	145,000.00	2,191,550.00	1,064,534.75	2,946,341.82
	All	50	50	100.00	9,800,000.00	463,000.00	43,300.00	1,121,056.00	471,102.38	1,763,627.51
4	A	10	10	100.00	10,100,000.00	2,135,000.00	180,000.00	2,999,533.33	1,784,523.02	3,178,966.40
	B	10	10	100.00	3,070,000.00	643,250.00	155,000.00	1,147,750.00	745,993.16	1,058,444.96
	C	10	10	100.00	52,000,000.00	959,000.00	184,000.00	6,330,650.00	1,330,490.89	16,084,627.28
	D	10	10	100.00	22,100,000.00	1,069,750.00	173,000.00	5,210,950.00	1,419,395.66	7,767,419.84
	E	10	10	100.00	17,700,000.00	1,226,000.00	106,000.00	5,433,500.00	1,749,496.88	6,615,250.72
	All	50	50	100.00	52,000,000.00	1,080,000.00	106,000.00	4,224,476.67	1,344,798.17	8,505,337.04
5	A	10	10	100.00	37,400,000.00	20,450,000.00	11,400,000.00	21,850,000.00	20,684,344.37	7,662,643.87
	B	10	10	100.00	38,900,000.00	16,900,000.00	3,360,000.00	19,396,000.00	16,225,230.43	10,649,264.14
	C	10	10	100.00	38,300,000.00	9,895,000.00	1,615,000.00	14,731,000.00	10,252,158.89	13,120,724.66
	D	10	10	100.00	29,400,000.00	5,945,000.00	1,600,000.00	10,790,500.00	7,247,408.66	10,124,330.01
	E	10	10	100.00	35,900,000.00	4,335,000.00	1,875,000.00	11,923,500.00	6,747,987.95	13,281,863.59
	All	50	50	100.00	38,900,000.00	13,000,000.00	1,600,000.00	15,738,200.00	11,096,882.87	11,532,097.21

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-12. Summary Statistics for Lead (Onsite by Soil Group and Depth)

Lead
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	41,700.00	4,575.00	2,500.00	11,005.00	6,449.09	13,234.39
	B	10	10	100.00	8,430.00	2,750.00	1,100.00	3,275.00	2,796.47	2,108.66
	C	10	10	100.00	4,520.00	3,225.00	200.00	2,887.00	2,266.42	1,399.02
	D	10	10	100.00	5,810.00	1,605.00	440.00	2,047.00	1,417.74	1,731.59
	E	10	9	90.00	5,880.00	695.00	<222.00	1,309.10	719.81	1,751.76
	All	50	49	98.00	41,700.00	2,625.00	200.00	4,104.62	2,108.88	6,861.50
2	A	10	10	100.00	15,800.00	4,550.00	1,700.00	5,423.00	4,408.57	4,131.36
	B	10	10	100.00	9,200.00	3,570.00	1,100.00	4,527.00	3,781.53	2,734.08
	C	10	10	100.00	8,100.00	2,200.00	1,400.00	3,028.00	2,553.25	2,101.13
	D	10	10	100.00	6,500.00	1,755.00	230.00	2,492.00	1,786.30	2,058.71
	E	9	8	88.89	3,800.00	1,500.00	<218.00	1,478.67	992.05	1,181.88
	All	49	48	97.96	15,800.00	2,700.00	<218.00	3,428.73	2,416.82	2,909.69
3	A	10	10	100.00	23,000.00	5,605.00	1,500.00	7,752.83	5,815.12	6,662.96
	B	10	10	100.00	9,400.00	3,600.00	1,400.00	4,340.00	3,723.91	2,517.25
	C	10	10	100.00	14,700.00	2,545.00	1,300.00	4,113.00	3,120.28	3,966.88
	D	10	10	100.00	6,030.00	2,400.00	1,300.00	3,061.00	2,627.52	1,753.82
	E	10	10	100.00	7,170.00	1,595.00	910.00	2,328.00	1,871.42	1,912.52
	All	50	50	100.00	23,000.00	2,825.00	910.00	4,318.97	3,193.70	4,122.16
4	A	10	10	100.00	48,100.00	18,750.00	4,500.00	24,850.00	18,600.27	16,985.04
	B	10	10	100.00	7,820.00	5,445.00	2,700.00	5,213.00	4,924.26	1,667.97
	C	10	10	100.00	12,400.00	4,530.00	1,800.00	4,780.00	4,076.89	3,064.17
	D	10	10	100.00	13,000.00	3,050.00	2,000.00	4,414.50	3,647.41	3,242.67
	E	10	10	100.00	5,380.00	2,875.00	1,100.00	2,945.50	2,634.14	1,275.71
	All	50	50	100.00	48,100.00	4,555.00	1,100.00	8,440.60	5,139.99	11,257.80
5	A	10	10	100.00	32,850.00	23,750.00	16,550.00	24,810.00	24,284.70	5,116.79
	B	10	10	100.00	24,800.00	21,200.00	6,100.00	17,100.00	15,303.10	7,451.32
	C	10	10	100.00	18,000.00	13,525.00	4,000.00	11,605.00	10,245.55	5,185.47
	D	10	10	100.00	19,800.00	11,500.00	2,200.00	10,745.00	8,705.59	5,815.14
	E	10	10	100.00	21,300.00	7,310.00	1,700.00	9,548.50	7,089.03	7,129.58
	All	50	50	100.00	32,850.00	14,850.00	1,700.00	14,761.70	11,863.33	8,251.50

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-13. Summary Statistics for Lithium (Onsite by Soil Group and Depth)

Lithium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	2	20.00	2,650.00	<687.00	<610.00			
	B	10	1	10.00	724.00	<687.00	<518.00			
	C	10	3	30.00	862.00	<687.00	<576.00			
	D	10	3	30.00	1,480.00	<547.00	<468.00			
	E	10	3	30.00	1,710.00	<538.00	<482.00			
	All	50	12	24.00	2,650.00	<687.00	<468.00			
2	A	10	4	40.00	7,900.00	<687.00	<257.00			
	B	10	1	10.00	1,260.00	<687.00	<378.00			
	C	10	2	20.00	800.00	<687.00	<217.00			
	D	10	3	30.00	2,530.00	<687.00	<211.00			
	E	9	2	22.22	2,060.00	<687.00	<218.00			
	All	49	12	24.49	7,900.00	<687.00	<211.00			
3	A	10	4	40.00	3,200.00	<687.00	<320.00			
	B	10	6	60.00	3,800.00	1,185.00	<294.00	1,697.50	968.10	1,516.78
	C	10	6	60.00	3,300.00	497.75	<486.00	1,097.13	704.90	1,066.03
	D	10	6	60.00	2,300.00	891.50	<491.00	981.68	697.33	733.20
	E	10	5	50.00	2,920.00	343.50	<232.00	927.28	529.02	952.21
	All	50	27	54.00	3,800.00	497.75	<232.00	1,165.49	679.50	1,110.35
4	A	10	7	70.00	9,120.00	2,140.00	<534.00	3,502.07	1,828.24	3,350.48
	B	10	7	70.00	6,800.00	1,230.00	<239.00	1,931.00	1,075.69	2,026.28
	C	10	7	70.00	3,900.00	860.00	<251.00	1,324.80	813.45	1,304.63
	D	10	3	30.00	1,300.00	<687.00	<252.00			
	E	10	5	50.00	7,100.00	451.75	<242.00	1,327.95	487.59	2,213.16
	All	50	29	58.00	9,120.00	751.25	<239.00	1,707.95	761.62	2,259.20
5	A	10	10	100.00	33,800.00	20,100.00	5,271.75	20,059.68	16,280.61	8,189.16
	B	10	10	100.00	36,100.00	19,000.00	9,900.00	20,140.00	18,197.35	9,514.34
	C	10	10	100.00	33,900.00	16,425.00	6,000.00	18,060.00	15,230.29	10,232.08
	D	8	7	87.50	34,100.00	16,600.00	<687.00	16,711.69	10,678.46	10,241.70
	E	8	8	100.00	28,900.00	7,420.00	3,500.00	10,864.38	8,355.98	8,640.24
	All	46	45	97.83	36,100.00	17,350.00	<687.00	17,460.98	13,603.49	9,560.16

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-14. Summary Statistics for Magnesium (Onsite by Soil Group and Depth)

Magnesium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	385,000.00	152,000.00	24,400.00	164,415.00	123,906.80	113,858.04
	B	10	10	100.00	123,000.00	66,000.00	5,900.00	66,330.00	51,339.57	38,140.33
	C	10	10	100.00	132,000.00	39,900.00	8,600.00	47,570.00	33,909.42	38,569.74
	D	10	10	100.00	87,400.00	11,550.00	2,150.00	26,215.00	13,762.56	32,789.09
	E	10	10	100.00	110,000.00	14,350.00	2,132.50	24,063.25	13,334.54	31,992.63
	All	50	50	100.00	385,000.00	39,050.00	2,132.50	65,718.65	33,075.70	77,684.05
2	A	10	9	90.00	144,000.00	26,125.00	14,700.00	41,865.00	30,264.61	39,986.57
	B	10	9	90.00	112,000.00	26,100.00	17,900.00	42,300.00	32,321.92	34,286.76
	C	10	9	90.00	156,000.00	21,550.00	4,700.00	38,380.00	24,302.32	44,340.80
	D	10	9	90.00	391,000.00	14,250.00	2,830.00	75,122.00	23,496.71	127,768.67
	E	9	8	88.89	725,000.00	8,730.00	3,890.00	125,663.33	17,905.30	251,805.89
	All	49	44	89.80	725,000.00	22,100.00	2,830.00	63,421.22	25,293.82	124,871.01
3	A	10	10	100.00	312,000.00	52,350.00	13,000.00	89,320.00	55,171.76	91,284.84
	B	10	9	90.00	145,000.00	19,700.00	9,500.00	51,250.00	30,160.12	55,459.02
	C	10	9	90.00	242,000.00	43,350.00	10,500.00	62,670.00	38,194.27	70,301.45
	D	10	9	90.00	414,000.00	35,600.00	9,510.00	78,841.00	39,434.85	121,882.12
	E	10	10	100.00	556,000.00	78,350.00	15,800.00	142,420.00	82,341.31	164,695.83
	All	50	47	94.00	556,000.00	47,300.00	9,500.00	84,900.20	46,018.16	108,316.51
4	A	10	9	90.00	434,000.00	140,100.00	22,200.00	175,686.67	108,899.83	147,725.28
	B	10	10	100.00	149,150.00	86,250.00	24,900.00	80,535.00	68,717.81	40,830.19
	C	10	10	100.00	237,000.00	60,100.00	19,900.00	83,485.00	61,865.32	72,661.82
	D	10	10	100.00	198,000.00	42,000.00	24,200.00	68,135.00	53,096.12	56,677.40
	E	10	10	100.00	161,000.00	46,300.00	26,000.00	65,375.00	51,827.42	47,731.49
	All	50	49	98.00	434,000.00	69,300.00	19,900.00	94,643.33	66,231.00	89,539.76
5	A	10	10	100.00	2,450,000.00	1,560,000.00	838,500.00	1,531,350.00	1,462,047.29	480,980.37
	B	10	10	100.00	3,000,000.00	1,650,000.00	505,000.00	1,733,200.00	1,498,238.03	890,176.49
	C	10	10	100.00	2,740,000.00	937,500.00	226,500.00	1,179,050.00	919,421.63	862,332.19
	D	10	10	100.00	2,390,000.00	580,500.00	174,000.00	890,550.00	674,227.85	705,177.14
	E	10	10	100.00	3,470,000.00	502,500.00	167,500.00	838,850.00	529,617.06	1,015,198.50
	All	50	50	100.00	3,470,000.00	1,014,500.00	167,500.00	1,234,600.00	936,192.42	854,816.50

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-15. Summary Statistics for Manganese (Onsite by Soil Group and Depth)

Manganese
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	55,200.00	14,700.00	3,600.00	20,775.00	14,934.10	17,301.43
	B	10	10	100.00	17,300.00	3,300.00	540.00	5,241.00	3,028.36	5,933.12
	C	10	9	90.00	6,430.00	1,165.00	<299.00	2,133.95	1,266.28	2,118.85
	D	10	9	90.00	9,620.00	1,365.00	<250.00	2,573.50	1,277.58	2,968.22
	E	10	10	100.00	7,210.00	1,800.00	400.00	2,625.00	1,717.21	2,291.30
	All	50	48	96.00	55,200.00	3,175.00	<250.00	6,669.69	2,629.21	10,809.05
2	A	10	10	100.00	16,100.00	5,350.00	570.00	6,137.00	4,259.04	5,010.40
	B	10	9	90.00	59,100.00	4,315.00	<274.00	11,031.70	4,011.94	17,794.57
	C	10	9	90.00	6,700.00	3,000.00	<225.00	2,791.25	1,776.00	2,023.10
	D	10	9	90.00	33,100.00	2,100.00	<312.00	5,080.60	2,053.09	9,894.98
	E	9	9	100.00	89,400.00	1,890.00	1,075.00	13,083.89	3,364.50	28,960.55
	All	49	46	93.88	89,400.00	3,000.00	<225.00	7,513.48	2,904.09	15,416.22
3	A	10	10	100.00	37,300.00	7,838.33	1,500.00	12,151.67	6,883.21	12,815.80
	B	10	10	100.00	11,850.00	3,000.00	650.00	3,687.00	2,299.24	3,632.16
	C	10	10	100.00	16,200.00	2,430.00	320.00	3,641.50	1,991.72	4,668.65
	D	10	10	100.00	12,465.00	1,760.00	350.00	2,890.50	1,629.37	3,621.37
	E	10	10	100.00	64,000.00	3,262.50	1,100.00	13,675.50	4,696.47	20,051.78
	All	50	50	100.00	64,000.00	2,862.50	320.00	7,209.23	2,995.57	11,632.17
4	A	10	10	100.00	400,000.00	28,000.00	2,600.00	88,870.00	34,508.78	129,764.20
	B	10	9	90.00	91,300.00	7,560.00	<312.00	17,657.60	6,224.90	27,190.13
	C	10	9	90.00	150,000.00	2,942.50	<312.00	18,005.10	3,382.28	46,443.01
	D	10	10	100.00	76,300.00	5,255.00	1,000.00	12,944.00	5,525.02	22,732.12
	E	10	9	90.00	21,700.00	4,140.00	<312.00	7,313.60	3,762.67	7,076.97
	All	50	47	94.00	400,000.00	5,885.00	<312.00	28,958.06	6,852.05	68,263.73
5	A	10	10	100.00	816,000.00	215,500.00	101,000.00	282,725.00	233,144.27	213,558.10
	B	10	10	100.00	2,530,000.00	215,250.00	25,500.00	466,280.00	217,633.40	747,812.66
	C	10	10	100.00	740,000.00	155,000.00	10,550.00	185,185.00	106,739.21	209,606.04
	D	10	10	100.00	287,500.00	58,300.00	14,100.00	87,480.00	63,315.31	81,261.99
	E	10	10	100.00	286,000.00	31,350.00	11,950.00	69,915.00	39,899.11	92,823.09
	All	50	50	100.00	2,530,000.00	144,250.00	10,550.00	218,317.00	106,470.49	378,897.40

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-16. Summary Statistics for Mercury (Onsite by Soil Group and Depth)

Mercury
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	2	20.00	210.00	<78.40	<72.90			
	B	10	2	20.00	140.00	<78.40	<61.00			
	C	10	3	30.00	740.00	<78.40	<61.90			
	D	10	2	20.00	100.00	<63.50	<57.50			
	E	10	1	10.00	100.00	<57.85	<56.80			
	All	50	10	20.00	740.00	<78.40	<56.80			
2	A	10	0	0.00	<78.40	<76.85	<63.40			
	B	10	0	0.00	<78.40	<74.725	<57.20			
	C	10	0	0.00	<78.40	<67.90	<57.00			
	D	10	0	0.00	<78.40	<63.85	<56.10			
	E	9	0	0.00	<78.40	<58.60	<53.40			
	All	49	0	0.00	<78.40	<72.15	<53.40			
3	A	10	0	0.00	<78.40	<72.30	<61.30			
	B	10	0	0.00	<78.40	<70.65	<56.00			
	C	10	0	0.00	<78.40	<67.45	<55.30			
	D	10	0	0.00	<78.40	<64.95	<57.00			
	E	10	0	0.00	<78.40	<65.40	<57.70			
	All	50	0	0.00	<78.40	<68.22	<55.30			
4	A	10	0	0.00	<78.40	<77.80	<60.30			
	B	10	0	0.00	<78.40	<60.70	<57.60			
	C	10	2	20.00	80.00	<74.20	<56.50			
	D	10	1	10.00	86.10	<63.00	<55.20			
	E	10	0	0.00	<78.40	<62.30	<58.40			
	All	50	3	6.00	86.10	<67.85	<55.20			
5	A	10	4	40.00	150.00	<78.40	<78.40			
	B	10	4	40.00	<78.40	<74.20	<28.00			
	C	10	1	10.00	<78.40	<64.20	<23.60			
	D	10	1	10.00	<78.40	<66.70	<23.00			
	E	10	1	10.00	<78.40	<64.20	<23.10			
	All	50	11	22.00	150.00	<78.40	<23.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-17. Summary Statistics for Nickel (Onsite by Soil Group and Depth)

Nickel
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	7	70.00	13,000.00	2,750.00	<1,235.00	3,694.13	2,225.23	3,903.64
	B	10	5	50.00	4,400.00	908.75	<1,009.50	1,695.48	1,217.75	1,487.65
	C	10	7	70.00	3,900.00	1,900.00	<1,015.00	1,837.25	1,478.16	1,109.67
	D	10	4	40.00	2,400.00	<995.00	<843.00			
	E	10	2	20.00	5,200.00	<937.50	<861.00			
	All	50	25	50.00	13,000.00	798.75	<843.00	1,877.45	1,169.29	2,232.77
2	A	10	3	30.00	3,440.00	<1,235.00	<1,190.00			
	B	10	2	20.00	3,770.00	<1,235.00	<1,140.00			
	C	10	3	30.00	2,100.00	<1,235.00	<1,010.00			
	D	10	3	30.00	2,900.00	<1,235.00	<1,060.00			
	E	9	2	22.22	10,800.00	<1,235.00	<944.50			
	All	49	13	26.53	10,800.00	<1,235.00	<944.50			
3	A	10	5	50.00	3,200.00	858.75	<969.00	1,359.70	1,045.49	991.78
	B	10	4	40.00	2,600.00	<1,235.00	<846.00			
	C	10	2	20.00	1,900.00	<1,222.50	<875.00			
	D	10	4	40.00	3,200.00	<1,195.00	<884.00			
	E	10	5	50.00	3,500.00	858.75	<762.00	1,328.23	995.06	1,065.46
	All	50	20	40.00	3,500.00	<1,235.00	<762.00			
4	A	10	8	80.00	7,343.33	3,600.00	<961.00	3,887.13	2,794.74	2,649.18
	B	10	5	50.00	3,500.00	783.75	<907.00	1,329.80	1,022.39	1,018.50
	C	10	6	50.00	2,940.00	948.75	<873.00	1,280.10	1,007.54	904.98
	D	10	3	30.00	2,730.00	<1,235.00	<688.00			
	E	10	2	20.00	1,800.00	<1,221.25	<810.00			
	All	50	23	46.00	7,343.33	<1,235.00	<688.00			
5	A	10	10	100.00	23,100.00	13,900.00	7,050.00	14,205.00	13,431.39	4,786.35
	B	10	10	100.00	32,100.00	11,080.00	1,700.00	12,276.00	9,482.28	8,606.56
	C	10	8	80.00	12,900.00	7,890.00	<1,235.00	6,931.50	4,780.97	4,302.46
	D	10	9	90.00	17,400.00	6,900.00	<1,235.00	7,329.75	5,753.68	4,460.28
	E	10	7	70.00	13,300.00	3,278.75	<1,000.00	5,103.50	2,733.56	4,717.23
	All	50	44	88.00	32,100.00	8,620.00	<1,000.00	9,169.15	6,255.25	6,417.58

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-18. Summary Statistics for Potassium (Onsite by Soil Group and Depth)

Potassium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	1	10.00	122,500.00	<96,375.00	<58,600.00			
	B	10	4	40.00	122,000.00	<69,500.00	<47,000.00			
	C	10	2	20.00	138,000.00	<70,675.00	<48,300.00			
	D	10	2	20.00	107,000.00	<45,800.00	<39,300.00			
	E	10	2	20.00	114,500.00	<45,450.00	<40,400.00			
	All	50	11	22.00	138,000.00	<63,700.00	<39,300.00			
2	A	10	2	20.00	92,000.00	<104,000.00	<55,500.00			
	B	10	2	20.00	<104,000.00	<104,000.00	<57,400.00			
	C	10	3	30.00	258,000.00	95,700.00	<47,200.00			
	D	10	2	20.00	433,000.00	<104,000.00	<52,550.00			
	E	9	2	22.22	664,000.00	<98,500.00	<43,950.00			
	All	49	11	22.45	664,000.00	<104,000.00	<43,950.00			
3	A	10	2	20.00	198,000.00	<94,250.00	<45,100.00			
	B	10	6	60.00	271,500.00	59,800.00	<38,400.00	97,895.00	67,804.67	90,127.40
	C	10	4	40.00	256,000.00	97,775.00	<40,700.00			
	D	10	6	60.00	326,000.00	52,775.00	<41,100.00	89,575.00	58,602.89	94,185.26
	E	10	6	60.00	333,000.00	71,616.67	<35,500.00	111,048.33	77,897.59	101,933.61
	All	50	24	48.00	333,000.00	<95,800.00	<35,500.00			
4	A	10	7	70.00	443,000.00	148,500.00	<44,700.00	184,935.00	128,404.44	153,169.11
	B	10	8	80.00	275,000.00	131,500.00	<42,200.00	131,870.00	105,399.60	75,681.57
	C	10	4	40.00	159,000.00	<97,925.00	<40,600.00			
	D	10	5	50.00	139,000.00	52,000.00	<32,100.00	65,315.00	55,367.29	36,032.36
	E	10	4	40.00	210,000.00	<96,550.00	41,000.00			
	All	50	28	56.00	443,000.00	55,650.00	<32,100.00	102,853.00	72,696.65	94,878.21
5	A	10	10	100.00	1,495,000.00	954,000.00	641,000.00	998,150.00	968,225.49	256,958.50
	B	10	10	100.00	1,440,000.00	795,250.00	291,000.00	798,850.00	692,879.33	405,542.03
	C	10	10	100.00	1,080,000.00	513,000.00	243,500.00	560,000.00	509,317.81	255,742.17
	D	10	10	100.00	890,500.00	455,000.00	210,000.00	529,550.00	482,959.84	228,419.50
	E	10	10	100.00	888,000.00	352,500.00	125,500.00	409,650.00	324,795.85	274,955.36
	All	50	50	100.00	1,495,000.00	628,000.00	125,500.00	659,240.00	556,966.27	351,271.44

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-19. Summary Statistics for Selenium (Onsite by Soil Group and Depth)

Selenium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	7	70.00	2,200.00	967.50	<237.50	967.13	619.70	712.20
	B	10	8	80.00	2,400.00	935.00	<195.00	1,010.33	713.12	689.14
	C	10	9	90.00	3,100.00	940.00	<237.50	1,392.88	980.47	1,081.41
	D	10	5	50.00	1,570.00	315.00	<180.00	548.00	301.85	568.70
	E	10	2	20.00	1,600.00	<221.50	<157.00	.	.	.
	All	50	31	62.00	3,100.00	712.50	<157.00	853.19	467.29	802.96
2	A	10	5	50.00	2,580.00	197.38	<237.50	549.23	292.36	767.73
	B	10	7	70.00	5,650.00	405.00	<237.50	1,406.13	557.36	1,943.01
	C	10	5	50.00	2,290.00	189.38	<228.00	462.45	260.36	668.49
	D	10	3	30.00	13,000.00	<237.50	<194.00	.	.	.
	E	9	0	0.00	<237.50	<218.00	<174.00	.	.	.
	All	49	20	40.82	13,000.00	<237.50	<174.00	.	.	.
3	A	10	3	30.00	690.00	<237.50	<201.00	.	.	.
	B	10	4	40.00	623.00	<237.50	<193.00	.	.	.
	C	10	3	30.00	1,330.00	<237.50	<197.00	.	.	.
	D	10	1	10.00	330.00	<227.13	<181.00	.	.	.
	E	10	0	0.00	<237.50	<226.00	<193.00	.	.	.
	All	50	11	22.00	1,330.00	<237.50	<181.00	.	.	.
4	A	10	3	30.00	360.00	<237.50	<230.00	.	.	.
	B	10	0	0.00	<237.50	<228.00	<165.00	.	.	.
	C	10	0	0.00	<237.50	<237.50	<154.00	.	.	.
	D	10	0	0.00	<237.50	<230.50	<178.00	.	.	.
	E	10	0	0.00	<237.50	<237.50	<166.00	.	.	.
	All	50	3	6.00	360.00	<237.50	<154.00	.	.	.
5	A	10	5	50.00	1,340.00	336.88	<237.50	528.17	310.05	475.26
	B	10	3	30.00	1,600.00	<237.50	<226.00	.	.	.
	C	10	3	30.00	443.00	<237.50	<204.00	.	.	.
	D	10	5	50.00	718.00	190.38	<182.00	303.95	216.66	256.54
	E	10	4	40.00	380.00	<235.75	<166.00	.	.	.
	All	50	20	40.00	1,600.00	<237.50	<166.00	.	.	.

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-20. Summary Statistics for Silver (Onsite by Soil Group and Depth)

Silver

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	3	30.00	3,900.00	<469.00	<419.00			
	B	10	2	20.00	2,100.00	<469.00	<311.00			
	C	10	3	30.00	2,400.00	<426.00	<283.00			
	D	10	3	30.00	990.00	<318.50	<206.00			
	E	10	2	20.00	1,105.00	<306.50	<174.00			
	All	50	13	26.00	3,900.00	<459.00	<174.00			
2	A	10	1	10.00	567.00	<469.00	<243.00			
	B	10	0	0.00	<469.00	<469.00	<247.00			
	C	10	0	0.00	<469.00	<448.75	<207.00			
	D	10	0	0.00	<469.00	<469.00	<201.00			
	E	9	1	11.11	530.00	<469.00	<208.00			
	All	49	2	4.08	567.00	<469.00	<201.00			
3	A	10	3	30.00	900.00	<447.50	<306.00			
	B	10	2	20.00	830.00	<363.00	<234.00			
	C	10	1	10.00	1,200.00	<332.75	<238.00			
	D	10	2	20.00	960.00	<343.75	<233.00			
	E	10	4	40.00	<469.00	<355.75	<221.00			
	All	50	12	24.00	1,200.00	<360.75	<221.00			
4	A	10	5	50.00	500.00	270.33	<320.00	314.17	291.41	119.65
	B	10	2	20.00	<469.00	<346.00	<228.00			
	C	10	4	40.00	1,160.00	<469.00	<291.00			
	D	10	4	40.00	1,250.00	<469.00	<230.00			
	E	10	4	40.00	739.00	<469.00	<237.00			
	All	50	19	38.00	1,250.00	<469.00	<228.00			
5	A	10	5	50.00	2,080.00	578.06	<469.00	836.91	555.89	712.68
	B	10	4	40.00	1,870.00	<469.00	<469.00			
	C	10	4	40.00	1,510.00	<469.00	<334.00			
	D	10	4	40.00	959.00	<469.00	<278.00			
	E	10	4	40.00	1,080.00	<469.00	<203.50			
	All	50	21	42.00	2,080.00	<469.00	<203.50			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-21. Summary Statistics for Sodium (Onsite by Soil Group and Depth)

Sodium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	82,800.00	57,600.00	15,700.00	52,715.00	47,587.88	20,673.49
	B	10	9	90.00	67,400.00	41,550.00	<2,870.00	38,083.50	27,407.85	21,277.35
	C	10	9	90.00	68,000.00	28,950.00	<2,690.00	32,519.50	23,393.46	20,582.01
	D	10	9	90.00	41,700.00	15,950.00	<2,250.00	19,279.50	14,463.90	11,992.07
	E	10	9	90.00	38,100.00	15,050.00	<1,780.00	18,185.00	12,666.73	12,653.43
All	50	46	92.00	82,800.00	25,500.00	<1,780.00	32,156.50	22,358.46	21,503.79	
2	A	10	8	80.00	202,000.00	29,025.00	<2,380.00	57,427.50	22,739.96	65,661.05
	B	10	7	70.00	112,000.00	21,625.00	<2,460.00	37,155.00	13,715.57	42,417.85
	C	10	7	70.00	105,000.00	15,030.00	<2,030.00	37,516.50	13,219.16	40,595.32
	D	10	8	80.00	105,000.00	22,125.00	<2,870.00	45,123.00	18,335.39	45,702.76
	E	9	6	66.67	119,000.00	14,500.00	<1,920.00	32,581.11	11,145.31	41,275.24
All	49	36	73.47	202,000.00	18,100.00	<1,920.00	42,152.04	15,414.69	46,986.41	
3	A	10	8	80.00	122,000.00	25,700.00	<2,140.00	43,448.83	20,435.68	41,905.10
	B	10	7	70.00	78,100.00	18,150.00	<2,090.00	24,254.50	10,019.49	27,941.75
	C	10	8	80.00	105,000.00	17,800.00	<1,820.00	29,572.50	12,667.66	35,522.54
	D	10	8	80.00	116,000.00	23,450.00	<1,770.00	38,453.50	15,813.68	43,402.60
	E	10	8	80.00	128,000.00	19,150.00	<1,790.00	37,948.00	15,479.25	46,639.83
All	50	39	78.00	128,000.00	19,100.00	<1,770.00	34,735.47	14,472.47	38,620.32	
4	A	10	9	90.00	144,000.00	34,500.00	<2,870.00	49,788.50	29,890.16	45,798.03
	B	10	9	90.00	64,500.00	17,950.00	<2,870.00	24,083.50	16,798.84	19,786.71
	C	10	9	90.00	110,000.00	20,450.00	<2,870.00	31,048.50	19,440.08	32,761.92
	D	10	9	90.00	84,800.00	22,400.00	<2,870.00	30,438.50	20,249.37	26,232.36
	E	10	10	100.00	108,000.00	25,600.00	10,280.00	36,853.00	28,191.83	31,261.50
All	50	46	92.00	144,000.00	20,775.00	<2,870.00	34,442.40	22,346.42	32,201.95	
5	A	10	10	100.00	204,000.00	99,025.00	49,400.00	106,882.50	98,604.24	44,853.34
	B	10	10	100.00	236,000.00	94,050.00	41,700.00	101,415.00	91,539.27	53,184.06
	C	10	10	100.00	192,000.00	89,400.00	34,900.00	87,550.00	75,385.63	49,803.84
	D	10	10	100.00	288,000.00	89,325.00	29,600.00	99,725.00	76,797.84	78,469.35
	E	10	10	100.00	520,000.00	54,850.00	18,300.00	116,060.00	65,261.17	153,704.81
All	50	50	100.00	520,000.00	87,150.00	18,300.00	102,326.50	80,641.59	83,088.80	

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-22. Summary Statistics for Sulfide (Onsite by Soil Group and Depth)

Sulfide
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<318.00	<318.00	<318.00			
	B	6	0	0.00	<318.00	<318.00	<318.00			
	C	6	0	0.00	<318.00	<318.00	<282.00			
	D	6	0	0.00	<318.00	<305.00	<287.50			
	E	6	0	0.00	<318.00	<288.50	<278.00			
	All	30	0	0.00	<318.00	<318.00	<278.00			
2	A	5	1	20.00	338.00	<318.00	<286.00			
	B	5	0	0.00	<318.00	<318.00	<285.00			
	C	5	0	0.00	<318.00	<318.00	<287.00			
	D	5	1	20.00	249.00	<306.00	<274.00			
	E	4	0	0.00	<300.00	<282.25	<277.00			
	All	24	2	8.33	338.00	<318.00	<274.00			
3	A	5	0	0.00	<318.00	<318.00	<307.00			
	B	5	0	0.00	<318.00	<318.00	<298.00			
	C	5	0	0.00	<318.00	<313.00	<306.00			
	D	5	0	0.00	<318.00	<304.00	<294.00			
	E	5	0	0.00	<313.00	<291.00	<288.00			
	All	25	0	0.00	<318.00	<313.00	<288.00			
4	A	5	0	0.00	<318.00	<315.00	<302.00			
	B	5	1	20.00	<310.00	<292.00	<287.00			
	C	5	0	0.00	<318.00	<309.00	<277.00			
	D	5	0	0.00	<318.00	<305.00	<300.00			
	E	5	0	0.00	<318.00	<313.66	<297.00			
	All	25	1	4.00	<318.00	<305.00	<277.00			
5	A	5	3	60.00	603.00	221.00	221.00	313.60	270.01	195.42
	B	5	1	20.00	2,080.00	<318.00	<100.00			
	C	5	2	40.00	643.00	<318.00	<100.00			
	D	5	2	40.00	<318.00	<115.00	<100.00			
	E	5	2	40.00	<318.00	<298.00	<100.00			
	All	25	10	40.00	2,080.00	<318.00	<100.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-23. Summary Statistics for Thallium (Onsite by Soil Group and Depth)

Thallium

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	1	10.00	251.00	<244.00	<244.00			
	B	10	0	0.00	<244.00	<244.00	<195.00			
	C	10	0	0.00	<244.00	<244.00	<198.00			
	D	10	0	0.00	<244.00	<219.50	<180.00			
	E	10	0	0.00	<244.00	<221.50	<157.00			
	All	50	1	2.00	251.00	<244.00	<157.00			
2	A	10	0	0.00	<244.00	<244.00	<230.00			
	B	10	0	0.00	<244.00	<244.00	<231.00			
	C	10	0	0.00	<244.00	<238.50	<222.00			
	D	10	0	0.00	<244.00	<239.00	<194.00			
	E	9	0	0.00	<244.00	<218.00	<174.00			
	All	49	0	0.00	<244.00	<244.00	<174.00			
3	A	10	0	0.00	<244.00	<244.00	<201.00			
	B	10	0	0.00	<244.00	<244.00	<193.00			
	C	10	0	0.00	<244.00	<240.00	<197.00			
	D	10	0	0.00	<244.00	<220.75	<181.00			
	E	10	0	0.00	<244.00	<226.00	<193.00			
	All	50	0	0.00	<244.00	<238.66	<181.00			
4	A	10	0	0.00	<244.00	<244.00	<230.00			
	B	10	0	0.00	<244.00	<228.00	<165.00			
	C	10	0	0.00	<244.00	<240.00	<154.00			
	D	10	0	0.00	<244.00	<230.50	<178.00			
	E	10	0	0.00	<244.00	<239.50	<166.00			
	All	50	0	0.00	<244.00	<238.00	<154.00			
5	A	10	6	60.00	1,900.00	480.67	<244.00	593.63	388.80	539.69
	B	10	6	60.00	971.50	597.50	<226.00	485.45	350.02	333.98
	C	10	6	60.00	959.00	496.50	<204.00	417.80	308.82	291.83
	D	10	6	60.00	577.00	306.00	<182.00	301.45	235.16	189.46
	E	10	3	30.00	570.00	<231.25	<166.00			
	All	50	27	54.00	1,900.00	314.50	<166.00	397.25	273.47	347.47

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-24. Summary Statistics for Tin (Onsite by Soil Group and Depth)

Tin
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	6	60.00	14,700.00	3,455.00	2,300.00	5,172.00	4,038.82	4,188.59
	B	10	7	70.00	8,570.00	2,700.00	1,700.00	3,845.00	3,311.97	2,258.85
	C	10	6	60.00	5,100.00	2,525.00	<1,530.00	2,898.50	2,604.77	1,246.71
	D	10	4	40.00	5,100.00	<2,720.00	288.75			
	E	10	6	60.00	<4,820.00	2,337.50	462.50	2,255.75	1,848.82	1,081.21
	All	50	29	58.00	14,700.00	2,410.00	288.75	3,232.43	2,497.85	2,526.56
2	A	10	2	20.00	<4,820.00	<4,820.00	1,700.00			
	B	10	3	30.00	7,420.00	<4,820.00	<1,690.00			
	C	10	0	0.00	<4,820.00	<4,685.00	<1,420.00			
	D	10	3	30.00	7,300.00	<4,820.00	<1,380.00			
	E	9	4	44.44	9,700.00	<4,520.00	<1,420.00			
	All	49	12	24.49	9,700.00	<4,820.00	<1,380.00			
3	A	10	3	30.00	8,000.00	<3375.00	<194.00			
	B	10	4	40.00	<4,820.00	<2,750.00	1,500.00			
	C	10	4	40.00	<4,820.00	<2,980.00	1,000.00			
	D	10	3	30.00	<4,820.00	<2,772.50	<1,620.00			
	E	10	4	40.00	9,100.00	<3387.50	<1,510.00			
	All	50	18	36.00	9,100.00	<2,972.50	<194.00			
4	A	10	2	20.00	5,700.00	<4,455.00	<1,610.00			
	B	10	4	40.00	<4,820.00	<2,900.00	<1,525.00			
	C	10	5	50.00	6,180.00	2,410.00	<1,620.00	2,788.75	2,409.78	1,513.96
	D	10	4	40.00	6,590.00	<4,820.00	<1,500.00			
	E	10	6	60.00	8,200.00	2,410.00	<1,630.00	3,541.25	2,780.13	2,314.43
	All	50	21	42.00	8,200.00	<4,465.00	<1,500.00			
5	A	10	2	20.00	9,970.00	<4,820.00	<2,290.00			
	B	10	4	40.00	28,800.00	<4,820.00	2,010.00			
	C	10	0	0.00	<4,820.00	<3585.00	<1,630.00			
	D	8	3	37.50	6,240.00	<4,610.00	<1,350.00			
	E	8	4	50.00	23,600.00	2,410.00	<1,390.00	5,404.69	2,613.69	7,847.67
	All	46	13	28.26	28,800.00	<4,820.00	<1,350.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-25. Summary Statistics for Vanadium (Onsite by Soil Group and Depth)

Vanadium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	9	90.00	20,300.00	2,000.00	<661.00	5,653.05	2,853.56	6,841.70
	B	10	10	100.00	21,200.00	2,300.00	780.00	4,784.00	2,743.50	6,209.95
	C	10	9	90.00	11,100.00	2,000.00	<230.00	3,405.50	2,147.56	3,205.40
	D	10	9	90.00	27,200.00	1,900.00	<187.00	5,163.85	1,862.12	8,251.17
	E	10	9	90.00	22,800.00	2,650.00	<208.00	5,864.90	2,578.75	7,279.38
	All	50	46	92.00	27,200.00	2,100.00	<187.00	4,974.26	2,406.64	6,370.11
2	A	10	8	80.00	26,800.00	2,167.50	940.00	4,801.00	2,601.81	7,829.43
	B	10	8	80.00	19,600.00	2,402.50	1,300.00	4,269.50	2,826.87	5,569.07
	C	10	9	90.00	7,300.00	2,402.50	2,000.00	3,325.50	2,995.30	1,752.13
	D	10	9	90.00	34,600.00	3,360.00	614.00	6,769.90	3,603.77	10,122.83
	E	9	7	77.78	13,100.00	2,940.00	253.25	4,630.08	2,400.23	4,334.56
	All	49	41	83.67	34,600.00	2,305.00	253.25	4,761.83	2,867.82	6,446.19
3	A	10	10	100.00	27,250.00	6,965.00	1,100.00	11,082.33	6,798.48	9,803.65
	B	10	9	90.00	30,800.00	4,015.00	1,300.00	7,887.50	4,715.15	9,240.32
	C	10	10	100.00	18,100.00	4,932.50	2,300.00	7,414.50	5,940.33	5,341.18
	D	10	10	100.00	10,600.00	3,650.00	910.00	4,257.00	3,580.23	2,616.46
	E	10	8	80.00	19,000.00	2,382.50	<233.00	5,070.15	2,725.00	5,670.77
	All	50	47	94.00	30,800.00	4,500.00	<233.00	7,142.30	4,506.08	7,184.11
4	A	10	9	90.00	31,000.00	14,150.00	950.00	13,258.83	9,082.39	9,342.46
	B	10	9	90.00	45,200.00	12,987.50	4,100.00	14,908.00	11,074.25	12,239.80
	C	10	10	100.00	144,000.00	27,950.00	1,500.00	42,154.50	21,465.96	47,219.84
	D	10	10	100.00	86,000.00	28,350.00	1,300.00	38,177.50	19,089.65	34,998.77
	E	10	9	90.00	105,000.00	22,350.00	3,200.00	31,690.50	19,448.00	30,170.25
	All	50	47	94.00	144,000.00	16,016.67	950.00	28,037.87	15,163.08	31,454.58
5	A	10	10	100.00	131,500.00	89,650.00	56,800.00	88,452.50	85,185.89	24,914.88
	B	10	10	100.00	121,000.00	79,450.00	24,700.00	74,020.00	66,492.54	32,562.28
	C	10	10	100.00	90,200.00	44,100.00	7,400.00	47,645.00	39,998.13	25,511.09
	D	10	10	100.00	82,450.00	42,975.00	7,900.00	44,920.00	36,567.60	23,965.05
	E	10	10	100.00	94,800.00	35,500.00	8,500.00	40,228.50	28,204.69	31,151.68
	All	50	50	100.00	131,500.00	54,350.00	7,400.00	59,053.20	47,175.83	32,768.66

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-26. Summary Statistics for Zinc (Onsite by Soil Group and Depth)

Zinc

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	60,500.00	7,350.00	4,600.00	13,498.00	9,117.68	17,020.00
	B	10	10	100.00	14,400.00	3,845.00	2,200.00	6,358.00	5,077.94	4,665.91
	C	10	10	100.00	10,000.00	3,700.00	1,300.00	4,746.00	3,968.96	2,971.42
	D	10	10	100.00	9,200.00	2,380.00	1,400.00	3,625.00	2,924.72	2,730.35
	E	10	10	100.00	9,700.00	2,245.00	1,300.00	3,366.00	2,669.40	2,737.91
	All	50	50	100.00	60,500.00	3,900.00	1,300.00	6,318.60	4,279.07	8,709.60
2	A	10	10	100.00	7,500.00	3,400.00	934.00	3,637.60	2,923.04	2,226.82
	B	10	9	90.00	11,000.00	2,700.00	616.00	3,935.60	2,562.36	3,874.03
	C	10	10	100.00	8,000.00	2,550.00	537.00	2,911.30	2,287.82	2,085.11
	D	10	9	90.00	24,400.00	4,465.00	453.00	5,845.70	3,134.60	7,001.82
	E	9	8	88.89	66,900.00	1,500.00	573.00	9,294.78	2,243.44	21,686.12
	All	49	46	93.88	66,900.00	2,600.00	453.00	5,039.90	2,615.36	9,862.56
3	A	10	10	100.00	9,600.00	3,560.00	1,630.00	4,861.00	3,898.27	3,234.74
	B	10	9	90.00	7,530.00	2,690.00	1,040.00	3,211.00	2,500.45	2,195.82
	C	10	10	100.00	5,200.00	2,085.00	1,420.00	2,816.00	2,470.51	1,552.10
	D	10	10	100.00	15,600.00	2,900.00	629.00	4,748.60	3,075.39	4,637.92
	E	10	10	100.00	26,700.00	4,950.00	800.00	6,923.50	4,533.93	7,508.69
	All	50	49	98.00	26,700.00	2,950.00	629.00	4,512.02	3,200.44	4,439.81
4	A	10	10	100.00	13,600.00	7,735.00	2,000.00	8,001.00	7,012.42	3,650.46
	B	10	10	100.00	5,060.00	2,700.00	1,200.00	2,964.50	2,666.63	1,340.64
	C	10	10	100.00	5,600.00	2,500.00	380.00	2,811.50	2,266.98	1,619.71
	D	10	9	90.00	3,600.00	2,180.00	<359.00	2,282.95	1,843.94	1,068.61
	E	10	10	100.00	7,900.00	2,000.00	985.00	2,634.50	2,184.79	2,007.51
	All	50	49	98.00	13,600.00	2,750.00	<359.00	3,738.89	2,795.68	2,982.65
5	A	10	10	100.00	100,000.00	68,237.50	48,600.00	69,742.50	67,906.37	16,855.27
	B	10	10	100.00	93,700.00	57,900.00	16,600.00	53,570.00	46,976.78	25,766.43
	C	10	10	100.00	74,700.00	31,250.00	7,350.00	35,470.00	28,307.16	22,632.15
	D	10	10	100.00	62,250.00	27,950.00	5,600.00	28,850.00	24,424.36	15,814.94
	E	10	10	100.00	48,100.00	14,800.00	5,800.00	23,980.00	17,325.35	18,585.23
	All	50	50	100.00	100,000.00	37,800.00	5,600.00	42,322.50	32,842.72	25,925.51

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-27. Summary Statistics for Fluoride (Onsite by Soil Group and Depth)

Fluoride
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	0	0.00	<4,960.00	<4,960.00	<4,960.00	.	.	.
	B	10	0	0.00	<4,960.00	<4,960.00	<3,700.00	.	.	.
	C	10	0	0.00	<4,960.00	<4,960.00	<3,140.00	.	.	.
	D	10	0	0.00	<4,960.00	<4,425.00	<3,080.00	.	.	.
	E	10	0	0.00	<4,960.00	<4,915.00	<2,920.00	.	.	.
	All	50	0	0.00	<4,960.00	<4,960.00	<2,920.00	.	.	.
2	A	10	0	0.00	<4,960.00	<4,960.00	<3,340.00	.	.	.
	B	10	0	0.00	<4,960.00	<4,885.00	<2,770.00	.	.	.
	C	10	0	0.00	<4,960.00	<4,765.00	<2,560.00	.	.	.
	D	10	0	0.00	<4,960.00	<4,380.00	<2,790.00	.	.	.
	E	9	0	0.00	<4,960.00	<4,550.00	<3,180.00	.	.	.
	All	49	0	0.00	<4,960.00	<4,730.00	<2,560.00	.	.	.
3	A	10	0	0.00	<4,960.00	<4,907.50	<2,850.00	.	.	.
	B	10	0	0.00	<4,960.00	<4,900.00	<3,280.00	.	.	.
	C	10	0	0.00	<4,960.00	<4,455.00	<3,520.00	.	.	.
	D	10	0	0.00	<4,960.00	<4,400.00	<3,770.00	.	.	.
	E	10	1	10.00	11,900.00	<4,795.00	<2,860.00	.	.	.
	All	50	1	2.00	11,900.00	<4,575.00	<2,850.00	.	.	.
4	A	10	0	0.00	<4,960.00	<4,785.83	<3,670.00	.	.	.
	B	10	0	0.00	<4,960.00	<4,275.00	<3,040.00	.	.	.
	C	10	0	0.00	<4,960.00	<4,825.00	<3,060.00	.	.	.
	D	10	0	0.00	<4,960.00	<4,710.00	<4,250.00	.	.	.
	E	10	0	0.00	<4,960.00	<4,870.00	<3,620.00	.	.	.
	All	50	0	0.00	<4,960.00	<4,700.00	<3,040.00	.	.	.
5	A	10	0	0.00	<4,960.00	<4,960.00	<3,450.00	.	.	.
	B	10	1	10.00	<4,960.00	<4,660.00	<3,160.00	.	.	.
	C	10	1	10.00	4,970.00	<4,960.00	<2,820.00	.	.	.
	D	10	1	10.00	<4,960.00	<4,850.00	<2,510.00	.	.	.
	E	10	2	20.00	6,060.00	<4,960.00	<2,590.00	.	.	.
	All	50	5	10.00	6,060.00	<4,960.00	<2,510.00	.	.	.

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-28. Summary Statistics for Nitrate as Nitrogen (Onsite by Soil Group and Depth)

Nitrate as Nitrogen
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	2	33.33	2,130.00	<630.00	505.00	.	.	.
	B	6	1	16.67	<630.00	<630.00	346.00	.	.	.
	C	6	3	50.00	918.00	315.00	258.00	445.33	391.76	260.03
	D	6	3	50.00	819.00	303.75	236.00	409.54	365.01	220.51
	E	6	3	50.00	<630.00	302.00	128.00	352.63	311.30	173.23
	All	30	12	40.00	2,130.00	<630.00	128.00	.	.	.
2	A	5	4	80.00	2,560.00	890.00	375.00	1,148.20	831.47	953.05
	B	5	4	80.00	3,510.00	599.00	466.00	1,160.60	746.51	1,335.25
	C	5	2	40.00	1,730.00	<601.00	325.00	.	.	.
	D	5	5	100.00	2,730.00	721.00	138.00	995.40	646.75	1,003.06
	E	4	2	50.00	<575.50	210.25	127.00	208.81	195.30	85.06
	All	24	17	70.83	3,510.00	420.50	127.00	846.41	529.10	919.43
3	A	5	3	60.00	2,690.00	772.00	<630.00	1,134.40	798.97	1,011.51
	B	5	5	100.00	1,780.00	1,270.00	738.00	1,233.00	1,179.40	399.70
	C	5	0	0.00	<630.00	<626.00	<612.00	.	.	.
	D	5	1	20.00	907.00	<607.00	<582.00	.	.	.
	E	5	3	60.00	2,520.00	593.00	<589.00	1,196.10	791.84	1,100.12
	All	25	12	48.00	2,690.00	<630.00	<582.00	.	.	.
4	A	5	3	60.00	1,860.00	315.00	132.00	876.90	476.24	856.90
	B	5	3	60.00	1,700.00	468.75	<583.00	678.65	531.07	585.88
	C	5	2	40.00	825.00	<630.00	<555.00	.	.	.
	D	5	1	20.00	927.00	<630.00	<599.00	.	.	.
	E	5	2	40.00	1,410.00	<630.00	<620.50	.	.	.
	All	25	11	44.00	1,860.00	<630.00	132.00	.	.	.
5	A	5	3	60.00	2,660.00	1,730.00	<630.00	1,374.00	966.79	1,030.78
	B	5	5	100.00	2,440.00	1,855.00	1,670.00	1,973.00	1,948.12	295.42
	C	5	5	100.00	2,520.00	1,280.00	685.00	1,460.20	1,327.85	695.08
	D	5	4	80.00	1,730.00	1,330.00	<630.00	1,121.90	949.09	559.69
	E	5	4	80.00	1,390.00	1,200.00	542.00	998.00	882.32	423.58
	All	25	21	84.00	2,660.00	1,390.00	542.00	1,385.42	1,159.33	687.84

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-29. Summary Statistics for Nitrate + Nitrite (Onsite by Soil Group and Depth)

Nitrate + Nitrite
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100	7,800,000.00	4,235,000.00	139,000.00	4,074,400.00	2,811,022.22	2,378,596.51
	B	10	10	100	2,860,000.00	2,045,000.00	164,000.00	1,695,550.00	1,270,819.90	983,186.67
	C	10	10	100	3,120,000.00	1,024,500.00	390,000.00	1,332,400.00	1,038,902.11	973,673.02
	D	10	10	100	1,590,000.00	284,000.00	24,100.00	498,835.00	223,845.81	532,078.80
	E	10	9	90	1,520,000.00	30,137.50	<22,350.00	244,282.50	53,510.16	494,524.10
	All	50	49	98	7,800,000.00	917,000.00	<22,350.00	1,569,093.50	536,514.70	1,837,213.05
2	A	10	10	100	5,115,000.00	1,137,500.00	664,000.00	1,748,200.00	1,421,883.11	1,356,873.35
	B	10	10	100	2,790,000.00	1,123,000.00	170,000.00	1,138,900.00	857,381.88	799,929.09
	C	10	9	90	1,140,000.00	323,500.00	<23,300.00	424,695.00	239,013.60	370,022.37
	D	10	8	80	1,700,000.00	69,600.00	<23,500.00	309,890.00	95,645.88	517,745.53
	E	9	4	44.44	73,300.00	<23500.00	<20,100.00			
	All	49	41	83.67	5,115,000.00	348,000.00	<20,100.00	744,220.24	236,404.19	969,777.52
3	A	10	10	100	5,550,000.00	960,500.00	311,000.00	1,555,966.67	1,046,580.21	1,588,611.25
	B	10	10	100	1,870,000.00	562,500.00	97,600.00	651,960.00	457,872.53	540,955.88
	C	10	10	100	1,270,000.00	268,000.00	30,900.00	380,340.00	232,818.55	390,704.62
	D	10	10	100	243,000.00	101,200.00	31,200.00	110,600.00	90,146.92	70,485.38
	E	10	10	100	149,500.00	52,112.50	19,600.00	67,677.50	50,516.43	49,218.99
	All	50	50	100	5,550,000.00	197,250.00	19,600.00	553,308.83	219,373.24	920,905.24
4	A	10	10	100	3,570,000.00	2,025,000.00	301,000.00	2,017,900.00	1,517,356.80	1,301,345.33
	B	10	10	100	498,000.00	234,500.00	185,000.00	272,950.00	255,752.95	108,380.62
	C	10	10	100	281,000.00	142,000.00	81,100.00	148,230.00	138,471.09	59,915.89
	D	10	10	100	164,000.00	106,500.00	39,700.00	106,300.00	99,468.64	36,428.68
	E	10	10	100	259,000.00	93,800.00	32,100.00	112,880.00	86,976.40	83,364.17
	All	50	50	100	3,570,000.00	174,500.00	32,100.00	531,652.00	215,511.78	939,449.24
5	A	10	10	100	10,300,000.00	3,085,000.00	1,690,000.00	3,926,000.00	3,350,153.08	2,656,364.27
	B	10	10	100	6,270,000.00	1,325,000.00	469,000.00	2,024,800.00	1,421,855.50	1,836,612.57
	C	10	10	100	1,950,000.00	497,500.00	124,000.00	786,400.00	507,702.21	709,792.29
	D	10	10	100	1,260,000.00	252,500.00	57,100.00	401,330.00	278,793.16	364,850.18
	E	10	10	100	663,000.00	183,325.00	41,200.00	225,105.00	154,202.25	203,531.92
	All	50	50	100	10,300,000.00	596,000.00	41,200.00	1,472,727.00	635,887.66	1,994,677.43

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-30. Summary Statistics for Total Phosphates (as P) (Onsite by Soil Group and Depth)

Total Phosphates (as P)

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	826,000.00	107,000.00	55,600.00	187,246.67	130,955.75	229,786.02
	B	10	10	100.00	226,000.00	45,100.00	30,600.00	72,505.00	56,735.00	63,601.42
	C	10	10	100.00	155,000.00	48,550.00	32,500.00	67,420.00	57,768.64	44,125.83
	D	10	10	100.00	151,000.00	33,500.00	15,050.00	47,755.00	39,110.15	38,695.61
	E	10	10	100.00	106,000.00	40,350.00	15,500.00	43,800.00	36,984.44	27,123.46
	All	50	50	100.00	826,000.00	51,450.00	15,050.00	83,745.33	57,358.17	118,597.68
2	A	10	10	100.00	258,000.00	84,050.00	41,400.00	108,226.67	89,616.35	75,053.74
	B	10	10	100.00	166,000.00	54,700.00	43,300.00	73,740.00	66,213.06	41,767.91
	C	10	10	100.00	129,500.00	42,000.00	18,900.00	50,100.00	43,342.85	31,787.66
	D	10	10	100.00	234,000.00	25,750.00	12,100.00	53,125.00	33,496.15	68,460.36
	E	9	9	100.00	208,000.00	23,400.00	10,800.00	53,738.89	32,039.42	65,260.84
	All	49	49	100.00	258,000.00	49,600.00	10,800.00	68,072.79	49,193.77	60,467.65
3	A	10	10	100.00	200,000.00	84,625.00	39,500.00	106,245.00	93,248.36	54,754.56
	B	10	10	100.00	124,000.00	57,900.00	24,800.00	65,010.00	57,129.30	33,556.90
	C	10	10	100.00	178,000.00	32,700.00	11,900.00	51,950.00	37,230.55	49,758.13
	D	10	10	100.00	375,000.00	39,400.00	13,100.00	67,600.00	38,056.45	109,178.63
	E	10	10	100.00	780,000.00	47,150.00	19,000.00	151,706.67	70,370.68	235,357.60
	All	50	50	100.00	780,000.00	49,350.00	11,900.00	88,502.33	55,596.04	122,187.81
4	A	10	10	100.00	367,000.00	136,000.00	51,100.00	163,286.67	135,224.89	105,986.91
	B	10	10	100.00	96,800.00	34,000.00	20,300.00	43,580.00	38,333.49	24,519.28
	C	10	10	100.00	195,000.00	32,100.00	16,600.00	54,485.00	36,797.29	60,519.81
	D	10	10	100.00	366,000.00	39,000.00	13,900.00	72,510.00	45,212.27	104,698.70
	E	10	10	100.00	288,000.00	29,100.00	15,000.00	62,450.00	40,124.36	82,114.60
	All	50	50	100.00	367,000.00	40,075.00	13,900.00	79,262.33	51,029.71	89,393.66
5	A	10	10	100.00	729,000.00	593,000.00	417,000.00	588,600.00	576,133.00	117,876.54
	B	10	10	100.00	532,000.00	395,500.00	135,000.00	349,700.00	317,484.75	144,563.75
	C	10	10	100.00	418,000.00	191,000.00	56,250.00	195,390.00	169,688.08	105,617.37
	D	10	10	100.00	189,000.00	121,500.00	933.00	104,660.80	50,822.95	65,216.65
	E	10	10	100.00	830,000.00	113,250.00	519.00	210,768.90	61,979.74	266,545.96
	All	50	50	100.00	830,000.00	192,500.00	519.00	289,823.94	157,776.14	226,521.53

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-31. Summary Statistics for Silicon (Onsite by Soil Group and Depth)

Silicon
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	1,390,000.00	226,000.00	48,500.00	387,855.00	258,645.38	402,442.67
	B	10	10	100.00	874,000.00	269,500.00	33,500.00	318,705.00	197,173.83	287,267.30
	C	10	10	100.00	504,000.00	183,000.00	66,400.00	209,890.00	173,635.41	135,600.32
	D	10	10	100.00	904,000.00	151,000.00	39,600.00	215,805.00	146,442.57	250,316.03
	E	10	10	100.00	350,000.00	124,500.00	24,100.00	146,600.00	103,072.70	116,214.09
	All	50	50	100.00	1,390,000.00	172,500.00	24,100.00	256,171.00	167,957.99	264,245.75
2	A	10	10	100.00	1,130,000.00	398,000.00	83,200.00	434,670.00	339,213.20	305,177.43
	B	10	10	100.00	800,000.00	450,500.00	93,200.00	445,320.00	379,689.31	226,150.20
	C	10	10	100.00	717,000.00	391,500.00	49,700.00	390,820.00	309,593.06	223,156.05
	D	10	10	100.00	1,100,000.00	261,000.00	115,000.00	347,500.00	266,315.00	297,884.49
	E	9	9	100.00	598,000.00	191,000.00	51,200.00	240,666.67	184,665.36	180,940.76
	All	49	49	100.00	1,130,000.00	338,000.00	49,700.00	374,471.43	290,011.54	252,682.68
3	A	10	10	100.00	1,500,000.00	448,000.00	138,000.00	544,166.67	426,229.46	424,837.29
	B	10	10	100.00	781,000.00	462,000.00	208,000.00	438,100.00	390,741.35	178,110.73
	C	10	10	100.00	808,000.00	417,500.00	127,000.00	420,800.00	357,943.05	217,857.65
	D	10	10	100.00	577,000.00	457,000.00	204,000.00	445,750.00	423,485.48	110,458.45
	E	10	10	100.00	838,000.00	475,000.00	265,000.00	474,250.00	444,918.76	180,403.14
	All	50	50	100.00	1,500,000.00	451,500.00	127,000.00	464,613.33	407,467.71	240,482.77
4	A	10	10	100.00	1,780,000.00	570,000.00	261,666.67	761,066.67	635,750.49	504,182.26
	B	10	10	100.00	1,410,000.00	551,000.00	277,500.00	638,750.00	560,310.27	373,988.21
	C	10	10	100.00	1,480,000.00	450,500.00	162,000.00	634,800.00	505,966.83	458,300.44
	D	10	10	100.00	1,420,000.00	505,000.00	264,000.00	656,600.00	563,346.71	400,531.65
	E	10	10	100.00	1,140,000.00	548,500.00	269,000.00	609,350.00	560,056.13	271,926.06
	All	50	50	100.00	1,780,000.00	551,000.00	162,000.00	660,113.33	563,597.33	396,027.73
5	A	10	10	100.00	2,392,500.00	484,000.00	200,000.00	755,700.00	556,148.04	720,951.81
	B	10	10	100.00	2,730,000.00	283,500.00	42,100.00	765,660.00	381,697.95	858,880.69
	C	10	10	100.00	1,260,000.00	313,000.00	88,450.00	409,995.00	291,908.05	362,562.13
	D	10	10	100.00	817,000.00	246,750.00	106,000.00	286,300.00	235,740.98	207,305.89
	E	10	10	100.00	470,000.00	270,500.00	69,400.00	273,450.00	230,069.66	129,800.59
	All	50	50	100.00	2,730,000.00	309,000.00	42,100.00	498,221.00	320,103.30	561,500.52

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-32. Summary Statistics for Sulfate (Onsite by Soil Group and Depth)

Sulfate
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	0	0.00	<15,800.00	<15,800.00	<15,800.00			
	B	10	0	0.00	<15,800.00	<15,800.00	<15,300.00			
	C	10	0	0.00	<15,800.00	<15,800.00	<14,100.00			
	D	10	0	0.00	<15,800.00	<14,750.00	<14,400.00			
	E	10	0	0.00	<15,800.00	<14,450.00	<13,900.00			
	All	50	0	0.00	<15,800.00	<15,800.00	<13,900.00			
2	A	10	0	0.00	<15,800.00	<15,800.00	<15,800.00			
	B	10	1	10.00	39,000.00	<15,800.00	<14,300.00			
	C	10	0	0.00	<15,800.00	<15,000.00	<14,200.00			
	D	10	0	0.00	<15,800.00	<15,150.00	<13,700.00			
	E	9	0	0.00	<15,800.00	<14,200.00	<13,400.00			
	All	49	1	2.04	39,000.00	<15,800.00	<13,400.00			
3	A	10	1	10.00	19,800.00	<15,800.00	<15,300.00			
	B	10	0	0.00	<15,800.00	<15,800.00	<14,000.00			
	C	10	0	0.00	<15,800.00	<15,450.00	<1,450.00			
	D	10	0	0.00	<15,800.00	<15,100.00	<14,300.00			
	E	10	2	20.00	21,700.00	<14,950.00	<14,400.00			
	All	50	3	6.00	21,700.00	<15,450.00	<1,450.00			
4	A	10	2	20.00	23,900.00	<15,800.00	<15,100.00			
	B	10	1	10.00	33,100.00	<14,800.00	<14,300.00			
	C	10	0	0.00	<15,800.00	<15,450.00	<13,800.00			
	D	10	0	0.00	<15,800.00	<15,350.00	<13,800.00			
	E	10	1	10.00	24,400.00	<15,375.00	<14,800.00			
	All	50	4	8.00	33,100.00	<15,500.00	<13,800.00			
5	A	10	9	90.00	164,000.00	71,950.00	<15,800.00	70,930.00	57,690.51	40,406.82
	B	10	5	50.00	220,000.00	14,600.00	<15,800.00	38,270.00	18,766.89	65,042.67
	C	10	5	50.00	137,000.00	11,733.33	<14,700.00	34,206.67	18,207.54	44,916.68
	D	10	3	30.00	174,000.00	<15,800.00	<14,600.00			
	E	10	2	20.00	138,000.00	<15,800.00	<14,300.00			
	All	50	24	48.00	220,000.00	<15,800.00	<14,300.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-33. Summary Statistics for Total Organic Carbon (Onsite by Soil Group and Depth)

Total Organic Carbon
Units: PER

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100	69,400,000.00	54,775,000.00	15,800,000.00	50,135,000.00	47,072,194.54	15,036,142.57
	B	10	10	100	52,100,000.00	43,450,000.00	10,500,000.00	37,300,000.00	33,647,056.88	14,486,315.38
	C	10	10	100	67,200,000.00	24,500,000.00	13,600,000.00	30,085,000.00	25,929,727.30	17,807,427.45
	D	10	10	100	40,300,000.00	6,965,000.00	370,000.00	12,936,900.00	4,187,418.08	14,358,088.04
	E	10	10	100	38,400,000.00	263,000.00	66,733.33	7,192,233.33	740,202.17	13,229,020.76
	All	50	50	100	69,400,000.00	24,850,000.00	66,733.33	27,529,826.67	10,494,487.40	21,477,728.54
2	A	10	10	100	83,200,000.00	21,700,000.00	13,700,000.00	31,785,000.00	27,013,831.73	21,519,165.23
	B	10	10	100	52,600,000.00	27,600,000.00	6,600,000.00	25,310,000.00	21,142,758.43	14,109,055.41
	C	10	10	100	32,700,000.00	10,800,000.00	127,000.00	13,533,200.00	6,581,773.13	11,523,327.22
	D	10	10	100	63,900,000.00	1,364,500.00	70,600.00	9,607,260.00	1,148,853.95	19,586,927.52
	E	9	7	77.78	10,300,000.00	152,000.00	<32300.0000	1,463,557.41	223,736.56	3,359,626.03
	All	49	47	95.92	83,200,000.00	10,900,000.00	<32300.0000	16,643,400.34	4,192,501.52	18,488,117.75
3	A	10	10	100	47,200,000.00	18,800,000.00	5,000,000.00	21,685,000.00	16,877,035.96	14,815,083.34
	B	10	10	100	30,300,000.00	14,550,000.00	2,310,000.00	14,491,000.00	10,615,016.88	9,376,597.88
	C	10	10	100	27,200,000.00	9,450,000.00	237,000.00	10,611,700.00	6,574,543.71	8,300,099.06
	D	10	10	100	16,750,000.00	9,950,000.00	254,000.00	9,236,400.00	5,882,227.25	5,227,765.26
	E	10	10	100	17,000,000.00	7,325,000.00	118,000.00	7,064,300.00	3,001,616.41	5,939,559.21
	All	50	50	100	47,200,000.00	10,850,000.00	118,000.00	12,617,680.00	7,304,590.84	10,371,062.54
4	A	10	10	100	41,600,000.00	34,600,000.00	11,000,000.00	29,966,666.67	27,302,534.22	11,505,618.60
	B	10	10	100	20,700,000.00	14,075,000.00	9,200,000.00	14,175,000.00	13,621,322.52	4,074,394.98
	C	10	10	100	32,000,000.00	16,950,000.00	6,000,000.00	18,685,000.00	16,407,990.16	9,175,330.75
	D	10	10	100	27,600,000.00	20,550,000.00	7,000,000.00	19,305,000.00	18,172,463.57	6,048,895.68
	E	10	10	100	36,050,000.00	18,100,000.00	11,500,000.00	19,025,000.00	17,915,745.54	6,954,425.05
	All	50	50	100	41,600,000.00	18,525,000.00	6,000,000.00	20,231,333.33	18,181,313.82	9,285,364.85
5	A	10	10	100	90,400,000.00	40,200,000.00	13,500,000.00	43,230,000.00	39,409,249.65	19,570,388.63
	B	10	10	100	65,000,000.00	26,600,000.00	6,400,000.00	28,123,333.33	21,565,064.33	19,680,848.94
	C	10	10	100	38,700,000.00	24,075,000.00	1,770,000.00	19,639,000.00	10,345,413.71	15,942,602.92
	D	10	10	100	42,800,000.00	19,275,000.00	656,000.00	17,132,300.00	7,360,933.65	15,235,167.84
	E	10	10	100	33,800,000.00	6,125,000.00	210,000.00	11,204,366.67	3,361,170.19	12,854,083.07
	All	50	50	100	90,400,000.00	24,375,000.00	210,000.00	23,865,800.00	11,681,645.93	19,672,174.80

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-34. Summary Statistics for Total Organic Halogens (Onsite by Soil Group and Depth)

Total Organic Halogens

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	1	10.00	32,900.00	<25,000.00	<25,000.00	.	.	.
	B	10	1	10.00	26,500.00	<25,000.00	<25,000.00	.	.	.
	C	10	1	10.00	29,400.00	<25,000.00	<25,000.00	.	.	.
	D	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	E	10	1	10.00	25,550.00	<25,000.00	<25,000.00	.	.	.
	All	50	4	8.00	32,900.00	<25,000.00	<25,000.00	.	.	.
2	A	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	B	10	0	0.00	<25,000.00	<2,000.00	<25,000.00	.	.	.
	C	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	D	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	E	9	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	All	49	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
3	A	10	1	10.00	67,300.00	<25,000.00	<25,000.00	.	.	.
	B	10	1	10.00	25,600.00	<25,000.00	<25,000.00	.	.	.
	C	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	D	10	1	10.00	62,000.00	<25,000.00	<25,000.00	.	.	.
	E	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	All	50	3	6.00	67,300.00	<25,000.00	<25,000.00	.	.	.
4	A	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	B	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	C	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	D	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	E	10	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
	All	50	0	0.00	<25,000.00	<25,000.00	<25,000.00	.	.	.
5	A	10	0	0.00	<25,000.00	<22,500.00	<20,000.00	.	.	.
	B	10	0	0.00	<25,000.00	<22,500.00	<20,000.00	.	.	.
	C	10	0	0.00	<25,000.00	<22,500.00	<20,000.00	.	.	.
	D	10	0	0.00	<25,000.00	<22,500.00	<20,000.00	.	.	.
	E	10	0	0.00	<25,000.00	<22,500.00	<20,000.00	.	.	.
	All	50	0	0.00	<25,000.00	<22,500.00	<20,000.00	.	.	.

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-35. Summary Statistics for Acetone (Onsite by Soil Group and Depth)

Acetone
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	5	83.33	143.50	96.97	<17.00	89.17	62.17	59.57
	B	6	6	100.00	135.70	56.14	26.20	63.23	51.59	37.93
	C	6	6	100.00	81.35	52.60	26.20	54.32	46.84	23.57
	D	6	6	100.00	98.10	49.30	19.20	50.80	44.82	27.14
	E	6	6	100.00	62.00	36.45	31.30	43.01	41.33	13.65
	All	30	29	96.67	143.50	50.88	<17.00	60.11	48.85	37.11
2	A	5	4	80.00	32.80	23.77	7.90	20.54	15.63	11.71
	B	5	5	100.00	180.00	46.40	19.40	64.40	45.87	65.73
	C	5	5	100.00	32.80	30.70	23.20	29.85	29.55	3.83
	D	5	5	100.00	52.95	34.43	24.40	36.88	35.24	11.02
	E	4	4	100.00	45.00	12.35	3.75	18.36	12.62	18.25
	All	24	23	95.83	180.00	30.58	3.75	34.66	25.53	33.62
3	A	5	5	100.00	95.20	57.00	27.80	58.90	48.72	26.15
	B	5	5	100.00	97.50	63.70	5.54	54.52	38.56	35.12
	C	5	5	100.00	80.20	30.00	12.40	38.99	32.45	25.81
	D	5	4	80.00	68.10	20.25	6.21	26.07	17.03	25.55
	E	5	5	100.00	87.00	36.30	11.30	39.95	31.48	28.27
	All	25	24	96.00	97.50	36.30	5.54	43.69	31.83	28.59
4	A	5	5	100.00	72.03	13.80	12.20	33.91	23.85	29.11
	B	5	5	100.00	28.00	23.90	10.40	20.68	19.22	7.33
	C	5	5	100.00	61.21	36.30	26.05	39.75	34.00	14.84
	D	5	5	100.00	101.00	33.40	11.50	49.52	36.88	37.77
	E	5	5	100.00	137.00	39.80	26.80	58.13	46.10	44.91
	All	25	25	100.00	137.00	28.00	10.40	40.40	30.52	30.55
5	A	5	4	80.00	392.50	72.40	<17.00	140.24	57.65	161.92
	B	5	5	100.00	352.00	149.00	35.10	171.17	104.83	117.58
	C	5	4	80.00	145.25	24.00	10.40	60.23	31.14	64.61
	D	5	4	80.00	113.00	34.80	7.96	46.32	25.69	45.01
	E	5	5	100.00	98.45	25.00	10.10	39.87	27.22	35.88
	All	25	22	88.00	392.50	48.90	7.96	91.57	42.06	104.52

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2)

Table D-36. Summary Statistics for Carbon Disulfide (Onsite by Soil Group and Depth)

Carbon Disulfide
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	1	16.67	<6.50	<6.50	4.79			
	B	6	0	0.00	<6.50	<6.50	<6.50			
	C	6	0	0.00	<6.50	<6.50	<5.65			
	D	6	0	0.00	<6.50	<6.25	<5.75			
	E	6	0	0.00	<6.50	<6.00	<5.50			
	All	30	1	3.33	<6.50	<6.50	<5.50			
2	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<5.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.25	<5.66	<5.50			
	E	4	0	0.00	<6.00	<5.75	<5.50			
	All	24	0	0.00	<6.50	<6.37	<5.50			
3	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.50	<6.00			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.00	<6.00			
	E	5	0	0.00	<6.50	<6.00	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			
4	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.00	<6.00	<5.50			
	C	5	0	0.00	<6.50	<6.00	<5.50			
	D	5	0	0.00	<6.50	<6.10	<6.00			
	E	5	1	20.00	<6.50	<6.00	3.55			
	All	25	1	4.00	<6.50	<6.00	3.55			
5	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<6.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.50	<6.50			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-37. Summary Statistics for Dichloromethane (Onsite by Soil Group and Depth)

Dichloromethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	6	100.00	153.75	49.47	26.60	65.55	52.68	48.29
	B	6	6	100.00	125.50	38.50	20.10	49.58	40.55	38.06
	C	6	6	100.00	57.70	35.78	23.80	38.45	34.51	14.40
	D	6	6	100.00	55.55	30.73	16.40	32.68	29.56	14.50
	E	6	6	100.00	44.80	23.80	9.92	26.24	22.74	14.36
	All	30	30	100.00	153.75	36.19	9.92	42.50	34.59	30.95
2	A	5	5	100.00	51.60	24.60	2.50	29.63	19.18	19.42
	B	5	5	100.00	60.20	30.80	3.90	31.19	22.37	21.30
	C	5	5	100.00	42.00	17.35	3.92	20.91	16.19	14.31
	D	5	5	100.00	37.77	18.10	1.46	17.11	11.09	13.64
	E	4	3	75.00	17.90	13.20	<6.00	11.83	9.50	7.30
	All	24	23	95.83	60.20	18.70	1.46	22.56	15.17	16.54
3	A	5	5	100.00	29.10	22.40	6.41	18.72	16.06	9.05
	B	5	5	100.00	40.30	20.20	2.23	21.47	15.17	14.47
	C	5	5	100.00	41.10	19.60	5.03	20.75	17.03	13.04
	D	5	5	100.00	23.50	16.60	2.18	14.74	11.30	8.15
	E	5	5	100.00	29.60	15.87	14.70	19.17	16.11	6.21
	All	25	25	100.00	41.10	19.30	2.18	18.97	14.98	10.00
4	A	5	3	60.00	80.20	12.90	<6.00	30.21	13.70	34.38
	B	5	4	80.00	49.10	15.80	3.52	20.38	11.33	19.68
	C	5	4	80.00	41.40	21.52	<6.50	20.63	13.81	14.22
	D	5	3	60.00	46.30	14.30	<6.50	16.57	9.97	17.64
	E	5	5	100.00	52.80	12.80	1.92	19.66	8.83	21.52
	All	25	19	76.00	80.20	14.30	1.92	21.49	11.35	21.12
5	A	5	5	100.00	84.20	39.60	16.80	43.86	37.84	25.46
	B	5	5	100.00	71.10	33.90	25.20	40.43	37.51	18.59
	C	5	5	100.00	41.60	21.85	12.00	22.77	20.64	11.52
	D	5	5	100.00	43.10	18.30	11.80	22.58	20.02	12.89
	E	5	5	100.00	35.10	25.90	18.85	27.25	26.45	6.61
	All	25	25	100.00	84.20	26.70	11.80	31.38	27.42	17.53

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table D-38. Summary Statistics for Ethyl Methacrylate (Onsite by Soil Group and Depth)

Ethyl Methacrylate
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<422.50	<422.50	<61.40			
	B	6	1	16.67	565.63	<422.50	<420.75			
	C	6	1	16.67	<422.50	<421.75	195.65			
	D	6	0	0.00	<422.50	<382.25	<229.75			
	E	6	0	0.00	<422.50	<378.66	<369.00			
	All	30	2	6.67	565.63	<422.50	<61.40			
2	A	5	0	0.00	<422.50	<422.50	<420.00			
	B	5	0	0.00	<422.50	<422.50	<373.00			
	C	5	0	0.00	<422.50	<405.00	<369.00			
	D	5	0	0.00	<417.25	<381.00	<358.00			
	E	4	0	0.00	<398.00	<371.00	<360.00			
	All	24	0	0.00	<422.50	<411.12	<358.00			
3	A	5	0	0.00	<422.50	<422.50	<400.00			
	B	5	0	0.00	<422.50	<422.50	<393.00			
	C	5	0	0.00	<422.50	<414.00	<407.00			
	D	5	0	0.00	<422.00	<398.00	<381.00			
	E	5	0	0.00	<416.00	<386.00	<383.00			
	All	25	0	0.00	<422.50	<414.00	<381.00			
4	A	5	0	0.00	<422.50	<409.33	<398.00			
	B	5	0	0.00	<398.00	<377.00	<211.70			
	C	5	0	0.00	<422.50	<401.00	<200.10			
	D	5	0	0.00	<422.50	<398.00	<215.60			
	E	5	0	0.00	<422.50	<398.00	<223.45			
	All	25	0	0.00	<422.50	<398.00	<200.10			
5	A	5	0	0.00	<422.50	<422.50	<422.50			
	B	5	0	0.00	<422.50	<422.50	<422.50			
	C	5	0	0.00	<422.50	<422.50	<412.00			
	D	5	0	0.00	<422.50	<422.50	<418.00			
	E	5	0	0.00	<422.50	<422.50	<369.00			
	All	25	0	0.00	<422.50	<422.50	<369.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-39. Summary Statistics for Methyl Ethyl Ketone (Onsite by Soil Group and Depth)

Methyl Ethyl Ketone

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<13.00	<13.00	<13.00			
	B	6	0	0.00	<13.00	<13.00	<13.00			
	C	6	1	16.67	14.75	<13.00	<13.00			
	D	6	0	0.00	<13.00	<12.50	<11.50			
	E	6	0	0.00	<13.00	<12.00	<11.00			
	All	30	1	3.33	14.75	<13.00	<11.00			
2	A	5	0	0.00	<13.00	<13.00	<13.00			
	B	5	0	0.00	<13.00	<13.00	<11.00			
	C	5	0	0.00	<13.00	<13.00	<12.00			
	D	5	0	0.00	<12.50	<11.33	<11.00			
	E	4	0	0.00	<12.00	<11.50	<11.00			
	All	24	0	0.00	<13.00	<12.80	<11.00			
3	A	5	1	20.00	<13.00	<13.00	4.43			
	B	5	0	0.00	<13.00	<13.00	<12.00			
	C	5	0	0.00	<13.00	<13.00	<12.00			
	D	5	0	0.00	<13.00	<12.00	<12.00			
	E	5	0	0.00	<13.00	<12.00	<12.00			
	All	25	1	4.00	<13.00	<13.00	4.43			
4	A	5	2	40.00	44.60	<13.00	6.28			
	B	5	0	0.00	<12.00	<12.00	<11.00			
	C	5	0	0.00	<13.00	<12.00	<11.00			
	D	5	0	0.00	<13.00	<12.20	<12.00			
	E	5	0	0.00	<13.00	<12.60	<12.00			
	All	25	2	8.00	44.60	<12.00	6.28			
5	A	5	2	40.00	49.20	<13.00	<13.00			
	B	5	1	20.00	40.50	<13.00	<13.00			
	C	5	0	0.00	<13.00	<13.00	<12.00			
	D	5	0	0.00	<13.00	<13.00	<13.00			
	E	5	0	0.00	<13.00	<13.00	<12.00			
	All	25	3	12.00	49.20	<13.00	<12.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table D-40. Summary Statistics for Methyl Methacrylate (Onsite by Soil Group and Depth)

Methyl Methacrylate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<423.00	<423.00	<61.40			
	B	6	1	16.67	565.75	<423.00	<421.00			
	C	6	1	16.67	<423.00	<422.00	195.65			
	D	6	0	0.00	<423.00	<382.25	<230.00			
	E	6	0	0.00	<423.00	<378.66	<369.00			
	All	30	2	6.67	565.75	<423.00	<61.40			
2	A	5	0	0.00	<423.00	<423.00	<420.00			
	B	5	0	0.00	<423.00	<423.00	<373.00			
	C	5	0	0.00	<423.00	<405.00	<369.00			
	D	5	0	0.00	<417.50	<381.00	<358.00			
	E	4	0	0.00	<398.00	<371.00	<360.00			
	All	24	0	0.00	<423.00	<411.25	<358.00			
3	A	5	0	0.00	<423.00	<423.00	<400.00			
	B	5	0	0.00	<423.00	<423.00	<393.00			
	C	5	0	0.00	<423.00	<414.00	<407.00			
	D	5	0	0.00	<422.00	<398.00	<381.00			
	E	5	0	0.00	<416.00	<386.00	<383.00			
	All	25	0	0.00	<423.00	<414.00	<381.00			
4	A	5	0	0.00	<423.00	<409.33	<398.00			
	B	5	0	0.00	<396.00	<377.00	<211.70			
	C	5	0	0.00	<423.00	<401.00	<200.10			
	D	5	0	0.00	<423.00	<398.00	<215.60			
	E	5	0	0.00	<423.00	<398.00	<223.70			
	All	25	0	0.00	<423.00	<398.00	<200.10			
5	A	5	0	0.00	<423.00	<423.00	<423.00			
	B	5	0	0.00	<423.00	<423.00	<423.00			
	C	5	0	0.00	<423.00	<423.00	<412.00			
	D	5	0	0.00	<423.00	<423.00	<418.00			
	E	5	0	0.00	<423.00	<423.00	<369.00			
	All	25	0	0.00	<423.00	<423.00	<369.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-41. Summary Statistics for Pentachloroethane (Onsite by Soil Group and Depth)

Pentachloroethane
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<423.00	<423.00	<61.40			
	B	6	1	16.67	565.75	<423.00	<421.00			
	C	6	1	16.67	<423.00	<422.00	195.65			
	D	6	0	0.00	<423.00	<382.25	<230.00			
	E	6	0	0.00	<423.00	<378.66	<369.00			
	All	30	2	6.67	565.75	<423.00	<61.40			
2	A	5	0	0.00	<423.00	<423.00	<420.00			
	B	5	0	0.00	<423.00	<423.00	<373.00			
	C	5	0	0.00	<423.00	<405.00	<369.00			
	D	5	0	0.00	<417.50	<381.00	<358.00			
	E	4	0	0.00	<398.00	<371.00	<360.00			
	All	24	0	0.00	<423.00	<411.25	<358.00			
3	A	5	0	0.00	<423.00	<423.00	<400.00			
	B	5	0	0.00	<423.00	<423.00	<393.00			
	C	5	0	0.00	<423.00	<414.00	<407.00			
	D	5	0	0.00	<422.00	<398.00	<381.00			
	E	5	0	0.00	<416.00	<386.00	<383.00			
	All	25	0	0.00	<423.00	<414.00	<381.00			
4	A	5	0	0.00	<423.00	<409.33	<398.00			
	B	5	0	0.00	<396.00	<377.00	<211.70			
	C	5	0	0.00	<423.00	<401.00	<200.10			
	D	5	0	0.00	<423.00	<398.00	<215.60			
	E	5	0	0.00	<423.00	<398.00	<223.70			
	All	25	0	0.00	<423.00	<398.00	<200.10			
5	A	5	0	0.00	<423.00	<423.00	<423.00			
	B	5	0	0.00	<423.00	<423.00	<423.00			
	C	5	0	0.00	<423.00	<423.00	<412.00			
	D	5	0	0.00	<423.00	<423.00	<418.00			
	E	5	0	0.00	<423.00	<423.00	<369.00			
	All	25	0	0.00	<423.00	<423.00	<369.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-42. Summary Statistics for Tetrachloroethylene (Onsite by Soil Group and Depth)

Tetrachloroethylene
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	1	16.67	129.50	<6.50	<6.50			
	B	6	1	16.67	70.75	<6.50	<6.50			
	C	6	1	16.67	36.30	<6.50	<6.50			
	D	6	1	16.67	30.30	<6.25	<5.75			
	E	6	1	16.67	<6.00	<5.75	3.10			
	All	30	5	16.67	129.50	<6.50	3.10			
2	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<5.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.25	<5.66	<5.50			
	E	4	0	0.00	<6.00	<5.75	<5.50			
	All	24	0	0.00	<6.50	<6.37	<5.50			
3	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.50	<6.00			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.00	<6.00			
	E	5	0	0.00	<6.50	<6.00	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			
4	A	5	1	20.00	36.47	<6.50	<6.00			
	B	5	1	20.00	6.19	<6.00	<5.50			
	C	5	1	20.00	<6.50	<6.14	<5.50			
	D	5	1	20.00	<6.50	<6.00	3.70			
	E	5	1	20.00	10.85	<6.50	<6.00			
	All	25	5	20.00	36.47	<6.00	3.70			
5	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<6.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.50	<6.50			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-43. Summary Statistics for 1,1,1-Trichloroethane (Onsite by Soil Group and Depth)

1,1,1-Trichloroethane
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	1	16.67	8.48	<6.50	<6.50			
	B	6	1	16.67	5.86	<6.50	<6.50			
	C	6	1	16.67	<6.50	<6.50	3.33			
	D	6	0	0.00	<6.50	<6.25	<5.75			
	E	6	0	0.00	<6.50	<6.00	<5.50			
	All	30	3	10.00	8.48	<6.50	3.33			
2	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<5.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.25	<5.66	<5.50			
	E	4	0	0.00	<6.00	<5.75	<5.50			
	All	24	0	0.00	<6.50	<6.37	<5.50			
3	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.50	<6.00			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.00	<6.00			
	E	5	0	0.00	<6.50	<6.00	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			
4	A	5	0	0.00	<6.50	<6.00	<5.60			
	B	5	0	0.00	<6.00	<6.00	<5.50			
	C	5	0	0.00	<6.50	<6.00	<5.50			
	D	5	0	0.00	<6.50	<6.10	<6.00			
	E	5	0	0.00	<6.50	<6.30	<6.00			
	All	25	0	0.00	<6.50	<6.00	<5.50			
5	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<6.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.50	<6.50			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-44. Summary Statistics for 1,1,2-Trichloroethane (Onsite by Soil Group and Depth)

1,1,2-Trichloroethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<6.50	<6.50	<6.50			
	B	6	0	0.00	<6.50	<6.50	<6.50			
	C	6	0	0.00	<6.50	<6.50	<5.65			
	D	6	0	0.00	<6.50	<6.25	<5.75			
	E	6	0	0.00	<6.50	<6.00	<5.50			
	All	30	0	0.00	<6.50	<6.50	<5.50			
2	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<5.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.25	<5.67	<5.50			
	E	4	0	0.00	<6.00	<5.75	<5.50			
	All	24	0	0.00	<6.50	<6.37	<5.50			
3	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.50	<6.00			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.00	<6.00			
	E	5	0	0.00	<6.50	<6.00	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			
4	A	5	1	20.00	6.98	<6.50	<6.00			
	B	5	1	20.00	<6.00	<6.00	2.56			
	C	5	0	0.00	<6.50	<6.00	<5.50			
	D	5	0	0.00	<6.50	<6.10	<6.00			
	E	5	0	0.00	<6.50	<6.30	<6.00			
	All	25	2	8.00	6.98	<6.00	2.56			
5	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<6.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.50	<6.50			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-45. Summary Statistics for Toluene (Onsite by Soil Group and Depth)

Toluene
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	1	16.67	17.10	<6.50	<6.50			
	B	6	2	33.33	12.82	<6.50	<6.50			
	C	6	2	33.33	<6.50	<6.50	2.75			
	D	6	2	33.33	11.00	<6.00	4.09			
	E	6	0	0.00	<6.50	<6.00	<5.50			
	All	30	7	23.33	17.10	<6.50	2.75			
2	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<5.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.25	<6.00	<5.50			
	E	4	0	0.00	<6.00	<5.75	<5.50			
	All	24	0	0.00	<6.50	<6.37	<5.50			
3	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.50	<6.00			
	C	5	1	20.00	<6.50	<6.00	4.59			
	D	5	0	0.00	<6.50	<6.00	<6.00			
	E	5	0	0.00	<6.50	<6.00	<6.00			
	All	25	1	4.00	<6.50	<6.00	4.59			
4	A	5	0	0.00	<6.50	<6.00	<5.09			
	B	5	0	0.00	<6.00	<6.00	<5.50			
	C	5	0	0.00	<6.50	<6.00	<5.50			
	D	5	0	0.00	<6.50	<6.10	<6.00			
	E	5	0	0.00	<6.50	<6.30	<6.00			
	All	25	0	0.00	<6.50	<6.00	<5.09			
5	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	1	20.00	6.37	<6.50	<6.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.50	<6.50			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	1	4.00	6.37	<6.50	<6.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-46. Summary Statistics for Trichlorofluoromethane (Onsite by Soil Group and Depth)

Trichlorofluoromethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	2	33.33	34.35	<6.50	<6.50			
	B	6	1	16.67	41.65	<6.50	<6.50			
	C	6	2	33.33	8.49	<6.50	<6.50			
	D	6	1	16.67	11.14	<6.25	<5.75			
	E	6	0	0.00	<6.50	<6.00	<5.50			
	All	30	6	20.00	41.65	<6.50	<5.50			
2	A	5	1	20.00	<6.50	<6.50	3.99			
	B	5	1	20.00	<6.50	<6.50	2.53			
	C	5	1	20.00	5.76	<6.50	<6.00			
	D	5	0	0.00	<6.25	<5.66	<5.50			
	E	4	0	0.00	<6.00	<5.75	<5.50			
	All	24	3	12.50	5.76	<6.00	2.53			
3	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.50	<6.00			
	C	5	1	20.00	<6.50	<6.00	1.38			
	D	5	0	0.00	<6.50	<6.00	<6.00			
	E	5	0	0.00	<6.50	<6.00	<6.00			
	All	25	1	4.00	<6.50	<6.00	1.38			
4	A	5	1	20.00	8.95	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.00	<5.50			
	C	5	0	0.00	<6.50	<6.50	<5.50			
	D	5	0	0.00	<6.50	<6.50	<6.00			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	1	4.00	8.95	<6.50	<5.50			
5	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<6.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.50	<6.50			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-47. Summary Statistics for Xylenes (Onsite by Soil Group and Depth)

Xylenes

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	1	16.67	10.38	<6.50	<6.50			
	B	6	0	0.00	<6.50	<6.50	<6.50			
	C	6	0	0.00	<6.50	<6.50	<5.65			
	D	6	0	0.00	<6.50	<6.25	<5.75			
	E	6	0	0.00	<6.50	<6.00	<5.50			
	All	30	1	3.33	10.38	<6.50	<5.50			
2	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<5.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.25	<5.66	<5.50			
	E	4	0	0.00	<6.00	<5.75	<5.50			
	All	24	0	0.00	<6.50	<6.37	<5.50			
3	A	5	0	0.00	<6.50	<6.50	<6.00			
	B	5	0	0.00	<6.50	<6.50	<6.00			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.00	<6.00			
	E	5	0	0.00	<6.50	<6.00	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			
4	A	5	0	0.00	<11.63	<6.50	<6.00			
	B	5	0	0.00	<6.00	<6.00	<5.50			
	C	5	0	0.00	<6.50	<6.00	<5.50			
	D	5	0	0.00	<6.50	<6.10	<6.00			
	E	5	0	0.00	<6.50	<6.30	<6.00			
	All	25	0	0.00	<11.63	<6.00	<5.50			
5	A	5	0	0.00	<6.50	<6.50	<6.50			
	B	5	0	0.00	<6.50	<6.50	<6.50			
	C	5	0	0.00	<6.50	<6.50	<6.00			
	D	5	0	0.00	<6.50	<6.50	<6.50			
	E	5	0	0.00	<6.50	<6.50	<6.00			
	All	25	0	0.00	<6.50	<6.50	<6.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-48. Summary Statistics for Benzo(a)Pyrene (Onsite by Soil Group and Depth)

Benzo(a)Pyrene
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<418.50	<418.50	<418.50	.	.	.
	B	6	1	16.67	468.00	<418.50	<418.50	.	.	.
	C	6	1	16.67	<418.50	<418.50	307.00	.	.	.
	D	6	1	16.67	511.00	<401.00	<378.00	.	.	.
	E	6	1	16.67	<388.50	<372.66	206.00	.	.	.
	All	30	4	13.33	511.00	<418.50	206.00	.	.	.
2	A	5	0	0.00	<418.50	<418.50	<418.50	.	.	.
	B	5	1	20.00	<418.50	<418.50	173.00	.	.	.
	C	5	0	0.00	<418.50	<405.00	<369.00	.	.	.
	D	5	0	0.00	<415.25	<381.00	<358.00	.	.	.
	E	4	0	0.00	<398.00	<371.00	<360.00	.	.	.
	All	24	1	4.17	<418.50	<402.00	173.00	.	.	.
3	A	5	0	0.00	<418.50	<418.50	<400.00	.	.	.
	B	5	0	0.00	<418.50	<418.50	<393.00	.	.	.
	C	5	0	0.00	<418.50	<414.00	<407.00	.	.	.
	D	5	0	0.00	<418.50	<398.00	<381.00	.	.	.
	E	5	0	0.00	<416.00	<386.00	<383.00	.	.	.
	All	25	0	0.00	<418.50	<414.00	<381.00	.	.	.
4	A	5	0	0.00	<418.50	<409.33	<398.00	.	.	.
	B	5	0	0.00	<396.00	<384.00	<375.00	.	.	.
	C	5	0	0.00	<418.50	<401.00	<366.00	.	.	.
	D	5	0	0.00	<418.50	<403.50	<393.00	.	.	.
	E	5	0	0.00	<418.50	<402.37	<390.00	.	.	.
	All	25	0	0.00	<418.50	<401.00	<366.00	.	.	.
5	A	5	2	40.00	<418.50	<418.50	182.00	.	.	.
	B	5	3	60.00	1,110.00	502.00	<418.50	512.63	400.67	367.91
	C	5	2	40.00	1,390.00	<418.50	212.62	.	.	.
	D	5	2	40.00	<418.50	<418.00	147.67	.	.	.
	E	5	0	0.00	<418.50	<418.50	<369.00	.	.	.
	All	25	9	36.00	1,390.00	<418.50	147.67	.	.	.

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-49. Summary Statistics for Bis(2-ethylhexyl) Phthalate (Onsite by Soil Group and Depth)

Bis(2-ethylhexyl) Phthalate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	4	66.67	38,850.00	217.00	124.00	7,285.92	759.88	15,542.06
	B	6	4	66.67	3,610.00	207.50	55.65	1,106.96	339.41	1,547.54
	C	6	3	50.00	863.00	207.50	61.60	356.35	255.75	305.24
	D	6	4	66.67	2,310.00	191.13	45.90	540.36	211.49	879.45
	E	6	3	50.00	719.33	190.13	45.90	324.34	203.17	273.60
	All	30	18	60.00	38,850.00	207.50	45.80	1,922.78	309.37	7,052.88
2	A	5	4	80.00	356.00	317.00	54.50	250.16	202.12	132.46
	B	5	4	80.00	2,210.00	354.00	93.20	672.34	365.97	874.79
	C	5	3	60.00	<415.00	207.50	101.00	211.00	196.96	82.50
	D	5	3	60.00	<381.00	190.50	140.80	201.86	190.98	57.86
	E	4	3	75.00	<360.00	201.00	115.05	191.76	172.46	58.68
	All	24	17	70.83	2,210.00	199.75	54.50	310.16	218.96	418.06
3	A	5	5	100.00	2,980.00	490.00	103.00	881.00	465.18	1,188.30
	B	5	5	100.00	479.00	268.00	65.80	274.16	223.46	165.24
	C	5	5	100.00	348.00	311.00	65.00	250.60	216.50	114.75
	D	5	4	80.00	<392.00	277.00	191.00	257.40	251.48	60.21
	E	5	5	100.00	292.00	219.00	42.80	201.56	169.71	93.79
	All	25	24	96.00	2,980.00	268.00	42.80	372.94	249.17	558.56
4	A	5	5	100.00	1,700.00	329.00	222.00	670.70	479.80	629.76
	B	5	4	80.00	888.50	192.00	99.10	333.52	240.90	320.86
	C	5	3	60.00	906.33	236.00	236.00	358.97	285.93	307.77
	D	5	3	60.00	692.00	199.00	191.00	307.50	264.72	216.71
	E	5	3	60.00	876.25	195.00	119.00	314.85	229.87	315.50
	All	25	18	72.00	1,700.00	222.00	99.10	397.11	288.86	378.53
5	A	5	3	60.00	1,210.50	207.50	153.00	529.70	344.14	481.88
	B	5	2	40.00	476.00	<415.00	<415.00			
	C	5	3	60.00	<415.00	206.00	140.00	187.83	181.13	42.24
	D	5	3	60.00	1,960.00	207.50	45.20	515.61	221.53	810.15
	E	5	3	60.00	<415.00	181.75	103.00	159.75	152.54	44.78
	All	25	14	56.00	1,960.00	207.50	45.20	340.84	227.06	421.64

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table D-50. Summary Statistics for Butylbenzyl Phthalate (Onsite by Soil Group and Depth)

Butylbenzyl Phthalate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<423.50	<423.50	<423.50			
	B	6	0	0.00	<423.50	<423.50	<421.25			
	C	6	0	0.00	<423.50	<422.25	<377.00			
	D	6	0	0.00	<423.50	<403.50	<378.00			
	E	6	0	0.00	<423.50	<378.66	<369.00			
	All	30	0	0.00	<423.50	<423.50	<369.00			
2	A	5	0	0.00	<423.50	<423.50	<420.00			
	B	5	0	0.00	<423.50	<423.50	<373.00			
	C	5	0	0.00	<423.50	<405.00	<369.00			
	D	5	0	0.00	<417.75	<381.00	<358.00			
	E	4	0	0.00	<398.00	<371.00	<360.00			
	All	24	0	0.00	<423.50	<411.37	<358.00			
3	A	5	0	0.00	<423.50	<423.50	<400.00			
	B	5	0	0.00	<423.50	<423.50	<393.00			
	C	5	0	0.00	<423.50	<414.00	<407.00			
	D	5	0	0.00	<422.00	<398.00	<381.00			
	E	5	0	0.00	<416.00	<386.00	<383.00			
	All	25	0	0.00	<423.50	<414.00	<381.00			
4	A	5	0	0.00	<423.50	<409.33	<398.00			
	B	5	0	0.00	<396.00	<384.00	<375.00			
	C	5	0	0.00	<423.50	<401.00	<366.00			
	D	5	0	0.00	<423.50	<403.50	<393.00			
	E	5	0	0.00	<423.50	<403.62	<390.00			
	All	25	0	0.00	<423.50	<401.00	<366.00			
5	A	5	0	0.00	<423.50	<423.50	<423.50			
	B	5	0	0.00	<423.50	<423.50	<423.50			
	C	5	0	0.00	<423.50	<423.50	<412.00			
	D	5	1	20.00	<423.50	<423.50	43.40			
	E	5	0	0.00	<423.50	<423.50	<316.95			
	All	25	1	4.00	<423.50	<423.50	43.40			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table D-51. Summary Statistics for Di-n-butyl Phthalate (Onsite by Soil Group and Depth)

Di-n-butyl Phthalate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	5	83.33	435.50	247.50	211.66	293.86	280.15	100.83
	B	6	5	83.33	<430.00	125.50	82.90	149.78	136.89	69.73
	C	6	5	83.33	<377.00	132.50	95.50	146.36	138.68	51.49
	D	6	6	100.00	164.00	89.83	75.70	105.89	101.50	35.27
	E	6	6	100.00	139.00	63.75	40.20	82.69	73.32	44.13
	All	30	27	90.00	435.50	135.50	40.20	155.72	131.67	95.86
2	A	5	3	60.00	<430.00	164.00	86.25	161.05	152.49	54.49
	B	5	3	60.00	<430.00	186.00	80.15	167.93	159.19	51.50
	C	5	3	60.00	<430.00	153.00	92.30	152.16	142.61	49.71
	D	5	4	80.00	<376.00	97.05	45.10	111.55	100.28	53.97
	E	4	4	100.00	117.00	75.25	60.75	82.06	79.34	25.45
	All	24	17	70.83	<430.00	134.00	45.10	137.15	124.70	55.21
3	A	5	5	100.00	249.67	156.00	70.20	163.57	147.81	75.87
	B	5	5	100.00	241.00	156.00	90.20	162.24	152.48	61.85
	C	5	5	100.00	164.00	136.00	94.50	131.90	128.86	31.03
	D	5	5	100.00	138.00	132.00	72.40	120.28	117.19	27.10
	E	5	5	100.00	148.00	103.00	84.80	105.18	102.97	25.59
	All	25	25	100.00	249.67	132.00	70.20	136.63	128.51	50.43
4	A	5	4	80.00	<409.33	162.00	68.10	154.75	144.20	56.13
	B	5	4	80.00	<375.00	108.00	55.40	107.76	98.86	50.71
	C	5	4	80.00	<401.00	96.33	53.60	112.59	100.00	60.32
	D	5	4	80.00	<393.00	105.45	48.10	111.51	97.24	60.84
	E	5	4	80.00	<390.00	111.68	70.30	117.02	108.96	47.21
	All	25	20	80.00	<409.33	111.68	48.10	120.73	108.60	53.47
5	A	5	3	60.00	459.00	215.00	83.50	250.10	217.98	136.60
	B	5	3	60.00	<430.00	215.00	92.00	187.00	176.88	56.71
	C	5	2	40.00	<430.00	<412.00	67.30	.	.	.
	D	5	2	40.00	<430.00	<418.00	94.20	.	.	.
	E	5	2	40.00	<430.00	<369.00	55.90	.	.	.
	All	25	12	48.00	459.00	<412.00	55.90	.	.	.

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table D-52. Summary Statistics for Fluoranthene (Onsite by Soil Group and Depth)

Fluoranthene
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<422.00	<422.00	<422.00			
	B	6	0	0.00	<422.00	<422.00	<420.50			
	C	6	1	16.67	<422.00	<421.50	44.10			
	D	6	1	16.67	<422.00	<382.25	81.70			
	E	6	0	0.00	<422.00	<378.66	<369.00			
	All	30	2	6.67	<422.00	<422.00	44.10			
2	A	5	0	0.00	<422.00	<422.00	<420.00			
	B	5	1	20.00	<422.00	<421.00	111.00			
	C	5	0	0.00	<422.00	<405.00	<369.00			
	D	5	0	0.00	<417.00	<381.00	<358.00			
	E	4	0	0.00	<398.00	<371.00	<360.00			
	All	24	1	4.17	<422.00	<402.00	111.00			
3	A	5	0	0.00	<422.00	<422.00	<400.00			
	B	5	0	0.00	<422.00	<422.00	<393.00			
	C	5	0	0.00	<422.00	<414.00	<407.00			
	D	5	0	0.00	<422.00	<398.00	<381.00			
	E	5	0	0.00	<416.00	<386.00	<383.00			
	All	25	0	0.00	<422.00	<414.00	<381.00			
4	A	5	0	0.00	<422.00	<409.33	<398.00			
	B	5	0	0.00	<396.00	<384.00	<375.00			
	C	5	0	0.00	<422.00	<401.00	<366.00			
	D	5	0	0.00	<422.00	<403.50	<393.00			
	E	5	0	0.00	<422.00	<403.25	<390.00			
	All	25	0	0.00	<422.00	<401.00	<366.00			
5	A	5	0	0.00	<422.00	<422.00	<422.00			
	B	5	0	0.00	<422.00	<422.00	<422.00			
	C	5	0	0.00	<422.00	<422.00	<412.00			
	D	5	0	0.00	<422.00	<422.00	<418.00			
	E	5	0	0.00	<422.00	<422.00	<369.00			
	All	25	0	0.00	<422.00	<422.00	<369.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-53. Summary Statistics for Kepone (Onsite by Soil Group and Depth)

Kepone
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<20.65	<20.65	<20.65			
	B	6	0	0.00	<20.65	<20.65	<20.62			
	C	6	0	0.00	<20.65	<20.65	<20.20			
	D	6	0	0.00	<20.65	<9.7938	<18.70			
	E	6	0	0.00	<20.65	<1,9.0833	<9.02			
	All	30	0	0.00	<20.65	<20.65	<9.02			
2	A	5	0	0.00	<20.65	<20.65	<20.30			
	B	5	0	0.00	<20.65	<20.65	<19.08			
	C	5	0	0.00	<20.65	<1,9.9000	<18.2000			
	D	5	0	0.00	<20.30	<18.40	<8.76			
	E	4	0	0.00	<19.20	<13.63	<8.63			
	All	24	0	0.00	<20.65	<20.10	<8.63			
3	A	5	1	20.00	31.30	<20.65	<20.65			
	B	5	0	0.00	<20.65	<20.65	<20.30			
	C	5	0	0.00	<20.65	<20.00	<19.60			
	D	5	0	0.00	<20.60	<1,9.4000	<18.70			
	E	5	0	0.00	<20.00	<18.60	<18.30			
	All	25	1	4.00	31.30	<20.30	<18.30			
4	A	5	0	0.00	<20.65	<20.65	<19.30			
	B	5	0	0.00	<19.80	<18.40	<9.53			
	C	5	1	20.00	<20.65	<17.70	5.01			
	D	5	1	20.00	<20.65	<1,9.2000	6.30			
	E	5	0	0.00	<20.65	<1,9.4000	<15.17			
	All	25	2	8.00	<20.65	<1,9.3000	5.01			
5	A	5	0	0.00	<20.65	<20.65	<20.65			
	B	5	2	40.00	542.00	<20.65	16.20			
	C	5	0	0.00	<20.65	<20.65	<10.36			
	D	5	0	0.00	<20.65	<20.65	<20.10			
	E	5	0	0.00	<20.65	<18.30	<10.70			
	All	25	2	8.00	542.00	<20.65	<10.36			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-54. Summary Statistics for m,p-Cresol (Onsite by Soil Group and Depth)

m,p-Cresol
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	3	1	33.33	<432.00	<432.00	133.65			
	B	3	0	0.00	<432.00	<432.00	<425.50			
	C	3	0	0.00	<432.00	<417.00	<377.00			
	D	3	0	0.00	<432.00	<432.00	<383.50			
	E	3	0	0.00	<432.00	<388.50	<384.00			
	All	15	1	6.67	<432.00	<432.00	133.65			
3	A	2	0	0.00	<432.00	<432.00	<432.00			
	B	2	0	0.00	<432.00	<432.00	<432.00			
	C	2	0	0.00	<429.00	<421.50	<414.00			
	D	2	0	0.00	<398.00	<389.50	<381.00			
	E	2	0	0.00	<416.00	<401.00	<386.00			
	All	10	0	0.00	<432.00	<422.50	<381.00			
4	A	2	0	0.00	<432.00	<432.00	<432.00			
	B	2	0	0.00	<396.00	<391.00	<386.00			
	C	2	0	0.00	<414.00	<399.00	<384.00			
	D	1	0	0.00	<432.00	<432.00	<432.00			
	E	2	0	0.00	<417.00	<407.00	<397.00			
	All	9	0	0.00	<432.00	<414.00	<384.00			
5	A	2	0	0.00	<432.00	<432.00	<432.00			
	B	2	0	0.00	<432.00	<432.00	<432.00			
	C	2	0	0.00	<432.00	<432.00	<432.00			
	D	2	0	0.00	<432.00	<432.00	<432.00			
	E	2	0	0.00	<432.00	<414.37	<396.75			
	All	10	0	0.00	<432.00	<432.00	<396.75			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-55. Summary Statistics for p-Cresol (4-Methylphenol) (Onsite by Soil Group and Depth)

p-Cresol (4-Methylphenol)

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	4	1	25.00	<420.00	<420.00	227.00			
	B	4	0	0.00	<420.00	<420.00	<420.00			
	C	4	0	0.00	<420.00	<420.00	<420.00			
	D	4	0	0.00	<420.00	<400.50	<378.00			
	E	4	0	0.00	<384.00	<372.66	<369.00			
	All	20	1	5.00	<420.00	<420.00	227.00			
2	A	5	1	20.00	<420.00	<420.00	199.00			
	B	5	0	0.00	<420.00	<420.00	<373.00			
	C	5	0	0.00	<420.00	<405.00	<369.00			
	D	5	0	0.00	<416.00	<381.00	<358.00			
	E	4	0	0.00	<398.00	<371.00	<360.00			
	All	24	1	4.17	<420.00	<402.00	199.00			
3	A	3	1	33.33	<420.00	<400.00	340.66			
	B	3	0	0.00	<420.00	<418.00	<393.00			
	C	3	0	0.00	<420.00	<408.00	<407.00			
	D	3	0	0.00	<420.00	<402.00	<392.00			
	E	3	0	0.00	<393.00	<383.00	<383.00			
	All	15	1	6.67	<420.00	<402.00	340.66			
4	A	3	0	0.00	<409.33	<403.00	<398.00			
	B	3	0	0.00	<384.00	<377.00	<375.00			
	C	3	0	0.00	<420.00	<401.00	<366.00			
	D	3	0	0.00	<420.00	<398.00	<393.00			
	E	3	0	0.00	<420.00	<398.00	<390.00			
	All	15	0	0.00	<420.00	<398.00	<366.00			
5	A	3	0	0.00	<420.00	<420.00	<420.00			
	B	3	0	0.00	<420.00	<420.00	<420.00			
	C	3	0	0.00	<420.00	<420.00	<412.00			
	D	3	0	0.00	<420.00	<420.00	<418.00			
	E	3	0	0.00	<420.00	<420.00	<369.00			
	All	15	0	0.00	<420.00	<420.00	<369.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-56. Summary Statistics for Phenol (Onsite by Soil Group and Depth)

Phenol
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<422.00	<422.00	<422.00			
	B	6	0	0.00	<422.00	<422.00	<420.50			
	C	6	0	0.00	<422.00	<421.50	<377.00			
	D	6	0	0.00	<422.00	<402.75	<378.00			
	E	6	0	0.00	<422.00	<378.50	<369.00			
	All	30	0	0.00	<422.00	<422.00	<369.00			
2	A	5	0	0.00	<422.00	<422.00	<420.00			
	B	5	0	0.00	<422.00	<422.00	<373.00			
	C	5	0	0.00	<422.00	<405.00	<369.00			
	D	5	0	0.00	<417.00	<381.00	<358.00			
	E	4	0	0.00	<398.00	<371.00	<360.00			
	All	24	0	0.00	<422.00	<411.00	<358.00			
3	A	5	0	0.00	<422.00	<422.00	<400.00			
	B	5	0	0.00	<422.00	<422.00	<393.00			
	C	5	0	0.00	<422.00	<414.00	<407.00			
	D	5	0	0.00	<422.00	<398.00	<381.00			
	E	5	0	0.00	<416.00	<386.00	<383.00			
	All	25	0	0.00	<422.00	<414.00	<381.00			
4	A	5	0	0.00	<422.00	<409.00	<398.00			
	B	5	0	0.00	<396.00	<384.00	<375.00			
	C	5	0	0.00	<422.00	<401.00	<366.00			
	D	5	0	0.00	<422.00	<403.50	<393.00			
	E	5	0	0.00	<422.00	<408.50	<390.00			
	All	25	0	0.00	<422.00	<401.00	<366.00			
5	A	5	0	0.00	<422.00	<422.00	<422.00			
	B	5	0	0.00	<422.00	<422.00	<422.00			
	C	5	0	0.00	<422.00	<422.00	<412.00			
	D	5	2	40.00	<422.00	<418.00	60.60			
	E	5	1	20.00	<422.00	<403.50	53.60			
	All	25	3	12.00	<422.00	<422.00	53.60			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-57. Summary Statistics for Pyridine (Onsite by Soil Group and Depth)

Pyridine
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	3	50.00	<449.50	224.75	90.16	224.65	208.19	79.93
	B	6	3	50.00	<449.50	207.75	91.40	188.57	180.40	52.07
	C	6	3	50.00	<449.50	201.00	95.00	176.25	166.03	59.86
	D	6	3	50.00	<449.50	196.63	71.60	175.89	163.51	62.15
	E	6	3	50.00	<449.50	169.33	67.30	166.37	157.63	54.23
	All	30	15	50.00	<449.50	210.63	71.60	186.35	174.27	61.57
2	A	5	1	20.00	<449.50	<440.00	105.88			
	B	5	0	0.00	<449.50	<449.50	<373.00			
	C	5	1	20.00	<449.50	<391.00	167.37			
	D	5	1	20.00	<399.00	<376.00	158.50			
	E	4	1	25.00	<398.00	<362.00	124.50			
	All	24	4	16.67	<449.50	<394.50	105.88			
3	A	5	0	0.00	<449.50	<449.50	<400.00			
	B	5	0	0.00	<449.50	<433.00	<393.00			
	C	5	0	0.00	<449.50	<414.00	<407.00			
	D	5	0	0.00	<422.00	<398.00	<381.00			
	E	5	0	0.00	<416.00	<386.00	<383.00			
	All	25	0	0.00	<449.50	<414.00	<381.00			
4	A	5	1	20.00	<449.50	<403.00	90.60			
	B	5	1	20.00	<449.50	<377.00	75.00			
	C	5	1	20.00	<449.50	<414.00	33.40			
	D	5	1	20.00	<449.50	<428.00	54.60			
	E	5	0	0.00	<449.50	<417.00	<390.00			
	All	25	4	16.00	<449.50	<403.00	33.40			
5	A	5	0	0.00	<449.50	<449.50	<449.50			
	B	5	0	0.00	<449.50	<449.50	<449.50			
	C	5	0	0.00	<449.50	<449.50	<412.00			
	D	5	0	0.00	<449.50	<449.50	<418.00			
	E	5	0	0.00	<449.50	<434.00	<369.00			
	All	25	0	0.00	<449.50	<449.50	<369.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-58. Summary Statistics for 2,4-Dichlorophenoxyacetic acid (Onsite by Soil Group and Depth)

2,4-Dichlorophenoxyacetic acid

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	<114.00	<114.00	<61.20			
	B	6	0	0.00	<114.00	<114.00	<70.60			
	C	6	1	16.67	<114.00	<114.00	17.40			
	D	6	1	16.67	<114.00	<114.00	23.58			
	E	6	0	0.00	<114.00	<113.50	<23.50			
	All	30	2	6.67	<114.00	<114.00	17.40			
2	A	5	1	20.00	<114.00	<114.00	13.30			
	B	5	0	0.00	<114.00	<114.00	<39.90			
	C	4	0	0.00	<114.00	<114.00	<39.20			
	D	5	0	0.00	<114.00	<47.10	<39.70			
	E	4	0	0.00	<114.00	<74.<75	<23.20			
	All	23	1	4.35	<114.00	<113.00	13.30			
3	A	5	0	0.00	<114.00	<65.90	<26.10			
	B	5	0	0.00	<114.00	<49.50	<26.30			
	C	5	0	0.00	<114.00	<48.90	<24.90			
	D	5	0	0.00	<114.00	<24.40	<23.50			
	E	5	0	0.00	<114.00	<23.30	<23.00			
	All	25	0	0.00	<114.00	<31.20	<23.00			
4	A	5	0	0.00	<114.00	<47.70	<27.80			
	B	5	0	0.00	<114.00	<39.30	<21.00			
	C	5	0	0.00	<114.00	<39.60	<25.10			
	D	5	0	0.00	<114.00	<38.80	<25.60			
	E	5	0	0.00	<114.00	<39.80	<25.20			
	All	25	0	0.00	<114.00	<39.80	<21.00			
5	A	5	0	0.00	<114.00	<114.00	<83.30			
	B	5	0	0.00	<114.00	<114.00	<63.40			
	C	5	0	0.00	<114.00	<114.00	<28.20			
	D	5	0	0.00	<114.00	<27.80	<23.90			
	E	5	0	0.00	<114.00	<28.60	<23.00			
	All	25	0	0.00	<114.00	<113.00	<23.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-59. Summary Statistics for 2,4,5-T (Onsite by Soil Group and Depth)

2,4,5-T

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	1	16.67	<60.20	<60.20	20.80			
	B	6	2	33.33	<60.20	<60.20	7.50			
	C	6	2	33.33	<60.20	<60.20	18.50			
	D	6	0	0.00	<60.20	<60.20	<11.35			
	E	6	0	0.00	<60.20	<60.20	<11.75			
	All	30	5	16.67	<60.20	<60.20	7.50			
2	A	5	1	20.00	<60.20	<60.20	12.00			
	B	5	2	40.00	<60.20	<34.21	5.79			
	C	4	1	25.00	<60.20	<60.20	5.10			
	D	5	1	20.00	<60.20	<23.50	<19.80			
	E	4	0	0.00	<60.20	<40.95	<11.60			
	All	23	5	21.74	<60.20	<34.21	5.10			
3	A	5	0	0.00	<60.20	<33.00	<13.00			
	B	5	1	20.00	<29.50	<1,9.3000	<13.20			
	C	5	1	20.00	<28.80	<20.3000	<12.50			
	D	5	0	0.00	<58.80	<12.20	<11.80			
	E	5	1	20.00	<12.50	<11.60	11.30			
	All	25	3	12.00	<60.20	<13.20	11.30			
4	A	5	1	20.00	<60.20	<23.80	5.96			
	B	5	1	20.00	<60.20	<12.40	5.31			
	C	5	0	0.00	<60.20	<1,9.8000	<12.50			
	D	5	0	0.00	<60.20	<1,9.4000	<12.80			
	E	5	1	20.00	<60.20	<12.80	5.38			
	All	25	3	12.00	<60.20	<1,9.4000	5.31			
5	A	5	0	0.00	<60.20	<60.20	<41.60			
	B	5	0	0.00	<60.20	<60.20	<31.70			
	C	5	2	40.00	63.50	<60.20	<14.10			
	D	5	0	0.00	<60.20	<13.90	<12.00			
	E	5	1	20.00	<60.20	<14.30	<11.50			
	All	25	3	12.00	63.50	<52.80	<11.50			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-60. Summary Statistics for Hexachlorodibenzo-p-dioxins (Onsite by Soil Group and Depth)

Hexachlorodibenzo-p-dioxins

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	6	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	All	27	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
2	A	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	4	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	3	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	3	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	4	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	All	19	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
3	A	5	0	0.00	< 0.1000	< 0.1000	< 0.0000	0.04	0.05	
	B	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	All	25	0	0.00	< 0.1000	< 0.1000	< 0.0000	0.05	0.05	
4	A	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	5	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	All	25	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
5	A	3	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	3	0	0.00	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	2	0	0.00	< 0.1000	< 0.0500	< 0.0000	0.03	0.05	
	D	4	3	75.00	0.70	0.13	0.04	0.25	0.13	0.31
	E	5	1	20.00	0.20	< 0.1000	< 0.1000	0.08	0.07	
	All	17	4	23.53	0.70	< 0.1000	< 0.0000	0.10	0.07	

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table D-61. Summary Statistics for Tritium (Onsite by Soil Group and Depth)

Tritium
Units: pCi/g

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	6	1	16.67	<7.06	<3.84	<2.10			
	B	6	0	0.00	<7.45	<6.36	<4.51			
	C	6	1	16.67	<7.45	<4.85	<2.21			
	D	6	0	0.00	<7.45	<7.45	<4.19			
	E	6	0	0.00	<7.45	<5.51	<3.57			
	All	30	2	6.67	<7.45	<5.86	<2.10			
2	A	5	0	0.00	<7.45	<6.99	<5.29			
	B	5	0	0.00	<7.45	<4.93	<3.70			
	C	5	0	0.00	<7.45	<5.30	<4.17			
	D	5	0	0.00	<7.45	<7.45	<5.28			
	E	4	0	0.00	<7.45	<7.45	<6.06			
	All	24	0	0.00	<7.45	<7.42	<3.70			
3	A	5	0	0.00	<7.45	<6.81	<5.01			
	B	5	0	0.00	<7.45	<7.45	<5.35			
	C	5	0	0.00	<7.45	<7.45	<3.80			
	D	5	0	0.00	<7.45	<7.45	<5.00			
	E	5	1	20.00	15.33	<7.45	<7.45			
	All	25	1	4.00	15.33	<7.45	<3.80			
4	A	5	0	0.00	<7.45	<7.45	<4.49			
	B	5	0	0.00	<7.45	<7.45	<6.05			
	C	5	0	0.00	<7.45	<7.45	<6.31			
	D	5	0	0.00	<7.45	<7.45	<4.53			
	E	5	0	0.00	<7.45	<7.45	<6.83			
	All	25	0	0.00	<7.45	<7.45	<4.49			
5	A	5	2	40.00	<6.66	<5.06	2.78			
	B	5	0	0.00	<7.45	<5.98	<2.69			
	C	5	0	0.00	<7.45	<5.52	<2.41			
	D	5	0	0.00	<7.45	<7.45	<3.32			
	E	5	0	0.00	<7.45	<7.45	<4.48			
	All	25	2	8.00	<7.45	<5.98	<2.41			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-62. Summary Statistics for Cation Exchange Capacity (Onsite by Soil Group and Depth)

Cation Exchange Capacity

Units: MEQ/100g

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100.00	58.20	25.35	9.60	27.50	23.97	15.01
	B	10	10	100.00	41.00	18.80	5.72	22.76	19.69	11.95
	C	10	10	100.00	42.70	16.35	6.21	20.00	17.57	10.83
	D	10	10	100.00	21.60	6.47	0.30	8.43	5.27	7.00
	E	10	10	100.00	12.00	2.58	0.40	3.60	2.33	3.59
	All	50	50	100.00	58.20	14.88	0.30	16.46	10.04	13.50
2	A	10	10	100.00	63.20	13.73	6.25	20.79	15.94	17.61
	B	10	10	100.00	40.10	13.15	4.73	16.52	13.34	11.28
	C	10	10	100.00	19.20	6.55	2.36	9.26	7.58	6.06
	D	10	10	100.00	26.60	6.34	0.28	8.01	3.75	8.82
	E	9	9	100.00	4.20	1.14	0.10	1.53	0.86	1.45
	All	49	49	100.00	63.20	7.00	0.10	11.42	5.75	12.22
3	A	10	10	100.00	33.85	8.42	1.93	13.08	8.77	10.97
	B	10	10	100.00	12.20	6.37	2.18	6.68	5.96	3.18
	C	10	10	100.00	9.60	4.33	0.32	4.65	3.09	2.89
	D	10	10	100.00	10.40	4.30	0.42	4.32	2.95	2.97
	E	10	10	100.00	19.20	4.54	0.32	6.42	2.99	6.43
	All	50	50	100.00	33.85	5.66	0.32	7.03	4.27	6.71
4	A	10	10	100.00	27.90	11.80	4.52	14.14	12.35	7.44
	B	10	10	100.00	10.60	4.70	0.14	4.62	2.23	3.76
	C	10	10	100.00	11.40	5.36	0.20	4.93	2.99	3.76
	D	10	10	100.00	12.10	6.47	0.75	5.33	3.39	4.06
	E	10	10	100.00	13.10	5.43	0.81	6.28	4.72	4.19
	All	50	50	100.00	27.90	6.20	0.14	7.06	4.21	5.89
5	A	10	10	100.00	194.00	33.90	14.40	52.11	37.07	54.12
	B	10	10	100.00	37.30	17.00	8.03	19.29	17.79	8.41
	C	10	10	100.00	31.40	15.80	3.05	15.81	13.25	8.98
	D	10	10	100.00	79.90	13.50	6.73	21.29	16.34	21.43
	E	10	10	100.00	29.35	11.65	3.29	14.50	11.86	9.21
	All	50	50	100.00	194.00	16.10	3.05	24.60	17.61	29.41

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-63. Summary Statistics for pH (Onsite by Soil Group and Depth)

pH

Units: pH

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100	4.70	4.48	4.13	4.43	NA	NA
	B	10	10	100	4.86	4.65	4.32	4.62	NA	NA
	C	10	10	100	4.90	4.69	4.42	4.68	NA	NA
	D	10	10	100	5.45	4.89	4.39	4.87	NA	NA
	E	10	10	100	5.81	5.08	4.35	5.12	NA	NA
	All	50	50	100	5.81	4.89	4.13	4.74	NA	NA
2	A	10	10	100	5.24	4.87	4.21	4.75	NA	NA
	B	10	10	100	6.05	4.66	4.26	4.75	NA	NA
	C	10	10	100	5.79	4.77	4.32	4.94	NA	NA
	D	10	10	100	5.92	5.16	4.31	5.21	NA	NA
	E	9	9	100	6.64	5.64	5.15	5.75	NA	NA
	All	49	49	100	6.64	4.99	4.21	5.07	NA	NA
3	A	10	10	100	5.37	4.90	4.35	4.83	NA	NA
	B	10	10	100	5.12	4.86	4.40	4.79	NA	NA
	C	10	10	100	6.86	4.87	4.45	5.04	NA	NA
	D	10	10	100	5.92	5.04	4.52	5.05	NA	NA
	E	10	10	100	8.25	5.03	4.65	5.37	NA	NA
	All	50	50	100	8.25	4.92	4.35	5.02	NA	NA
4	A	10	10	100	6.98	4.85	4.37	4.99	NA	NA
	B	10	10	100	7.62	4.89	4.72	5.15	NA	NA
	C	10	10	100	5.53	5.05	4.71	5.05	NA	NA
	D	10	10	100	5.39	4.99	4.56	4.98	NA	NA
	E	10	10	100	5.34	5.09	4.00	4.95	NA	NA
	All	50	50	100	7.62	4.97	4.00	5.02	NA	NA
5	A	10	10	100	6.37	5.06	4.61	5.13	NA	NA
	B	10	10	100	6.98	5.05	4.65	5.18	NA	NA
	C	10	10	100	5.64	4.99	4.27	5.01	NA	NA
	D	10	10	100	5.92	5.09	4.15	5.07	NA	NA
	E	10	10	100	6.31	5.57	4.56	5.54	NA	NA
	All	50	50	100	6.98	5.09	4.15	5.18	NA	NA

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table D-64. Summary Statistics for Percent Solids (Onsite by Soil Group and Depth)

Percent Solids
Units: %

Soil Group	Depth	No. of Samples	No. Above Detect	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	10	10	100	88.60	37.35	25.40	39.61	NA	NA
	B	10	10	100	81.90	56.00	34.40	57.10	NA	NA
	C	10	10	100	88.50	70.60	42.40	66.94	NA	NA
	D	10	10	100	87.00	84.65	54.20	78.46	NA	NA
	E	10	10	100	89.37	88.45	63.10	82.77	NA	NA
	All	50	50	100	88.87	69.45	25.40	64.97	NA	NA
2	A	10	10	100	78.80	68.35	43.10	65.56	NA	NA
	B	10	10	100	87.40	69.55	34.20	67.43	NA	NA
	C	10	10	100	87.70	81.00	57.90	76.84	NA	NA
	D	10	10	100	91.30	82.40	57.60	81.22	NA	NA
	E	9	9	100	93.55	88.30	67.40	86.25	NA	NA
	All	49	49	100	93.55	78.70	34.20	75.24	NA	NA
3	A	10	10	100	81.60	66.81	40.30	66.53	NA	NA
	B	10	10	100	89.30	77.45	57.37	76.28	NA	NA
	C	10	10	100	90.40	81.00	61.30	79.59	NA	NA
	D	10	10	100	87.70	83.13	73.70	82.68	NA	NA
	E	10	10	100	86.90	85.15	74.80	83.18	NA	NA
	All	50	50	100	90.40	81.10	40.30	77.65	NA	NA
4	A	10	10	100	82.90	70.70	53.70	71.14	NA	NA
	B	10	10	100	87.20	85.00	80.60	84.61	NA	NA
	C	10	10	100	90.45	80.75	77.05	82.24	NA	NA
	D	10	10	100	90.60	81.40	74.10	81.06	NA	NA
	E	10	10	100	85.60	82.02	60.20	79.43	NA	NA
	All	50	50	100	90.60	81.40	53.70	79.69	NA	NA
5	A	10	10	100	63.30	37.95	21.50	38.57	NA	NA
	B	10	10	100	75.35	54.58	19.40	51.82	NA	NA
	C	10	10	100	84.90	71.33	47.00	68.38	NA	NA
	D	10	10	100	85.65	74.68	47.30	72.79	NA	NA
	E	10	10	100	87.70	77.50	68.70	78.45	NA	NA
	All	50	50	100	87.70	69.35	19.40	62.00	NA	NA

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

APPENDIX E

Offsite Analytical Results

Offsite Analytical Results

Metals

E-1	Summary Statistics for Aluminum (by Soil Group and Depth).....	1
E-2	Summary Statistics for Antimony (by Soil Group and Depth).....	2
E-3	Summary Statistics for Arsenic (by Soil Group and Depth).....	3
E-4	Summary Statistics for Barium (by Soil Group and Depth).....	4
E-5	Summary Statistics for Beryllium (by Soil Group and Depth).....	5
E-6	Summary Statistics for Cadmium (by Soil Group and Depth).....	6
E-7	Summary Statistics for Calcium (by Soil Group and Depth).....	7
E-8	Summary Statistics for Chromium (by Soil Group and Depth).....	8
E-9	Summary Statistics for Cobalt (by Soil Group and Depth).....	9
E-10	Summary Statistics for Lead (by Soil Group and Depth).....	10
E-11	Summary Statistics for Copper (by Soil Group and Depth).....	11
E-12	Summary Statistics for Iron (by Soil Group and Depth).....	12
E-13	Summary Statistics for Lithium (by Soil Group and Depth).....	13
E-14	Summary Statistics for Magnesium (by Soil Group and Depth).....	14
E-15	Summary Statistics for Manganese (by Soil Group and Depth).....	15
E-16	Summary Statistics for Mercury (by Soil Group and Depth).....	16
E-17	Summary Statistics for Nickel (by Soil Group and Depth).....	17
E-18	Summary Statistics for Potassium (by Soil Group and Depth).....	18
E-19	Summary Statistics for Selenium (by Soil Group and Depth).....	19
E-20	Summary Statistics for Silver (by Soil Group and Depth).....	20
E-21	Summary Statistics for Sodium (by Soil Group and Depth).....	21
E-22	Summary Statistics for Sulfide (by Soil Group and Depth).....	22
E-23	Summary Statistics for Thallium (by Soil Group and Depth).....	23
E-24	Summary Statistics for Tin (by Soil Group and Depth).....	24
E-25	Summary Statistics for Vanadium (by Soil Group and Depth).....	25
E-26	Summary Statistics for Zinc (by Soil Group and Depth).....	26

Other Inorganic Parameters

E-27	Summary Statistics for Fluoride (by Soil Group and Depth).....	27
E-28	Summary Statistics for Nitrate as Nitrogen (by Soil Group and Depth).....	28
E-29	Summary Statistics for Nitrate + Nitrite (by Soil Group and Depth).....	29

Other Inorganic Parameters (Continued)

E-30 Summary Statistics for Phosphates as Phosphorus (by Soil Group and Depth).....30
E-31 Summary Statistics for Silicon (by Soil Group and Depth).....31
E-32 Summary Statistics for Sulfate (by Soil Group and Depth).....32

Organics

E-34 Summary Statistics for Total Organic Halogens (by Soil Group and Depth).....34
E-35 Summary Statistics for Acetone (by Soil Group and Depth).....35
E-36 Summary Statistics for Carbon Disulfide (by Soil Group and Depth)36
E-37 Summary Statistics for Dichloromethane (by Soil Group and Depth)37
E-38 Summary Statistics for Ethyl Methacrylate (by Soil Group and Depth)38
E-39 Summary Statistics for Methyl Ethyl Ketone (by Soil Group and Depth)39
E-40 Summary Statistics for Methyl Methacrylate (by Soil Group and Depth)40
E-41 Summary Statistics for Pentachloroethane (by Soil Group and Depth).....41
E-42 Summary Statistics for Tetrachloroethylene (by Soil Group and Depth).....42
E-43 Summary Statistics for 1,1,1-Trichloroethane (by Soil Group and Depth)43
E-44 Summary Statistics for 1,1,2-Trichloroethane (by Soil Group and Depth)44
E-45 Summary Statistics for Toluene (by Soil Group and Depth).....45
E-46 Summary Statistics for Trichlorofluoromethane (by Soil Group and Depth).....46
E-47 Summary Statistics for Xylenes (by Soil Group and Depth).....47
E-48 Summary Statistics for Benzo(a)pyrene (by Soil Group and Depth).....48
E-49 Summary Statistics for Bis(2-ethylhexyl)phthalate (by Soil Group and Depth)49
E-50 Summary Statistics for Butylbenzyl Phthalate (by Soil Group and Depth).....50
E-51 Summary Statistics for Di-n-butyl Phthalate (by Soil Group and Depth)51
E-52 Summary Statistics for Fluoranthene (by Soil Group and Depth).....52
E-53 Summary Statistics for Kepone (by Soil Group and Depth).....53
E-54 Summary Statistics for m,p-Cresol (by Soil Group and Depth).....54
E-55 Summary Statistics for p-Cresol (by Soil Group and Depth)55
E-56 Summary Statistics for Phenol (by Soil Group and Depth).....56
E-57 Summary Statistics for Pyridine (by Soil Group and Depth)57
E-58 Summary Statistics for 2,4-Dichlorophenoxyacetic Acid (by Soil
Group and Depth)58
E-59 Summary Statistics for 2,4,5-T (by Soil Group and Depth)59

Organics (Continued)

E-60 Summary Statistics for Hexachlorodibenzo-p-dioxin Isomers (by Soil
Group and Depth)60

E-61 Summary Statistics for Pentachlorodibenzo-p-furan Isomers (by Soil
Group and Depth)61

Radiological Parameters

E-62 Summary Statistics for Tritium (by Soil Group and Depth).....62

Agricultural Parameters

E-63 Summary Statistics for Cation Exchange Capacity (by Soil Group and Depth)63

E-64 Summary Statistics for pH (by Soil Group and Depth)64

E-65 Summary Statistics for Percent Solids (by Soil Group and Depth)

Table E-1. Summary Statistics for Aluminum (Offsite by Soil Group and Depth)

Aluminum
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	10,550,000.00	4,650,000.00	2,290,000.00	5,334,000.00	4,690,563.57	3,111,282.69
	B	5	5	100	5,650,000.00	3,140,000.00	1,850,000.00	3,263,000.00	2,981,532.53	1,503,710.41
	C	5	5	100	6,600,000.00	2,920,000.00	1,200,000.00	3,664,000.00	3,157,463.53	2,053,419.10
	D	5	5	100	3,930,000.00	2,900,000.00	2,025,000.00	3,071,000.00	2,978,924.77	820,688.74
	E	5	5	100	4,080,000.00	1,820,000.00	176,000.00	2,237,200.00	1,502,911.61	1,526,151.76
		25	25	100	10,550,000.00	3,140,000.00	176,000.00	3,513,840.00	2,878,718.37	2,069,254.47
2	A	5	5	100	8,130,000.00	6,400,000.00	1,020,000.00	4,662,000.00	3,562,440.06	3,331,744.29
	B	5	5	100	7,790,000.00	4,890,000.00	836,000.00	4,179,200.00	2,945,293.80	3,102,883.05
	C	5	5	100	7,950,000.00	5,160,000.00	1,340,000.00	4,966,000.00	4,109,400.85	2,890,671.20
	D	5	5	100	7,420,000.00	2,660,000.00	1,180,000.00	3,618,000.00	2,887,398.62	2,621,511.01
	E	5	5	100	9,380,000.00	3,840,000.00	294,000.00	3,906,800.00	2,314,442.57	3,542,562.80
		25	25	100	9,380,000.00	4,680,000.00	294,000.00	4,306,400.00	3,107,476.43	2,893,911.77
3	A	5	5	100	4,480,000.00	2,150,000.00	1,090,000.00	2,456,000.00	2,211,367.55	1,268,672.53
	B	5	5	100	3,235,000.00	1,460,000.00	384,000.00	1,873,800.00	1,488,527.16	1,175,877.20
	C	5	5	100	4,480,000.00	4,180,000.00	254,000.00	2,798,800.00	1,670,136.67	2,145,513.27
	D	5	5	100	5,715,000.00	848,000.00	511,000.00	2,212,800.00	1,419,730.90	2,245,525.04
	E	5	5	100	4,655,000.00	2,040,000.00	833,000.00	2,263,600.00	1,859,083.96	1,550,676.40
		25	25	100	5,715,000.00	2,040,000.00	254,000.00	2,321,000.00	1,707,398.71	1,613,449.15
4	A	5	5	100	3,740,000.00	2,700,000.00	920,000.00	2,489,000.00	2,230,399.93	1,126,734.22
	B	5	5	100	13,500,000.00	3,980,000.00	1,790,000.00	5,614,000.00	4,344,620.72	4,688,835.68
	C	5	5	100	14,800,000.00	1,980,000.00	1,450,000.00	4,434,000.00	2,767,712.45	5,801,480.85
	D	5	5	100	9,300,000.00	2,230,000.00	1,031,000.00	3,602,200.00	2,715,885.31	3,296,359.23
	E	5	5	100	7,950,000.00	4,200,000.00	471,000.00	4,419,200.00	3,166,151.19	2,799,268.78
		25	25	100	14,800,000.00	2,740,000.00	471,000.00	4,111,680.00	2,968,791.73	3,703,576.77
5	A	5	5	100	29,600,000.00	20,100,000.00	15,300,000.00	20,300,000.00	19,707,359.42	5,764,980.49
	B	5	5	100	24,400,000.00	13,900,000.00	11,600,000.00	15,720,000.00	15,144,590.29	5,153,348.43
	C	5	5	100	18,500,000.00	12,400,000.00	6,220,000.00	12,482,000.00	11,577,795.69	5,091,386.84
	D	5	5	100	23,200,000.00	8,210,000.00	3,690,000.00	10,460,000.00	8,229,672.11	8,071,898.79
	E	5	5	100	10,600,000.00	5,460,000.00	1,950,000.00	6,144,000.00	4,951,069.24	4,063,635.07
		25	25	100	29,600,000.00	12,500,000.00	1,950,000.00	13,021,200.00	10,708,254.29	7,192,547.25
ALL		125	125	100	29,600,000.00	3,535,000.00	176,000.00	5,454,824.00	3,445,466.85	5,525,633.93

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Sample collection included the use of an aluminum core tube - these results may be elevated due to contamination by the sample tool.

Table E-2. Summary Statistics for Antimony (Offsite by Soil Group and Depth)

Antimony

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<2,330.00	<2330.00	<2330.00			
	B	5	0	0	<2,330.00	<2330.00	<2020.00			
	C	5	0	0	<2,330.00	<2115.00	<1890.00			
	D	5	0	0	<2,330.00	<2225.00	<1690.00			
	E	5	0	0	<2,330.00	<1990.00	<1820.00			
		25	0	0	<2,330.00	<2330.00	<1690.00			
2	A	5	0	0	<2,330.00	<2210.00	<1880.00			
	B	5	0	0	<2,330.00	<2090.00	<1830.00			
	C	5	0	0	<2,330.00	<2120.00	<1630.00			
	D	5	2	40	6,460.00	<2080.00	<1760.00			
	E	5	1	20	3,620.00	<2110.00	<1740.00			
		25	3	12	6,460.00	<2110.00	<1630.00			
3	A	5	0	0	<2,330.00	<2330.00	<1820.00			
	B	5	0	0	<2,330.00	<1900.00	<1700.00			
	C	5	0	0	<1,980.00	<1910.00	<1670.00			
	D	5	1	20	<2,095.00	<1760.00	<1720.00			
	E	5	0	0	<2,025.00	<1970.00	<1770.00			
		25	1	4	<2,330.00	<1920.00	<1670.00			
4	A	5	2	40	5,260.00	<2330.00	<1870.00			
	B	5	1	20	4,020.00	<2330.00	<1830.00			
	C	5	1	20	<2,330.00	<2060.00	1,780.00			
	D	5	0	0	<2,330.00	<2230.00	<1640.00			
	E	5	1	20	<2,330.00	<2020.00	<1730.00			
		25	5	20	5,260.00	<2230.00	<1640.00			
5	A	5	0	0	<2,330.00	<2330.00	<2200.00			
	B	5	0	0	<2,330.00	<2330.00	<2080.00			
	C	5	0	0	<2,330.00	<2330.00	<2110.00			
	D	5	0	0	<2,330.00	<2330.00	<2050.00			
	E	5	0	0	<2,330.00	<2330.00	<2260.00			
		25	0	0	<2,330.00	<2330.00	<2050.00			
ALL		125	9	7.2	6,460.00	<2260.00	<1630.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-3. Summary Statistics for Arsenic (Offsite by Soil Group and Depth)

Arsenic

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	660.00	<221.00	<221.00			
	B	5	1	20	370.00	<221.00	<221.00			
	C	5	0	0	<221.00	<220.50	<208.00			
	D	5	0	0	<221.00	<221.00	<215.50			
	E	5	2	40	300.00	<219.00	<204.50			
		25	5	20	660.00	<221.00	<204.50			
2	A	5	2	40	800.00	<221.00	<197.00			
	B	5	1	20	<221.00	<214.00	62.00			
	C	5	1	20	390.00	<221.00	<173.00			
	D	5	1	20	3,760.00	<206.00	<22.00			
	E	5	2	40	2,960.00	<221.00	<212.00			
		25	7	28	3,760.00	<221.00	<22.00			
3	A	5	3	60	636.00	410.00	<221.00	353.40	272.99	235.88
	B	5	2	40	490.00	<221.00	<217.00			
	C	5	1	20	<221.00	<220.00	<210.00			
	D	5	1	20	380.00	<221.00	<201.00			
	E	5	2	40	700.00	<221.00	<210.00			
		25	9	36	700.00	<221.00	<201.00			
4	A	5	4	80	446.00	320.00	<203.00	275.55	239.89	135.43
	B	5	2	40	240.00	<202.00	<49.00			
	C	5	1	20	650.00	<221.00	<198.00			
	D	5	1	20	280.00	<218.00	<168.00			
	E	5	3	60	2,700.00	395.25	<214.00	751.85	328.75	1,100.52
		25	11	44	2,700.00	<221.00	<49.00			
5	A	5	4	80	5,990.00	1,400.00	<221.00	2,180.10	1,158.30	2,299.35
	B	5	5	100	3,230.00	950.00	380.00	1,288.00	990.10	1,127.77
	C	5	5	100	1,300.00	960.00	370.00	854.00	749.56	437.81
	D	5	5	100	1,200.00	620.00	180.00	625.40	529.95	369.81
	E	5	4	80	1,100.00	520.00	<200.00	539.40	396.00	403.01
		25	23	92	5,990.00	750.00	180.00	1,097.38	709.98	1,245.14
ALL		125	55	44	5,990.00	<221.00	<22.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-4. Summary Statistics for Barium (Offsite by Soil Group and Depth)

Barium

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	227,500.00	37,900.00	27,200.00	78,400.00	54,808.29	84,772.34
	B	5	5	100	37,700.00	7,700.00	4,000.00	17,710.00	12,053.56	15,780.30
	C	5	5	100	43,800.00	8,600.00	3,000.00	17,070.00	10,602.23	17,320.78
	D	5	5	100	22,100.00	11,200.00	5,200.00	12,177.00	10,970.02	6,138.80
	E	5	5	100	14,400.00	10,700.00	280.00	8,956.67	5,254.40	5,269.18
		25	25	100	227,500.00	11,200.00	280.00	26,862.73	13,219.58	44,750.98
2	A	5	5	100	26,500.00	18,500.00	3,110.00	16,532.00	13,275.57	9,221.44
	B	5	5	100	13,000.00	11,900.00	2,040.00	10,148.00	8,509.21	4,571.16
	C	5	5	100	15,000.00	11,900.00	10,000.00	12,260.00	12,126.07	2,041.57
	D	5	5	100	16,900.00	6,360.00	1,500.00	8,732.00	6,236.17	6,842.52
	E	5	4	80	13,300.00	3,860.00	<1460.00	6,858.00	4,384.39	5,908.93
		25	24	96	26,500.00	11,900.00	<1460.00	10,906.00	8,216.71	6,592.92
3	A	5	5	100	57,600.00	17,400.00	7,200.00	23,920.00	18,083.38	20,450.60
	B	5	5	100	24,000.00	4,800.00	3,700.00	9,400.00	7,186.33	8,500.88
	C	5	5	100	22,400.00	10,600.00	1,200.00	9,680.00	5,998.66	8,572.46
	D	5	5	100	17,950.00	2,700.00	850.00	6,260.00	3,298.12	7,265.97
	E	5	5	100	20,450.00	5,800.00	2,100.00	7,890.00	5,516.29	7,523.99
		25	25	100	57,600.00	8,700.00	850.00	11,430.00	6,766.30	12,426.04
4	A	5	5	100	11,400.00	6,300.00	3,700.00	7,079.00	6,609.85	2,860.02
	B	5	5	100	24,000.00	9,000.00	6,600.00	11,396.00	10,097.58	7,146.47
	C	5	5	100	40,200.00	6,500.00	3,840.00	12,568.00	8,218.17	15,488.00
	D	5	5	100	21,200.00	5,300.00	2,670.00	8,084.00	6,167.60	7,499.44
	E	5	5	100	12,100.00	7,790.00	1,100.00	7,556.00	5,885.99	4,069.17
		25	25	100	40,200.00	7,000.00	1,100.00	9,336.60	7,241.42	8,191.24
5	A	5	5	100	206,000.00	158,000.00	71,300.00	151,060.00	142,527.22	50,249.56
	B	5	5	100	199,000.00	139,000.00	40,900.00	123,700.00	107,578.34	63,290.05
	C	5	5	100	167,000.00	97,300.00	14,900.00	100,440.00	74,299.18	67,383.85
	D	5	5	100	218,000.00	138,000.00	11,600.00	118,900.00	72,876.28	94,498.04
	E	5	5	100	86,400.00	56,400.00	5,620.00	49,164.00	33,887.68	34,695.35
		25	25	100	218,000.00	97,300.00	5,620.00	108,652.80	77,597.36	68,769.03
ALL		125	124	99.2	227,500.00	11,400.00	280.00	33,437.63	13,279.68	53,109.65

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-5. Summary Statistics for Beryllium (Offsite by Soil Group and Depth)

Beryllium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	4	80	4,655.00	500.00	<104.00	1,327.40	557.14	1,887.74
	B	5	3	60	915.00	320.00	<104.00	347.80	199.00	353.63
	C	5	3	60	530.00	170.00	<104.00	214.00	143.80	198.11
	D	5	3	60	320.00	146.90	<104.00	166.18	116.10	121.36
	E	5	2	40	220.00	<104.00	<87.57			
		25	15	60	4,655.00	180.00	<87.57	433.99	174.70	915.94
2	A	5	4	80	490.00	290.00	<61.30	295.23	208.98	192.65
	B	5	2	40	390.00	<104.00	<82.50			
	C	5	2	40	500.00	<104.00	<52.10			
	D	5	1	20	130.00	<104.00	<54.80			
	E	5	2	40	120.00	<104.00	67.30			
		25	11	44	500.00	<104.00	<52.10			
3	A	5	2	40	269.33	<104.00	<104.00			
	B	5	2	40	162.80	<104.00	<104.00			
	C	5	2	40	113.00	<104.00	<104.00			
	D	5	2	40	115.00	<104.00	<101.00			
	E	5	2	40	370.00	<104.00	<84.35			
		25	10	40	370.00	<104.00	<84.35			
4	A	4	1	25	81.00	<100.70	<68.10			
	B	5	3	60	125.00	80.70	<66.90	81.03	72.37	39.14
	C	5	2	40	186.00	<104.00	<53.60			
	D	5	3	60	125.00	83.10	<52.40	79.06	68.80	40.46
	E	5	4	80	1,300.00	210.00	<55.70	423.17	205.09	517.71
		24	13	54.17	1,300.00	80.85	<52.40	148.20	82.55	262.33
5	A	5	5	100	2,000.00	1,700.00	398.00	1,479.60	1,295.82	630.94
	B	5	5	100	1,700.00	1,400.00	277.00	1,255.40	1,061.05	586.64
	C	5	4	80	1,900.00	1,500.00	<67.40	1,188.74	667.24	765.13
	D	5	4	80	4,600.00	680.00	<65.30	1,662.53	638.61	1,918.56
	E	5	4	80	1,600.00	840.00	<72.10	715.21	400.44	611.20
		25	22	88	4,600.00	1,400.00	<65.30	1,260.30	748.28	1,001.85
ALL		124	71	57.26	4,655.00	110.50	<52.10	421.48	148.69	756.77

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-6. Summary Statistics for Cadmium (Offsite by Soil Group and Depth)

Cadmium

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	1	20	51.20	<23.00	<23.00			
	B	5	0	0	<23.00	<23.00	<23.00			
	C	5	0	0	<23.00	<23.00	<22.25			
	D	5	0	0	<23.00	<23.00	<22.00			
	E	5	0	0	<23.00	<23.00	<20.45			
		25	1	4	51.20	<23.00	<20.45			
2	A	5	1	20	43.30	<23.00	<19.70			
	B	5	0	0	<23.00	<22.60	<20.70			
	C	5	1	20	240.00	<22.90	<17.30			
	D	5	0	0	<23.00	<20.70	<20.30			
	E	5	0	0	<22.10	<21.60	<21.20			
		25	2	8	240.00	<22.10	<17.30			
3	A	5	1	20	18.75	<23.00	<22.40			
	B	5	1	20	70.75	<23.00	<21.80			
	C	5	0	0	<23.00	<23.00	<21.40			
	D	5	0	0	<23.00	<22.20	<20.55			
	E	5	0	0	<23.00	<23.00	<21.45			
		25	2	8	70.75	<23.00	<20.55			
4	A	5	1	20	110.00	<23.00	<20.30			
	B	5	1	20	49.00	<20.20	<18.35			
	C	5	0	0	<23.00	<22.20	<19.80			
	D	5	1	20	80.00	<21.80	<16.80			
	E	5	2	40	480.00	<21.60	<20.40			
		25	5	20	480.00	<21.80	<16.80			
5	A	5	3	60	93.00	33.00	<23.00	48.40	32.76	41.65
	B	5	3	60	230.00	24.00	<22.20	77.32	37.83	94.79
	C	5	2	40	270.00	<23.00	<16.90			
	D	5	2	40	420.00	<23.00	<17.60			
	E	5	2	40	100.00	<23.00	<20.00			
		25	12	48	420.00	<23.00	<16.90			
ALL		125	22	17.6	480.00	<23.00	<16.80			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-7. Summary Statistics for Calcium (Offsite by Soil Group and Depth)

Calcium

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	412,500.00	134,000.00	82,900.00	189,240.00	158,003.20	135,287.85
	B	5	5	100	100,000.00	73,700.00	33,800.00	73,570.00	68,451.60	28,078.14
	C	5	5	100	111,000.00	83,600.00	10,100.00	68,920.00	50,564.59	39,311.54
	D	5	5	100	125,000.00	62,850.00	37,000.00	70,610.00	61,192.85	32,904.72
	E	5	5	100	89,000.00	54,000.00	27,800.00	57,153.33	52,646.03	22,839.97
			25	25	100	412,500.00	73,700.00	10,100.00	91,999.67	70,663.06
2	A	5	5	100	167,000.00	162,000.00	35,400.00	115,500.00	94,914.43	67,066.61
	B	5	5	100	71,600.00	27,600.00	9,180.00	39,836.00	30,504.59	29,028.86
	C	5	5	100	131,000.00	44,500.00	7,860.00	56,472.00	40,601.50	45,394.37
	D	5	5	100	127,000.00	17,400.00	12,800.00	43,820.00	28,798.47	48,542.89
	E	5	5	100	125,000.00	29,500.00	14,700.00	48,340.00	36,584.33	44,344.71
			25	25	100	167,000.00	44,500.00	7,860.00	60,793.60	41,550.94
3	A	5	5	100	890,000.00	189,500.00	37,100.00	289,920.00	169,309.53	343,381.58
	B	5	5	100	128,000.00	55,800.00	37,600.00	66,120.00	59,235.26	37,063.96
	C	5	5	100	65,850.00	32,200.00	30,100.00	42,450.00	40,116.47	16,300.38
	D	5	5	100	83,900.00	33,200.00	24,800.00	43,920.00	39,455.72	24,297.26
	E	5	5	100	76,300.00	41,500.00	32,650.00	47,870.00	45,314.10	18,358.16
			25	25	100	890,000.00	49,600.00	24,800.00	98,056.00	59,072.53
4	A	5	5	100	352,000.00	96,500.00	10,800.00	127,620.00	69,029.90	137,138.62
	B	5	5	100	779,000.00	25,100.00	6,300.00	278,680.00	66,468.29	366,624.80
	C	5	5	100	824,000.00	36,600.00	4,600.00	324,020.00	79,830.86	411,630.39
	D	5	5	100	12,500,000.00	29,400.00	9,330.00	2,669,446.00	138,021.73	5,505,580.89
	E	5	5	100	120,500,000.00	40,000.00	13,700.00	47,915,220.00	602,702.41	65,578,027.48
			25	25	100	120,500,000.00	36,600.00	4,600.00	10,262,997.20	124,961.03
5	A	5	5	100	1,020,000.00	472,000.00	128,000.00	494,000.00	405,642.70	326,128.81
	B	5	5	100	483,000.00	187,000.00	30,400.00	254,280.00	174,460.26	196,348.90
	C	5	5	100	223,000.00	149,000.00	24,000.00	135,200.00	109,182.04	71,761.41
	D	5	5	100	223,000.00	154,000.00	21,800.00	137,960.00	108,910.94	75,000.72
	E	5	5	100	321,000.00	97,800.00	16,800.00	153,440.00	100,957.65	127,823.97
			25	25	100	1,020,000.00	154,000.00	16,800.00	234,976.00	153,405.32
ALL		125	125	100	120,500,000.00	67,500.00	4,600.00	2,149,744.29	80,233.32	15,098,265.98

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-8. Summary Statistics for Chromium (Offsite by Soil Group and Depth)

Chromium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	13,250.00	6,500.00	4,400.00	7,310.00	6,713.61	3,495.43
	B	5	5	100	7,500.00	4,500.00	2,500.00	4,660.00	4,269.30	2,085.19
	C	5	5	100	15,200.00	7,220.00	4,300.00	8,304.00	7,339.92	4,593.37
	D	5	5	100	14,300.00	5,900.00	3,100.00	7,306.00	6,426.71	4,227.25
	E	5	5	100	10,200.00	4,600.00	620.00	5,719.33	3,986.59	3,952.35
		25	25	100	15,200.00	5,900.00	620.00	6,659.87	5,575.95	3,689.85
2	A	5	5	100	15,600.00	5,585.00	2,100.00	6,487.00	4,874.28	5,526.73
	B	5	5	100	26,300.00	6,100.00	2,290.00	9,092.00	6,242.93	9,813.14
	C	5	5	100	31,000.00	6,940.00	3,450.00	10,538.00	7,329.55	11,581.33
	D	5	5	100	14,700.00	4,300.00	4,100.00	6,338.00	5,443.11	4,675.87
	E	5	5	100	13,700.00	6,800.00	1,000.00	6,370.00	4,631.66	4,832.39
		25	25	100	31,000.00	5,585.00	1,000.00	7,765.00	5,623.31	7,360.00
3	A	5	5	100	28,600.00	2,400.00	1,800.00	7,813.00	4,088.86	11,648.57
	B	5	5	100	10,600.00	2,900.00	2,200.00	4,400.00	3,642.92	3,517.81
	C	5	5	100	7,400.00	4,670.00	1,100.00	4,034.00	3,095.77	2,688.55
	D	5	5	100	13,900.00	3,500.00	950.00	5,135.00	3,387.74	5,203.05
	E	5	5	100	8,700.00	5,500.00	2,400.00	5,520.00	5,016.13	2,498.40
		25	25	100	28,600.00	3,800.00	950.00	5,380.40	3,787.86	5,767.30
4	A	5	5	100	4,510.00	2,600.00	1,800.00	3,082.00	2,922.97	1,097.32
	B	5	5	100	9,950.00	3,600.00	2,350.00	5,434.00	4,686.10	3,226.15
	C	5	5	100	10,200.00	2,600.00	2,000.00	4,686.00	3,835.93	3,468.71
	D	5	5	100	21,000.00	5,940.00	1,350.00	8,350.00	5,785.78	7,598.31
	E	5	5	100	100,000.00	17,700.00	860.00	30,254.00	10,587.27	40,497.65
		25	25	100	100,000.00	4,360.00	860.00	10,361.20	5,029.56	19,824.18
5	A	5	5	100	47,500.00	36,400.00	21,100.00	34,700.00	33,534.67	9,659.45
	B	5	5	100	36,300.00	28,000.00	21,400.00	27,340.00	26,807.95	6,126.83
	C	5	5	100	34,200.00	23,800.00	12,900.00	22,720.00	21,136.86	9,235.64
	D	5	5	100	42,100.00	13,400.00	6,500.00	19,568.00	15,478.21	14,829.43
	E	5	5	100	27,900.00	13,500.00	3,800.00	12,888.00	10,048.20	9,638.97
		25	25	100	47,500.00	23,800.00	3,800.00	23,443.20	19,684.36	12,007.14
ALL		125	125	100	100,000.00	5,900.00	620.00	10,721.93	6,517.35	12,923.66

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-9. Summary Statistics for Cobalt (Offsite by Soil Group and Depth)

Cobalt

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	4	80	2,605.00	1,600.00	<336.00	1,614.60	1,157.80	973.34
	B	5	4	80	920.00	640.00	<336.00	568.70	469.06	304.59
	C	5	5	100	1,400.00	1,000.00	200.50	946.10	790.72	455.40
	D	5	3	60	1,100.00	489.00	<336.00	527.00	393.04	394.03
	E	5	4	80	1,300.00	960.00	<391.00	818.43	662.28	395.70
		25	20	80	2,605.00	920.00	200.50	894.97	645.17	648.03
2	A	5	2	40	1,300.00	<336.00	<220.00			
	B	5	2	40	1,000.00	<336.00	<229.00			
	C	5	3	60	2,600.00	1,000.00	<191.00	1,044.70	536.62	1,035.44
	D	5	3	60	1,300.00	391.00	<201.00	587.90	384.56	527.61
	E	5	2	40	2,300.00	<336.00	<247.00			
		25	12	48	2,600.00	<336.00	<191.00			
3	A	5	4	80	1,700.00	1,400.00	<336.00	1,206.70	910.63	599.02
	B	5	5	100	1,304.50	890.00	320.00	918.90	759.99	383.65
	C	5	5	100	980.00	790.00	350.00	720.50	671.09	233.03
	D	5	5	100	840.00	664.25	410.00	650.85	567.91	172.41
	E	5	5	100	3,500.00	960.00	420.00	1,428.80	1,094.77	1,209.04
		25	24	96	3,500.00	864.00	320.00	985.15	780.02	657.26
4	A	5	2	40	482.50	<336.00	<336.00			
	B	5	2	40	834.00	<336.00	<245.00			
	C	5	1	20	925.00	<336.00	<197.00			
	D	5	0	0	<336.00	<326.00	<192.00			
	E	5	1	20	1,134.00	<325.00	<201.00			
		25	6	24	1,134.00	<336.00	<192.00			
5	A	5	5	100	26,500.00	9,900.00	6,940.00	13,308.00	11,749.76	7,986.70
	B	5	5	100	10,100.00	6,400.00	1,550.00	6,370.00	5,302.81	3,508.13
	C	5	5	100	6,300.00	4,500.00	877.00	3,995.40	3,348.04	1,996.44
	D	5	5	100	13,700.00	3,300.00	468.00	5,273.60	3,133.59	5,253.45
	E	5	5	100	7,600.00	2,300.00	588.00	3,697.60	2,619.51	2,959.50
		25	25	100	26,500.00	6,000.00	468.00	6,528.92	4,433.20	5,685.18
ALL		125	87	69.6	26,500.00	834.00	<191.00	1,876.41	693.71	3,471.88

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-10. Summary Statistics for Copper (Offsite by Soil Group and Depth)

Copper

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	4,680.00	3,500.00	2,000.00	3,232.00	3,078.37	1,029.14
	B	5	5	100	2,300.00	1,800.00	1,100.00	1,700.00	1,648.82	441.59
	C	5	5	100	6,100.00	1,800.00	1,037.50	2,627.50	2,135.42	2,020.37
	D	5	5	100	5,600.00	2,700.00	900.00	2,618.00	2,075.15	1,885.37
	E	5	5	100	4,400.00	1,200.00	590.00	2,102.87	1,477.58	1,769.36
			25	25	100	6,100.00	2,000.00	590.00	2,456.07	2,015.19
2	A	5	4	80	2,400.00	1,500.00	<214.00	1,245.40	831.34	877.97
	B	5	4	80	1,900.00	1,100.00	<219.00	1,119.90	777.56	754.52
	C	5	5	100	8,700.00	1,700.00	712.00	3,342.40	2,259.29	3,294.27
	D	5	5	100	2,700.00	2,000.00	1,600.00	2,058.00	2,013.65	482.10
	E	5	5	100	4,600.00	2,080.00	1,200.00	2,460.00	2,221.85	1,301.23
			25	23	92	8,700.00	1,700.00	<214.00	2,045.14	1,455.58
3	A	5	5	100	4,870.00	1,600.00	990.00	2,452.00	2,028.24	1,636.73
	B	5	5	100	2,265.00	1,200.00	450.00	1,283.00	1,122.44	654.27
	C	5	5	100	3,200.00	2,000.00	420.00	1,751.00	1,399.53	1,108.89
	D	5	5	100	5,600.00	1,100.00	930.00	2,262.00	1,724.90	2,002.13
	E	5	5	100	5,100.00	1,785.00	880.00	2,413.00	2,008.98	1,654.37
			25	25	100	5,600.00	1,500.00	420.00	2,032.20	1,616.59
4	A	5	4	80	1,200.00	942.00	410.00	761.40	643.32	411.38
	B	5	3	60	1,100.00	660.00	<234.00	560.40	426.74	390.98
	C	5	3	60	1,840.00	393.00	<340.00	767.20	509.48	728.06
	D	5	4	80	3,400.00	980.00	<490.00	1,340.80	942.71	1,233.88
	E	5	5	100	8,400.00	1,640.00	820.00	3,158.00	2,075.37	3,105.00
			25	19	76	8,400.00	942.00	<234.00	1,317.56	771.68
5	A	5	5	100	27,200.00	18,500.00	10,400.00	19,400.00	18,436.12	6,467.23
	B	5	5	100	15,300.00	11,900.00	7,800.00	11,340.00	11,036.91	2,907.40
	C	5	5	100	21,000.00	6,500.00	4,170.00	11,054.00	9,032.05	7,672.10
	D	5	5	100	26,600.00	7,600.00	2,320.00	11,884.00	8,026.70	10,569.83
	E	5	5	100	19,500.00	8,100.00	1,590.00	8,498.00	6,076.96	7,039.14
			25	25	100	27,200.00	10,400.00	1,590.00	12,435.20	9,783.75
ALL		125	117	93.6	27,200.00	1,800.00	<214.00	4,057.23	2,045.40	5,591.89

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-11. Summary Statistics for Iron (Offsite by Soil Group and Depth)

Iron

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	19,400.00	920,000.00	184,000.00	981,000.00	735,326.28	664,904.50
	B	5	5	100	635,000.00	168,000.00	81,000.00	249,400.00	182,525.06	228,437.46
	C	5	5	100	520,000.00	245,000.00	47,600.00	262,020.00	199,650.76	181,852.69
	D	5	5	100	434,000.00	219,000.00	120,000.00	246,500.00	223,010.95	123,089.40
	E	5	5	100	534,000.00	306,000.00	13,100.00	303,620.00	178,582.89	217,962.78
		25	25	100	1,940,000.00	270,500.00	13,100.00	404,508.00	254,476.64	423,575.62
2	A	5	5	100	1,935,000.00	316,000.00	97,200.00	590,640.00	322,749.55	767,695.22
	B	5	5	100	311,000.00	162,000.00	82,700.00	191,540.00	168,916.52	102,421.23
	C	5	5	100	500,000.00	252,000.00	133,000.00	313,200.00	281,475.48	152,982.68
	D	5	5	100	14,700,000.00	291,000.00	118,000.00	3,421,200.00	715,126.94	6,342,564.68
	E	5	5	100	12,200,000.00	1,100,000.00	371,000.00	3,559,400.00	1,713,079.34	4,948,193.49
		25	25	100	14,700,000.00	311,000.00	82,700.00	1,615,196.00	451,676.81	3,653,824.50
3	A	5	5	100	1,930,000.00	705,000.00	266,000.00	868,400.00	682,527.86	665,625.50
	B	5	5	100	1,050,000.00	520,000.00	75,700.00	455,840.00	282,236.59	404,310.28
	C	5	5	100	1,680,000.00	435,000.00	32,600.00	554,220.00	250,572.75	667,184.94
	D	5	5	100	1,040,000.00	388,000.00	35,200.00	418,440.00	249,807.00	392,411.73
	E	5	5	100	9,980,000.00	370,000.00	129,000.00	2,343,200.00	596,797.06	4,286,919.61
		25	25	100	9,980,000.00	435,000.00	32,600.00	928,020.00	372,751.81	1,952,311.79
4	A	5	5	100	1,740,000.00	844,000.00	201,000.00	822,700.00	624,865.67	614,997.32
	B	5	5	100	3,030,000.00	1,120,000.00	467,000.00	1,345,000.00	1,080,853.93	1,021,788.63
	C	5	5	100	4,800,000.00	988,000.00	98,900.00	1,519,980.00	604,724.02	1,940,484.36
	D	5	5	100	2,340,000.00	407,000.00	73,200.00	905,440.00	464,495.92	979,840.33
	E	5	5	100	10,900,000.00	1,600,000.00	13,600.00	3,081,820.00	641,538.06	4,501,921.83
		25	25	100	10,900,000.00	988,000.00	13,600.00	1,534,988.00	656,240.52	2,257,617.07
5	A	5	5	100	45,700,000.00	28,700,000.00	13,600,000.00	29,340,000.00	26,725,850.62	13,321,523.94
	B	5	5	100	34,300,000.00	16,900,000.00	7,400,000.00	18,374,000.00	15,701,484.11	11,076,704.38
	C	5	5	100	20,700,000.00	9,920,000.00	6,050,000.00	12,944,000.00	11,639,328.20	6,493,568.36
	D	5	5	100	18,600,000.00	7,810,000.00	3,850,000.00	9,306,000.00	8,077,691.31	5,711,858.72
	E	5	5	100	5,900,000.00	3,490,000.00	1,740,000.00	3,514,000.00	3,155,354.70	1,752,877.63
		25	25	100	45,700,000.00	9,920,000.00	1,740,000.00	14,695,600.00	10,447,854.57	11,968,271.62
ALL		125	125	100	45,700,000.00	534,000.00	13,100.00	3,835,662.40	782,703.23	7,872,979.08

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-12. Summary Statistics for Lead (Offsite by Soil Group and Depth)

Lead

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	4	80	13,566.67	6,000.00	<2230.00	7,496.33	5,366.91	5,582.43
	B	5	3	60	3,200.00	2,507.50	<2230.00	2,147.50	1,875.88	974.07
	C	5	4	80	13,800.00	3,100.00	<2230.00	4,776.00	3,296.67	5,129.37
	D	5	4	80	5,800.00	2,515.00	1,800.00	3,061.00	2,593.22	1,894.38
	E	5	4	80	5,100.00	2,735.00	<2190.00	3,226.00	2,829.29	1,625.87
		25	19	76	13,800.00	2,800.00	1,800.00	4,141.37	3,001.27	3,796.51
2	A	5	5	100	11,700.00	8,100.00	1,960.00	7,434.00	6,408.00	3,576.03
	B	5	5	100	6,900.00	3,620.00	1,680.00	4,240.00	3,797.09	2,063.30
	C	5	5	100	8,900.00	3,600.00	2,900.00	4,628.00	4,230.28	2,461.49
	D	5	5	100	3,070.00	1,560.00	1,100.00	1,866.00	1,706.86	882.99
	E	5	5	100	2,770.00	2,000.00	1,400.00	1,988.00	1,932.16	534.11
		25	25	100	11,700.00	3,070.00	1,100.00	4,031.20	3,207.43	2,893.12
3	A	5	5	100	15,600.00	3,900.00	1,400.00	5,600.00	3,930.17	5,735.42
	B	5	4	80	6,025.00	1,200.00	610.00	2,184.00	1,556.83	2,204.58
	C	5	3	60	5,615.00	1,105.00	1,100.00	2,274.00	1,761.38	1,965.73
	D	5	3	60	3,225.00	1,115.00	860.00	1,721.00	1,497.44	1,010.60
	E	5	4	80	4,100.00	1,400.00	740.00	1,908.00	1,595.34	1,335.36
		25	19	76	15,600.00	1,400.00	610.00	2,737.40	1,914.88	3,094.87
4	A	5	5	100	7,920.00	4,400.00	2,900.00	4,903.00	4,583.04	2,008.19
	B	5	5	100	6,110.00	3,100.00	2,400.00	4,162.00	3,847.72	1,796.59
	C	5	5	100	6,890.00	3,500.00	1,800.00	4,418.00	3,941.69	2,207.57
	D	5	5	100	4,380.00	3,200.00	1,800.00	3,190.00	3,063.01	944.03
	E	5	5	100	6,690.00	1,900.00	330.00	2,638.00	1,671.07	2,482.88
		25	25	100	7,920.00	3,350.00	330.00	3,862.20	3,237.70	1,978.24
5	A	5	5	100	33,900.00	27,100.00	3,880.00	23,356.00	18,679.46	12,132.30
	B	5	5	100	22,100.00	10,000.00	5,610.00	12,362.00	10,723.99	7,207.58
	C	5	5	100	19,300.00	16,000.00	1,760.00	12,092.00	9,002.51	7,590.54
	D	5	5	100	13,500.00	7,300.00	1,590.00	7,918.00	6,030.99	5,445.05
	E	5	5	100	11,200.00	5,500.00	987.00	5,437.40	3,878.76	4,189.50
		25	25	100	33,900.00	10,000.00	987.00	12,233.08	8,414.59	9,483.80
ALL		125	113	90.4	33,900.00	3,225.00	330.00	5,401.05	3,468.76	6,037.05

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-13. Summary Statistics for Lithium (Offsite by Soil Group and Depth)

Lithium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	5,375.00	<2685.00	<866.00			
	B	5	3	60	4,500.00	1,400.00	<684.00	1,821.15	1,343.05	1,570.07
	C	5	3	60	5,100.00	1,342.50	670.00	1,949.75	1,396.08	1,853.75
	D	5	3	60	<2685.00	1,342.50	680.00	1,239.25	1,196.01	320.37
	E	5	2	40	<2,685.00	<1900.00	<1140.00			
		25	13	52	5,375.00	1,342.50	670.00	1,776.08	1,354.66	1,477.70
2	A	5	2	40	2,760.00	<1800.00	<214.00			
	B	5	4	80	7,000.00	1,400.00	<538.00	2,429.80	1,460.82	2,672.83
	C	5	2	40	<2,685.00	<1900.00	<540.00			
	D	5	4	80	<2,685.00	1,190.00	860.00	1,432.50	1,321.82	713.55
	E	5	4	80	4,650.00	1,342.50	540.00	1,708.50	1,235.50	1,692.16
		25	16	64	7,000.00	1,342.50	<214.00	1,620.86	1,094.62	1,519.60
3	A	5	2	40	<1,540.00	<1145.00	<1000.00			
	B	5	4	80	1,500.00	1,500.00	<1060.00	1,194.00	1,098.48	443.37
	C	5	4	80	2,000.00	1,400.00	<1130.00	1,372.00	1,262.20	544.36
	D	5	3	60	2,500.00	849.50	849.50	1,067.90	893.70	815.61
	E	5	3	60	1,500.00	555.00	332.00	815.20	644.50	589.28
		25	16	64	2,500.00	880.00	332.00	1,045.92	898.71	562.34
4	A	5	1	20	<2,685.00	<1170.00	<238.50			
	B	5	2	40	7,890.00	<2685.00	<1140.00			
	C	5	3	60	8,160.00	1,342.50	1,090.00	2,824.75	1,754.33	3,115.36
	D	5	2	40	2,930.00	<2685.00	533.00			
	E	5	3	60	7,800.00	1,342.50	757.00	2,433.90	1,488.91	3,036.47
		25	11	44	8,160.00	<2685.00	<238.50			
5	A	5	5	100	16,300.00	7,900.00	5,870.00	9,794.00	9,146.33	4,206.98
	B	5	5	100	19,000.00	6,100.00	3,590.00	8,738.00	7,409.93	6,061.25
	C	5	3	60	16,900.00	1,342.50	1,250.00	6,347.00	3,338.95	7,213.96
	D	5	3	60	14,700.00	1,342.50	631.00	4,823.20	2,521.74	5,936.89
	E	5	1	20	6,600.00	<2685.00	<252.00			
		25	17	68	19,000.00	5,900.00	<252.00	6,370.08	3,658.12	5,702.76
ALL		125	73	58.4	19,000.00	1,342.50	<214.00	2,568.60	1,440.77	3,468.39

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-14. Summary Statistics for Magnesium (Offsite by Soil Group and Depth)

Magnesium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	237,500.00	99,700.00	33,300.00	111,620.00	83,947.93	85,923.61
	B	5	5	100	86,500.00	34,000.00	16,400.00	39,600.00	33,577.16	27,361.56
	C	5	5	100	97,300.00	64,800.00	9,400.00	57,280.00	44,801.26	32,284.32
	D	5	5	100	72,100.00	34,500.00	27,500.00	44,160.00	41,140.23	18,296.67
	E	5	5	100	70,200.00	47,100.00	2,800.00	45,020.00	29,868.60	25,822.80
			25	25	100	237,500.00	47,000.00	2,800.00	59,536.00	43,467.55
2	A	5	5	100	139,500.00	50,600.00	21,000.00	65,680.00	54,569.30	45,049.38
	B	5	5	100	60,300.00	43,400.00	26,200.00	41,260.00	39,309.88	14,081.30
	C	5	5	100	131,000.00	62,500.00	33,000.00	66,640.00	58,511.19	39,560.88
	D	5	5	100	57,000.00	46,600.00	42,200.00	48,700.00	48,298.41	7,049.82
	E	5	5	100	114,000.00	65,200.00	14,300.00	62,740.00	51,740.77	36,195.41
			25	25	100	139,500.00	49,000.00	14,300.00	57,004.00	50,036.96
3	A	5	5	100	106,300.00	85,400.00	29,900.00	68,880.00	61,107.96	33,559.68
	B	5	5	100	57,900.00	41,300.00	17,600.00	38,490.00	35,634.43	15,194.18
	C	5	5	100	84,100.00	50,400.00	9,300.00	42,540.00	30,244.61	32,002.55
	D	5	5	100	52,500.00	17,200.00	12,600.00	24,180.00	21,095.55	16,148.13
	E	5	5	100	69,000.00	28,100.00	13,800.00	35,720.00	31,056.65	21,111.06
			25	25	100	106,300.00	36,900.00	9,300.00	41,962.00	33,650.55
4	A	5	5	100	104,000.00	40,600.00	20,600.00	51,200.00	44,190.14	31,630.05
	B	5	5	100	270,000.00	90,500.00	31,600.00	141,600.00	104,821.18	109,487.92
	C	5	5	100	350,000.00	87,800.00	14,400.00	126,360.00	66,054.99	138,866.58
	D	5	5	100	1,090,000.00	75,400.00	8,700.00	256,950.00	60,843.56	467,347.54
	E	5	4	80	5,300,000.00	43,800.00	<1840.00	1,447,644.00	96,961.27	2,295,734.62
			25	24	96	5,300,000.00	67,900.00	<1840.00	404,750.80	71,006.58
5	A	5	5	100	2,890,000.00	2,250,000.00	787,000.00	2,095,400.00	1,921,984.11	795,764.29
	B	5	5	100	2,140,000.00	1,410,000.00	190,000.00	1,211,200.00	917,917.00	768,002.08
	C	5	5	100	1,620,000.00	1,050,000.00	92,100.00	988,220.00	688,013.73	638,828.92
	D	5	5	100	3,230,000.00	730,000.00	55,400.00	1,065,680.00	560,412.68	1,241,787.91
	E	5	5	100	1,670,000.00	622,000.00	32,200.00	691,640.00	374,325.68	638,649.24
			25	25	100	3,230,000.00	886,000.00	32,200.00	1,210,428.00	760,644.23
ALL		125	124	99.2	5,300,000.00	57,000.00	<1840.00	354,736.16	83,058.81	773,740.57

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-15. Summary Statistics for Manganese (Offsite by Soil Group and Depth)

Manganese

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	28,800.00	12,400.00	3,100.00	12,420.00	8,992.20	10,391.92
	B	5	5	100	6,000.00	1,500.00	1,200.00	2,675.00	2,163.35	2,061.10
	C	5	5	100	6,400.00	3,100.00	1,300.00	3,555.00	2,990.09	2,184.63
	D	5	5	100	2,900.00	2,300.00	1,400.00	2,200.00	2,129.43	574.46
	E	5	5	100	3,510.00	2,500.00	570.00	2,236.00	1,883.79	1,167.96
		25	25	100	28,800.00	2,900.00	570.00	4,617.20	2,975.74	5,990.66
2	A	5	5	100	13,600.00	3,300.00	2,120.00	7,014.00	5,086.95	5,913.46
	B	5	5	100	4,200.00	1,700.00	1,200.00	2,328.00	2,088.22	1,246.46
	C	5	5	100	6,500.00	2,460.00	1,700.00	3,158.00	2,819.25	1,906.55
	D	5	5	100	6,000.00	3,100.00	2,060.00	3,672.00	3,434.39	1,527.72
	E	5	5	100	28,400.00	4,350.00	1,500.00	10,100.00	6,061.58	11,106.59
		25	25	100	28,400.00	2,990.00	1,200.00	5,254.40	3,622.10	6,033.19
3	A	5	5	100	13,225.00	10,800.00	4,500.00	9,225.00	8,352.65	3,885.47
	B	5	5	100	7,200.00	3,100.00	1,700.00	3,680.00	3,101.87	2,098.09
	C	5	5	100	3,730.00	2,100.00	880.00	2,322.00	2,091.05	1,066.41
	D	5	4	80	4,500.00	2,800.00	<229.00	2,580.90	1,603.02	1,601.87
	E	5	5	100	31,900.00	2,700.00	860.00	8,407.00	3,509.35	13,198.55
		25	24	96	31,900.00	3,100.00	<229.00	5,242.98	3,139.03	6,484.79
4	A	5	4	80	6,155.00	2,600.00	<229.00	2,983.90	1,654.82	2,371.78
	B	5	5	100	5,180.00	2,890.00	420.00	2,919.00	2,005.51	2,178.25
	C	5	4	80	7,100.00	1,900.00	<224.00	3,114.40	1,445.98	3,110.53
	D	5	5	100	12,300.00	1,910.00	575.00	3,903.00	2,033.37	4,901.59
	E	5	5	100	17,000.00	3,910.00	340.00	6,858.00	3,535.66	6,482.62
		25	23	92	17,000.00	2,890.00	<224.00	3,955.66	2,030.32	4,083.23
5	A	5	5	100	1,570,000.00	213,000.00	179,000.00	540,400.00	367,050.22	593,116.60
	B	5	5	100	329,000.00	216,000.00	11,600.00	187,520.00	120,888.75	124,231.45
	C	5	5	100	217,000.00	158,000.00	5,980.00	118,476.00	68,609.38	89,115.53
	D	5	5	100	190,000.00	70,900.00	5,910.00	69,902.00	36,598.47	74,027.12
	E	5	5	100	85,300.00	13,200.00	5,260.00	29,752.00	18,172.61	33,195.67
		25	25	100	1,570,000.00	120,000.00	5,260.00	189,210.00	72,656.59	314,045.27
ALL		125	122	97.6	1,570,000.00	3,730.00	<224.00	41,656.05	5,490.83	156,847.46

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-16. Summary Statistics for Mercury (Offsite by Soil Group and Depth)

Mercury

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<74.30	<74.30	<74.30			
	B	5	0	0	<74.30	<69.30	<62.40			
	C	5	0	0	<74.30	<62.70	<56.70			
	D	5	0	0	<66.65	<60.00	<57.10			
	E	5	0	0	<65.65	<60.80	<58.20			
		25	0	0	<74.30	<65.65	<56.70			
2	A	5	0	0	<74.30	<74.30	<65.60			
	B	5	1	20	<74.30	<74.30	<56.90			
	C	5	0	0	<74.30	<74.30	<57.60			
	D	5	0	0	<74.30	<61.70	<55.00			
	E	5	0	0	<74.30	<57.40	<56.20			
		25	1	4	<74.30	<74.30	<55.00			
3	A	5	0	0	<74.30	<74.30	<61.00			
	B	5	0	0	<74.30	<60.20	<55.00			
	C	5	1	20	129.00	<59.50	<56.80			
	D	5	0	0	<67.15	<57.70	<55.40			
	E	5	1	20	70.00	<61.00	<58.40			
		25	2	8	129.00	<61.00	<55.00			
4	A	5	0	0	<74.30	<74.30	<63.60			
	B	5	0	0	<74.30	<74.30	<58.40			
	C	5	0	0	<74.30	<74.30	<58.20			
	D	5	0	0	<74.30	<74.30	<58.65			
	E	5	0	0	<74.30	<74.30	<58.30			
		25	0	0	<74.30	<74.30	<58.20			
5	A	5	3	60	264.00	174.00	<74.30	149.86	108.48	107.95
	B	5	3	60	223.00	127.00	<73.20	122.75	93.94	85.64
	C	5	2	40	270.00	<74.30	<66.10			
	D	5	4	80	300.00	110.00	<67.50	155.95	122.59	105.85
	E	5	2	40	147.00	<74.30	<63.40			
		25	14	56	300.00	90.00	<63.40	118.13	85.43	91.17
ALL		125	17	13.6	300.00	<74.30	<55.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-17. Summary Statistics for Nickel (Offsite by Soil Group and Depth)

Nickel

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	3,400.00	<1170.00	<1170.00			
	B	5	0	0	<1,170.00	<1170.00	<883.00			
	C	5	1	20	6,600.00	<1170.00	<1000.00			
	D	5	2	40	<1,170.00	<1145.00	850.00			
	E	5	1	20	1,400.00	<1170.00	<797.00			
		25	6	24	6,600.00	<1170.00	<797.00			
2	A	5	1	20	922.50	<1170.00	<1010.00			
	B	5	1	20	3,000.00	<1110.00	<968.00			
	C	5	0	0	<1,170.00	<1120.00	<859.00			
	D	5	3	60	1,390.00	904.00	904.00	897.80	837.65	364.49
	E	5	3	60	2,400.00	1,300.00	<921.00	1,267.10	1,059.71	791.31
		25	8	32	3,000.00	<1170.00	<859.00			
3	A	5	1	20	10,200.00	<1170.00	<794.00			
	B	5	1	20	4,400.00	<1170.00	<744.00			
	C	5	2	40	1,600.00	<1043.00	<1010.00			
	D	5	1	20	1,500.00	<911.00	<750.00			
	E	5	5	100	2,655.00	1,400.00	1,000.00	1,611.00	1,476.15	680.52
		25	10	40	10,200.00	<1110.00	<744.00			
4	A	5	0	0	<1,170.00	<1125.00	<818.00			
	B	5	4	80	2,100.00	1,192.50	820.00	1,232.50	1,078.30	604.50
	C	5	3	60	3,000.00	1,610.00	<784.00	1,517.40	1,172.42	1,069.52
	D	5	2	40	2,500.00	<1170.00	<760.00			
	E	5	3	60	17,900.00	1,400.00	<759.00	5,677.90	1,934.54	7,576.20
		25	12	48	17,900.00	<1170.00	<759.00			
5	A	5	5	100	13,500.00	10,800.00	5,940.00	10,328.00	9,976.74	2,762.95
	B	5	5	100	11,900.00	5,900.00	1,770.00	6,434.00	5,385.35	3,822.01
	C	5	3	60	8,600.00	3,300.00	<1110.00	3,968.00	2,287.67	3,640.57
	D	5	2	40	16,800.00	<1170.00	<1080.00			
	E	5	3	60	7,400.00	3,400.00	<1170.00	3,574.00	2,193.69	3,080.06
		25	18	72	16,800.00	5,900.00	<1080.00	5,733.20	3,361.83	4,722.32
ALL		125	54	43.2	17,900.00	<1170.00	<744.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-18. Summary Statistics for Potassium (Offsite by Soil Group and Depth)

Potassium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	3	60	326,000.00	122,000.00	<95350.00	156,070.00	115,721.48	122,561.81
	B	5	4	80	183,000.00	72,600.00	69,400.00	90,302.50	79,532.97	53,131.13
	C	5	3	60	<95,350.00	61,700.00	61,700.00	66,201.67	62,898.77	20,569.88
	D	5	3	60	196,000.00	47,900.00	47,900.00	81,905.00	66,593.95	65,512.50
	E	5	2	40	<95,350.00	<85700.00	71,200.00			
		25	15	60	326,000.00	69,400.00	47,900.00	90,939.83	74,193.44	70,960.49
2	A	5	0	0	<95,350.00	<70475.00	<54400.00			
	B	5	1	20	133,000.00	<69975.00	<45100.00			
	C	5	1	20	<95,350.00	<68600.00	<45200.00			
	D	5	1	20	<95,350.00	<70950.00	<43400.00			
	E	5	3	60	110,000.00	48,537.50	<42900.00	58,297.50	50,909.77	32,670.84
		25	6	24	133,000.00	<70950.00	<42900.00			
3	A	5	2	40	102,000.00	<72400.00	<49000.00			
	B	5	2	40	77,925.00	<53600.00	<45900.00			
	C	5	2	40	111,000.00	<72900.00	<47000.00			
	D	5	1	20	<82,816.67	<46300.00	<42400.00			
	E	5	3	60	<81,216.67	61,400.00	<50900.00	58,315.00	52,874.28	20,402.74
		25	10	40	111,000.00	<61400.00	<42400.00			
4	A	5	2	40	80,337.50	<82400.00	<50500.00			
	B	5	2	40	161,000.00	<74525.00	<55200.00			
	C	5	2	40	120,000.00	<73050.00	<56800.00			
	D	5	2	40	422,000.00	<76625.00	50,700.00			
	E	5	4	80	3,930,000.00	63,850.00	<46800.00	918,745.00	148,495.83	1,695,529.67
		25	12	48	3,930,000.00	<82400.00	<46800.00			
5	A	5	5	100	1,270,000.00	881,000.00	406,000.00	883,200.00	827,815.51	315,438.90
	B	5	5	100	804,000.00	480,000.00	164,000.00	459,800.00	384,550.71	276,176.03
	C	5	5	100	728,000.00	373,000.00	142,000.00	370,600.00	316,852.36	228,586.53
	D	5	3	60	1,170,000.00	238,000.00	<76275.00	347,562.50	164,268.52	470,321.41
	E	5	3	60	1,330,000.00	166,000.00	<76825.00	370,817.50	160,567.18	544,669.70
		25	21	84	1,330,000.00	373,000.00	<76275.00	486,396.00	305,485.82	408,482.41
ALL		125	64	51.2	3,930,000.00	57,025.00	<42400.00	183,350.27	76,074.71	422,866.50

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-19. Summary Statistics for Selenium (Offsite by Soil Group and Depth)

Selenium

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	900.00	<226.00	<226.00			
	B	5	1	20	830.00	<226.00	<226.00			
	C	5	2	40	330.00	<226.00	<222.50			
	D	5	1	20	670.00	<226.00	<218.00			
	E	5	2	40	750.00	<226.00	<204.50			
		25	8	32	900.00	<226.00	<204.50			
2	A	5	3	60	890.00	280.00	<197.00	379.40	268.09	332.66
	B	5	2	40	1,300.00	<226.00	<207.00			
	C	5	2	40	4,100.00	<226.00	<173.00			
	D	5	1	20	930.00	<218.00	<203.00			
	E	5	0	0	<221.00	<216.00	<212.00			
		25	8	32	4,100.00	<221.00	<173.00			
3	A	5	1	20	206.00	<226.00	<224.00			
	B	5	0	0	<226.00	<226.00	<218.00			
	C	5	0	0	<226.00	<226.00	<214.00			
	D	5	0	0	<226.00	<222.00	<203.50			
	E	5	0	0	<226.00	<226.00	<212.50			
		25	1	4	206.00	<226.00	<203.50			
4	A	5	1	20	<226.00	<226.00	158.00			
	B	5	0	0	<226.00	<202.00	<183.50			
	C	5	0	0	<226.00	<222.00	<198.00			
	D	5	0	0	<226.00	<218.00	<168.00			
	E	5	2	40	1,300.00	<216.00	<204.00			
		25	3	12	1,300.00	<218.00	<168.00			
5	A	5	2	40	500.00	<226.00	<222.00			
	B	5	4	80	610.00	360.00	<226.00	372.60	324.05	187.56
	C	5	3	60	910.00	360.00	<169.00	388.40	269.76	336.35
	D	5	3	60	1,200.00	410.00	<176.00	471.90	305.36	452.03
	E	5	2	40	890.00	<226.00	<200.00			
		25	14	56	1,200.00	300.00	<169.00	352.42	250.74	299.95
ALL		125	34	27.2	4,100.00	<226.00	<168.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-20. Summary Statistics for Silver (Offsite by Soil Group and Depth)

Silver

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	1	20	490.50	<454.00	<454.00			
	B	5	0	0	<454.00	<454.00	<345.00			
	C	5	0	0	<454.00	<454.00	<328.50			
	D	5	0	0	<454.00	<422.00	<327.00			
	E	5	0	0	<454.00	<454.00	<276.67			
		25	1	4	490.50	<454.00	<276.67			
2	A	5	0	0	<454.00	<389.00	<200.00			
	B	5	0	0	<454.00	<323.00	<208.00			
	C	5	0	0	<454.00	<324.00	<174.00			
	D	5	1	20	<454.00	<315.00	<183.00			
	E	5	1	20	547.00	<341.00	<224.00			
		25	2	8	547.00	<324.00	<174.00			
3	A	5	0	0	<454.00	<454.00	<356.00			
	B	5	1	20	<435.00	<425.00	<335.00			
	C	5	1	20	<452.00	<339.00	257.25			
	D	5	0	0	<454.00	<311.00	<293.00			
	E	5	0	0	<454.00	<356.00	<286.00			
		25	2	8	<454.00	<418.00	<286.00			
4	A	5	1	20	463.50	<454.00	<227.00			
	B	5	0	0	<454.00	<454.00	<223.00			
	C	5	0	0	<454.00	<448.00	<179.00			
	D	5	1	20	<454.00	<434.00	<175.00			
	E	5	0	0	<454.00	<434.00	<182.00			
		25	2	8	463.50	<448.00	<175.00			
5	A	5	1	20	867.00	<454.00	<454.00			
	B	5	2	40	10,000.00	<454.00	<454.00			
	C	5	0	0	<454.00	<454.00	<225.00			
	D	5	1	20	<454.00	<454.00	348.00			
	E	5	1	20	1,200.00	<454.00	<240.00			
		25	5	20	10,000.00	<454.00	<225.00			
ALL		125	12	9.6	10,000.00	<448.00	<174.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-21. Summary Statistics for Sodium (Offsite by Soil Group and Depth)

Sodium

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	125,500.00	118,000.00	95,400.00	111,740.00	111,000.16	13,681.30
	B	5	5	100	102,000.00	47,400.00	21,400.00	53,780.00	46,150.61	30,616.53
	C	5	5	100	71,800.00	46,800.00	36,800.00	48,320.00	46,208.74	14,297.80
	D	5	5	100	96,800.00	58,600.00	19,550.00	54,950.00	47,115.44	29,947.16
	E	5	5	100	59,800.00	52,400.00	17,026.67	43,445.33	37,925.16	18,329.64
			25	25	100	125,500.00	56,200.00	17,026.67	62,447.07	53,120.63
2	A	5	5	100	99,100.00	27,300.00	10,100.00	37,930.00	28,341.19	35,187.70
	B	5	5	100	66,700.00	12,800.00	10,200.00	24,680.00	18,734.25	23,858.69
	C	5	5	100	71,200.00	16,900.00	9,770.00	29,514.00	23,043.76	24,798.04
	D	5	5	100	39,600.00	19,200.00	16,500.00	22,720.00	21,505.93	9,507.21
	E	5	5	100	94,600.00	13,400.00	10,700.00	33,280.00	22,378.87	35,892.44
			25	25	100	99,100.00	19,200.00	9,770.00	29,624.80	22,594.40
3	A	5	5	100	173,000.00	45,600.00	24,800.00	71,700.00	54,828.51	60,407.70
	B	5	5	100	49,900.00	21,700.00	13,800.00	26,600.00	23,726.31	14,075.69
	C	5	5	100	57,400.00	39,500.00	14,900.00	35,210.00	31,435.92	17,104.40
	D	5	5	100	41,200.00	25,000.00	14,800.00	28,960.00	26,964.18	11,201.25
	E	5	5	100	44,900.00	26,800.00	17,100.00	29,450.00	27,023.50	11,980.51
			25	25	100	173,000.00	28,600.00	13,800.00	38,384.00	31,249.16
4	A	5	4	80	59,900.00	22,800.00	<6750.00	28,895.00	19,447.98	23,011.39
	B	5	5	100	63,450.00	29,500.00	22,500.00	36,390.00	33,779.37	16,677.02
	C	5	4	80	50,000.00	19,500.00	<6600.00	23,840.00	17,303.78	17,574.21
	D	5	5	100	162,000.00	29,700.00	9,750.00	55,950.00	33,429.86	63,086.90
	E	5	5	100	957,000.00	21,000.00	10,800.00	283,080.00	62,889.65	414,152.83
			25	23	92	957,000.00	25,500.00	<6600.00	85,631.00	29,900.34
5	A	5	5	100	97,600.00	81,100.00	20,800.00	69,440.00	60,869.95	31,977.70
	B	5	5	100	128,000.00	58,400.00	13,500.00	66,880.00	53,231.33	42,520.20
	C	5	5	100	131,000.00	54,500.00	14,000.00	72,600.00	56,742.50	47,264.42
	D	5	5	100	166,000.00	96,000.00	8,700.00	81,900.00	48,539.15	68,352.54
	E	5	5	100	138,000.00	32,700.00	10,800.00	59,680.00	42,026.56	51,736.90
			25	25	100	166,000.00	58,400.00	8,700.00	70,100.00	51,858.38
ALL		125	123	98.4	957,000.00	36,300.00	<6600.00	57,237.37	35,720.66	95,191.66

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-22. Summary Statistics for Sulfide (Offsite by Soil Group and Depth)

Sulfide

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<305.00	<305.00	<305.00			
	B	5	0	0	<305.00	<305.00	<305.00			
	C	5	0	0	<305.00	<305.00	<284.00			
	D	5	1	20	<305.00	<290.00	<286.00			
	E	5	0	0	<305.00	<292.00	<281.33			
		25	1	4	<305.00	<305.00	<281.33			
2	A	5	0	0	<305.00	<305.00	<305.00			
	B	5	0	0	<305.00	<284.00	<276.00			
	C	5	0	0	<305.00	<293.00	<267.00			
	D	5	0	0	<305.00	<284.00	<275.00			
	E	5	0	0	<305.00	<286.00	<281.00			
		25	0	0	<305.00	<293.00	<267.00			
3	A	5	0	0	<305.00	<305.00	<305.00			
	B	5	0	0	<305.00	<300.50	<275.00			
	C	5	0	0	<298.00	<286.00	<284.00			
	D	5	0	0	<298.50	<289.00	<277.00			
	E	5	0	0	<305.00	<305.00	<292.00			
		25	0	0	<305.00	<298.50	<275.00			
4	A	5	0	0	<305.00	<305.00	<298.00			
	B	5	0	0	<305.00	<293.00	<276.00			
	C	5	0	0	<291.00	<284.00	<282.00			
	D	5	1	20	422.00	<294.00	<279.00			
	E	5	0	0	<305.00	<305.00	<292.00			
		25	1	4	422.00	<294.00	<276.00			
5	A	5	0	0	<305.00	<305.00	<305.00			
	B	5	0	0	<305.00	<305.00	<295.00			
	C	5	0	0	<305.00	<305.00	<290.00			
	D	5	0	0	<305.00	<305.00	<299.00			
	E	5	0	0	<305.00	<305.00	<297.00			
		25	0	0	<305.00	<305.00	<290.00			
ALL		125	2	1.6	422.00	<305.00	<267.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-23. Summary Statistics for Thallium (Offsite by Soil Group and Depth)

Thallium

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<225.00	<225.00	<225.00			
	B	5	0	0	<225.00	<225.00	<225.00			
	C	5	0	0	<225.00	<222.50	<208.00			
	D	5	0	0	<225.00	<225.00	<217.50			
	E	5	0	0	<225.00	<219.00	<204.50			
		25	0	0	<225.00	<225.00	<204.50			
2	A	5	2	40	<225.00	<217.00	54.00			
	B	5	0	0	<225.00	<225.00	<207.00			
	C	5	0	0	<225.00	<225.00	<173.00			
	D	5	0	0	<225.00	<207.00	<203.00			
	E	5	0	0	<221.00	<216.00	<212.00			
		25	2	8	<225.00	<217.00	54.00			
3	A	5	0	0	<225.00	<225.00	<224.00			
	B	5	0	0	<225.00	<225.00	<217.00			
	C	5	0	0	<225.00	<215.50	<210.00			
	D	5	0	0	<225.00	<221.00	<203.00			
	E	5	1	20	189.75	<225.00	<223.00			
		25	1	4	189.75	<225.00	<203.00			
4	A	5	0	0	<225.00	<225.00	<203.00			
	B	5	0	0	<225.00	<202.00	<183.50			
	C	5	0	0	<225.00	<222.00	<198.00			
	D	5	0	0	<225.00	<218.00	<168.00			
	E	5	1	20	470.00	<216.00	<204.00			
		25	1	4	470.00	<218.00	<168.00			
5	A	5	3	60	540.00	420.00	<225.00	325.60	263.55	199.68
	B	5	4	80	450.00	320.00	<222.00	306.20	278.28	124.63
	C	5	2	40	360.00	<225.00	<169.00			
	D	5	2	40	650.00	<225.00	<176.00			
	E	5	0	0	<225.00	<225.00	<200.00			
		25	11	44	650.00	<225.00	<169.00			
ALL		125	15	12	650.00	<225.00	54.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-24. Summary Statistics for Tin (Offsite by Soil Group and Depth)

Tin

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	1	20	<2,780.00	<2780.00	2,600.00			
	B	5	1	20	<2,780.00	<2780.00	560.00			
	C	5	1	20	<2,780.00	<2650.00	1,300.00			
	D	5	1	20	<2,780.00	<2320.00	370.00			
	E	5	0	0	<2,780.00	<2510.00	<199.00			
		25	4	16	<2,780.00	<2780.00	<199.00			
2	A	5	3	60	3,800.00	1,400.00	<1370.00	1,803.00	1,544.70	1,180.56
	B	5	2	40	<2,780.00	<1720.00	790.00			
	C	5	3	60	3,700.00	1,400.00	1,400.00	2,166.00	1,827.63	1,350.55
	D	5	3	60	3,710.00	1,390.00	1,100.00	1,865.00	1,547.11	1,240.53
	E	5	4	80	3,050.00	2,280.00	1,100.00	2,124.00	1,971.33	855.30
		25	15	60	3,800.00	1,390.00	790.00	1,849.80	1,575.56	1,063.91
3	A	5	2	40	<2,780.00	<1185.00	<311.00			
	B	5	2	40	30,300.00	<2390.00	<256.00			
	C	5	4	80	4,100.00	912.25	<204.00	1,566.85	726.39	1,629.61
	D	5	3	60	3,400.00	950.00	<187.00	1,310.70	799.80	1,238.84
	E	5	2	40	3,900.00	<2590.00	<1600.00			
		25	13	52	30,300.00	1,180.00	<187.00	2,549.03	977.49	5,897.59
4	A	5	1	20	3,915.00	<2600.00	<2220.00			
	B	5	3	60	4,690.00	2,120.00	2,120.00	2,560.00	2,239.94	1,470.94
	C	5	2	40	5,100.00	<2780.00	<1220.00			
	D	5	2	40	3,030.00	<2700.00	<1200.00			
	E	5	2	40	6,500.00	<2380.00	<1270.00			
		25	10	40	6,500.00	<2700.00	<1200.00			
5	A	5	4	80	48,200.00	22,900.00	2,030.00	19,664.00	9,418.77	19,279.38
	B	5	2	40	22,000.00	<2780.00	<1520.00			
	C	5	2	40	14,700.00	<2780.00	<1540.00			
	D	5	2	40	11,300.00	<2780.00	<1490.00			
	E	5	0	0	<2,780.00	<2780.00	<1650.00			
		25	10	40	48,200.00	<2780.00	<1490.00			
ALL		125	52	41.6	48,200.00	<2730.00	<187.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-25. Summary Statistics for Vanadium (Offsite by Soil Group and Depth)

Vanadium
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	13,500.00	4,100.00	1,200.00	6,480.00	4,705.68	5,118.79
	B	5	5	100	12,400.00	5,500.00	1,600.00	5,480.00	4,265.04	4,255.23
	C	5	5	100	16,200.00	3,600.00	2,000.00	6,372.00	4,668.55	5,870.43
	D	5	5	100	23,900.00	5,395.00	1,900.00	9,959.00	6,912.12	8,990.52
	E	5	4	80	24,000.00	6,600.00	<338.00	9,604.47	4,312.07	9,269.86
		25	24	96	24,000.00	5,395.00	<338.00	7,579.09	4,899.83	6,665.55
2	A	5	5	100	8,410.00	4,300.00	1,300.00	4,694.00	3,530.69	3,423.14
	B	5	5	100	23,600.00	2,800.00	1,150.00	6,716.00	3,683.05	9,475.29
	C	5	5	100	67,900.00	2,800.00	1,400.00	16,100.00	5,205.78	29,008.59
	D	5	5	100	23,400.00	3,600.00	1,800.00	8,696.00	5,679.60	8,989.00
	E	5	5	100	21,300.00	5,300.00	3,600.00	7,920.00	6,128.95	7,531.73
		25	25	100	67,900.00	3,600.00	1,150.00	8,825.20	4,725.54	13,991.78
3	A	5	4	80	7,540.00	2,100.00	<338.00	2,635.80	1,398.76	2,911.44
	B	5	5	100	7,470.00	2,000.00	700.00	2,900.00	2,010.04	2,768.84
	C	5	5	100	8,500.00	4,800.00	560.00	4,662.00	2,958.87	3,709.61
	D	5	5	100	8,900.00	2,000.00	950.00	4,220.00	2,710.23	3,959.26
	E	5	4	80	5,565.00	1,200.00	<237.00	2,204.70	1,169.30	2,220.10
		25	23	92	8,900.00	2,000.00	<237.00	3,324.50	1,923.98	3,058.67
4	A	5	4	80	4,220.00	3,100.00	<338.00	2,676.80	1,772.86	1,614.98
	B	5	5	100	7,970.00	6,000.00	1,600.00	5,206.00	4,526.48	2,562.58
	C	5	4	80	8,500.00	3,850.00	<336.00	4,405.60	2,323.48	3,731.30
	D	5	5	100	8,200.00	3,750.00	1,400.00	4,118.00	3,435.68	2,674.03
	E	5	4	80	38,800.00	9,230.00	<325.00	13,468.50	4,913.93	15,269.00
		25	22	88	38,800.00	3,850.00	<325.00	5,974.98	3,159.39	7,695.31
5	A	5	5	100	113,000.00	93,500.00	51,000.00	86,340.00	83,405.12	23,474.31
	B	5	5	100	72,900.00	51,100.00	33,100.00	50,140.00	47,882.95	16,802.47
	C	5	5	100	71,200.00	42,000.00	19,400.00	44,840.00	41,324.71	18,657.79
	D	5	5	100	67,500.00	35,800.00	13,500.00	36,820.00	31,133.90	22,234.37
	E	5	5	100	53,400.00	19,200.00	7,310.00	22,662.00	17,830.23	18,306.18
		25	25	100	113,000.00	49,000.00	7,310.00	48,160.40	39,119.63	28,358.45
ALL		125	119	95.2	113,000.00	5,395.00	<237.00	14,772.83	5,597.20	22,355.16

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-26. Summary Statistics for Zinc (Offsite by Soil Group and Depth)

Zinc

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	14,550.00	7,700.00	4,600.00	8,330.00	7,701.07	3,795.00
	B	5	5	100	28,900.00	3,800.00	3,200.00	9,192.00	5,962.16	11,094.47
	C	5	5	100	5,500.00	4,125.00	2,100.00	3,885.00	3,608.13	1,250.95
	D	5	5	100	7,600.00	4,100.00	2,900.00	4,430.00	4,036.34	1,846.48
	E	5	5	100	8,600.00	5,300.00	3,000.00	5,510.00	4,928.02	2,221.60
			25	25	100	28,900.00	4,300.00	2,100.00	6,269.40	5,053.35
2	A	5	5	100	10,800.00	5,400.00	796.00	5,424.20	4,086.49	3,630.93
	B	5	5	100	5,300.00	2,700.00	677.00	3,103.40	2,454.73	2,004.27
	C	5	5	100	8,900.00	6,100.00	981.00	5,192.20	3,785.51	3,639.92
	D	5	5	100	9,500.00	4,700.00	1,890.00	4,732.00	3,924.53	3,130.25
	E	5	5	100	4,100.00	2,790.00	1,820.00	2,782.00	2,686.37	837.99
			25	25	100	10,800.00	4,025.00	677.00	4,246.76	3,315.02
3	A	5	5	100	10,000.00	6,000.00	3,900.00	6,704.00	5,930.31	2,959.57
	B	5	5	100	4,400.00	3,525.00	1,800.00	3,225.00	2,976.35	1,027.44
	C	5	5	100	10,300.00	5,200.00	3,190.00	5,498.00	4,939.65	2,867.32
	D	5	5	100	5,800.00	3,800.00	3,100.00	4,114.00	3,898.44	1,008.70
	E	5	5	100	6,135.00	4,300.00	2,700.00	4,387.00	4,011.41	1,265.84
			25	25	100	10,300.00	4,000.00	1,800.00	4,785.60	4,235.74
4	A	5	5	100	7,600.00	3,400.00	618.50	3,975.70	2,948.10	2,697.55
	B	5	5	100	4,400.00	2,850.00	1,420.00	2,908.00	2,715.56	1,058.48
	C	5	5	100	15,100.00	2,850.00	670.00	4,918.00	2,973.71	5,786.59
	D	5	4	80	11,000.00	4,400.00	<253.00	4,539.30	2,302.34	4,094.47
	E	5	5	100	47,300.00	1,640.00	1,300.00	15,716.00	5,154.88	20,765.34
			25	24	96	47,300.00	2,850.00	<253.00	6,411.40	3,091.84
5	A	5	5	100	67,100.00	45,900.00	18,800.00	45,340.00	41,914.68	17,475.21
	B	5	5	100	56,700.00	25,300.00	6,110.00	30,822.00	24,477.48	19,321.71
	C	5	5	100	39,800.00	32,700.00	3,740.00	24,988.00	19,056.85	14,868.48
	D	5	5	100	73,200.00	10,900.00	2,250.00	31,710.00	16,229.56	33,214.88
	E	5	5	100	79,400.00	16,000.00	1,440.00	24,088.00	11,646.87	31,559.21
			25	25	100	79,400.00	25,300.00	1,440.00	31,389.60	20,584.48
ALL		125	124	99.2	79,400.00	4,400.00	<253.00	10,620.55	5,382.08	15,692.53

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-27. Summary Statistics for Fluoride (Offsite by Soil Group and Depth)

Fluoride

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<5,430.00	<5430.00	<5430.00			
	B	5	0	0	<5,430.00	<5350.00	<4520.00			
	C	5	0	0	<5,430.00	<5200.00	<4400.00			
	D	5	0	0	<5,430.00	<5095.00	<3970.00			
	E	5	0	0	<5,430.00	<4990.00	<4660.00			
		25	0	0	<5,430.00	<5350.00	<3970.00			
2	A	5	0	0	<5,430.00	<5430.00	<4755.00			
	B	5	0	0	<5,430.00	<5360.00	<4380.00			
	C	5	0	0	<5,430.00	<4940.00	<4810.00			
	D	5	0	0	<5,430.00	<4940.00	<4550.00			
	E	5	0	0	<5,430.00	<4620.00	<3770.00			
		25	0	0	<5,430.00	<5020.00	<3770.00			
3	A	5	0	0	<5,430.00	<5430.00	<5430.00			
	B	5	0	0	<5,430.00	<5060.00	<3670.00			
	C	5	0	0	<5,220.00	<4810.00	<3630.00			
	D	5	0	0	<5,080.00	<4540.00	<3970.00			
	E	5	0	0	<5,350.00	<4360.00	<3980.00			
		25	0	0	<5,430.00	<4850.00	<3630.00			
4	A	5	0	0	<5,430.00	<5430.00	<5235.00			
	B	5	2	40	35,407.50	<5430.00	<4550.00			
	C	5	2	40	11,800.00	<5430.00	<5110.00			
	D	5	2	40	146,000.00	<5430.00	<4280.00			
	E	5	2	40	818,500.00	<5390.00	<4540.00			
		25	8	32	818,500.00	<5430.00	<4280.00			
5	A	5	0	0	<5,430.00	<5430.00	<5430.00			
	B	5	2	40	7,050.00	<5430.00	<4790.00			
	C	5	2	40	8,510.00	<5430.00	<4490.00			
	D	5	1	20	<5,430.00	<5430.00	<4450.00			
	E	5	1	20	6,220.00	<5430.00	<5090.00			
		25	6	24	8,510.00	<5430.00	<4450.00			
ALL		125	14	11.2	818,500.00	<5360.00	<3630.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-28. Summary Statistics for Nitrate as Nitrogen (Offsite by Soil Group and Depth)

Nitrate as Nitrogen

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	2,375.00	<612.00	<612.00			
	B	5	2	40	1,120.00	<612.00	<612.00			
	C	5	1	20	972.00	<612.00	<567.00			
	D	5	2	40	852.00	<612.00	<576.00			
	E	5	2	40	1,110.00	<612.00	<558.50			
		25	9	36	2,375.00	<612.00	<558.50			
2	A	5	3	60	2,120.00	1,230.00	<612.00	1,086.40	814.70	783.29
	B	5	2	40	<612.00	<552.00	432.00			
	C	5	2	40	1,430.00	<612.00	<535.00			
	D	5	3	60	683.00	616.00	<612.00	513.00	481.07	190.45
	E	5	3	60	1,500.00	635.00	<574.00	714.00	588.24	497.30
		25	13	52	2,120.00	432.00	432.00	679.32	532.96	524.25
3	A	5	4	80	2,070.00	695.00	347.00	882.60	685.10	720.60
	B	5	4	80	1,480.00	580.00	536.00	699.30	585.66	455.35
	C	5	5	100	916.00	766.00	583.25	758.05	728.85	121.33
	D	5	5	100	847.00	734.00	299.00	599.50	549.25	250.39
	E	5	4	80	900.00	771.00	<489.33	672.67	625.97	238.17
		25	22	88	2,070.00	722.00	299.00	722.42	631.64	390.95
4	A	5	3	60	1,740.00	741.75	<612.00	882.75	661.96	634.67
	B	5	1	20	1,280.00	<586.00	<552.00			
	C	5	3	60	2,170.00	594.25	<564.00	890.85	630.78	792.28
	D	5	2	40	1,050.00	<587.00	<558.00			
	E	5	3	60	1,876.50	403.00	403.00	789.60	574.95	687.46
		25	12	48	2,170.00	<612.00	403.00			
5	A	5	1	20	1,750.00	<612.00	<611.00			
	B	5	1	20	1,200.00	<612.00	<590.00			
	C	5	1	20	1,900.00	<612.00	<580.00			
	D	5	1	20	3,390.00	<612.00	<598.00			
	E	5	1	20	717.00	<612.00	<594.00			
		25	5	20	3,390.00	<612.00	<580.00			
ALL		125	61	48.8	3,390.00	<612.00	299.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-29. Summary Statistics for Nitrate + Nitrite (Offsite by Soil Group and Depth)

Nitrate + Nitrite

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	4,180,000.00	3,380,000.00	2,110,000.00	3,258,000.00	3,182,483.42	783,945.15
	B	5	5	100	1,690,000.00	670,000.00	337,000.00	795,600.00	687,677.23	521,640.01
	C	5	5	100	535,000.00	333,000.00	108,000.00	333,000.00	278,686.23	193,321.95
	D	5	5	100	376,000.00	173,000.00	65,600.00	175,580.00	144,451.72	122,360.70
	E	5	5	100	207,000.00	154,000.00	18,675.00	126,835.00	96,690.97	73,176.87
		25	25	100	4,180,000.00	337,000.00	18,675.00	937,803.00	385,059.11	1,271,767.01
2	A	5	5	100	3,800,000.00	630,000.00	594,000.00	1,499,600.00	1,101,839.61	1,394,841.50
	B	5	5	100	1,310,000.00	76,700.00	34,200.00	438,240.00	173,715.68	562,176.60
	C	5	5	100	1,300,000.00	78,000.00	36,000.00	481,400.00	170,904.72	601,002.33
	D	5	5	100	190,000.00	41,900.00	32,900.00	87,380.00	67,585.78	70,021.26
	E	5	5	100	101,000.00	70,800.00	22,500.00	63,320.00	56,356.76	29,846.56
		25	25	100	3,800,000.00	78,000.00	22,500.00	513,988.00	165,616.10	849,782.46
3	A	5	5	100	4,840,000.00	966,500.00	405,000.00	1,910,500.00	1,310,818.68	1,799,205.17
	B	5	5	100	591,000.00	95,600.00	76,800.00	223,940.00	157,344.19	219,871.59
	C	5	5	100	119,000.00	87,900.00	29,200.00	82,580.00	74,491.84	34,514.01
	D	5	4	80	98,500.00	27,400.00	<19700.0000	42,690.00	31,436.80	35,324.01
	E	5	5	100	64,600.00	33,800.00	22,475.00	38,875.00	35,406.16	17,327.49
		25	24	96	4,840,000.00	87,800.00	<19700.0000	459,717.00	111,327.86	1,049,225.07
4	A	5	5	100	1,970,000.00	756,000.00	564,000.00	1,032,700.00	902,330.09	598,099.45
	B	5	5	100	494,000.00	297,000.00	124,000.00	304,000.00	270,049.56	152,821.79
	C	5	5	100	105,000.00	92,000.00	37,300.00	82,690.00	77,563.35	28,087.51
	D	5	4	80	93,900.00	55,000.00	<27300.0000	56,400.00	45,752.68	33,938.49
	E	5	3	60	515,500.00	46,450.00	<22200.0000	195,140.00	67,026.97	239,337.78
		25	22	88	1,970,000.00	105,000.00	<22200.0000	334,186.00	142,110.55	456,623.18
5	A	5	5	100	2,730,000.00	1,970,000.00	914,000.00	1,772,600.00	1,607,345.90	813,824.80
	B	5	5	100	2,940,000.00	490,000.00	137,000.00	1,297,400.00	676,043.63	1,376,738.46
	C	5	5	100	4,610,000.00	306,000.00	42,300.00	1,353,860.00	457,965.78	1,922,716.94
	D	5	5	100	3,060,000.00	156,000.00	37,000.00	893,700.00	285,268.51	1,290,283.57
	E	5	4	80	553,000.00	146,000.00	<27300.0000	250,290.00	111,334.77	259,025.36
		25	24	96	4,610,000.00	503,000.00	<27300.0000	1,113,570.00	436,275.02	1,267,267.17
ALL		125	120	96	4,840,000.00	173,000.00	<19700.00	671,852.80	213,169.02	1,052,498.60

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-30. Summary Statistics for Total Phosphates (as P) (Offsite by Soil Group and Depth)

Total Phosphates (as P)

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	242,666.67	114,000.00	51,150.00	129,963.33	115,355.18	69,873.27
	B	5	5	100	55,100.00	36,100.00	25,100.00	38,670.00	36,695.59	13,433.15
	C	5	5	100	46,900.00	26,900.00	17,100.00	31,240.00	28,510.47	14,403.06
	D	5	5	100	50,900.00	25,200.00	15,500.00	28,340.00	26,029.00	13,527.49
	E	5	5	100	39,700.00	19,000.00	8,710.00	22,972.00	19,925.43	12,587.72
			25	25	100	242,666.67	31,900.00	8,710.00	50,237.07	36,249.67
2	A	5	5	100	188,000.00	95,600.00	31,300.00	102,940.00	84,518.21	65,320.50
	B	5	5	100	80,300.00	13,400.00	7,980.00	33,396.00	21,781.40	32,546.26
	C	5	5	100	97,200.00	15,100.00	9,250.00	33,928.00	21,808.83	37,388.93
	D	5	5	100	82,000.00	27,400.00	9,140.00	31,408.00	22,760.82	29,636.62
	E	5	5	100	85,200.00	22,300.00	9,660.00	34,832.00	26,343.37	30,206.81
			25	25	100	188,000.00	27,800.00	7,980.00	47,300.80	29,943.70
3	A	5	5	100	167,500.00	61,500.00	49,300.00	82,600.00	73,667.69	48,816.70
	B	5	5	100	56,400.00	26,100.00	24,000.00	35,240.00	31,464.81	14,270.35
	C	5	5	100	66,700.00	20,800.00	11,700.00	28,640.00	22,898.58	22,767.04
	D	5	5	100	254,100.00	20,100.00	7,300.00	64,120.00	21,891.89	106,360.53
	E	5	5	100	117,000.00	19,800.00	13,000.00	37,393.33	25,120.39	44,624.21
			25	25	100	254,100.00	26,000.00	7,300.00	49,598.67	31,120.32
4	A	5	5	100	149,500.00	94,700.00	66,500.00	98,140.00	94,518.10	31,449.45
	B	5	5	100	97,500.00	46,000.00	16,900.00	49,300.00	41,703.74	30,333.23
	C	5	5	100	145,200.00	21,700.00	13,600.00	26,780.00	24,060.23	12,381.92
	D	5	5	100	9,950,000.00	21,200.00	11,700.00	2,005,460.00	65,035.11	4,441,135.93
	E	5	5	100	69,800,000.00	24,800.00	9,865.00	15,502,453.00	269,313.78	30,533,435.98
			25	25	100	69,800,000.00	32,800.00	9,865.00	3,536,426.60	69,835.98
5	A	5	5	100	770,000.00	438,500.00	180,000.00	464,100.00	415,885.18	223,378.71
	B	5	5	100	296,000.00	236,000.00	82,400.00	213,680.00	196,910.01	79,158.15
	C	5	5	100	483,000.00	195,000.00	90,000.00	235,000.00	198,745.97	154,736.87
	D	5	5	100	960,000.00	118,000.00	33,300.00	275,340.00	128,460.37	390,340.32
	E	5	5	100	123,000.00	46,600.00	30,500.00	63,020.00	54,764.79	38,608.70
			25	25	100	960,000.00	195,000.00	30,500.00	250,228.00	162,840.35
ALL		125	125	100	69,800,000.00	41,400.00	7,300.00	786,758.23	52,107.35	6,321,867.33

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-31. Summary Statistics for Silicon (Offsite by Soil Group and Depth)

Silicon

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	880,500.00	627,000.00	211,000.00	552,100.00	479,251.90	268,103.62
	B	5	5	100	596,000.00	541,500.00	260,000.00	465,300.00	436,842.78	143,309.80
	C	5	5	100	808,000.00	352,000.00	185,000.00	421,870.00	349,461.02	257,062.75
	D	5	5	100	916,000.00	609,000.00	351,500.00	634,100.00	597,571.62	232,777.36
	E	5	5	100	543,000.00	421,000.00	81,400.00	357,426.67	284,347.08	198,951.91
		25	25	100	916,000.00	518,000.00	81,400.00	486,159.33	415,819.92	227,846.57
2	A	5	5	100	989,000.00	581,000.00	228,000.00	569,000.00	480,902.83	335,774.48
	B	5	5	100	872,000.00	346,000.00	157,000.00	479,400.00	375,113.96	348,757.51
	C	5	5	100	1,320,000.00	457,000.00	171,000.00	633,400.00	465,147.60	509,483.37
	D	5	5	100	418,000.00	298,000.00	172,000.00	294,800.00	283,454.86	88,256.44
	E	5	5	100	318,000.00	185,000.00	79,000.00	208,000.00	187,846.00	92,714.62
		25	25	100	1,320,000.00	298,000.00	79,000.00	436,920.00	338,859.32	335,013.80
3	A	5	5	100	1,082,500.00	455,000.00	163,000.00	501,900.00	411,838.50	348,370.21
	B	5	5	100	590,500.00	395,000.00	183,000.00	417,500.00	374,502.63	156,152.17
	C	5	5	100	918,000.00	483,500.00	112,000.00	456,300.00	351,388.27	319,824.87
	D	5	5	100	692,000.00	295,000.00	181,000.00	372,900.00	305,005.31	209,656.98
	E	5	5	100	963,000.00	325,000.00	315,900.00	508,380.00	425,860.65	284,462.51
		25	25	100	1,082,500.00	395,000.00	112,000.00	451,396.00	371,115.25	254,729.85
4	A	5	5	100	532,000.00	415,500.00	251,000.00	390,900.00	358,634.42	134,793.55
	B	5	5	100	1,170,000.00	468,000.00	135,000.00	589,700.00	467,440.33	399,162.19
	C	5	5	100	1,070,000.00	389,000.00	126,000.00	460,100.00	331,560.75	391,292.15
	D	5	5	100	1,590,000.00	490,000.00	123,000.00	599,000.00	418,681.04	580,378.76
	E	5	5	100	1,340,000.00	200,000.00	109,000.00	511,800.00	309,980.07	538,208.42
		25	25	100	1,590,000.00	415,500.00	109,000.00	510,260.00	372,933.73	407,391.04
5	A	5	5	100	3,890,000.00	1,080,000.00	176,000.00	1,349,200.00	837,098.45	1,472,750.22
	B	5	5	100	1,840,000.00	732,000.00	244,000.00	849,600.00	648,661.72	656,430.35
	C	5	5	100	2,400,000.00	790,000.00	210,000.00	1,143,200.00	853,370.53	863,742.55
	D	5	5	100	2,360,000.00	574,000.00	154,000.00	981,800.00	680,549.92	868,855.11
	E	5	5	100	820,000.00	713,000.00	166,000.00	535,600.00	436,734.33	318,201.67
		25	25	100	3,890,000.00	732,000.00	154,000.00	971,880.00	672,669.84	882,562.24
ALL		125	125	100	3,890,000.00	457,000.00	79,000.00	571,323.07	420,313.59	517,990.17

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-32. Summary Statistics for Sulfate (Offsite by Soil Group and Depth)

Sulfate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<15,150.00	<15150.00	<15150.00			
	B	5	1	20	78,400.00	<15150.00	<15150.00			
	C	5	0	0	<15,150.00	<15150.00	<14200.00			
	D	5	0	0	<15,150.00	<14500.00	<14300.00			
	E	5	0	0	<15,150.00	<14600.00	<13950.00			
		25	1	4	78,400.00	<15150.00	<13950.00			
2	A	5	1	20	26,600.00	<15150.00	<15150.00			
	B	5	1	20	27,800.00	<15150.00	<13800.00			
	C	5	1	20	23,700.00	<15150.00	<13400.00			
	D	5	0	0	<15,150.00	<14200.00	<13800.00			
	E	5	1	20	26,800.00	<14300.00	<14000.00			
		25	4	16	27,800.00	<15150.00	<13400.00			
3	A	5	0	0	<15,150.00	<15150.00	<15150.00			
	B	5	1	20	<15,150.00	<14975.00	13,900.00			
	C	5	1	20	14,900.00	<14500.00	<14300.00			
	D	5	0	0	<1,4950.00	<14400.00	<13800.00			
	E	5	0	0	<15,150.00	<15150.00	<14600.00			
		25	2	8	<15,150.00	<14950.00	<13800.00			
4	A	5	0	0	<15,150.00	<15150.00	<14900.00			
	B	5	1	20	173,000.00	<15150.00	<14300.00			
	C	5	1	20	71,200.00	<14400.00	<14100.00			
	D	5	1	20	15,200.00	<14700.00	<13900.00			
	E	5	2	40	394,500.00	<15150.00	<14600.00			
		25	5	20	394,500.00	<14900.00	<13900.00			
5	A	5	5	100	64,900.00	36,100.00	29,500.00	43,580.00	41,246.86	16,380.38
	B	5	3	60	32,700.00	19,100.00	<14800.00	19,615.00	16,141.65	12,269.77
	C	5	2	40	57,900.00	<15150.00	<14500.00			
	D	5	1	20	52,200.00	<15150.00	<14900.00			
	E	5	1	20	41,600.00	<15150.00	<14900.00			
		25	12	48	64,900.00	<15150.00	<14500.00			
ALL		125	24	19.2	394,500.00	<15150.00	<13400.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-33. Summary Statistics for Total Organic Carbon (Off-site by Soil Group and Depth)

Total Organic Carbon

Units: ug/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	58,300,000.00	44,250,000.00	31,200,000.00	45,270,000.00	44,342,786.40	9,866,711.71
	B	5	5	100	40,100,000.00	17,500,000.00	13,400,000.00	21,340,000.00	19,677,999.42	10,703,877.80
	C	5	5	100	33,900,000.00	7,833,333.33	5,100,000.00	13,286,666.67	10,312,069.05	11,861,740.55
	D	5	5	100	19,700,000.00	10,000,000.00	5,267,500.00	12,433,500.00	9,533,634.97	6,797,002.00
	E	5	5	100	18,100,000.00	5,100,000.00	90,525.00	7,480,105.00	3,046,427.08	6,844,823.60
		25	25	100	58,300,000.00	16,400,000.00	90,525.00	19,962,054.33	12,118,247.23	16,175,928.79
2	A	5	5	100	58,850,000.00	16,700,000.00	9,500,000.00	25,550,000.00	20,690,353.09	19,871,461.95
	B	5	5	100	43,200,000.00	647,000.00	244,000.00	12,067,100.00	2,254,931.14	18,610,683.18
	C	5	5	100	41,600,000.00	13,300,000.00	186,000.00	17,736,800.00	3,686,157.73	19,040,177.45
	D	5	5	100	10,800,000.00	295,000.00	258,000.00	4,408,400.00	1,198,281.02	5,653,918.05
	E	5	5	100	14,200,000.00	3,850,000.00	107,000.00	5,316,600.00	1,819,392.87	5,901,784.63
		25	25	100	58,850,000.00	9,500,000.00	107,000.00	13,015,780.00	3,271,839.97	16,138,115.13
3	A	5	5	100	42,800,000.00	23,700,000.00	13,100,000.00	26,360,000.00	24,337,169.71	11,512,949.23
	B	5	5	100	16,500,000.00	1,830,000.00	1,120,000.00	5,033,000.00	2,876,134.66	6,516,206.34
	C	5	5	100	16,000,000.00	8,650,000.00	660,000.00	9,172,000.00	6,091,932.03	5,905,139.29
	D	5	5	100	122,000,000.00	6,950,000.00	219,000.00	30,170,200.00	4,059,403.63	52,055,703.69
	E	5	5	100	6,400,000.00	551,000.00	106,500.00	1,588,800.00	561,500.22	2,696,668.00
		25	25	100	122,000,000.00	6,950,000.00	106,500.00	14,464,800.00	3,958,487.71	25,051,936.33
4	A	5	5	100	42,200,000.00	21,500,000.00	12,100,000.00	23,800,000.00	21,810,520.76	11,445,959.99
	B	5	5	100	12,400,000.00	10,500,000.00	3,465,000.00	8,633,000.00	7,662,087.56	3,774,678.13
	C	5	5	100	19,100,000.00	9,000,000.00	616,000.00	8,621,200.00	4,641,867.47	7,760,993.96
	D	5	5	100	12,900,000.00	9,700,000.00	338,500.00	8,237,700.00	4,980,749.58	4,990,204.80
	E	5	4	80	30,200,000.00	6,650,000.00	<100,000.00	13,440,000.00	4,226,850.79	13,250,160.38
		25	24	96	42,200,000.00	10,900,000.00	<100,000.00	12,546,380.00	6,959,908.04	10,221,473.69
5	A	5	5	100	44,900,000.00	37,400,000.00	27,600,000.00	36,720,000.00	36,272,653.00	6,259,153.30
	B	5	5	100	41,700,000.00	34,500,000.00	19,600,000.00	31,980,000.00	30,876,729.97	8,915,548.22
	C	5	5	100	42,300,000.00	36,300,000.00	6,100,000.00	28,560,000.00	23,398,777.75	15,360,273.44
	D	5	5	100	44,900,000.00	26,600,000.00	135,000.00	23,087,000.00	8,751,150.13	18,305,329.69
	E	5	5	100	27,800,000.00	16,100,000.00	129,000.00	14,292,600.00	3,258,734.88	13,698,260.14
		25	25	100	44,900,000.00	27,800,000.00	129,000.00	26,927,920.00	14,952,148.14	14,436,206.99
ALL		125	124	99.2	122,000,000.00	17,383,386.87	6,960,070.70	12,800,000.00	<100,000.00	17,693,724.36

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-34. Summary Statistics for Total Organic Halogens (Offsite by Soil Group and Depth)

Total Organic Halogens

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<25,000.00	<25000.00	<25000.00			
	B	5	0	0	<25,000.00	<25000.00	<25000.00			
	C	5	0	0	<25,000.00	<25000.00	<25000.00			
	D	5	0	0	<25,000.00	<25000.00	<25000.00			
	E	5	0	0	<25,000.00	<25000.00	<25000.00			
		25	0	0	<25,000.00	<25000.00	<25000.00			
2	A	5	0	0	<25,000.00	<25000.00	<24700.00			
	B	5	0	0	<25,000.00	<25000.00	<23700.00			
	C	5	0	0	<25,000.00	<25000.00	<23400.00			
	D	5	0	0	<25,000.00	<25000.00	<24300.00			
	E	5	0	0	<25,000.00	<25000.00	<25000.00			
		25	0	0	<25,000.00	<2500.00	<23400.00			
3	A	5	0	0	<25,000.00	<25000.00	<25000.00			
	B	5	0	0	<25,000.00	<25000.00	<25000.00			
	C	5	0	0	<25,000.00	<25000.00	<24750.00			
	D	5	0	0	<25,000.00	<25000.00	<25000.00			
	E	5	0	0	<25,000.00	<25000.00	<25000.00			
		25	0	0	<25,000.00	<25000.00	<25000.00			
4	A	5	0	0	<25,000.00	<25000.00	<25000.00			
	B	5	0	0	<25,000.00	<25000.00	<25000.00			
	C	5	0	0	<25,000.00	<25000.00	<24200.00			
	D	5	0	0	<25,000.00	<25000.00	<25000.00			
	E	5	0	0	<25,000.00	<25000.00	<25000.00			
		25	0	0	<25,000.00	<25000.00	<24200.00			
5	A	5	0	0	<25,000.00	<25000.00	<25000.00			
	B	5	0	0	<25,000.00	<25000.00	<25000.00			
	C	5	0	0	<25,000.00	<25000.00	<24600.00			
	D	5	0	0	<25,000.00	<25000.00	<24950.00			
	E	5	0	0	<25,000.00	<25000.00	<25000.00			
		25	0	0	<25,000.00	<25000.00	<24600.00			
ALL		125	0	0	<25,000.00	<25000.00	<23400.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-35. Summary Statistics for Acetone (Offsite by Soil Group and Depth)

Acetone
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	626.75	340.50	121.85	343.22	272.91	184.30
	B	5	5	100	480.50	224.00	116.50	256.60	212.56	147.71
	C	5	5	100	576.50	215.00	127.40	255.08	202.17	185.73
	D	5	5	100	1,630.50	149.00	111.00	441.69	205.16	664.91
	E	5	5	100	612.00	121.36	72.00	218.27	150.29	223.89
		25	25	100	1,630.50	184.00	72.00	302.97	204.95	322.26
2	A	5	5	100	415.00	159.67	8.34	164.92	71.93	168.16
	B	5	5	100	1,227.00	148.30	7.36	332.59	76.53	511.61
	C	5	5	100	1,318.00	79.60	10.90	308.09	73.80	565.92
	D	5	5	100	444.50	43.60	19.20	141.48	64.58	181.83
	E	5	5	100	638.50	157.00	6.36	201.41	75.01	256.99
		25	25	100	1,318.00	106.95	6.36	229.70	72.25	352.68
3	A	5	5	100	218.00	29.40	24.73	89.91	50.36	89.84
	B	5	5	100	202.33	83.10	38.90	104.93	88.01	63.54
	C	5	5	100	276.00	107.00	29.85	125.67	90.02	90.52
	D	5	5	100	309.00	110.45	88.00	145.42	124.42	91.95
	E	5	5	100	317.00	93.55	28.38	130.11	85.09	111.32
		25	25	100	317.00	107.00	24.73	119.21	84.17	85.19
4	A	5	4	80	119.43	32.60	<11.90	45.50	27.01	44.69
	B	5	5	100	150.00	108.50	8.93	83.45	46.26	67.94
	C	5	5	100	156.50	111.20	15.30	90.92	64.10	57.88
	D	5	5	100	271.55	126.98	24.10	129.98	58.89	89.80
	E	5	4	80	527.60	92.30	20.90	169.21	76.50	205.98
		25	23	92	527.60	98.43	8.93	103.81	51.46	109.27
5	A	5	5	100	94.50	50.50	10.50	54.72	41.44	37.15
	B	5	5	100	99.50	79.60	25.20	72.92	66.24	28.28
	C	5	5	100	108.00	57.00	22.30	61.18	53.44	33.21
	D	5	5	100	547.00	135.00	16.80	190.36	113.75	206.06
	E	5	5	100	300.85	85.90	17.40	109.55	62.02	114.65
		25	25	100	547.00	79.60	10.50	97.75	63.53	111.46
ALL		125	123	98.4	1,630.50	108.50	6.36	170.69	83.56	238.82

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-36. Summary Statistics for Carbon Disulfide (Offsite by Soil Group and Depth)

Carbon Disulfide

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<6.05	<6.05	<6.05			
	B	5	2	40	22.00	<6.05	<6.05			
	C	5	3	60	6.76	4.79	<5.65	4.45	3.95	1.60
	D	5	1	20	<6.05	<5.78	3.54			
	E	5	0	0	<6.05	<5.70	<5.48			
		25	6	24	22.00	<6.05	3.54			
2	A	5	0	0	<6.05	<6.05	<5.80			
	B	5	0	0	<6.05	<6.05	<5.50			
	C	5	0	0	<6.05	<6.00	<5.55			
	D	5	0	0	<6.05	<5.65	<5.50			
	E	5	0	0	<6.05	<5.50	<5.50			
		25	0	0	<6.05	<5.95	<5.50			
3	A	5	0	0	<6.05	<6.05	<6.05			
	B	5	0	0	<6.05	<6.00	<5.55			
	C	5	0	0	<6.00	<5.70	<5.65			
	D	5	0	0	<6.05	<5.65	<5.50			
	E	5	0	0	<6.05	<6.00	<5.85			
		25	0	0	<6.05	<6.00	<5.50			
4	A	5	0	0	<6.05	<6.05	<5.98			
	B	5	0	0	<6.05	<5.95	<5.50			
	C	5	0	0	<5.80	<5.73	<5.50			
	D	5	0	0	<6.05	<5.78	<5.50			
	E	5	0	0	<6.05	<6.05	<5.85			
		25	0	0	<6.05	<5.95	<5.50			
5	A	5	0	0	<6.05	<6.05	<6.05			
	B	5	1	20	14.50	<6.05	<5.80			
	C	5	0	0	<6.05	<6.05	<5.90			
	D	5	2	40	33.20	<6.05	<6.00			
	E	5	1	20	13.60	<6.05	<6.05			
		25	4	16	33.20	<6.05	<5.80			
ALL		125	10	8	33.20	<6.05	3.54			

Arithmetic average, geometric average, and standard deviation are reported only if > 50% of sample results were above the detection limit.

Table E-37. Summary Statistics for Dichloromethane (Offsite by Soil Group and Depth)

Dichloromethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	1,991.50	1,148.00	164.40	1,069.20	611.60	665.53
	B	5	5	100	415.50	241.44	150.00	249.59	217.36	101.79
	C	5	5	100	119.30	61.10	44.40	77.28	60.20	37.08
	D	5	5	100	240.67	123.00	21.50	117.29	85.44	82.08
	E	5	5	100	185.00	56.70	18.40	77.47	59.10	63.39
		25	25	100	1,991.50	132.00	18.40	318.17	132.22	478.15
2	A	5	4	80	736.50	117.33	1.49	208.99	36.46	305.13
	B	5	5	100	255.00	67.35	1.50	85.79	19.72	104.27
	C	5	5	100	315.00	73.70	1.46	94.23	23.65	128.64
	D	5	4	80	115.00	48.15	3.57	52.71	21.91	51.30
	E	5	5	100	144.00	78.20	1.16	65.37	21.47	62.25
		25	23	92	736.50	73.70	1.16	101.42	24.02	156.24
3	A	5	5	100	819.00	98.53	30.80	224.55	103.76	333.75
	B	5	5	100	185.33	31.20	22.20	61.86	42.06	69.49
	C	5	5	100	113.00	37.80	14.10	47.02	35.48	38.28
	D	5	5	100	94.50	39.40	24.80	52.32	44.83	28.94
	E	5	5	100	131.00	47.57	26.60	58.69	47.03	43.01
		25	25	100	819.00	40.30	14.10	88.89	50.44	157.74
4	A	5	4	80	1,664.45	392.75	<6.00	552.11	128.92	647.91
	B	5	5	100	135.77	112.50	1.60	90.63	46.20	55.69
	C	5	5	100	90.10	86.00	1.67	56.89	27.80	43.36
	D	5	5	100	86.50	79.50	1.77	56.03	26.09	39.16
	E	5	5	100	520.20	66.50	2.22	139.10	35.76	216.56
		25	24	96	1,664.45	86.00	1.60	178.95	43.43	340.71
5	A	5	3	60	271.40	8.35	<7.00	84.78	18.17	118.94
	B	5	4	80	406.00	14.30	2.67	93.00	18.48	175.56
	C	5	3	60	274.00	5.77	5.77	63.98	14.19	118.10
	D	5	5	100	290.00	53.00	1.42	84.12	30.31	117.25
	E	5	5	100	227.00	35.50	2.96	62.83	21.82	93.56
		25	20	80	406.00	21.40	1.42	77.74	19.94	117.14
ALL		125	117	93.6	1,991.50	66.50	1.16	153.03	42.50	295.05

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table E-38. Summary Statistics for Ethyl Methacrylate (Offsite by Soil Group and Depth)

Ethyl Methacrylate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	0	0	<396.00	<396.00	<25.80			
	C	5	0	0	<396.00	<396.00	<22.60			
	D	5	0	0	<396.00	<379.50	<25.00			
	E	5	0	0	<396.00	<368.00	<23.80			
			25	0	0	<396.00	<396.00	<22.60		
2	A	5	0	0	<396.00	<396.00	<387.00			
	B	5	0	0	<396.00	<396.00	<373.00			
	C	5	0	0	<396.00	<396.00	<383.00			
	D	5	0	0	<396.00	<377.00	<361.00			
	E	5	0	0	<396.00	<376.00	<362.00			
			25	0	0	<396.00	<391.00	<361.00		
3	A	5	0	0	<396.00	<396.00	<37.80			
	B	5	0	0	<396.00	<396.00	<30.00			
	C	5	0	0	<395.00	<380.00	<22.60			
	D	5	0	0	<396.00	<380.00	<22.40			
	E	4	0	0	<396.00	<388.00	<24.60			
			24	0	0	<396.00	<390.50	<22.40		
4	A	5	0	0	<396.00	<396.00	<149.93			
	B	5	0	0	<396.00	<392.00	<201.50			
	C	5	0	0	<396.00	<380.00	<201.50			
	D	5	0	0	<396.00	<372.00	<206.40			
	E	4	0	0	<396.00	<391.50	<304.05			
			24	0	0	<396.00	<387.50	<201.50		
5	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	0	0	<396.00	<396.00	<383.33			
	C	5	0	0	<396.00	<396.00	<392.00			
	D	5	0	0	<396.00	<396.00	<393.00			
	E	5	0	0	<396.00	<396.00	<396.00			
			25	0	0	<396.00	<396.00	<383.33		
ALL		123	0	0	<396.00	<396.00	<22.40			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-39. Summary Statistics for Methyl Ethyl Ketone (Offsite by Soil Group and Depth)

Methyl Ethyl Ketone

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	<36.83	<18.10	<12.10			
	B	5	2	40	<14.60	<12.55	<12.10			
	C	5	1	20	<12.10	<11.95	<11.30			
	D	5	2	40	25.73	<12.10	<11.30			
	E	5	1	20	14.30	<11.90	<10.96			
		25	8	32	<36.83	<12.10	<10.96			
2	A	5	0	0	<12.10	<12.10	<11.60			
	B	5	2	40	<12.10	<11.20	8.83			
	C	5	0	0	<12.10	<12.00	<11.10			
	D	5	2	40	15.30	<11.00	6.28			
	E	5	0	0	<12.10	<11.00	<11.00			
		25	4	16	15.30	<11.70	6.28			
3	A	5	1	20	23.68	<12.10	<12.10			
	B	5	1	20	9.28	<12.00	<11.10			
	C	5	0	0	<12.00	<11.40	<11.30			
	D	5	1	20	26.50	<11.93	<11.20			
	E	5	1	20	24.30	<12.05	<11.70			
		25	4	16	26.50	<12.00	<11.10			
4	A	5	1	20	33.85	<12.10	<12.00			
	B	5	1	20	20.75	<12.10	<11.00			
	C	5	1	20	15.90	<11.50	<11.00			
	D	5	1	20	20.65	<12.10	<11.00			
	E	5	1	20	36.93	<12.10	<11.70			
		25	5	20	36.93	<12.10	<11.00			
5	A	5	0	0	<12.10	<12.10	<12.10			
	B	5	2	40	19.90	<12.00	<11.60			
	C	5	0	0	<12.10	<12.10	<11.80			
	D	5	2	40	114.00	<12.10	<12.00			
	E	5	1	20	76.80	<12.10	<12.10			
		25	5	20	114.00	<1210000	<11.60			
ALL		125	26	20.8	114.00	<12.10	6.28			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table E-40. Summary Statistics for Methyl Methacrylate (Off-site by Soil Group and Depth)

Methyl Methacrylate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	0	0	<396.00	<396.00	<25.80			
	C	5	0	0	<396.00	<396.00	<22.60			
	D	5	0	0	<396.00	<379.50	<25.00			
	E	5	0	0	<396.00	<368.00	<23.80			
		25	0	0	<396.00	<396.00	<22.60			
2	A	5	0	0	<396.00	<396.00	<387.00			
	B	5	0	0	<396.00	<396.00	<373.00			
	C	5	0	0	<396.00	<385.00	<366.00			
	D	5	0	0	<396.00	<377.00	<361.00			
	E	5	0	0	<396.00	<376.00	<362.00			
		25	0	0	<396.00	<387.00	<361.00			
3	A	5	0	0	<396.00	<396.00	<37.80			
	B	5	0	0	<396.00	<396.00	<30.00			
	C	5	0	0	<395.00	<380.00	<22.60			
	D	5	0	0	<396.00	<380.00	<22.40			
	E	4	0	0	<396.00	<388.00	<24.60			
		24	0	0	<396.00	<390.50	<22.40			
4	A	5	0	0	<396.00	<396.00	<209.70			
	B	5	0	0	<396.00	<392.00	<201.50			
	C	5	0	0	<396.00	<380.00	<201.50			
	D	5	0	0	<396.00	<372.00	<206.40			
	E	4	0	0	<396.00	<391.50	<304.05			
		24	0	0	<396.00	<387.50	<201.50			
5	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	0	0	<396.00	<396.00	<383.33			
	C	5	0	0	<396.00	<396.00	<392.00			
	D	5	0	0	<400.00	<400.00	<393.00			
	E	5	0	0	<400.00	<400.00	<400.00			
		25	0	0	<396.00	<396.00	<383.33			
ALL		123	0	0	<396.00	<396.00	<22.40			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-41. Summary Statistics for Pentachloroethane (Offsite by Soil Group and Depth)

Pentachloroethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<401.00	<401.00	<401.00			
	B	5	0	0	<401.00	<401.00	<384.00			
	C	5	0	0	<401.00	<396.00	<370.00			
	D	5	0	0	<401.00	<401.00	<370.00			
	E	5	0	0	<401.00	<380.00	<366.00			
			25	0	0	<401.00	<401.00	<366.00		
2	A	5	0	0	<401.00	<401.00	<387.00			
	B	5	0	0	<401.00	<401.00	<373.00			
	C	5	0	0	<401.00	<401.00	<383.00			
	D	5	0	0	<401.00	<377.00	<361.00			
	E	5	0	0	<401.00	<376.00	<362.00			
			25	0	0	<401.00	<391.00	<361.00		
3	A	5	0	0	<401.00	<401.00	<401.00			
	B	5	0	0	<401.00	<396.00	<368.00			
	C	5	0	0	<395.00	<380.00	<374.67			
	D	5	0	0	<401.00	<380.00	<360.00			
	E	5	0	0	<401.00	<400.00	<380.00			
			25	0	0	<401.00	<395.50	<360.00		
4	A	5	0	0	<401.00	<401.00	<388.00			
	B	5	0	0	<401.00	<392.00	<365.00			
	C	5	0	0	<401.00	<380.00	<364.00			
	D	5	0	0	<401.00	<385.00	<362.00			
	E	5	0	0	<401.00	<401.00	<385.00			
			25	0	0	<401.00	<390.50	<362.00		
5	A	5	0	0	<401.00	<401.00	<401.00			
	B	5	0	0	<401.00	<401.00	<383.33			
	C	5	0	0	<401.00	<401.00	<392.00			
	D	5	0	0	<401.00	<401.00	<393.00			
	E	5	0	0	<401.00	<401.00	<401.00			
			25	0	0	<401.00	<401.00	<383.33		
ALL		125	0	0	<401.00	<401.00	<360.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-42. Summary Statistics for Tetrachloroethylene (Offsite by Soil Group and Depth)

Tetrachloroethylene

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	4	80	320.00	55.30	<5.95	107.36	29.01	131.19
	B	5	4	80	38.80	24.10	<5.95	22.44	15.18	16.66
	C	5	3	60	6.77	2.98	2.93	4.25	3.70	1.87
	D	5	3	60	10.20	2.98	2.96	4.82	4.21	3.15
	E	5	1	20	6.33	<5.70	<5.48	.	.	.
		25	15	60	320.00	5.10	2.93	28.48	7.44	67.75
2	A	5	2	40	55.40	<5.95	<5.95	.	.	.
	B	5	0	0	<5.95	<5.95	<5.50	.	.	.
	C	5	0	0	<5.95	<5.95	<5.55	.	.	.
	D	5	1	20	<5.95	<5.60	<5.50	.	.	.
	E	5	1	20	5.78	<5.50	<5.50	.	.	.
		25	4	16	55.40	<5.85	<5.50	.	.	.
3	A	5	4	80	99.50	14.60	4.37	28.92	11.66	40.30
	B	5	2	40	21.49	<5.55	3.74	.	.	.
	C	5	0	0	<5.95	<5.70	<5.65	.	.	.
	D	5	0	0	<5.95	<5.65	<5.50	.	.	.
	E	5	0	0	<5.95	<5.95	<5.85	.	.	.
		25	6	24	99.50	<5.93	3.74	.	.	.
4	A	5	4	80	92.25	12.50	<5.95	28.69	12.89	36.48
	B	5	4	80	13.97	5.56	4.11	6.41	5.38	4.39
	C	5	2	40	9.30	<5.70	2.65	.	.	.
	D	5	2	40	<5.95	<5.50	2.64	.	.	.
	E	5	1	20	57.05	<5.95	<5.73	.	.	.
		25	13	52	92.25	2.98	2.64	11.23	5.25	20.44
5	A	5	2	40	27.43	<5.95	<5.95	.	.	.
	B	5	1	20	15.10	<5.95	<5.80	.	.	.
	C	5	1	20	8.67	<5.95	<5.90	.	.	.
	D	5	1	20	9.19	<5.95	<5.95	.	.	.
	E	5	1	20	6.01	<5.95	<5.95	.	.	.
		25	6	24	27.43	<5.95	<5.80	.	.	.
ALL		125	44	35.2	320.00	<5.95	2.64	.	.	.

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-43. Summary Statistics for 1,1,1-Trichloroethane (Offsite by Soil Group and Depth)

1,1,1-Trichloroethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	25.74	<6.05	<6.05			
	B	5	0	0	<6.05	<6.05	<5.46			
	C	5	1	20	4.66	<6.05	<5.65			
	D	5	0	0	<6.05	<6.05	<5.65			
	E	5	1	20	<22.81	<6.05	<5.60			
		25	4	16	25.74	<6.05	<5.46			
2	A	5	2	40	67.70	<6.05	<6.05			
	B	5	2	40	31.70	<6.05	<5.50			
	C	5	2	40	42.64	<6.05	<6.00			
	D	5	2	40	53.10	<5.95	<5.50			
	E	5	2	40	55.00	<5.50	<5.50			
		25	10	40	67.70	<6.05	<5.50			
3	A	5	1	20	20.06	<6.05	<6.05			
	B	5	1	20	11.86	<6.00	<5.55			
	C	5	1	20	13.80	<5.70	<5.65			
	D	5	1	20	18.75	<5.65	<5.50			
	E	5	1	20	14.60	<6.00	<5.85			
		25	5	20	20.06	<6.00	<5.50			
4	A	5	2	40	15.06	<6.05	<5.98			
	B	5	2	40	<6.05	<5.50	4.20			
	C	5	1	20	5.83	<5.73	<5.50			
	D	5	1	20	<6.05	<5.78	<5.50			
	E	5	1	20	6.15	<6.05	<5.85			
		25	7	28	15.06	<5.85	4.20			
5	A	5	2	40	15.26	<6.05	<6.05			
	B	5	1	20	6.09	<6.05	<6.00			
	C	5	1	20	27.40	<6.05	<6.00			
	D	5	1	20	26.20	<6.05	<6.05			
	E	5	1	20	<6.05	<6.05	5.81			
		25	6	24	27.40	<6.05	5.81			
ALL		125	32	25.6	67.70	<6.05	4.20			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-44. Summary Statistics for 1,1,2-Trichloroethane (Offsite by Soil Group and Depth)

1,1,2-Trichloroethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<6.05	<6.05	<6.05			
	B	5	0	0	<6.05	<6.05	<5.90			
	C	5	0	0	<6.05	<6.05	<5.65			
	D	5	0	0	<6.05	<6.05	<5.65			
	E	5	0	0	<6.05	<5.70	<5.48			
		25	0	0	<6.05	<6.05	<5.48			
2	A	5	0	0	<6.05	<6.05	<5.80			
	B	5	0	0	<6.05	<6.05	<5.50			
	C	5	0	0	<6.05	<6.00	<5.55			
	D	5	0	0	<6.05	<5.65	<5.50			
	E	5	0	0	<6.05	<5.50	<5.50			
		25	0	0	<6.05	<5.95	<5.50			
3	A	5	0	0	<6.05	<6.05	<6.05			
	B	5	0	0	<6.05	<6.00	<5.55			
	C	5	0	0	<6.00	<5.70	<5.65			
	D	5	0	0	<6.05	<5.65	<5.50			
	E	5	0	0	<6.05	<6.00	<5.85			
		25	0	0	<6.05	<6.00	<5.50			
4	A	5	0	0	<6.05	<6.05	<5.98			
	B	5	0	0	<6.05	<5.95	<5.50			
	C	5	0	0	<5.80	<5.73	<5.50			
	D	5	0	0	<6.05	<5.78	<5.50			
	E	5	0	0	<6.05	<6.05	<5.85			
		25	0	0	<6.05	<5.95	<5.50			
5	A	5	0	0	<6.05	<6.05	<6.05			
	B	5	0	0	<6.05	<6.05	<5.80			
	C	5	0	0	<6.05	<6.05	<5.90			
	D	5	0	0	<6.05	<6.05	<6.00			
	E	5	0	0	<6.05	<6.05	<6.05			
		25	0	0	<6.05	<6.05	<5.80			
ALL		125	0	0	<6.05	<6.05	<5.48			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-45. Summary Statistics for Toluene (Offsite by Soil Group and Depth)

Toluene

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	4	80	107.00	17.75	3.78	32.17	11.14	43.22
	B	5	4	80	47.55	7.38	3.48	14.37	8.22	18.80
	C	5	4	80	5.28	4.40	2.16	3.96	3.58	1.40
	D	5	3	60	<6.00	3.00	1.45	3.05	2.84	1.25
	E	5	1	20	<6.00	<5.60	1.93			
		25	16	64	107.00	3.00	1.45	11.23	4.73	22.47
2	A	5	3	60	17.10	3.00	2.18	5.72	4.07	6.37
	B	5	2	40	<6.00	<5.50	2.75			
	C	5	3	60	<6.00	3.00	1.47	3.07	2.86	1.02
	D	5	2	40	<5.95	<5.50	3.81			
	E	5	2	40	<5.50	<5.50	3.83			
		25	12	48	17.10	<5.50	1.47			
3	A	5	3	60	25.33	3.75	3.75	7.88	4.57	9.77
	B	5	1	20	7.25	<6.00	<5.55			
	C	5	1	20	6.32	<5.70	<5.65			
	D	5	1	20	6.85	<5.65	<5.50			
	E	5	1	20	5.66	<6.00	<5.85			
		25	7	28	25.33	<6.00	3.75			
4	A	5	4	80	43.00	7.99	2.31	13.24	6.91	16.95
	B	5	3	60	15.60	3.00	2.58	5.57	4.19	5.63
	C	5	2	40	<5.80	<5.50	2.98			
	D	5	4	80	<5.50	3.78	3.09	3.62	3.51	0.73
	E	5	2	40	63.15	<5.85	3.07			
		25	15	60	63.15	3.00	2.31	8.16	4.48	14.13
5	A	5	2	40	22.29	<6.00	<6.00			
	B	5	2	40	18.90	<6.00	<6.00			
	C	5	2	40	10.20	<6.00	<6.00			
	D	5	4	80	11.00	6.92	2.17	6.72	5.54	4.10
	E	5	3	60	8.81	5.14	5.14	5.02	4.62	2.37
		25	13	52	22.29	3.00	2.17	6.79	5.22	5.38
ALL		125	63	50.4	107.00	3.00	1.45	6.88	4.19	12.44

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-46. Summary Statistics for Trichlorofluoromethane (Offsite by Soil Group and Depth)

Trichlorofluoromethane

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	2	40	23.3	<11.70	9.2			
	B	5	1	20	<11.70	<11.70	4.195			
	C	5	3	60	<11.70	4.95	4.355	5.06	4.89	0.67
	D	5	1	20	<11.70	<11.70	3.11			
	E	5	0	0	<11.70	<11.40	<7.55			
		25	7	28	23.3	<11.70	3.11			
2	A	5	1	20	<11.70	<7.50	<6.50			
	B	5	2	40	<11.70	<8.74	<5.50			
	C	5	1	20	<11.70	<6.50	2.69			
	D	5	1	20	<11.70	<5.50	2.475			
	E	5	1	20	<11.30	<5.50	3.44			
		25	6	24	<11.70	<6.57	2.475			
3	A	5	1	20	<11.70	<11.70	4.1733			
	B	5	1	20	<11.70	<11.10	<6.00			
	C	5	1	20	<11.40	<11.30	3.26			
	D	5	1	20	<11.30	<8.40	<5.50			
	E	5	2	40	58.45	<11.70	3.13			
		25	6	24	58.45	<11.10	3.13			
4	A	5	2	40	<11.70	<10.80	3.65			
	B	5	1	20	<11.70	<11.50	2.63			
	C	5	2	40	<11.45	<5.50	3.06			
	D	5	1	20	<11.70	<11.55	4.1			
	E	5	2	40	<11.70	<7.00	3.16			
		25	8	32	<11.70	<10.80	2.63			
5	A	5	2	40	8.825	<9.50	2.2			
	B	5	1	20	<11.70	<8.50	3.27			
	C	5	1	20	<11.70	<8.50	2.48			
	D	5	1	20	<11.70	<10.00	2.98			
	E	5	1	20	<11.70	<7.00	2.4			
		25	6	24	8.825	<8.50	2.2			
ALL		125	33	26.4	58.45	<10.50	2.2			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-47. Summary Statistics for Xylenes (Offsite by Soil Group and Depth)

Xylenes

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<14.88	<6.03	<6.02			
	B	5	2	40	7.49	<6.03	5.56			
	C	5	1	20	<6.02	<5.96	2.5513			
	D	5	0	0	<6.02	<6.03	<5.65			
	E	5	0	0	<6.02	<5.70	<5.48			
		25	3	12	<14.88	<6.03	2.5513			
2	A	5	1	20	11.12	<6.03	<5.80			
	B	5	0	0	<6.02	<6.03	<5.50			
	C	5	0	0	<6.02	<6.00	<5.55			
	D	5	1	20	<5.95	<5.50	2.7063			
	E	5	0	0	<6.02	<5.50	<5.50			
		25	2	8	11.12	<5.85	2.7063			
3	A	5	2	40	8.9475	<6.03	2.7263			
	B	5	1	20	<6.00	<5.55	2.9463			
	C	5	0	0	<6.00	<5.70	<5.65			
	D	5	0	0	<6.02	<5.65	<5.50			
	E	5	0	0	<6.02	<6.00	<5.85			
		25	3	12	8.9475	<5.85	2.7263			
4	A	5	1	20	10.3063	<6.03	<5.85			
	B	5	1	20	53.4375	<6.03	<5.50			
	C	5	0	0	<5.80	<5.73	<5.50			
	D	5	1	20	<6.02	<5.60	2.52			
	E	5	0	0	<8.89	<6.03	<5.85			
		25	3	12	53.4375	<5.85	2.52			
5	A	5	0	0	<6.02	<6.03	<6.02			
	B	5	0	0	<6.02	<6.03	<5.80			
	C	5	0	0	<6.02	<6.03	<5.90			
	D	5	0	0	<6.02	<6.03	<6.00			
	E	5	1	20	<6.02	<6.03	1.22			
		25	1	4	<6.02	<6.03	1.22			
ALL		125	12	9.6	53.4375	<6.00	1.22			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-48. Summary Statistics for Benzo(a)Pyrene (Offsite by Soil Group and Depth)

Benzo(a)Pyrene

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	1	20	<396.00	<396.00	196.00			
	C	5	3	60	<396.00	183.50	40.80	134.65	106.16	84.66
	D	5	3	60	458.00	190.25	187.00	291.05	265.18	142.15
	E	5	3	60	425.00	230.00	230.00	279.55	262.33	112.55
		25	10	40	458.00	<384.00	40.80			
2	A	5	0	0	<396.00	<396.00	<387.00			
	B	5	1	20	<396.00	<375.00	283.00			
	C	5	1	20	586.00	<385.00	<366.00			
	D	5	1	20	<396.00	<377.00	124.00			
	E	5	0	0	<396.00	<376.00	<362.00			
		25	3	12	586.00	<383.00	124.00			
3	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	1	20	<396.00	<370.00	114.00			
	C	5	0	0	<395.00	<378.00	<374.67			
	D	5	0	0	<396.00	<375.00	<380.00			
	E	5	0	0	<396.00	<396.00	<381.00			
		25	1	4	<396.00	<395.00	114.00			
4	A	5	0	0	<396.00	<396.00	<388.00			
	B	5	0	0	<396.00	<392.00	<365.00			
	C	5	0	0	<381.00	<378.00	<364.00			
	D	5	0	0	<396.00	<384.50	<362.00			
	E	5	0	0	<396.00	<396.00	<385.00			
		25	0	0	<396.00	<388.00	<362.00			
5	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	0	0	<396.00	<396.00	<383.33			
	C	5	0	0	<396.00	<396.00	<392.00			
	D	5	0	0	<396.00	<396.00	<393.00			
	E	5	0	0	<396.00	<396.00	<396.00			
		25	0	0	<396.00	<396.00	<383.33			
ALL		125	14	11.2	586.00	<396.00	40.80			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-49. Summary Statistics for Bis(2-ethylhexyl) Phthalate (Offsite by Soil Group and Depth)

Bis(2-ethylhexyl) Phthalate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	10,900.00	1,970.00	729.00	3,781.80	2,444.58	4,130.75
	B	5	5	100	3,090.00	449.00	415.00	988.60	674.48	1,175.64
	C	5	5	100	565.00	390.00	234.00	397.80	382.41	119.55
	D	5	5	100	2,243.75	769.00	300.00	950.48	698.51	765.62
	E	5	5	100	4,846.33	604.00	128.00	1,349.27	582.87	1,968.94
		25	25	100	10,900.00	565.00	128.00	1,493.59	761.88	2,297.89
2	A	5	5	100	1,120.00	288.00	188.00	465.00	364.74	390.54
	B	5	5	100	1,740.00	202.00	51.90	537.78	267.56	699.60
	C	5	5	100	1,030.00	286.00	49.60	356.32	216.91	392.96
	D	5	5	100	640.00	287.00	75.80	345.68	244.18	274.79
	E	5	4	80	578.00	421.00	42.00	334.30	243.24	215.18
		25	24	96	1,740.00	287.00	42.00	407.82	262.96	399.64
3	A	5	5	100	7,040.00	1,670.00	483.50	2,637.90	1,646.51	2,700.28
	B	5	5	100	813.00	486.00	203.00	461.60	404.68	246.69
	C	5	5	100	610.00	269.90	159.00	347.78	268.74	182.60
	D	5	5	100	565.00	264.00	70.30	280.71	230.29	180.52
	E	5	5	100	1,460.00	247.00	66.50	640.65	309.70	661.42
		25	25	100	7,040.00	457.00	66.50	873.73	418.06	1,461.26
4	A	5	5	100	1,710.00	531.00	71.00	838.60	505.41	742.78
	B	5	4	80	1,330.00	647.00	283.50	694.60	539.85	487.27
	C	5	4	80	1,700.00	294.00	180.00	546.60	361.48	650.04
	D	5	5	100	796.00	490.50	44.50	416.40	272.48	307.15
	E	5	4	80	3,064.00	643.00	<399.00	1,314.70	765.95	1,220.81
		25	22	88	3,064.00	531.00	44.50	762.18	459.95	752.62
5	A	5	5	100	1,980.00	147.00	64.90	731.38	287.65	895.73
	B	5	5	100	469.00	266.67	60.50	246.99	187.30	170.68
	C	5	4	80	<399.00	202.00	41.00	229.70	183.11	130.16
	D	5	4	80	665.00	316.00	73.70	353.24	275.32	237.47
	E	5	5	100	524.00	83.20	47.00	240.54	139.30	247.02
		25	23	92	1,980.00	202.00	41.00	360.37	206.81	445.96
ALL		125	119	95.2	10,900.00	415.00	41.00	779.54	380.42	1,335.01

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table E-50. Summary Statistics for Butylbenzyl Phthalate (Offsite by Soil Group and Depth)

Butylbenzyl Phthalate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<400.00	<400.00	<400.00			
	B	5	0	0	<400.00	<400.00	<384.00			
	C	5	0	0	<400.00	<396.00	<367.00			
	D	5	0	0	<400.00	<400.00	<370.00			
	E	5	0	0	<400.00	<375.00	<362.50			
			25	0	0	<400.00	<400.00	<362.50		
2	A	5	0	0	<400.00	<400.00	<387.00			
	B	5	0	0	<400.00	<400.00	<373.00			
	C	5	0	0	<400.00	<385.00	<366.00			
	D	5	0	0	<400.00	<377.00	<361.00			
	E	5	0	0	<400.00	<376.00	<362.00			
			25	0	0	<400.00	<387.00	<361.00		
3	A	5	0	0	<400.00	<400.00	<400.00			
	B	5	0	0	<400.00	<396.00	<368.00			
	C	5	0	0	<395.00	<378.00	<374.87			
	D	5	0	0	<400.00	<375.00	<360.00			
	E	5	0	0	<400.00	<399.50	<381.00			
			25	0	0	<400.00	<395.50	<360.00		
4	A	5	0	0	<400.00	<400.00	<388.00			
	B	5	0	0	<400.00	<392.00	<365.00			
	C	5	0	0	<381.00	<378.00	<364.00			
	D	5	0	0	<400.00	<384.50	<362.00			
	E	5	0	0	<400.00	<400.00	<385.00			
			25	0	0	<400.00	<388.00	<362.00		
5	A	5	0	0	<400.00	<400.00	<400.00			
	B	5	0	0	<400.00	<400.00	<383.33			
	C	5	0	0	<400.00	<400.00	<392.00			
	D	5	0	0	<400.00	<400.00	<393.00			
	E	5	0	0	<400.00	<400.00	<400.00			
			25	0	0	<400.00	<400.00	<383.33		
ALL		125	0	0	<400.00	<400.00	<360.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table E-51. Summary Statistics for Di-n-butyl Phthalate (Offsite by Soil Group and Depth)

Di-n-butyl Phthalate

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	4	80	488.00	213.00	150.00	257.75	236.59	132.20
	B	5	4	80	<384.00	127.00	74.80	126.62	117.68	46.82
	C	5	3	60	<406.00	122.70	65.70	133.72	115.70	64.52
	D	5	3	60	<415.00	88.65	45.50	122.32	98.56	78.13
	E	5	4	80	<368.00	63.80	47.40	84.48	73.94	56.32
		25	18	72	488.00	127.00	45.50	144.98	118.61	95.57
2	A	5	4	80	<415.00	64.80	51.10	96.12	82.96	65.08
	B	5	4	80	<415.00	47.70	44.70	90.02	73.37	70.29
	C	5	3	60	<415.00	176.00	46.60	132.12	108.15	78.53
	D	5	3	60	<391.00	45.20	43.00	103.32	79.52	81.00
	E	5	4	80	<370.00	51.20	41.40	80.00	67.76	59.70
		25	18	72	<415.00	57.20	41.40	100.32	81.28	67.59
3	A	5	5	100	145.50	88.90	55.60	95.16	86.06	41.54
	B	5	5	100	138.50	75.40	60.70	91.18	84.74	31.43
	C	5	5	100	125.55	48.80	37.10	63.21	54.80	35.71
	D	5	5	100	129.25	55.80	42.50	68.25	60.38	35.69
	E	5	5	100	131.45	58.40	41.10	70.23	62.53	35.37
		25	25	100	145.50	60.70	37.10	77.61	68.51	35.51
4	A	5	4	80	<388.00	72.60	55.70	93.12	82.85	56.97
	B	5	4	80	<365.00	53.30	46.50	79.18	67.86	58.04
	C	5	4	80	<364.00	53.70	38.20	77.19	65.09	59.09
	D	5	2	40	<415.00	<362.00	48.50			
	E	5	4	80	<415.00	50.70	41.30	84.19	67.84	70.32
		25	18	72	<415.00	58.50	38.20	93.84	77.53	63.16
5	A	5	2	40	<415.00	<415.00	70.30			
	B	5	2	40	<415.00	<406.00	58.10			
	C	5	1	20	<415.00	<415.00	45.50			
	D	5	2	40	<415.00	<415.00	46.00			
	E	5	1	20	<415.00	<415.00	46.20			
		25	8	32	<415.00	<415.00	45.50			
ALL		125	87	69.6	488.00	74.80	37.10	115.17	93.12	75.05

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

This analyte is a common laboratory artifact (see Section 7.2).

Table E-52. Summary Statistics for Fluoranthene (Offsite by Soil Group and Depth)

Fluoranthene
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<400.00	<400.00	<400.00			
	B	5	0	0	<400.00	<400.00	<384.00			
	C	5	0	0	<400.00	<396.00	<367.00			
	D	5	0	0	<400.00	<400.00	<370.00			
	E	5	0	0	<400.00	<375.00	<362.50			
		25	0	0	<400.00	<400.00	<362.50			
2	A	5	0	0	<400.00	<400.00	<387.00			
	B	5	0	0	<400.00	<400.00	<373.00			
	C	5	0	0	<400.00	<385.00	<366.00			
	D	5	0	0	<400.00	<377.00	<361.00			
	E	5	0	0	<400.00	<376.00	<362.00			
		25	0	0	<400.00	<367.00	<361.00			
3	A	5	0	0	<400.00	<400.00	<400.00			
	B	5	0	0	<400.00	<396.00	<368.00			
	C	5	0	0	<395.00	<378.00	<374.67			
	D	5	0	0	<400.00	<375.00	<360.00			
	E	5	0	0	<400.00	<399.50	<381.00			
		25	0	0	<400.00	<395.50	<360.00			
4	A	5	0	0	<400.00	<400.00	<388.00			
	B	5	0	0	<400.00	<392.00	<365.00			
	C	5	0	0	<381.00	<378.00	<364.00			
	D	5	0	0	<400.00	<384.50	<362.00			
	E	5	0	0	<400.00	<400.00	<385.00			
		25	0	0	<400.00	<388.00	<362.00			
5	A	5	0	0	<400.00	<400.00	<400.00			
	B	5	0	0	<400.00	<400.00	<383.33			
	C	5	0	0	<400.00	<400.00	<392.00			
	D	5	0	0	<400.00	<400.00	<393.00			
	E	5	0	0	<400.00	<400.00	<400.00			
		25	0	0	<400.00	<400.00	<383.33			
ALL		125	0	0	<400.00	<400.00	<360.00			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-53. Summary Statistics for Kepone (Offsite by Soil Group and Depth)

Kepone

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<18.20	<18.20	<18.20			
	B	5	0	0	<18.20	<18.20	<9.36			
	C	5	0	0	<18.20	<10.40	<9.48			
	D	5	0	0	<18.20	<11.30	<8.91			
	E	5	0	0	<18.20	<10.30	<8.80			
			25	0	0	<18.20	<18.20	<8.80		
2	A	5	0	0	<18.20	<18.20	<18.20			
	B	5	0	0	<18.20	<18.20	<8.95			
	C	5	0	0	<18.20	<18.20	<8.91			
	D	5	0	0	<18.20	<17.60	<9.04			
	E	5	0	0	<18.20	<10.30	<8.69			
			25	0	0	<18.20	<18.20	<8.69		
3	A	5	0	0	<18.20	<18.20	<18.20			
	B	5	0	0	<18.20	<16.03	<8.81			
	C	5	0	0	<18.20	<13.78	<9.00			
	D	5	0	0	<18.20	<13.82	<8.98			
	E	5	0	0	<18.20	<13.93	<9.17			
			25	0	0	<18.20	<17.70	<8.81		
4	A	5	0	0	<18.20	<18.20	<18.20			
	B	5	1	20	<18.20	<9.38	1.20			
	C	5	0	0	<9.29	<9.0800	<9.03			
	D	5	0	0	<9.93	<9.0950	<8.91			
	E	5	0	0	<18.20	<9.53	<9.18			
			25	1	4	<18.20	<9.38	1.20		
5	A	5	0	0	<18.20	<18.20	<15.40			
	B	5	0	0	<18.20	<18.20	<9.21			
	C	5	0	0	<18.20	<18.20	<9.38			
	D	5	0	0	<18.20	<18.20	<9.56			
	E	5	0	0	<18.20	<18.20	<9.74			
			25	0	0	<18.20	<18.20	<9.21		
ALL		125	1	0.8	<18.20	<18.20	1.20			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-54. Summary Statistics for m,p-Cresol (Offsite by Soil Group and Depth)

m,p-Cresol

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	3	1	33.33	<404.00	<404.00	65.30			
	B	3	0	0	<404.00	<404.00	<384.00			
	C	3	0	0	<404.00	<396.00	<390.00			
	D	3	0	0	<404.00	<404.00	<377.00			
	E	3	0	0	<404.00	<368.00	<367.00			
		15	1	6.67	<484.00	<404.00	65.30			
2	A	1	0	0	<404.00	<404.00	<404.00			
	B	1	0	0	<404.00	<404.00	<404.00			
	C	1	0	0	<404.00	<404.00	<404.00			
	D	1	0	0	<391.00	<391.00	<391.00			
	E	1	0	0	<362.00	<362.00	<362.00			
		5	0	0	<404.00	<404.00	<362.00			
3	A	1	0	0	<404.00	<404.00	<404.00			
	B	1	0	0	<368.00	<368.00	<368.00			
	C	1	0	0	<374.67	<374.67	<374.67			
	D	1	0	0	<404.00	<404.00	<404.00			
	E	1	0	0	<381.00	<381.00	<381.00			
		5	0	0	<404.00	<381.00	<368.00			
4	A	2	0	0	<401.00	<339.07	<277.13			
	B	2	0	0	<402.00	<391.00	<380.00			
	C	2	0	0	<379.50	<377.25	<375.00			
	D	2	0	0	<404.00	<394.25	<384.50			
	E	2	0	0	<404.00	<394.50	<385.00			
		10	0	0	<404.00	<384.75	<277.13			
5	A	1	0	0	<404.00	<404.00	<404.00			
	B	1	0	0	<404.00	<404.00	<404.00			
	C	1	0	0	<404.00	<404.00	<404.00			
	D	1	0	0	<404.00	<404.00	<404.00			
	E	1	0	0	<404.00	<404.00	<404.00			
		5	0	0	<404.00	<404.00	<404.00			
ALL		40	1	2.5	<404.0000	<403.0000	65.3			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-55. Summary Statistics for 4-Methylphenol (p-Cresol) (Offsite by Soil Group and Depth)

4-Methylphenol (p-Cresol)

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<396.00	<396.00	<396.00			
	B	5	0	0	<396.00	<396.00	<384.00			
	C	5	0	0	<396.00	<396.00	<367.00			
	D	5	0	0	<396.00	<396.00	<370.00			
	E	5	0	0	<396.00	<375.00	<362.50			
		25	0	0	<396.00	<396.00	<362.50			
2	A	2	0	0	<411.00	<411.00	<411.00			
	B	2	0	0	<411.00	<393.00	<375.00			
	C	2	0	0	<411.00	<397.00	<383.00			
	D	2	0	0	<377.00	<369.00	<361.00			
	E	2	0	0	<377.00	<373.50	<370.00			
		10	0	0	<411.00	<380.00	<361.00			
3	A	2	1	50	<411.00	160.75	116.00	160.75	154.40	63.29
	B	2	0	0	<411.00	<403.50	<396.00			
	C	2	0	0	<395.00	<388.50	<382.00			
	D	2	0	0	<395.00	<377.50	<360.00			
	E	2	0	0	<403.00	<403.00	<403.00			
		10	1	10	<411.00	<395.50	116.00			
4	A	1	0	0	<388.00	<388.00	<388.00			
	B	1	0	0	<365.00	<365.00	<365.00			
	C	1	0	0	<364.00	<364.00	<364.00			
	D	1	0	0	<372.00	<372.00	<372.00			
	E	1	0	0	<411.00	<411.00	<411.00			
		5	0	0	<411.00	<372.00	<364.00			
5	A	3	0	0	<411.00	<411.00	<411.00			
	B	3	0	0	<411.00	<411.00	<406.00			
	C	3	0	0	<411.00	<411.00	<397.00			
	D	3	0	0	<411.00	<411.00	<411.00			
	E	3	0	0	<411.00	<411.00	<411.00			
		15	0	0	<411.00	<411.00	<397.00			
ALL		40	1	2.5	<411.00	<408.50	116.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-56. Summary Statistics for Phenol (Offsite by Soil Group and Depth)

Phenol

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<402.00	<402.00	<402.00			
	B	5	0	0	<402.00	<402.00	<384.00			
	C	5	0	0	<402.00	<396.00	<367.00			
	D	5	0	0	<402.00	<402.00	<371.00			
	E	5	0	0	<402.00	<375.00	<362.50			
			25	0	0	<402.00	<402.00	<362.50		
2	A	5	0	0	<402.00	<402.00	<387.00			
	B	5	0	0	<402.00	<402.00	<373.00			
	C	5	0	0	<402.00	<385.00	<366.00			
	D	5	0	0	<402.00	<377.00	<361.00			
	E	5	0	0	<402.00	<376.00	<362.00			
			25	0	0	<402.00	<387.00	<361.00		
3	A	5	0	0	<402.00	<402.00	<402.00			
	B	5	0	0	<402.00	<396.00	<368.00			
	C	5	0	0	<395.00	<378.00	<374.00			
	D	5	0	0	<402.00	<375.00	<360.00			
	E	5	1	20	<402.00	<382.00	62.30			
			25	1	4	<402.00	<395.00	62.30		
4	A	5	0	0	<402.00	<401.00	<388.00			
	B	5	0	0	<402.00	<392.00	<365.00			
	C	5	0	0	<381.00	<378.00	<364.00			
	D	5	0	0	<402.00	<384.50	<362.00			
	E	5	0	0	<402.00	<402.00	<385.00			
			25	0	0	<402.00	<388.00	<362.00		
5	A	5	0	0	<402.00	<402.00	<402.00			
	B	5	0	0	<402.00	<402.00	<383.00			
	C	5	0	0	<402.00	<402.00	<392.00			
	D	5	0	0	<402.00	<402.00	<393.00			
	E	5	0	0	<402.00	<402.00	<402.00			
			25	0	0	<402.00	<402.00	<383.00		
ALL		125	1	0.8	<402.00	<402.00	62.30			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-57. Summary Statistics for Pyridine (Offsite by Soil Group and Depth)

Pyridine
Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<767.00	<767.00	<767.00			
	B	5	0	0	<767.00	<767.00	<767.00			
	C	5	0	0	<767.00	<767.00	<734.00			
	D	5	0	0	<767.00	<767.00	<740.00			
	E	5	0	0	<767.00	<750.00	<725.00			
		25	0	0	<767.00	<767.00	<725.00			
2	A	5	0	0	<767.00	<767.00	<431.00			
	B	5	0	0	<767.00	<746.00	<375.00			
	C	5	0	0	<767.00	<732.00	<383.00			
	D	5	0	0	<767.00	<754.00	<361.00			
	E	5	0	0	<767.00	<724.00	<370.00			
		25	0	0	<767.00	<746.00	<361.00			
3	A	5	0	0	<767.00	<767.00	<478.00			
	B	5	0	0	<767.00	<740.00	<396.00			
	C	5	0	0	<756.00	<749.33	<395.00			
	D	5	0	0	<767.00	<744.00	<360.00			
	E	5	0	0	<767.00	<762.00	<403.00			
		25	0	0	<767.00	<750.00	<360.00			
4	A	5	0	0	<767.00	<767.00	<388.00			
	B	5	0	0	<767.00	<767.00	<365.00			
	C	5	0	0	<762.00	<756.00	<364.00			
	D	5	0	0	<767.00	<764.50	<372.00			
	E	5	0	0	<767.00	<767.00	<464.00			
		25	0	0	<767.00	<767.00	<364.00			
5	A	5	0	0	<767.00	<671.00	<470.00			
	B	5	0	0	<767.00	<691.00	<406.00			
	C	5	0	0	<767.00	<767.00	<397.00			
	D	5	0	0	<767.00	<767.00	<430.00			
	E	5	0	0	<767.00	<684.00	<411.00			
		25	0	0	<767.00	<691.00	<397.00			
ALL		125	0	0	<767.00	<764.50	<360.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-58. Summary Statistics for 2,4-Dichlorophenoxyacetic acid¹ (Offsite by Soil Group and Depth)

2,4-Dichlorophenoxyacetic acid

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<115.00	<115.00	<115.00			
	B	5	0	0	<115.00	<115.00	<113.00			
	C	5	0	0	<115.00	<115.00	<111.50			
	D	5	0	0	<115.00	<115.00	<110.00			
	E	5	0	0	<115.00	<112.00	<107.50			
		25	0	0	<115.00	<115.00	<107.50			
2	A	5	0	0	<115.00	<115.00	<25.60			
	B	5	0	0	<115.00	<115.00	<22.80			
	C	5	0	0	<115.00	<115.00	<22.90			
	D	5	0	0	<115.00	<110.00	<22.00			
	E	5	0	0	<115.00	<112.00	<22.20			
		25	0	0	<115.00	<115.00	<22.00			
3	A	5	0	0	<115.00	<115.00	<81.45			
	B	5	0	0	<115.00	<109.00	<24.10			
	C	5	0	0	<115.00	<111.00	<23.60			
	D	5	0	0	<115.00	<112.00	<22.00			
	E	5	0	0	<115.00	<115.00	<24.10			
		25	0	0	<115.00	<112.00	<22.00			
4	A	5	0	0	<115.00	<115.00	<69.45			
	B	5	0	0	<115.00	<113.50	<32.55			
	C	5	0	0	<115.00	<114.00	<38.83			
	D	5	0	0	<115.00	<113.00	<33.85			
	E	5	0	0	<115.00	<115.00	<37.60			
		25	0	0	<115.00	<115.00	<32.55			
5	A	5	0	0	<115.00	<78.60	<28.70			
	B	5	0	0	<115.00	<85.80	<25.00			
	C	5	0	0	<115.00	<115.00	<23.50			
	D	5	0	0	<115.00	<115.00	<26.00			
	E	5	0	0	<115.00	<80.00	<24.65			
		25	0	0	<115.00	<85.80	<23.50			
ALL		125	0	0	<115.00	<115.00	<22.00	47.51	41.96	

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-59. Summary Statistics for 2,5,4-T (Offsite by Soil Group and Depth)

2,4,5-T

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	0	0	<114.50	<114.50	<114.50			
	B	5	0	0	<114.50	<114.50	<113.00			
	C	5	0	0	<114.50	<114.50	<111.25			
	D	5	0	0	<114.50	<114.50	<110.00			
	E	5	0	0	<114.50	<112.00	<107.50			
		25	0	0	<114.50	<114.50	<107.50			
2	A	5	1	20	<114.50	<75.60	<12.80			
	B	5	0	0	<114.50	<105.00	<11.40			
	C	5	0	0	<114.50	<111.00	<11.40			
	D	5	0	0	<114.50	<110.00	<11.00			
	E	5	0	0	<114.50	<112.00	<11.10			
		25	1	4	<114.50	<110.00	<11.00			
3	A	5	0	0	<114.50	<114.50	<69.20			
	B	5	0	0	<114.50	<109.00	<12.00			
	C	5	0	0	<114.50	<111.00	<11.80			
	D	5	0	0	<114.50	<112.00	<11.00			
	E	5	0	0	<114.50	<114.50	<12.10			
		25	0	0	<114.50	<111.00	<11.00			
4	A	5	0	0	<114.50	<114.50	<35.60			
	B	5	1	20	<114.50	<113.50	11.48			
	C	5	0	0	<114.50	<114.00	<18.46			
	D	5	1	20	<114.50	<112.75	10.90			
	E	5	1	20	<114.50	<114.50	22.92			
		25	3	12	<114.50	<114.50	10.90			
5	A	5	0	0	<114.50	<39.30	<14.40			
	B	5	0	0	<114.50	<42.90	<12.50			
	C	5	0	0	<114.50	<57.60	<11.80			
	D	5	0	0	<114.50	<71.00	<13.00			
	E	5	0	0	<114.50	<40.00	<12.30			
		25	0	0	<114.50	<42.90	<11.80			
ALL		125	4	3.2	<114.50	<113.50	<11.00			

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-60. Summary Statistics for Hexachlorodibenzo-p-dioxins (Offsite by Soil Group and Depth)

Hexachlorodibenzo-p-dioxins

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	1	20	2.40	< 0.1000	< 0.1000	0.52	0.11	
	B	2	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	4	1	25	2.13	< 0.1000	< 0.1000	0.57	0.09	
	D	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
			17	2	11.76	2.40	< 0.1000	< 0.1000	0.31	0.07
2	A	5	1	20	0.10	< 0.1000	< 0.1000	0.06	0.06	
	B	4	1	25	4.10	< 0.1000	< 0.1000	1.06	0.15	
	C	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
			19	2	10.53	4.10	< 0.1000	< 0.1000	0.27	0.07
3	A	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
			23	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05
4	A	2	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
			15	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05
5	A	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
			22	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05
ALL		96	4	4.17	4.10	< 0.1000	< 0.1000	0.14	0.06	

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-61. Summary Statistics for Pentachlorodibenzo-p-furans (Offsite by Soil Group and Depth)

Pentachlorodibenzo-p-furans

Units: µg/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	3	1	33.33	0.30	< 0.1000	< 0.1000	0.13	0.09	
	D	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
		18	1	5.56	0.30	< 0.1000	< 0.1000	0.06	0.06	
2	A	5	1	20	0.10	< 0.1000	< 0.1000	0.06	0.06	
	B	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
		25	1	4	0.10	< 0.1000	< 0.1000	0.05	0.05	
3	A	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	3	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
		22	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
4	A	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	C	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	4	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
		21	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
5	A	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	B	5	1	20	1.00	< 0.1000	< 0.1000	0.24	0.09	
	C	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	D	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
	E	5	0	0	< 0.1000	< 0.1000	< 0.1000	0.05	0.05	
		25	1	4	1.00	< 0.1000	< 0.1000	0.09	0.06	
ALL		111	3	2.7	1.00	< 0.1000	< 0.1000	0.06	0.05	

Arithmetic average, geometric average, and standard deviation are reported only if ≥ 50% of sample results were above the detection limit.

Table E-62. Summary Statistics for Tritium (Offsite by Soil Group and Depth)

Tritium

Units: pCi/kg

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	1	20	17.64	<8.23	<3.57			
	B	5	2	40	15.59	<12.70	<7.46			
	C	5	1	20	<12.70	<8.98	0.03			
	D	5	1	20	<12.70	<12.36	0.16			
	E	5	1	20	<12.70	<8.10	0.19			
			25	6	24	17.64	<8.98	0.03		
2	A	5	1	20	<12.70	<11.22	<0.02			
	B	5	2	40	<12.70	<5.67	0.09			
	C	5	2	40	<12.70	<8.15	0.16			
	D	5	2	40	<12.70	<1.21	0.09			
	E	5	1	20	<12.70	<8.12	<0.02			
			25	8	32	<12.70	<6.30	<0.02		
3	A	5	1	20	<11.30	<2.43	<0.02			
	B	5	2	40	<12.70	<2.64	<0.05			
	C	5	3	60	<12.70	3.21	0.02	3.22	0.62	3.13
	D	5	1	20	<12.70	<4.15	<0.03			
	E	5	3	60	<12.70	3.21	0.04	3.10	0.67	2.99
			25	10	40	<12.70	<4.15	0.02		
4	A	5	0	0	<12.70	<12.70	<9.2550			
	B	5	0	0	<12.70	<12.70	<12.70			
	C	5	0	0	<12.70	<12.70	<12.70			
	D	5	0	0	<12.70	<12.70	<9.03			
	E	5	0	0	<12.70	<12.70	<8.62			
			25	0	0	<12.70	<12.70	<8.62		
5	A	5	0	0	<12.70	<8.93	<5.8900			
	B	5	0	0	<12.70	<12.70	<5.34			
	C	5	0	0	<12.70	<12.40	<7.05			
	D	5	0	0	<12.70	<8.07	<4.90			
	E	5	1	20	<12.70	<9.46	2.20			
			25	1	4	<12.70	<9.46	2.20		
ALL		125	25	20	17.64	<10.68	0.02			

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-63. Summary Statistics for Cation Exchange Capacity (Offsite by Soil Group and Depth)

Cation Exchange Capacity

Units: MEQ/100gm

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	41.20	29.05	27.60	32.61	32.19	5.99
	B	5	5	100	33.50	15.70	7.86	17.25	15.35	9.68
	C	5	5	100	20.97	9.93	6.65	11.26	9.73	5.64
	D	5	5	100	13.90	8.84	5.18	9.00	8.48	3.21
	E	5	5	100	15.80	6.78	3.63	7.66	6.72	4.75
		25	25	100	41.20	10.60	3.63	15.56	12.23	10.93
2	A	5	5	100	45.40	15.50	1.48	19.26	12.13	16.53
	B	5	5	100	32.80	5.28	1.18	9.96	5.30	13.03
	C	5	5	100	13.20	3.20	0.62	5.72	3.12	5.76
	D	5	5	100	12.60	4.51	0.22	5.69	3.10	4.87
	E	5	5	100	8.49	7.44	3.46	6.11	5.67	2.43
		25	25	100	45.40	7.44	0.22	9.35	5.12	10.61
3	A	5	5	100	22.20	9.30	8.38	12.53	10.91	5.80
	B	5	5	100	13.10	7.49	2.74	6.76	5.57	4.26
	C	5	5	100	6.19	5.55	1.94	4.82	4.45	1.71
	D	5	5	100	5.24	2.62	0.61	2.62	1.90	1.98
	E	5	5	100	5.91	2.14	1.44	3.25	2.71	2.10
		25	25	100	22.20	5.24	0.61	6.00	4.25	4.88
4	A	5	5	100	32.45	12.00	6.80	16.72	14.29	10.29
	B	5	5	100	16.60	9.58	7.79	10.89	10.50	3.40
	C	5	5	100	16.20	10.60	5.30	10.68	10.04	3.93
	D	5	5	100	16.60	12.40	6.87	12.22	11.73	3.49
	E	5	5	100	46.95	4.86	2.14	20.19	9.28	23.04
		25	25	100	46.95	11.23	2.14	14.14	11.04	11.27
5	A	5	5	100	23.70	17.00	11.60	17.94	17.44	4.61
	B	5	5	100	20.00	17.50	5.55	14.77	13.52	5.71
	C	5	5	100	27.20	15.20	4.63	15.33	13.29	8.08
	D	5	5	100	23.80	17.60	5.32	14.96	13.10	7.54
	E	5	5	100	20.40	11.70	2.04	10.11	7.13	7.73
		25	25	100	27.20	16.40	2.04	14.62	12.40	6.78
ALL		125	125	100	46.95	9.39	0.22	11.93	8.17	9.82

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-64. Summary Statistics for pH (Offsite by Soil Group and Depth)

pH

Units: PH

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	5.09	4.33	3.92	4.48	NA	NA
	B	5	5	100	5.23	4.39	4.08	4.63	NA	NA
	C	5	5	100	5.51	4.68	4.51	4.94	NA	NA
	D	5	5	100	5.76	4.88	4.63	5.13	NA	NA
	E	5	5	100	5.94	4.73	4.30	4.91	NA	NA
		25	25	100	5.94	4.68	3.92	4.82	NA	NA
2	A	5	5	100	5.52	5.06	4.40	4.94	NA	NA
	B	5	5	100	5.49	4.73	4.55	4.90	NA	NA
	C	5	5	100	5.41	4.90	4.59	5.02	NA	NA
	D	5	5	100	5.55	5.34	4.88	5.24	NA	NA
	E	5	5	100	5.46	5.23	4.56	5.10	NA	NA
		25	25	100	5.55	5.06	4.40	5.04	NA	NA
3	A	5	5	100	4.91	4.52	4.23	4.56	NA	NA
	B	5	5	100	5.52	4.66	4.34	4.73	NA	NA
	C	5	5	100	5.62	4.82	4.50	4.98	NA	NA
	D	5	5	100	6.03	5.14	4.59	5.18	NA	NA
	E	5	5	100	5.62	5.01	4.75	5.07	NA	NA
		25	25	100	6.03	4.87	4.23	4.90	NA	NA
4	A	5	5	100	4.89	4.31	4.25	4.48	NA	NA
	B	5	5	100	7.25	4.75	4.55	5.53	NA	NA
	C	5	5	100	7.86	4.69	4.65	5.84	NA	NA
	D	5	5	100	7.95	4.75	4.69	5.93	NA	NA
	E	5	5	100	8.17	4.88	4.65	6.12	NA	NA
		25	25	100	8.17	4.75	4.25	5.58	NA	NA
5	A	5	5	100	5.09	5.02	4.67	4.95	NA	NA
	B	5	5	100	5.55	4.75	4.49	4.91	NA	NA
	C	5	5	100	5.54	4.75	4.55	4.98	NA	NA
	D	5	5	100	5.49	5.39	4.58	5.15	NA	NA
	E	5	5	100	5.52	5.22	4.68	5.12	NA	NA
		25	25	100	5.55	5.02	4.49	5.02	NA	NA
ALL		125	125	100	8.17	4.88	3.92	5.08	NA	NA

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

Table E-65. Summary Statistics for Percent Solids (Offsite by Soil Group and Depth)

Percent Solids

Units: %

Soil Group	Depth	No. of Samples	No. Above Detect.	Percent Above Detect	Maximum	Median	Minimum	Arithmetic Average	Geometric Average	Standard Deviation
1	A	5	5	100	62.60	49.23	31.28	45.10	NA	NA
	B	5	5	100	82.65	70.30	59.15	70.84	NA	NA
	C	5	5	100	88.35	81.20	73.00	80.82	NA	NA
	D	5	5	100	88.05	83.25	74.25	82.72	NA	NA
	E	5	5	100	89.50	85.80	76.30	84.62	NA	NA
			25	25	100	89.50	77.95	31.28	72.82	NA
2	A	5	5	100	82.75	76.35	54.90	72.39	NA	NA
	B	5	5	100	89.80	83.85	65.10	80.97	NA	NA
	C	5	5	100	91.65	85.30	57.05	79.96	NA	NA
	D	5	5	100	90.80	87.90	81.95	86.42	NA	NA
	E	5	5	100	89.00	88.20	78.60	86.41	NA	NA
			25	25	100	91.65	83.85	54.90	81.23	NA
3	A	5	5	100	81.20	67.80	54.35	65.77	NA	NA
	B	5	5	100	90.35	83.10	67.55	79.62	NA	NA
	C	5	5	100	87.85	87.60	84.00	86.59	NA	NA
	D	5	5	100	90.30	87.70	83.35	86.69	NA	NA
	E	5	5	100	85.50	82.80	81.97	83.27	NA	NA
			25	25	100	90.35	83.80	54.35	80.39	NA
4	A	5	5	100	83.80	77.86	53.95	74.42	NA	NA
	B	5	5	100	90.60	84.60	80.65	84.99	NA	NA
	C	5	5	100	88.10	87.78	86.50	87.45	NA	NA
	D	5	5	100	89.55	86.90	81.70	86.04	NA	NA
	E	5	5	100	85.60	81.87	66.88	78.07	NA	NA
			25	25	100	90.60	84.60	53.95	82.19	NA
5	A	5	5	100	79.25	54.85	49.70	61.26	NA	NA
	B	5	5	100	85.30	68.50	46.70	67.74	NA	NA
	C	5	5	100	85.60	73.40	34.20	66.76	NA	NA
	D	5	5	100	83.50	73.95	28.00	62.29	NA	NA
	E	5	5	100	83.10	77.10	48.40	72.18	NA	NA
			25	25	100	85.60	72.70	28.00	66.05	NA
ALL		125.00	125.00	100.00	91.65	81.97	28.00	76.53	NA	NA

Arithmetic average, geometric average, and standard deviation are reported only if $\geq 50\%$ of sample results were above the detection limit.

APPENDIX F

Final Wetlands Soils Database

Key to Abbreviations

Remark	Definition
(blank)	Data not remarked. Number should be interpreted exactly as reported.
L	Off-scale high. The actual value is not known but is known to be greater than the value shown.
U	Material to be analyzed for but not detected. Analytical result reported is less than the sample quantitation limit.
J	The analytical result is an estimated quantity.
R	Rejected because performance requirements in the sample or associated quality control analyses were not met. The analyte may or may not be present.

<u>Name</u>	<u>Abbrev.</u>	<u>Category (from Objectives page)</u>
1,1,1-Trichloroethane	111TCE	Volatile Organic Compounds
1,1,2-Trichloroethane	112TCE	Volatile Organic Compounds
1,1-Dichloroethylene	11DCE	Volatile Organic Compounds
1,2-Dichloroethylene	12DCE	Volatile Organic Compounds
1,2-Dichloroethane	12DCLE	Volatile Organic Compounds
2,3,7,8-TCDD	23TCDD	Dioxins/Furans
2,4,5-T	245T	Pesticides/Herbicides
2,4-Dichlorophenoxyacetic	24D	Pesticides/Herbicides
3-Methylphenol	3MP	Semivolatile Organic Compounds
m,p-Cresol	3MP4MP	Semivolatile Organic Compounds
4-Methylphenol	4MP	Semivolatile Organic Compounds
Acetone	ACET	Volatile Organic Compounds
Acetophenone	ACPHN	Semivolatile Organic Compounds
Silver	AG	Metals
Aluminum	AL	Metals
Aldrin	ALDRN	Pesticides/Herbicides
Arsenic	AS	Metals
Bis(2-ethylhexyl) Phthalate	B2EHP	Semivolatile Organic Compounds
Barium	BA	Metals
Benzo(a)Pyrene	BAPYR	Semivolatile Organic Compounds
Beta-Benzene Hexachloride	BBHC	Pesticides/Herbicides
Butylbenzyl Phthalate	BBZP	Semivolatile Organic Compounds
Beryllium	BE	Metals
Benzoic Acid	BENZOA	Semivolatile Organic Compounds
Benzene	C6H6	Volatile Organic Compounds
Calcium	CA	Metals
Trichlorofluoromethane	CCL3F	Volatile Organic Compounds
Carbon Tetrachloride	CCL4	Volatile Organic Compounds
Cadmium	CD	Metals
Cation Exchange Capacity	CEC	Agricultural Parameters
Dichloromethane	CH2CL2	Volatile Organic Compounds
Chloroform	CHCL3	Volatile Organic Compounds
Pentachloroethane	CL5ET	Volatile Organic Compounds
Chlorobenzene	CLC6H5	Volatile Organic Compounds
Cobalt	CO	Metals
Chromium	CR	Metals
Carbon Disulfide	CS2	Volatile Organic Compounds
Copper	CU	Metals
Di-n-butyl Phthalate	DNBP	Semivolatile Organic Compounds
Di-n-octyl Phthalate	DNOP	Semivolatile Organic Compounds
Endrin Aldehyde	ENDALD	Pesticides/Herbicides
Endrin	ENDRN	Pesticides/Herbicides
Ethylbenzene	ETC6H5	Volatile Organic Compounds

<u>Name</u>	<u>Abbrev.</u>	<u>Category (from Objectives page)</u>
Ethyl Methacrylate	ETMEAC	Volatile Organic Compounds
Fluoride	F	Other Inorganic Parameters
Fluoranthene	FANT	Semivolatile Organic Compounds
Iron	FE	Metals
Mercury	HG	Metals
Hexachlorodibenzo-p-dioxins	HXCDD	Dioxins/Furans
Hexachlorodibenzo-p-furans	HXCDF	Dioxins/Furans
Intone	INTON	Other Inorganic Compounds
Potassium	K	Metals
Kepona	KEPONE	Semivolatile Organic Compounds
Lithium	LI	Metals
Toluene	MEC6H5	Volatile Organic Compounds
Methyl Ethyl Ketone	MEK	Volatile Organic Compounds
Ethyl Methacrylate	MEMEAC	Volatile Organic Compounds
Magnesium	MG	Metals
Manganese	MN	Metals
Sodium	NA	Metals
Nickel	NI	Metals
Nitrate as Nitrogen	NO3	Other Inorganic Parameters
Lead	PB	Metals
Pentachlorodibenzo-p-dioxin	PCDD	Dioxins/Furans
Pentachlorodibenzo-p-furan	PCDF	Dioxins/Furans
Pentachlorophenol	PCP	Semivolatile Organic Compounds
pH	PH	Agricultural Parameters
Phenol	PHENOL	Semivolatile Organic Compounds
p,p'-DDD	PPDDD	Pesticides/Herbicides
p,p'-DDE	PPDDE	Pesticides/Herbicides
p,p'-DDT	PPDDT	Pesticides/Herbicides
p-Terphenyl-d14	PTERP	???
Pyrene	PYR	Semivolatile Organic Compounds
Pyridine	PYRID	Semivolatile Organic Compounds
Antimony	SB	Metals
Selenium	SE	Metals
Silicon	SIL	Other Inorganic Parameters
Silvex	SILVEX	Pesticides/Herbicides
Tin	SN	Metals
Sulfate	SO4	Other Inorganic Parameters
Percent Solids	SOLID	Agricultural Parameters
Styrene	STYR	Volatile Organic Compounds
Sulfide	SULFID	Metals
Tetrachlorodibenzo-p-dioxin	TCDD	Dioxins/Furans
Tetrachlorodibenzo-p-furan	TCDF	Dioxins/Furans
1,1,2,2-Tetrachloroethane	TCLEA	Volatile Organic Compounds
Tetrachloroethylene	TCLEE	Volatile Organic Compounds

<u>Name</u>	<u>Abbrev.</u>	<u>Category (from Objectives page)</u>
Thallium	TL	Metals
Total Organic Carbon	TOC	Organic Compounds
Total Organic Halogens	TOX	Organic Compounds
Total Phosphates (as P)	TPO4	Other Inorganic Parameters
Trichloroethylene	TRCLE	Volatile Organic Compounds
Tritium	TRITIU	Radiological Parameters
Vanadium	V	Metals
Vinyl Acetate	VINYLA	Volatile Organic Compounds
Xylenes	XYLEN	Volatile Organic Compounds
Zinc	ZN	Metals

The Data will be included with the final version of this report. It will be stored in ASCII files on "electronic media.

APPENDIX G

Particle Size Analysis

Table 1. Particle Size Fractions Used in Lithologic Logging

Size Class	Size Range
Gravel - Cobble	25.6 cm - 6.4 cm
Pebble	6.4 cm - 0.4 cm
Granule	0.4 cm - 0.2 cm
Sand - Very Coarse and Coarse	0.2 cm - 0.05 cm
Medium	0.05 cm - 0.025 cm
Fine and Very Fine	0.025 cm - 0.00625 cm
Mud - Silt and Clay Sized Sediments	Finer than 0.00625 cm
