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REMEDIAL INVESTIGATION REPORT
SOUTHERN WOOD PIEDMONT COMPANY
GULF, NORTH CAROLINA, FACILITY

VOLUME I

October 7, 1994

NC0028004

Prepared for:

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Spartanburg, South Carolina

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REMEDIAL INVESTIGATION REPORT
SOUTHERN WOOD PIEDMONT COMPANY
GULF, NORTH CAROLINA, FACILITY

October 7, 1994

Geraghty & Miller, Inc., is submitting this report to Southern Wood Piedmont Company for work performed at a former wood-treating facility in Gulf, North Carolina. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

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CONTENTS

Page

1.0 INTRODUCTION 1-1
- 1.1 Purpose And Report Organization 1-2
- 1.2 Site Background 1-2
  - 1.2.1 Process Area 1-4
  - 1.2.2 Treated Wood Storage 1-4
  - 1.2.3 Untreated Wood Storage 1-5
  - 1.2.4 Wastewater Treatment Area 1-5
  - 1.2.5 Maintenance and Area Fuel Dispensing 1-6
  - 1.2.6 Manufacturing Area 1-6
- 1.3 Site Description 1-6
- 1.4 Previous Investigations 1-7
- 1.5 Interim Remedial Action 1-8

2.0 STUDY AREA INVESTIGATION (METHODS) 2-1
- 2.1 Topographic Survey 2-3
- 2.2 Literature And Records Survey 2-4
- 2.3 Magnetometer Survey 2-5
- 2.4 Background Soil Sampling 2-6
- 2.5 Test Pits 2-6
  - 2.5.1 Phase I Test Pits 2-7
  - 2.5.2 Phase II Test Pits 2-7
  - 2.5.3 Pond Removal Confirmation Sampling 2-7
- 2.6 Soil Boring Program 2-8
  - 2.6.1 Northern Impoundments Area Boring Program 2-8
  - 2.6.2 Eastern Stormwater Pond Boring Program 2-9
  - 2.6.3 Drip-Track Boring Program 2-9
  - 2.6.4 Diesel Fuel Storage Area Boring Program 2-9
- 2.7 Bedrock Core Boring Program 2-10
- 2.8 Groundwater Assessment 2-11
  - 2.8.1 Monitor-Well Sampling 2-13
  - 2.8.2 Slug Tests 2-13
- 2.9 Surface-Water/Sediment Sampling 2-14
- 2.10 Bioreclamation Feasibility Study 2-15

3.0 ENVIRONMENTAL SETTING 3-1
- 3.1 Surface Features 3-1
- 3.2 Land Use And Groundwater Use 3-1
- 3.3 Climate 3-2
- 3.4 Surface-Water And Ecological Features 3-3

CONTENTS

Page

3.5 Geology 3-5
3.5.1 Regional Geology 3-5
3.5.2 Site-specific Geology 3-7
3.6 Hydrogeology 3-8
3.6.1 Regional Hydrogeology 3-8
3.6.2 Site Hydrogeology 3-9

4.0 NATURE AND EXTENT OF CONTAMINATION 4-1
4.1 Soil Sampling Results 4-1
4.1.1 Background Soil Boring Program Results 4-2
4.1.2 Removal Confirmation Sampling Results 4-3
4.1.3 Northern Impoundments Soil Boring Program Results 4-4
4.1.4 Drip Track Soil Boring Program Results 4-6
4.1.5 Diesel Fuel Storage Area Soil Boring Program Results 4-7
4.2 Core Boring Sample Analytical Results 4-8
4.3 Groundwater Sample Results 4-9
4.3.1 Facility Monitor Well Sample Results 4-10
4.3.1.1 SVOC Groundwater Results 4-10
4.3.1.2 VOC Groundwater Results 4-13
4.3.2 Diesel Fuel Storage Area/Off-site Monitor-Well Sample Results . 4-14
4.4 Residential Well Sampling Results 4-15
4.5 Surface-Water And Sediment Sampling Results 4-16

5.0 PRINCIPAL FINDINGS 5-1

6.0 REFERENCES 6-1

TABLES

2-1. Site-Specific Constituents.
2-2. Summary of Monitor Well Identification Changes and Construction Details.
3-1. Summary of Water Level Elevation Data.
4-1. Background Soil Sample Results, October 1990.
4-2. Removal Confirmation Sampling Results, Southern Ponds.
4-3. Northern Impoundments Area Soil Sample Results.
4-4. Drip Track Areas Soil Sample Results.
4-5. Diesel Fuel Storage Area Soil Sample Results.
4-6. CB-9 Core Rock Sample Results.
4-7. Groundwater Sampling Results, Core-Boring Packer Tests, August 1991.

CONTENTS

Page

TABLES

4-8. Groundwater Sampling Results, October 1990.
4-9. Groundwater Sampling Results, August 1991.
4-10. Groundwater Sampling Results, December 1992.
4-11. Groundwater Sampling Results, June 1993.
4-12. Groundwater Sampling Results, December 1993.
4-13. Diesel Fuel Storage Area Groundwater Sampling Results, July 1993.
4-14. Residential Well Sampling Results, August 1990.
4-15. Little Cedar Creek/Drainage Ditch Samples Collected On May 3, 1990.
4-16. Little Cedar Creek Surface Water and Sediment Sample Results, August 13, 1990.

FIGURES

1-1. Site Location Topographic Map.
1-2. Former Facility Layout.
2-1. Site Topographic Map.
2-2. 200 X 200 Foot Grid System.
2-3. Removal Confirmation Soil Sampling Locations.
2-4. Northern Impoundments Area Soil Boring Locations.
2-5. Eastern Stormwater Pond Soil Boring Locations.
2-6. Drip Track Area Borings.
2-7. Soil Boring and Monitor Well Locations, Diesel Fuel Storage Area.
2-8. Core Boring Locations.
2-9. Site Monitor Well.
2-10. Surface Water and Sediment Sampling Locations for the May, 1990 Sampling Event.
2-11. Surface Water and Sediment Sampling Locations for the August, 1990 Sampling Event.
3-1. Site Surface Water Features.
3-2. Geologic Cross-Section Location Map.
3-3. North-South Geologic Cross Section.
3-4. Geologic Interpretation of Magnetometer Data, Surface Outcroppings, and Core Borings.
3-5. Water Table Elevations, June 19, 1991.
3-6. Water Table Elevations, September 27, 1991.
3-7. Water Table Elevations, January 31, 1992.
3-8. Water Table Elevations, March 31, 1992.
3-9. Water Table Elevations, December 7 & 8, 1993.
3-10. Bedrock Zone Water Levels, December 7 & 8, 1993.
4-1. Northern Impoundments Area Soil Boring Observations.

CONTENTS

Page

FIGURES

4-2. Northern Impoundments Area Visual Observations of Impacted Soils, Cross-Sections C3, D3 to D4, and E2 to E5.
4-3. Northern Impoundments Area Visual Observations of Impacted Soils, Cross-Sections F3 to F5, and G4 to G5, and H4 to H6.
4-4. Northern Impoundments Area Visual Observations of Impacted Soils, Cross-Sections I4 to I6, J5 to J7, and K5 to K7.
4-5. Northern Impoundments Area Visual Observations of Impacted Soils, Cross-Sections L6 to L8, M6 to M8, and N7 to N9.
4-6. Summary of Groundwater Sampling Data for the October 1990, August 1991, December 1992, June 1993, and December 1993 Sampling Events.

APPENDICES - VOLUME II

A-1. Patterson Exploration (PES) Report.
A-2. Environmental Technology Engineering (ETE) Report.
B-1. Phase I Test Pit Descriptions.
B-2. Phase II Test Pit Locations and Cross-Sections.
B-3. Northern Impoundments Area Soil Boring Logs.
B-4. Eastern Stormwater Pond Soil Boring Logs.
B-5. DMP-Track Area Soil Boring Logs.
B-6. Diesel Fuel Storage Area Soil Boring Logs.
B-7. Bedrock Core Logs.
C. Well Construction Logs and Sample Core Logs.

APPENDICES - VOLUME III

D. Laboratory Reports.

REMEDIAL INVESTIGATION REPORT
SOUTHERN WOOD PIEDMONT COMPANY
GULF, NORTH CAROLINA, FACILITY

1.0 INTRODUCTION

Geraghty & Miller, Inc., was retained in 1989 by Southern Wood Piedmont Company (SWP), a subsidiary of Rayonier, Inc. to conduct a remedial investigation (RI) of the former wood-treatment facility in Gulf, North Carolina. The RI was conducted in phases in order to address both source areas and the extent of contamination. This RI report, summarizing investigative results, was prepared following the Draft Guidelines for Responsible Party Voluntary Site Remedial Action, North Carolina Department of Environment Health and Natural Resources (NCDEHNR, 1994a). However, because several phases of the investigation were completed before these guidelines had been established, not all of the components of the guidelines were included in the investigation. For example, a work plan was not submitted to the NCDEHNR Superfund Section for the investigation activities. Also, full analytical scans of U.S. Environmental Protection Agency (USEPA) Target Compound List (TCL) organic compounds, Hazardous Substance List (HSL) inorganic compounds, pesticides, polychlorinated biphenyls (PCBs), and dioxins were not performed, as specified in the guidelines, because the investigations were focused on constituents associated with wood-preserving sites.

The approach taken at this site parallels the USEPA Superfund Accelerated Cleanup Model (SACM), in which investigation and remediation at certain types of sites with similar characteristics (i.e., wood preserving sites) can be focused and streamlined, without unnecessary, extensive characterization. Two USEPA presumptive remedy documents have already been released which specifically address wood treatment sites (USEPA, 1992, 1993).

1.1 PURPOSE AND REPORT ORGANIZATION

The purpose of this RI report is to present the findings of the RI field activities to characterize the site, the sources of contamination, and the nature and extent of contamination. The scope of RI activities encompassed the drilling of boreholes, collection and analysis of soil samples, installation of monitoring wells, collection and analysis of groundwater samples, rock coring, magnetometer survey, sediment and surface-water sampling and analysis, monitor-well slug testing, a well inventory, and preparation of various maps including water levels, surface features, and site geology.

This report is organized into six chapters. Following this introductory chapter is a description of investigative methods, Chapter 2.0. A summary of regional site physical characteristics is presented in Chapter 3.0 (Environmental Setting). An evaluation of the soil and water chemical data generated during the RI is presented in Chapter 4.0 (Nature and Extent of Contamination). A summary of principal findings is given in Chapter 5.0 and references are provided in Chapter 6.0.

1.2 SITE BACKGROUND

The former SWP facility is located along SR2145 in the town of Gulf, North Carolina. The Chatham County site is approximately 89 acres in size. A general location map is shown in Figure 1-1.

The best available information indicates that the site was constructed in 1947 as General Creosoting Company (GCC). GCC used creosote as a wood preservative. ITT purchased GCC in 1969, and in 1971 GCC came under the control of southern Wood Piedmont company (SWP). The site was then incorporated into SWP, and SWP used pentachlorophenol (PCP), as well as creosote, as preservatives. Treated products included poles, pilings, fence posts, and ties. Prior to closure in 1980, the former SWP plant handled approximately 1 million cubic feet of wood

products per year. Figure 1-2 shows the facility layout prior to closure. Primary operating areas are as follows:

- treatment process area (the process area);
- treated wood storage area;
- untreated wood storage area;
- pole peeling and maintenance area; and
- waste-water treatment (treatment impoundments and spray irrigation areas)

Based on a review of historical aerial photographs and interviews with a current and a former SWP employee, the facility production layout did not change substantially over the period of operations. The primary changes occurred north of the Norfolk and Southern Railroad right-of-way with the addition of the northern treatment impoundments and the spray irrigation field. Subsequent sections provide a brief description of each area.

The plant contained storage tanks for the wood preservatives, pumps, piping, vacuum systems, a boiler, and steam-generating equipment. Wood treatment involved pressurizing the wood in treatment cylinders. The preservative was heated prior to pumping into the cylinder. PCP was dissolved in diesel fuel as a carrier.

At closure, the plant's closed-loop wastewater treatment system consisted of an oil/water separator, aeration lagoons, a spray irrigation field, spray collection pond, and piping system. The lagoons had a capacity of approximately 4,500,000 gallons.

Plant closure followed a seven-step plan. Treated and untreated wood and remaining preservative, including tank residues, were removed from the site. All on-site structures were dismantled or scrapped. Some equipment was shipped to another plant. The cylinders were dismantled for scrap. The closure plan called for shipping unusable residues to an appropriate disposal facility. The wastewater ponds were emptied of pumpable residues then filled with

on-site soil, tree bark, and wood shavings. The water treatment process operated until all of the lagoons were emptied. The backfilled ponds were then graded and planted.

1.2.1 Process Area

The process area included treatment cylinders, drip areas, product storage tanks and associated structures, and control buildings. This area also contained three surface impoundments.

At the time of closure, there were four treatment cylinders, each 6 feet in diameter and from 88 to 150 feet in length. Associated with the cylinders were storage tanks, surge tanks, sumps, pumps, piping, vacuum systems, and steam generation equipment. A boiler used to generate steam was fueled with wood shavings from the manufacturing (peeling) of poles. PCP was stored in solid form in a building west of the treatment cylinders. Creosote and diesel fuel were stored in tanks within a diked area north of the treatment cylinders, near the Norfolk and Southern Railroad right-of-way.

Within the production area were three impoundments (ponds), referred to collectively as the southern ponds. The largest, southernmost pond was used for steam boiler blow down, and it also received stormwater runoff. The other two ponds were used for wastewater storage prior to treatment. A drip track was present in front of each treatment cylinder. Treated wood resided in this area until visual drippage ceased and then was removed to treated wood storage for final drying. A concrete oil-water separator also was present to process wastewater prior to discharge into the southern ponds.

1.2.2 Treated Wood Storage

These areas received treated wood from the drip track for storage on cross beams prior to shipment. These areas are easily identifiable from aerial photographs due to the darkened

wood. Drippage onto the soil surface may have caused soil contamination of these areas. A storm water retention pond formed by a natural depression existed at the northeast corner of the treated wood storage area.

1.2.3 Untreated Wood Storage

Large areas of the site were reserved for the storage of raw wood materials prior to manufacturing or treatment. Raw wood was brought to the site by both rail car and truck, and stored in the western untreated wood storage area. After manufacturing (pole peeling), the raw product was stored in the eastern untreated wood storage area. It is unlikely these areas were impacted by site-related constituents.

1.2.4 Wastewater Treatment Area

Beginning in 1976, SWP converted its wastewater treatment system to a zero discharge system, permitted by the State of North Carolina. Wastewater from the process area was treated in aeration lagoons (i.e., the northern impoundments). Treated wastewater was pumped to a terraced spray irrigation field. This area received diluted, treated wastewater, potentially containing dissolved wood-preserving constituents. The spray field soils were used as a source of fill during site closure. Indications are that all spray irrigation surface soils were removed at closure and placed in the wastewater treatment ponds.

The number and configuration of the northern impoundments changed over the period of operation. For the purposes of investigation, a single aggregate northern impoundments area was designated. The record does not indicate when surface impoundments were first constructed. Figure 1-2 shows the general area of the ponds at the time of closure and the historical extent of ponds determined from aerial photographs. Active treatment processes included anaerobic and aerobic biological treatment. Prior to operation of the zero discharge system, excess effluent from the treatment system was likely discharged to a drainage ditch

which flows north along the eastern property boundary and eventually discharges into Little Cedar Creek.

1.2.5 Maintenance and Area Fuel Dispensing

The Gulf wood-preserving plant maintenance facilities included a maintenance shop, storage sheds, locker room, and vehicle fuel dispensing area. The fueling area, as determined from aerial photographs, contained aboveground diesel and gasoline storage tanks of an undetermined size. It is believed that surface soils from maintenance areas close to the process area ponds were removed, to some extent, and used as fill for the ponds.

1.2.6 Manufacturing Area

SWP manufactured the poles, posts and ties on site from raw timber. A pole peeling mill was operated as part of the manufacturing process in the southern end of the area designated in Figure 1-2. Waste wood was used to fuel the boiler. After manufacturing, the product was stored in the eastern untreated wood storage area.

1.3 SITE DESCRIPTION

At present the site is vacant land with forested and grassed areas. All site structures, including impoundments, were removed or covered during facility closure in 1980. Access roads to the site are gated and locked. The site is transected east to west by the Norfolk and Southern Railroad. To the north, the property extends to Little Cedar Creek, a tributary to the Deep River. The eastern edge of the property is bounded by forest lands. On the western property boundary is a church and additional forest land. The southern property line is delimited by an abandoned railway right of way and state road SR2145.

1.4 PREVIOUS INVESTIGATIONS

Prior to facility closure, a soil boring program was performed to provide information concerning the depth of soil contamination and to quantify the amount of contaminated soil if possible. Seven soil borings were drilled to a maximum depth of 12 feet below land surface (ft bls), and soil samples were analyzed for phenol and oil and grease. The exact locations of these borings cannot be identified today, but the results were useful in guiding the RI.

The former SWP facility site was the subject of three post-closure investigations prior to this RI (1983, 1987, and 1988). The U. S. Environmental Protection Agency (USEPA), Region IV, Environmental Services Division (ESD), conducted a hazardous waste site investigation (SI) pursuant to CERCLA in September 1983. Soil samples and sediment samples were collected both on-site and off-site. Creosote-related constituents (primarily polycyclic aromatic hydrocarbons, or PAHs) and PCP were detected in on-site soils and sediments. Off-site sediment in Little Cedar Creek contained lower levels of the same constituents. Because Gulf residents were supplied by a public water-supply system, no drinking-water wells were sampled. An upgradient sediment sample in Little Cedar Creek contained somewhat higher concentrations of PAHs than the downgradient samples.

The SI report states that chromium was detected in a downstream sediment sample collected from Little Cedar Creek at a concentration (28 milligrams per kilogram, or mg/kg) significantly higher than the upstream sample chromium concentration (4.6 mg/kg). However, site-specific concentrations of chromium in background soil samples collated at the site during this RI range from 14 to 30 mg/kg (see Section 4.1.1 and Table 4-1). In addition, the estimated average concentration of chromium in the surficial materials of the eastern U.S. is 52 mg/kg (USGS, 1984), which is approximately two times the maximum chromium concentration detected in sediment samples collected from Little Cedar Creek. Therefore, the sediment sampling data do not indicate significantly elevated chromium concentrations based on site-specific and regional

background levels of chromium in surficial materials. Also, inorganic wood preservatives (i.e., chromatal copper arsenate) were never used at the site when it was operational.

In 1987, Patterson Exploration Services, Inc., (PES) of Sanford, North Carolina, completed an evaluation of clay and shale raw materials on-site on behalf of the Cherokee Sanford Group. Twenty-three soil borings were made across the site to a maximum depth of 30 ft bls. PES identified diabase intrusive materials in parts of the site as well as three triassic formations (the Sanford, Cumnock, and Pekin formations). They concluded that large areas of the site have no usable materials for bricks. Creosote-stained materials were noted in the former pond areas. A copy of the PES report is presented in Appendix A-1.

Environmental Technology Engineering, Inc., (ETE) installed five piezometers (wells) in 1988. The piezometers were intended to provide water-level information in order to establish the direction of groundwater flow. Water-level data indicated that groundwater in the southern portion of the site flows to the southeast. No water-quality information was collected during the ETE investigation. A copy of the ETE report is presented in Appendix A-2.

1.5 INTERIM REMEDIAL ACTION

In July 1990, the three ponds in the process area (Southern Ponds) were excavated by a remedial contractor under the supervision of Southern Wood Piedmont Company. The material excavated from the ponds was stockpiled on-site in a contained area and transported off-site for thermal processing. A berm was constructed around the excavation and stockpiles to isolate stormwater runoff from the stockpiles from stormwater from the rest of the site. A drainage ditch was dug around the berm to direct stormwater outside the remediation and stockpile area to the north side of the railroad tracks through a small sediment collection pond. The pond discharged to the north-south drainage feature that eventually flows into Little Cedar Creek under a permit issued by the NCDEHNR, Division of Environmental Management (DEM). A small volume of contaminated soil was left in place near the railroad right-of-way. Confirmation

soil sampling in the excavated area was conducted as part of the RI. After excavation was completed, the ponds area was filled with clean soil material mined from the property owned by Mr. Oldham adjacent to and east of the northern impoundments area.

2.0 STUDY AREA INVESTIGATION (METHODS)

This section describes the field investigations and other activities conducted to characterize the study area and to determine the nature and extent of contamination. Generally a phased "outside to inside" investigative approach was employed. Monitoring wells were installed along the site perimeter in the initial phase. The locations of major source areas were determined prior to any deeper investigations. The primary source area were believed to be to be buried impoundments and portions of the process area (drip tracks and preservative storage area). A list of chemicals specific to wood-preserving activities conducted at the site was complied at the beginning of the assessment to ensure that relevant chemicals were consistently analyzed during sampling events. The site-specific constituent list with applicable analytical methods is presented in Table 2-1.

Primary data-collection activities conducted for the investigation included the following:

(1) Topographic Survey: Preparation of a detailed topographic map of the site to evaluate surface features.

(2) Literature and Records Survey: A review of available literature and records to assess hydrogeology site history and prior investigations.

(3) Magnetometer Survey: Completion of a surface geophysical survey to determine the existence and location of diabase dikes and sills on the site.

(4) Background Soil Sampling: Collection and chemical analysis of background surface soil samples.

(5) Test Pits: Completion of backhoe test pits to locate buried ponds that formerly contained cooling water, process wastes and wastewater, and surface-water runoff. Soil quality was evaluated visually and by analysis of selected soil samples.

(6) Soil Boring Program: Completion of soil borings to determine the depth and lateral extent of the former ponds, to evaluate soil quality within the ponds and in other areas of concern, and to provide lithological information.

(7) Bedrock Coring Program: Completion of ten bedrock core borings from January 1991 to June 1991 to collect geologic information and to construct cross-sections across the site.

(8) Groundwater Assessment: Installation of monitor wells and collection of groundwater samples to evaluate groundwater quality and flow direction. Monitor wells were installed and sampled in a phased manner. The groundwater assessment included:

- Installation of 11 water-table monitor wells around the perimeter of the site and collection of one round of groundwater samples (phase I).

- Installation of 18 additional monitor wells (Phases II and III), including additional water-table monitor wells and deeper bedrock wells. Deeper wells were for the most part clustered with water-table monitor wells.

- Performance of in-situ hydraulic conductivity tests (slug tests) on monitor wells to assess aquifer characteristics at various locations throughout the site.

- Collection of monthly water-level measurements from site monitor wells for the period from August 1990 to March 1992 and quarterly from March 1992 to April 1993 to document seasonal changes in hydraulic conditions.

- Analysis of groundwater samples collected in October 1990, August 1991, December 1992, June 1993, and December 1993.

- Collection and chemical analysis of a groundwater sample from a residential well adjacent to the site.

(9) Surface-Water and Sediment Assessment: Chemical analysis of surface-water and sediment samples collected from Little Cedar Creek and the site drainage ditch leading into the creek. The samples were collected during two sampling events in May and August, 1990.

(10) Bioreclamation Feasibility Study: The site was evaluated for the applicability of on-site bioremediation as a remediation alternative.

All site investigations were conducted in accordance with Geraghty & Miller's Quality Assurance Manual and standard operating procedures including borings, well installation, and environmental media sampling.

2.1 TOPOGRAPHIC SURVEY

A topographic map of the site (Figure 2-1) was prepared using photogrammetric methods according to National Map Accuracy standards at a scale of 1 inch is equal to 100 ft and a vertical contour interval of 1 ft. The topographic map was used to evaluate surface features at the site and to plan the investigative approach. Planimetric and topographic features, including drainage features, wooded areas, roads, railroad tracks, fences, and structures, are depicted on the map. Sampling and monitor-well locations also are depicted on the map.

Aerial photographs used in the preparation of the topographic map were obtained on April 5, 1990, by Ragsdale Consultants of Raleigh, North Carolina. Ground control survey

points were provided by Joseph T. Johnston and Associates of Raleigh, North Carolina. Supplemental survey work was conducted by Joseph T. Johnston and Associates to locate sample points and monitor wells, to provide elevations of monitor wells, and to provide detailed topographic contours for certain soil excavations.

Joseph T. Johnston and Associates also surveyed and staked a 200-ft x 200-ft grid system over the site. The grid is consistent with the North Carolina Grid System. The North Carolina Grid System is a North Carolina Geodetic Survey system that links horizontal positions to a national and global grid based on longitude and latitude. This system of horizontal and vertical locations is valuable when surveying sampling and well locations in the absence of significant site features such as buildings. The North American Datum (NAD) used in the survey was established in 1927 and updated in 1983. The vertical elevation of monitor wells, site topography, and site features was surveyed to NAD established in 1929.

The survey resulted in a grid over the site placed on 200-ft by 200-ft centers. Geraghty & Miller established a sub-grid on 100-ft by 100-ft centers in an area for a subsequent soil boring program. The grid and sub-grid and the numbering system are shown in Figure 2-2.

2.2 LITERATURE AND RECORDS SURVEY

The local environmental, geological, and hydrogeological settings and land use were researched using technical publications, historical aerial photography, consultant reports, interviews with Mr. Mike Pruett and Mr. Tommy Davis, former SWP employee Mr. Robert Willingham, and Chatham County personnel, and review of state and local records. Other references used in the preparation of this report include federal guidance documents. A list of references cited is included in Chapter 7.0 of this report.

2.3 MAGNETOMETER SURVEY

A review of geologic literature and the PES report (Patterson, 1987) indicated that diabase intrusive bodies (dikes and sills) have been mapped in the vicinity of the site. Weathered diabase boulders were observed as float rock (i.e., separated from its parent material) in the southern part of the site. Outcroppings of weathered diabase are present at a railroad cut in the central part of the site and in the northwesterly-trending drainage ditch that runs along the eastern boundary of the site (north of the tracks). The outcrop pattern was observed to be aligned with a diabase exposure southeast of the site, an observation that indicated the possible presence of a north-trending subsurface diabase dike. Diabase dikes and sills are known to affect groundwater flow (Reinemund, 1955).

Two surface magnetometer surveys (using a proton precession magnetometer) were conducted over portions of the site during June 1990 and February 1991 to delineate the shape and extent of subsurface diabase intrusive bodies (dikes and/or sills) underlying the site. Diabase bodies, being composed in part of iron-rich minerals, including magnetite, can be mapped using magnetic techniques, especially when surrounded by sedimentary strata of much lesser content of magnetic mineral content.

The magnetometer survey traverses followed the east-west lines of the 200-ft x 200-ft grid. Readings were taken at 50-foot intervals. Limitations to the proton precession magnetometer surveys that were carried out are:

- Susceptibility to interferences from cultural features such as electric power lines and metallic objects, including railroad tracks and buried metallic objects; and

- Susceptibility to interferences from naturally-occurring phenomena, including diurnal fluctuations in the earth's magnetic field.

Discussion of the results of the magnetometer survey can be found in Chapter 3.

2.4 BACKGROUND SOIL SAMPLING

In October 1990, six surficial soil samples (B-1 through B-6) were collected in an undisturbed location in the southwestern corner of the Gulf property near Grid points Q5 and R5. This area was the former raw, untreated wood storage area and would not have been directly contaminated by site operations. The samples were analyzed for site-specific wood-preserving constituents and selected inorganics.

2.5 TEST PITS

The wood-preserving facility utilized a number of unlined ponds which were filled and covered during site closure. To locate the ponds, historical photographs, test pits, and soil borings were used. The initial step was to excavate test pits at selected locations determined from historical aerial photographs, historic site plans, and discussions with SWP personnel. Test pits were excavated with a standard backhoe and a larger trackhoe until soil that appeared unaffected by wood-preserving materials was observed. Depths of the pits ranged from 5 ft to 16 ft below land surface (bls). Descriptions of the test pits are presented in Appendix B-2. Soil was visually examined for discoloration in the field and screened with a TIP II organic vapor meter (OVM) equipped with a photoionization detector manufactured by Photovac. Soil removed from the pits was placed back into the excavation after visual observations were recorded. As described in the following sections, soil borings were used to delineate the vertical and horizontal extent of former ponds in the northern area of the site after the test pit program had identified general locations.

Based on the first phase of the test pit program, performed in March 1990, the contents of the three ponds in the production area (southern ponds) were excavated and transported off-

site for disposal. Confirmation samples of the soil beneath the ponds following excavation were collected for analysis (see Section 2.5.3).

2.5.1 Phase I Test Pits

Test pits were excavated in March 1990 to delineate the vertical and horizontal extent of the southern ponds. The depth of each test pit or trench was between 4 to 16 ft bls. The depth of excavation was determined by the absence of visually discolored soil or the presence of groundwater. Five to nine trenches were excavated in each pond area. Descriptions of each trench with depth are provided in Appendix B-1.

2.5.2 Phase II Test Pits

Thirty-two backhoe test pits were excavated in the vicinity of the Northern ponds during September 1990. Descriptions of lithology, soil color, odor, and the presence of debris were recorded (see Appendix B-2). The depth of excavation varied between 2 and 15 ft bls. Excavation was terminated when visibly discolored soil was no longer observed in soils excavated from in the bottom of the pit. In some cases excavation was limited by the presence of debris including timbers, logs, and tires. No samples were collected for laboratory analysis. After excavation, the trenches were filled with the excavated material.

2.5.3 Pond Removal Confirmation Sampling

On October 10, 1990, eight soil samples (P-1A through D, P-2A and P-2B, P-3A, and PO) were collected from the completed excavation substrate of the southern ponds prior to backfilling. Each sample was a composite of three, shallow (0 to 6 inches) sub-samples. The approximate locations are depicted on Figure 2-3. The samples were analyzed for site-specific constituents and selected inorganics.

2.6 SOIL BORING PROGRAM

Several phases of soil boring investigation were conducted in areas potentially impacted by site-related constituents, and are described in the following sections.

2.6.1 Northern Impoundments Area Boring Program

A soil boring program was designed to characterize the location and extent of abandoned impoundments on the northern area of the property. A 100-ft x 100-ft grid was staked out over the suspected location of the former impoundments (Figure 2-4). Thirty-eight borings were advanced at the intersection points of this grid using hollow-stem augers. Split-spoon soil samples were taken continuously as each boring encountered and proceeded vertically through the pond material. The continuous sampling allowed for a more accurate determination of former pond dimensions and also allowed for a more complete description of the substrate's lithology. The borings were advanced to between 6 and 37 ft bls depending on whether auger refusal or the presence of unstained soil was observed, whichever occurred first. Boreholes were abandoned with cement/bentonite grout. Boring logs are provided in Appendix B-3.

In April 1991, 13 soil samples were collected for laboratory analysis from 5 borings in the northern pond area using a hollow-stem auger rig (split-spoon). A background location (M-4) was sampled from 0 to 2 ft bls. At four locations, samples were collected at three depths ranging from 0-2 ft bls to 8-10 ft bls in order to characterize constituent concentrations in the pond materials. Sample identifications are BG-1 (grid M-4), E-4 (0 to 2 ft bls), E-4B (2 to 4 ft bls), E-4C (8 to 10 ft bls), G-4 (0 to 2 ft bls), G-4B (2 to 4 ft bls), G-4C (8 to 10 ft bls), H-6A (0 to 2 ft bls), H-6B (4 to 6 ft bls), H-6C (8 to 9 ft bls), I-6A (0 to 2 ft bls), I-6B (4 to 6 ft bls), and I-6C (8 to 10 ft bls). Soil samples were analyzed for the site-specific constituent list.

2.6.2 Eastern Stormwater Pond Boring Program

On April 26, 1991, seven soil borings (B-1, B-1a, B-2, B-3, B-4, B-4a, and B-5) were advanced using 4-1/4-inch I.D. hollow-stem augers to approximately 8 to 14 ft bls within or near the eastern stormwater pond (see Figure 2-5) in the northeast corner of the treated wood storage area. Continuous split spoons were collected, and the lithology was logged. No samples were analyzed for site-specific analytes, but visual observations were recorded. Boring logs are provided in Appendix B-4. The intent of boring program was to generally determine conditions in the vicinity of former stormwater pond.

2.6.3 Drip-Track Boring Program

In May 1991, nine boreholes (DTB-1 through DTB-9) were advanced from 5 to 14 ft bls in the approximate area of the former drip tracks (Figure 2-6) to determine the extent of stained soil and to collect soil samples for laboratory analysis. Nine samples were selected for laboratory analysis from three borehole locations. Soil samples were collected at three depths within each selected sample location. The soil samples were analyzed for site-specific analytes. The drip-track samples were identified as DTB-1A (0 to 2 ft bls), DTB-1B (2 to 4 ft bls), DTB-1C (4 to 6 ft bls), DTB-2, DTB-3, DTB-4A (0 to 2 ft bls), DTB-4B (2 to 4 ft bls), DTB-4C (4 to 6 ft bls), DTB-5, DTB-6, DTB-7, DTB-8, DTB-9A (0 to 2 ft bls), DTB-9B (2 to 4 ft bls), and DTB-9C (4 to 6 ft bls). Boring logs are provided in Appendix B-5.

2.6.4 Diesel Fuel Storage Area Boring Program

The diesel fuel and possibly gasoline reportedly were stored in aboveground tanks near SR 2145, Jordan Road (Figure 1-2). Examination of aerial photographs revealed that at least two configurations of tanks existed at different times within a small area north of Jordan Road. The investigation of this area included locating the area using aerial photographs and collecting soil and groundwater samples.

In July 1993, seven borings (SB-1 through SB-7) were advanced from 12 to 20 ft bls within the tank area and the surrounding area, and 2-ft-long split-spoon samples were collected continuously from each boring (see Figure 2-7). Samples were screened in the field using an OVA. Soil samples were collected from the 2 to 4 ft bls interval in each boring and were analyzed for gasoline, diesel, and other petroleum hydrocarbons using EPA Method 8015 modified to detect fuel hydrocarbons. EPA Method 5030, purge and trap, was used to prepare samples for gasoline and lighter fuels analysis. EPA Method 3550, solvent extraction, was used to prepare samples for diesel and heavier fuel oil analysis. The 2 to 4 ft bls interval routinely had the highest OVA reading in each boring. Boring logs are provided in Appendix B-6.

In addition, a groundwater sample was collected from a temporary well placed in HP-1, and groundwater samples were collected from MW-1A and MW-1B. The water samples also were analyzed for petroleum hydrocarbons as described above. The groundwater sampling is discussed in more detail in Section 2.8.

2.7 BEDROCK CORE BORING PROGRAM

Ten core borings, CB-1 through CB-10, were completed in June 1991 to characterize the geology and associated structures of the site and to assist in determining locations of screens for additional wells that were installed (Figure 2-8). Six of the borings (CB-1, CB-4, CB-5, CB-6, CB-7, and CB-8) were advanced to total depths of 67 to 97 ft bls using a cylindrical, diamond-studded bit attached to hollow drill rods. Three borings (CB-2, CB-3, and CB-10) were advanced to total depths of 115 to 120.5 ft bls. One core boring (CB-9) was advanced to 400 ft bls.

Groundwater samples were collected from six core borings (CB-3, CB-4, CB-5, CB-6, CB-7, and CB-8) using a packer assembly. At the desired depth, an interval from 30 to 94 inches long was sealed off from the remainder of the corehole using an inflatable device

(packer). Water then was removed from this interval, and the approximate rate at which the water could be pumped from the interval was measured.

Intact rock core samples were collected from each corehole and were examined to assess lithology, fracture density and pattern, and the degree of weathering of the bedrock. Core logs are provided in Appendix B-7.

The rocks collected at approximately 70 ft bls in core boring CB-3 were interpreted as being in a brecciated and slickensided zone indicative of faulting. A similar zone was encountered in CB-6, 200 ft to the east at approximately the same depth. It is likely that this fault correlates to the Gulf Fault, a major east-west trending normal fault that has been mapped in the area. At nearby outcroppings, the Gulf Fault was found to dip to the southwest at a 60 degree angle, with a vertical displacement of 600 ft (Reinemund, 1955).

The deep core boring (CB-9) was advanced to 400 ft into the Pekin formation (see Chapter 3 for a discussion of regional geology) to locate the above-mentioned fault south of the former southern Ponds. This corehole was abandoned by grouting to the ground surface immediately upon completion. The rock samples were examined to determine if the brecciated zone associated with the fault could have been a conduit for heavier-than-water wood preserving constituents. Four rock core samples were later selected from CB-9 for laboratory analysis based on observations of discoloration and odor. The samples were analyzed for site-specific constituents.

2.8 GROUNDWATER ASSESSMENT

The groundwater assessment was conducted in phases using the outside to inside approach. Figure 2-9 shows the location of all site monitor wells. Over the course of the investigation activities at the site, monitor well identifications changed. A systematic numbering system was instituted for this report. Table 2-2 lists all monitor wells by current well ID and

previous well ID and includes well-construction details. The first phase of well installation involved placement of shallow wells along the property boundary and at selected intrasite locations. These wells allowed for an initial determination of groundwater flow direction and locations where shallow groundwater quality has been impacted. Subsequent phases of well installation were designed to evaluate the vertical and lateral extent of groundwater impacts and to better characterize aquifer conditions, including groundwater flow direction, hydraulic conductivity, and rock/soil characteristics.

The monitor wells were installed in boreholes advanced by a mechanical drill rig using hollow-stem augers (with split-spoon samples collected at continuous or 5-ft intervals) or by mud-rotary until refusal. Below refusal the boreholes were advanced using air hammering until the final depth was reached. A single surface casing was installed (Type II well) during drilling/construction of wells MW-1A, MW-2A, MW-9A, MW-9B, MW-10A, MW-11A, MW-11B, MW-11C, MW-13B, MW-15A, MW-15B, MW-15C, MW-16B, and MW-16C. A double surface casing (Type III well) was installed during drilling/construction of well MW-13C. Surface casings were installed to prevent potentially contaminated soils from entering the borehole during drilling and to prevent potentially contaminated shallow groundwater from migrating into deeper zones via the borehole. Surface casings for wells MW-15B, MW-15C, MW-16B, and MW-16C consisted of 6-1/4-inch ID, carbon-steel casing. Wells MW-1A, MW-2A, MW-9A, MW-9B, MW-10A, MW-11A, MW-11B, MW-11C, MW-13B, and MW-15 were constructed using 6-1/4-inch ID, polyvinyl chloride (PVC) surface casing. Surface casings for well MW-13C consisted of a 12-inch ID, carbon-steel outer casing with a 6-inch ID, carbon-steel inner casing.

Monitor wells MW-1A, MW-2A, MW-3A, MW-7A, MW-7B, MW-8A, MW-9A, MW-9B, MW-10A, MW-10B, MW-10C, MW-11A, MW-11B, MW-11C, MW-12A, MW-13A, MW-13B, MW-14A, MW-15A, MW-17A, and MW-18A were constructed of 2-inch ID, Schedule 40 PVC screen and riser. Monitor wells MW-6A, MW-13C, MW-15B, MW-15C, MW-16A, MW-16B, and MW-16C were constructed of 2-inch ID, Schedule 304, stainless steel screen with

carbon-steel riser. Monitor well MW-3C was installed using the air hammer with casing advancer method. The remainder of the wells were constructed as follows: the sand pack was introduced into the annular space around the well to an average of 2 ft above the top of the screen; an average 2-ft-thickness of bentonite pellets were placed above the sand pack and hydrated to provide a low-permeability seal between the screened interval and overlying material; finally, the remainder of the annular space was filled with a Portland cement/bentonite-powder grout mixture. Well-construction diagrams are provided in Appendix C.

2.8.1 Monitor-Well Sampling

Five rounds of groundwater sampling were completed at the Gulf site by Geraghty & Miller representatives and other contractors. All samples collected from monitor wells were analyzed for site-specific constituents.

In October 1990, the first round of groundwater samples were collected from nine monitor wells screened within the shallow zone. Thirty, 27, 31 and 29 groundwater samples were collected in August 1991, December 1992, June 1993, and December 1993 respectively, from monitor wells screened within the shallow zone and deep (bedrock) zone.

2.8.2 Slug Tests

Slug tests were performed at each of the monitor wells on-site if they did not contain free product (creosote) and if they had a sufficient amount of water in the monitor well to perform the test. A weighted stainless steel cylinder of known volume was dropped into each well, thus displacing an equal volume of water. Simultaneously, an electronic data logger attached to a pressure transducer in the well was activated. The rate at which the water level in the well returned to its original height was recorded. The procedure was repeated as the slug was removed, thus giving two complementary data sets from which hydraulic conductivity values were calculated. Slug test data was analyzed using AQTESOLV, a proprietary computer code.

2.9 SURFACE-WATER/SEDIMENT SAMPLING

During May 1990, six sediment and three surface-water samples were collected from Little Cedar Creek and the on-site drainage ditch (see Figure 2-10). Three surface-water samples were collected to characterize the water quality with respect to the Gulf site-specific constituents. Grab samples were collected at the following locations: from the center of the Little Cedar Creek near the upstream property boundary, on-site from the confluence of the drainage ditch and stream, and on-site from the upstream drainage ditch. The samples were analyzed for site-specific constituents and total suspended solids (TSS).

Six sediment samples were collected at the following locations: one from the center of the confluence of the stream near the property boundary, one sample from the confluence of the ditch and the stream, and four samples from the upstream ditch. The samples were analyzed for site-specific constituents.

Three surface-water samples were collected in August 1990 from Little Cedar Creek and the drainage ditch to characterize the water quality with respect to site-specific constituents (see Figure 2-11). Grab samples were collected at the following locations: confluence of stream and drainage ditch, approximately 50 yards downstream of confluence, and approximately 50 yards downstream of confluence after disturbing the sediment from 4 to 6 inches in the stream bed. The samples were analyzed for site-specific constituents. The disturbed sediment water sample was collected to assess potential exposure to persons wading in the creek.

A sediment sample was collected from the center of the stream bed approximately 8 inches below the surface approximately 50 yards downstream of the confluence. The sample was analyzed for site-specific constituents.

2.10 BIORECLAMATION FEASIBILITY STUDY

A soil and groundwater sampling program was implemented to determine suitability for bioreclamation activities. This program was divided into three tasks. The first task was to analyze the saturated and unsaturated soils for the presence of acclimated bacteria. The majority of bacteria populations in aquifers exist attached to soil particles. Aerobic bacteria were confirmed in soil samples collected from saturated and unsaturated soils at the site. These analyses determined the populations of bacteria present, the proportion of bacteria that have adapted to degrade selected organic compounds, and indicated if inhibitory conditions exist.

Eight soil samples were collected as part of the former northern impoundments area boring program. Four samples were collected from the unsaturated zone and four from the saturated zone. A direct reading instrument (OVA) was used to confirm that VOCs were present. One soil sample pair (unsaturated and saturated) was collected upgradient from the Northern pond area. Three soil sample pairs were collected from locations within the pond area suspected to have "high," "medium," and "low" concentrations of organic compounds. Sampling equipment was decontaminated to prevent bacterial cross-contamination during boring activities. The samples were analyzed for total heterotrophic bacteria; heterotrophic bacteria capable of degrading to pentachlorophenol, naphthalene, and benzene; inorganic nutrients (ammonia, ortho-phosphate); soil pH; and moisture content.

The second task was to determine dissolved oxygen (DO), oxidation-reduction potential (Eh), pH, temperature, and conductivity in groundwater. The objective of this task was to evaluate the distribution of DO, Eh, and pH in soil, borehole, and well water. These measurements are general indicators of biological activity. Biological activity that exceeds the rate of oxygen uptake will result in low DO and negative Eh values. The DO data were used to indicate if more aerobic zones occur in the aquifer to stimulate degradation; the magnitude of the Eh value indicates the type of biological respiration that may exist in the aquifer; and the magnitude of the pH value indicates if conditions were conducive to maintain optimal enzyme

activity. Six wells (MW-11A, MW-13A, MW-15A, MW-15C, and MW-16B) were evaluated. Monitoring well MW-11S was the background well.

The third task was to analyze groundwater samples for the following inorganic parameters: nitrate/nitrite, sulfate, carbon dioxide, soluble iron, calcium, magnesium, total hardness, and alkalinity; and for the following organic-indicating parameters: TOC, BOD, and COD.

The report presenting the results of the bioreclamation feasibility study will be included in the Remedial Action Plan (RAP), which will be submitted under separate cover at a later date.

3.0 ENVIRONMENTAL SETTING

The physical characteristics of the site, including surface features, land use/groundwater use, climate, surface-water hydrology, geology, and hydrogeology, are discussed in this section. The site consists of approximately 89 acres, on SR 2145, at the southern edge of Chatham County, North Carolina.

3.1 SURFACE FEATURES

The site is vacant and vegetated with grass and trees. Trees are generally present along the perimeter of the facility with more densely treed areas occurring near the northwest and southeast corners. The remainder of the facility is covered with grass. All building structures relating to the former wood-preserving operations have been removed. A temporary storage shed near the entrance is the only building present on the site. A Norfolk and Southern Railroad right-of-way transects the site and a Southern Railroad right-of-way is present south of the site. The Southern Railroad is no longer active, and the tracks have been removed. The site is not fenced and is not serviced by electric or gas utilities. Site access roads are gated and locked.

Surface-water features are present on the site are limited to stormwater management. These features are discussed in detail in section 3.4.

A surface expression of a diabase dike is present near the Norfolk and Southern Railroad. The dike is discussed in detail in Section 3.5.2, Site-specific Geology.

3.2 LAND USE AND GROUNDWATER USE

Land use in the vicinity of the site is low density residential, forestry and industrial. According to a worksheet in the NCDEHNR, Superfund Section file for the site, there are 748 households and approximately 1,933 people living within 4 miles of the site. Land areas to the

north and east of the site are forested. Cherokee Sanford Brick Co. and Sandford grading are directly south of the plant. According to Mr. Travis Cade of the Goldston-Gulf Sanitation District, the city water plant is approximately 1/2 mile southwest of the site. The water plant in-take from the Deep River is up stream from the Gulf site. City water is supplied east of Gulf along state highway 421 and north of 421 to SR 2139 to the Cherokee Sanford Brick Co. facility. City water also is supplied to Goldston via a pipeline installed along Highway 421. This pipeline supplies residents between Gulf and Goldston along Highway 421 and State Road 2195. Mr. Cade stated that to his knowledge, there are no records of private drinking water well users in the area.

Groundwater use in the vicinity of the Gulf site is limited to one residence east of the site on SR 2145 which maintains a private well for non-drinking water purposes. This well was sampled during the RI and was found to be free of site-specific constituents.

3.3 CLIMATE

Climatic data for the area near Gulf was obtained from the National Oceanic and Atmospheric Administration's "Climates of the States" (NOAA, 1974). North Carolina has the most varied climate of any eastern state, due mostly to the wide range of elevations and the distance from the mountains to the sea. The state is divided into eight climatological subdivisions: northern and southern mountains; northern, central, and southern piedmont; and northern, central, and southern coastal plain. Gulf, North Carolina is in the central piedmont climatological subdivision. However, it is close to the border of the southern coastal plain subdivision. No meteorological monitoring station data were available for Gulf or nearby Sanford, North Carolina. Therefore, data from Moncure 3 SE (approximately 12 miles northeast of Gulf) and Raleigh-Durham Airport (approximately 35 miles northeast of Gulf) were used to represent conditions in Gulf, North Carolina.

The average minimum temperatures recorded at the Moncure 3 SE station range from 32 degrees Fahrenheit (F) in January to 55 F in July. The average maximum temperatures recorded at the Moncure 3 SE station range from 68 F in January to 91 F in July. The average annual precipitation totals 48.65 inches and ranges from 3.16 inches in November to 6.84 inches in July. Relative humidity, from the Raleigh-Durham Airport monitoring station, ranges from 44 percent in March to 92 percent in August and September. Throughout the year, the lowest humidity consistently is recorded at mid-day and the highest humidity in the early morning. The Raleigh-Durham Airport monitoring station reported the predominant wind direction is southwesterly 9 months of the year. From August to October, however, the predominant wind direction is northeasterly to north/northeasterly. Average wind speed ranges from 7 miles per hour (mph) in June to 9.6 mph in March (NOAA, 1974).

North Carolina is outside the principal tornado area of the United States, with an average of less than four tornados each year. Primary economic losses related to weather are the result of thunderstorms.

3.4 SURFACE-WATER AND ECOLOGICAL FEATURES

Surface-water features on the site (shown in Figure 3-1) include drainage ditches, a portion of Little Cedar Creek, and a stormwater retention pond. Surface drainage at the site occurs primarily in either a northerly or a southeastern direction. The site topographic map, Figure 2-1, provides a perspective on general overland flow of Stormwater.

Surface waters in the vicinity of the site include Little Cedar Creek, the Deep River, and associated wetlands. Little Cedar Creek converges with the Deep River approximately 1.75 miles east of the site. It has been reported that Little Cedar Creek has not been fished for many years and is not considered a fishery (NCDEHNR, 1994b).

Hunting and fishing are allowed in the Deep River. Freshwater sport fish are known to inhabit the Deep River; however, surveys of the distribution of species in the Deep River were unavailable. Wetlands associated with Cedar Creek, the Deep River, and tributaries to these systems are classified primarily as temporarily and seasonally flooded broad leaved deciduous forested wetlands (USFWS, 1983a and b). These wetland types typically are vegetated by river birch (*Betula nigra*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), yellow poplar (*Liriodendron tulipifera*), sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), sugar berry (*Celtis laevigata*), bitternut hickory (*Carya cordiformis*), box elder (*Acer negundo*), and swamp chestnut oak (*Quercus michauxii*) with an increased occurrence of swamp chestnut oak, black gum (*Nyssa sylvatica*), willow oak (*Quercus phellos*), water hickory (*Carya aquatica*), river birch, and Southern red oak (*Quercus falcata*) in seasonally flooded wetlands.

The North Carolina Natural Heritage Program database was to searched for the occurrence of threatened and endangered species and/or any sensitive habitats within the vicinity (both a 1-mile and 4-mile radius) of the site. The Natural Heritage Program indicated that they have records of the occurrence of one state significantly rare plant species, the Indian physic (*Porteranthus stipulatus*), within a 4-mile radius of the site (NCNHP, 1993). The preferred habitat for this species is rich wooded areas. Due to the industrialized nature of the site, it is unlikely that suitable habitat for the Indian physic would be present on-site.

The Heritage Program indicated that the site is immediately upstream from the nationally significant Natural Heritage Priority Area of the Rocky River-Deep River Aquatic Habitat. This aquatic habitat is significant because several species of special concern inhabit these rivers. The United States Fish and Wildlife Service (USFWS) database was searched for the occurrence of any species of special concern within the aquatic habitats in vicinity of the site. The USFWS indicated that no aquatic species of special concern have been reported to occur in the vicinity of the site, but cautioned that a species of special concern survey has not been conducted specifically for these areas (USFWS, 1993a). According to the USFWS, the federally-listed endangered Cape Fear shiner (*Notropis mekistocholas*) exists in a few isolated populations of the

Deep River (USFWS, 1993b). The USFWS also identified federally-listed endangered species and species that are candidates for federal listing known to occur in Chatham County (USFWS, 1993b). However, none of these species is known to occur on the site.

3.5 GEOLOGY

3.5.1 Regional Geology

The site is in Chatham County, approximately 10 miles northwest of Sanford. Chatham County lies within a geologic feature known as a Triassic basin. The basin referred to as the Deep River basin extends through central North Carolina and out crops within the eastern boundary of the Slate Belt (NCGS, 1985). The Deep River basin is a graben-like structure that is separated into three parts: northern, central, and southern. The Durham basin is considered the northern part; the Sanford basin is considered the southern part; and the area between the two basins is considered the Colon cross-structure (Reinemund, 1955). The Gulf site is located in the Sanford basin. The Deep River Triassic basin encompasses the Upper Triassic Newark Supergroup which encompasses the Chatham Group. The Chatham group is then subdivided into three units: Pekin formation (lower unit), the Cumnock formation (middle unit), and the Sanford formation (upper unit) (Horton and Zullo, 1991).

The Pekin formation consists of red, brown, or purple rocks. The rocks tend to be fine-grained clastics such as claystone, shale, siltstone, and sandstone. This formation tends to be 1,800 to 4,000 feet thick in exposed areas of the Sanford basin. The lower 50 to 500 ft of the formation consists of a basal conglomerate (Reinemund, 1955).

The Cumnock consists of gray and/or black rocks with two layers of coal. The Cumnock contains two layers of coal; the Gulf coal bed and the Cumnock coal bed. The thickness of Gulf coal bed is approximately 2 ft or less; the Cumnock coal bed thickness is approximately 4 ft or less. These coal beds are separated by 30 to 40 ft of gray shale, siltstone, and fine-grained

sandstone. The coals in this part of the basin are underlain by about 250 ft of gray shale, claystone, siltstone, and sandstone, and they are overlain by about 500 ft of gray and black shale and claystone, which is irregularly calcareous, carbonaceous, and fossiliferous (Reinemund, 1955). The Cumnock is 750 to 800 ft at its thickest point, which is observed in the eastern section of the Sanford basin.

The Sanford formation consists of red, brown, or purple rocks. This formation consists of fine-grained clastics in the Sanford basin and coarse-grained conglomerate and fanglomerates along the southeast edge of the Deep River basin. The Sanford Formation is greater than 3,000 ft thick in the Sanford basin (Reinemund, 1955).

The Deep River basin was formed by tilting and subsidence along the Jonesboro fault and possible uplift of southeast source area. Tensional cracks formed cross faults, which are perpendicular to the basin's axis, and then longitudinal faulting began to occur. After faulting had occurred, magma arose and filled in both the cross faults and the longitudinal faults. The sediments from the Triassic basin have been eroding away. The Jonesboro fault is considered the southeastern boundary of the basin, and the two longitudinal faults, the Gulf and the Deep River, bound the "canoe-shaped graben" on the north and south. The Pekin formation is the western boundary (Reinemund, 1955).

The Triassic basin contains dikes, sills, and sill-like structures which intruded the sediments either during the late Triassic or possibly Jurassic time period. Dikes are intrusive vertical bodies that contain igneous material, and sills are intrusive splays off from dikes that tend to follow bedding planes which contain igneous material. The dikes are from a fraction of an inch to more than 300 ft wide and are from a few feet to more than 7 miles long. Most dikes trend north 15 to 40 degrees west (Reinemund, 1955). The dikes usually have definitive contacts with the surrounding rock they intrude, except in faulted areas where the contacts are irregular and the dikes are not continuous. The dikes present in this area are classified as diabase dikes.

Sills and sill-like structures are present in the Sanford basin, upper Cumnock formation. They range from several inches to 100 ft thick. Sills are predominantly found in the western part of the coal-bearing area, where areas of intense faulting have occurred (Reinemund, 1955).

3.5.2 Site-specific Geology

Investigative activities (bedrock core boring and soil borings) performed at the site confirmed Sanford basin features including the Sanford, Cumnock and Pekin formations, the Gulf fault, a diabase dike and diabase sills. A geologic cross-section location map is shown in Figure 3-2. A north-south geologic cross-section showing these features is presented in Figure 3-3. A geologic map is provided in Figure 3-4.

A relatively thin layer of residual soils and partially weathered rock (saprolite) overlays the Triassic bedrock. The thickness of each of the unconsolidated layers, is variable throughout the site. According to the lithology collected from the core borings and the soil boring program, the unconsolidated material ranges in thickness over the entire site from the surface to a maximum of approximately 37 ft bls in the northern portion of the site at the E-5 soil boring. Residual soils and saprolite are typically fine grained, clays, sandy clays and silty clays.

The bedrock is composed of either red, gray, or purple fine-grained sandstone or siltstone and gray or black shale. The red, gray, and purple sandstone, siltstone, and shale in the northern section of the site are believed to be the Pekin formation and in the southern section of the site the Sanford formation. The gray or black sandstone, siltstone, and shale are believed to be the Cumnock formation, which is located in the center of the site. Core borings conducted outside of the fault zone indicate consolidated material with occasional fractures to the full depth of coring. In the fault zone core samples were frequently brecciated. The core samples reveal that the bedrock contains many moderately to closely fractured zones that do not appear to be correlated to the bedding planes or other laterally extensive features. A weathered brecciated

zone in the vicinity of the Gulf fault extends to at least 400 ft bls (the maximum depth of core boring CB-9).

Several geologic structures have been observed on site: the Gulf fault, a diabase dike, and several diabase sills. The Gulf fault reportedly trends east to west and dips approximately 60 degrees south/southeast (Reinemund, 1985). Based upon core logs and the above information, the Gulf fault is located directly below the former southern ponds. The Gulf fault separates the site into three geologic zones: northern, central, and southern. The northern side of the fault is the uplifted Pekin formation. The area south of the fault is the Sanford formation, and the area where the fault is located near the surface is the Cumnock formation.

A diabase dike and several diabase sills were located on-site using several methods. Figure 3-4 depicts the locations of these geologic features based on the geologic interpretation of magnetometer data, surface outcroppings and core boring logs. The magnetometer survey revealed possible locations of these igneous intrusions, and further drilling confirmed these locations. The dike is oriented north to south in close proximity to the drainage ditch on the northeast property line. Diabase materials are evident in the bottom of this ditch. The dike is also evident off-site to the south on the Cherokee Sanford Brick property. Two sills are located in the southern area of the site: the first sill is observed near the location of CB-4 and the other sill is located along SR 2145 near the entry road.

3.6 HYDROGEOLOGY

3.6.1 Regional Hydrogeology

No information concerning hydrogeology was available for the Gulf region. Within the Triassic basin, groundwater is present in the fractures and rock openings; however, the availability of groundwater as a water supply is highly variable. Siltstones and claystones are known to have low yields. Wilson and Carpenter (1981) reported average yields of 7 gpm for

47 Triassic basin wells in Chatham County. Reinemund (1955) noted that wells placed near dikes and faults generally resulted in higher yields.

Diabase dikes in the Deep River Triassic basin are relatively dense and impermeable and tend to impound groundwater behind them (Baine, 1966). One reported example for a large dike is located northwest of the junction of the Eno and Little Rivers in Durham County.

3.6.2 Site Hydrogeology

Investigation results indicate a single bedrock/saprolite aquifer to be present at the site. The lower portion of the thin residual soil/saprolite layer is saturated across much of the site. The transition from soil to rock is very gradual. As described in section 3.5 the bedrock units are transected vertically by a fault zone and a diabase dike. Both features characteristically are expected to have higher transmissivities (hydraulic conductivity) than the surrounding rock. As a result these features should have a pronounced influence on groundwater flow. The North South trending dike zone may behave as both a drain and a barrier to flow. The broken up zone on either side of the dike likely has a relatively high transmissivity compared to adjacent rocks. Water level maps of the site consistently show a gradient toward and down the dike (toward Little Cedar Creek) consistent with a drain-like behavior. The dike follows a drainage ditch on the northeast property line. Flow in this ditch is intermittent, occurring during rainfall events.

The fault zone appears to coincide with a groundwater divide. Very low water level gradients along the fault zone indicate that water may be moving from up slope areas west of the site. Groundwater flow patterns consistently show lateral flow away from the fault zone.

Water levels have been measured periodically across the site since August 1990. Figures 3-5, 3-6, 3-7 and 3-8 depict water table elevations for 4 dates which are generally representative of groundwater flow conditions during different synoptic periods. Table 3-1 provides water level data for those dates. An east-west trending flow divide is present within the southern

portion of the site in approximately the same location as the Gulf fault. Flow north of well cluster MW-3 is to the north toward Little Cedar Creek. Flow south of well cluster MW-3 is to the south-southeast. Flow on the east end of the site tends to flow east to northeast.

Water levels taken December 7 and 8, 1993, also listed in Table 3-1, provide for the most comprehensive understanding of bedrock zone flow and the interrelationship of shallow and deeper groundwater. This is the first round of water levels representing static conditions since four deep monitoring wells MW-3C, MW-10C, MW-13C and MW-18A were installed in May 1993. The water table elevation pattern shown in Figure 3-9 is similar to previous water table elevation patterns for the site. Bedrock zone water levels are shown in Figure 3-10. Flow in bedrock at the 100 ft depth north of well cluster MW-3 (and the Gulf Fault) is to the north, parallel to the diabase dike and away from the Gulf fault. The influence of the dike zone on deep bedrock flow, if present, is not apparent in the water level map. Flow at this depth in other portions of the site cannot be determined from the existing well network. However, it is possible the pattern is similar to shallow groundwater flow.

Vertical gradients vary temporally and according well location. Well clusters MW-10 and MW-11 which are screened in competent rock of the Pekin formation show the greatest downward vertical gradients. Well clusters MW-3, MW-13, MW-15, and MW-16, located in close proximity to the diabase dike and the Gulf fault, show comparably small vertical gradients. Gradients in these 4 well clusters on December 7 and 8, 1994 were slightly downward in clusters MW-13 and MW-16, slightly upward in cluster MW-3 and indeterminate in cluster MW-15.

Hydraulic conductivity measurements (slug tests) were performed in selected wells. The shallow, soil/saprolite Sanford formation portion aquifer in the southern portion of site tends to have a very low hydraulic conductivity ranging from 7.3 E-05 to 5.3 E-06 cm/sec. Shallow wells (i.e. wells less than 40 ft in depth) in the southern portion of the site tend to be very slow to recover after purging.

Aquifer conditions in the northern portion of the site are more permeable. Hydraulic conductivity in the shallow, unconsolidated zone range from 1.3 E-04 to 7.8 E-04 cm/sec. Within the unconsolidated flood plain aquifer, MW-14A, was the most permeable at 1.9 E-02 cm/sec.

These results show that outside of the fault zone and diabase dike zone the shallow aquifer materials have low permeabilities. Based on the core logs and drilling program results the fault zone and diabase dike zone have considerably greater secondary porosity than surrounding rocks and therefore should have higher hydraulic conductivities. Testing for such properties in these zones however, has been limited due to either creosote present in the wells (clusters, MW-13, MW-15 and MW-16) near the dike and a lack of deeper bedrock wells in the fault zone. It is apparent that the soil/saprolite zone above these features is similar to soil/saprolite elsewhere on the site, possessing low permeability. As a result, the interconnection between surface features and the more and more permeable fault and dike zones may be somewhat limited. The presence of creosote and dissolved constituents in these zones below the soil/seprolite zone. (reported in the following chapter) indicate that an interconnection exists. It is possible that pond excavation during construction or maintenance may in combination with the hydraulic head within the impoundments have increased the level of interconnection between these units.

4.0 NATURE AND EXTENT OF CONTAMINATION

This section presents the results of the soil, groundwater, and surface-water investigations at the site. These findings are interpreted, together with local and regional geologic, hydrogeologic, and surface hydrologic information, to define the nature and extent of impacts to soil, groundwater, and surface water.

Sample analytical results are summarized on data tables referenced in the following sections. Results for constituents that were not detected above quantitation limits are reported in the tables as ND. The data were validated by Southern Wood Piedmont. Laboratory reports are included in Appendix D (Volume III). The data tables include total volatile organic constituent (VOC) and total semi-volatile organic constituent (SVOC) results that are the sums of the detectable concentrations.

4.1 SOIL SAMPLING RESULTS

Tables 4-1 through 4-4 summarize the analytical results of the soil sampling events. The discussions of soil results are presented in five sections, which correspond to the different sampling programs: background soil boring program, removal confirmation soil sampling, northern impoundments soil boring program, drip track area sampling, and diesel fuel storage area soil boring program. For purposes of comparison, total aggregate VOC and SVOC results will be discussed along with individual constituent results. Selected soil samples were analyzed for a suite of target inorganic constituents, and results for these constituents will be discussed individually.

Soil samples submitted to the analytical laboratory(s) were analyzed for the site-specific constituents listed in Table 2-1. One difference in SVOC constituent reporting which occurs in the groundwater results is the manner in which benzo(b)fluoranthene and benzo(k)fluoranthene results are presented in the tables. All soil results and groundwater results for the first three

groundwater sampling events report these two isomers as one concentration (designated as benzo[b,k]fluoranthene). Groundwater results for the June 1993 and December 1993 groundwater sampling events are reported for each individual isomer.

4.1.1 Background Soil Boring Program Results

Background soil sample results for the site-specific constituents and RCRA metals are summarized in Table 4-1. All background soil samples were taken at undisturbed locations with no obvious visual contamination. Only one soil sample (B-6) was observed to have a noticeable organic odor during sample collection.

Detectable SVOCs occurred in soil samples B-2, B-4, and B-6, with total SVOC concentrations of 0.89, 6.2, and 4.4 milligrams per kilogram, dry weight basis (mg/kg dw), respectively (Table 4-1). The SVOCs detected in one or more of the soil samples are PAHs: acenaphthene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene+benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, and phenanthrene. No other SVOCs were detected, and no VOCs were detected in the background soil samples.

The SVOCs detected in the background are consistent with the types and concentrations of PAHs detected in other background locations. Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous in the environment; anthropogenic sources include the burning of fuel oil, coal, and wood for heating and energy production, and emissions from internal combustion engines and solid waste incinerators (Moriselli & Zappoli, 1988). Numerous studies have reported the presence of PAHs in both rural and urban soils, with an increase in PAH abundance near urban centers (Moriselli & Zappoli, 1988). Jones, et al (1989), analyzed soil samples collected from an agricultural plot over a span of approximately 100 years for PAHs and found that total PAHs have increased in abundance approximately four to five-fold during the period. Some of the PAHs showing the largest increases (benzo[b]fluoranthene, benzo[k]fluoranthene, and benzo[a]anthracene) were also among the most abundant PAHs detected in background soil

samples. Fluoranthene and chrysene also increased at least five-fold within that period (Jones, et al, 1989); these PAHs were detected in the background samples. The authors attribute the increase to the burning of fossil fuels.

Detectable concentrations of the following inorganics occurred in all six background soil samples: arsenic (5.4-14 mg/kg dw), barium (56-220 mg/kg dw), chromium (14-30 mg/kg dw), copper (13-51 mg/kg dw), lead (8.4-30 mg/kg dw), and mercury (0.012-0.026 mg/kg dw) (Table 4-1). These concentrations are within observed naturally-occurring ranges for soils of the eastern United States (USGS, 1984).

4.1.2 Removal Confirmation Sampling Results

Results for the removal confirmation soil samples collected in the area of the former southern ponds are summarized in Table 4-2. Seven soil samples were collected from the bottom of the excavated area; each was a composite sample consisting of three subsamples. The eighth soil sample, sample P-O, was prepared by compositing the seven composite samples into one in the field.

SVOCs, VOCs, and naturally-occurring inorganics were detected in all eight samples. Most of the SVOCs detected in one or more removal confirmation samples are PAHs: acenaphthene; anthracene; benzo(a)anthracene; benzo(b)fluoranthene+benzo(k)fluoranthene; chrysene; fluoranthene; naphthalene; phenanthrene; fluorene; and 2-methylnaphthene. Carbazole was also detected. The maximum total SVOC concentration (2,800 mg/kg dw) occurred in sample P-2-B; the sample with the next-highest total SVOC concentration (sample P-1-D) contained 720 mg/kg dw total SVOCs (Table 4-2). The overall composite sample P-O, which is representative of the entire sampling area, had a total SVOC concentration of 250 mg/kg dw (Table 4-2).

Detectable VOCs include the aromatic compounds benzene (detected in one sample only), ethylbenzene, toluene, and xylenes. Total VOC concentrations range from 0.076 mg/kg dw to 2.8 mg/kg dw for samples P-1-A and P-3-A, respectively (Table 4-2). Overall composite soil sample P-O had a total VOC concentration of 0.095 mg/kg dw (Table 4-2).

Inorganic constituents detected in one or more removal confirmation samples include arsenic, barium, chromium, copper, lead, and mercury. The maximum concentrations of arsenic copper, and lead detected in the confirmation samples were below their maximum concentrations in the site background samples (see Table 4-1). Maximum concentrations of barium, chromium, and mercury detected in the confirmation samples were not in excess of three times the maximum concentrations detected in site background samples.

4.1.3 Northern Impoundments Soil Boring Program Results

Thirty-eight borings on a 100 ft x 100 ft grid pattern were advanced to determine the extent of the northern impoundments. A total of 13 soil samples, including background soil sample, were collected for laboratory analysis from 5 of the borings. Northern impoundment soil sample analytical results for the site-specific constituents are summarized in Table 4-3. The soil samples are identified using their grid coordinates; for example, soil sample G-4A is the 0 to 2 ft bls soil sample from the boring located at G4 on the grid. Visual and odor observations of soil impacts are summarized in graphical form on Figure 4-1, which depicts the approximate horizontal extent of the impacted soils in the northern impoundments area. Figures 4-2 through 4-5 are east-west cross-sections of the area showing vertical distributions of impacted soils based on visual observations during the northern impoundments soil boring program.

Based on field observations of soil samples collected during this soil boring program and upon historical air photos, the approximate horizontal extent of impacted soil in the northern impoundments area has been delineated (see Figure 4-1). Total SVOC concentrations in 8 soil samples collected from within the contaminated pond materials range from 9.8 mg/kg dw

(0 to 2 ft deep soil sample from boring E-4) to 4,000 mg/kg dw (2 to 4 ft deep soil sample from boring E-4) (Table 4-5). Samples E-4C, G-4C H-6C and I-6C represent subsoil conditions beneath the ponds. Subpond soils were free of VOCs except I-6C. Total SVOCs in subpond soils ranged from 3.49 mg/kg dw to 187.9 mg/kg dw (Table 4-3). All 12 soil samples (not including the background soil sample) had detectable concentrations of PAHs. The following PAHs (with maximum concentrations in parentheses) were detected in one or more of the soil samples: acenaphthene (730 mg/kg dw), anthracene (280 mg/kg dw), benzo(b)fluoranthene+benzo(k)flouranthene (0.56 mg/kg dw), chrysene (82 mg/kg dw), flouranthene 430 mg/kg dw), fluorene (840 mg/kg dw), 2-methylnaphthalene (980 mg/kg dw), naphthalene (310 mg/kg dw), and phenanthrene (710 mg/kg dw) (Table 4-3). One non-PAH SVOC constituent, carbazole, was detected in 7 of 12 soil samples, at a maximum concentration of 120 mg/kg dw (Table 4-3). No other SVOCs were detected.

VOCs were detected in 7 of 12 soil samples (not including the background soil sample). Total detectable VOC concentrations ranged from 0.26 mg/kg dw for the 0 to 2 ft deep soil sample from boring G-4 to 58 mg/kg dw for the 2 to 4 ft deep soil sample from the same boring (Table 4-3). The detected VOCs and maximum concentrations consist of toluene (10 mg/kg dw), ethylbenzene (11 mg/kg dw), and xylenes (37 mg/kg dw) (Table 4-3). No other target VOCs were detected in the soil samples.

The vertical extent of soil impacts in the northern impoundments area can be approximated based on the visual observations and analytical results for soil samples collected during this boring program. In three of the four borings (borings E-4, G-4, and H-6) from which soil samples were collected for laboratory analysis, the highest total SVOC concentrations for each boring occur in the 2 to 4 ft deep soil sample. The 2-ft to approximately 10-ft soil horizon appears to be the interval in which most of the discolored soils were observed during the boring program. Odors were observed in soils below this horizon in several of the borings, and in some borings oily material was observed below this depth (as deep as 19 ft bls in boring

H6). Free-phase creosote behaves as a dense, non-aqueous phase liquid (DNAPL) in the subsurface and can migrate vertically as a mass.

4.1.4 Drip Track Soil Boring Program Results

Nine soil samples were selected for laboratory analysis during the drip track soil boring program. A total of nine borings were advanced to auger refusal, with continuous split-spoon sampling. The soil samples were collected from three depths (0 to 2, 2 to 4, and 4 to 6 ft bls) at each of three borings (DTB-1, DTB-4, and DTB-9). Soil sample results for site-specific constituents are summarized in Table 4-4.

SVOCs were detected in five of nine soil samples: the 0 to 2 and 2 to 4 ft bls soil samples from boring DTB-1; the 0 to 2 and 2 to 4 ft bls soil samples from boring DTB-4; and the 0 to 2 ft bls soil sample from boring DTB-9. All but one of the detectable SVOCs are PAHs, listed as follows with maximum detected concentrations: 2-methylnaphthalene (1.5 mg/kg dw), acenaphthene (54 mg/kg dw), anthracene (35 mg/kg dw), benzo(a)anthracene (5. 7 mg/kg dw), benzo(a)pyrene (1.5 mg/kg dw), benzo(b)fluoranthene+benzo(k)fluoranthene (2.8 mg/kg dw), chrysene (5 mg/kg dw), fluoranthene (94 mg/kg dw), fluorene (1.5 mg/kg dw), indeno(1,2,3-cd)pyrene (0.53 mg/kg dw), naphthalene (44 mg/kg dw), and phenanthrene (120 mg/kg) (Table 4-4). The non-PAH constituent is a heterocyclic nitrogen-containing compound: carbazole (1.4 mg/kg). The maximum total detectable SVOC concentration is 350 mg/kg dw, which occurred in the 0 to 2 ft bls soil sample from boring DTB-4 (Table 4-4).

The vertical distributions of the detectable SVOCs in borings DTB-1, DTB-4, and DTB-9 correlate reasonably well with observations of soil discoloration and odor. The constituents are limited to the upper 4 ft bls in borings DTB-1 and DTB-4 and to the upper 2 ft in boring DTB-9. No SVOCs were detected in the 4 to 6 ft bls soil sample from any of the borings. No odors or soil discolorations were observed during boring activities at the other six boring locations.

One VOC, ethylbenzene, was detected in the following soil samples: the 2 to 4 ft bls soil sample from boring DTB-4 (0.012 mg/kg dw) and the 2 to 4 (0.0086 mg/kg dw) and 4 to 6 (0.092 mg/kg dw) ft bls soil samples from boring DTB-9 (Table 4-4). No other VOCs were detected in any of the soil samples.

Based on these results, impacted soils in the drip track area do not extend below a depth of approximately 4 ft bls. The highest concentrations were found in soil samples DTB-9 and DTB-4. Because the exact location of the drip track area was not well defined at the time of sampling, these borings were only generally located in the drip track area, and it is possible soil impacts extend further to the south.

4.1.5 Diesel Fuel Storage Area Soil Boring Program Results

Seven soil samples were selected for laboratory analysis during the diesel fuel storage area soil boring program. A total of seven borings (one boring, SB-1, was converted to temporary monitor well HP-1) were advanced to a total depth of 12 ft, with continuous split spoon sampling. One soil sample was selected from 2 to 4 ft bls (unsaturated zone) in each of the seven borings for laboratory analysis. Soil samples were analyzed for TPH as gasoline (modified USEPA Method 8015/5030) and TPH as diesel fuel (modified USEPA Method 8100, equivalent to modified USEPA Method 8015/3550). Soil sample results for TPH are summarized in Table 4-5.

During soil boring operations, elevated field headspace measurements were recorded for soil samples from borings SB-1 (maximum 500 parts per million, or ppm, at 6 to 8 ft bls), SB-4 (maximum 550 ppm at 6 to 8 ft bls), SB-5 (maximum greater than 10,000 ppm at 6 to 8 ft bls), SB-6 (maximum 11 ppm at 6 to 8 ft bls), and SB-7 (maximum 500 ppm at 6 to 8 ft bls). Because the water table occurred at a depth of approximately 4 ft bls during the soil boring program, soil samples from the 6 to 8 ft bls interval represented the saturated zone and therefore were not selected for laboratory analysis.

TPH as gasoline (25 mg/kg dw) and diesel fuel (56 mg/kg dw) were detected in the 2 to 4 ft bls soil sample from boring SB-5. These concentrations exceed the North Carolina cleanup goal guidelines established by the Division of Environmental Management for petroleum-contaminated soils. No other soil samples had detectable TPH.

These results suggest that a petroleum release has occurred in this area. As discussed in Section 4.3.2, Groundwater Results for the Diesel Fuel Storage Area, the groundwater sample collected from temporary monitor well HP-1 (installed in boring SB-1) during this field program to contained 34 mg/L TPH as gasoline. Borings SB-2 and SB-3, from which soil samples did not show elevated field headspace levels, are hydraulically upgradient/crossgradient from the location of the former fuel storage tanks.

4.2 CORE BORING SAMPLE ANALYTICAL RESULTS

During the core boring program both core samples and groundwater samples were collected. Core segments selected from highly fractured or brecciated zones in core boring CB-9 were crushed in the laboratory prior to analysis. The results are summarized in Table 4-6. Core sample CB-9C from the interval 90 to 100 ft bls was found to contain site-specific constituents (Table 4-6). The indication is that oily materials (free product) has migrated to this depth. No VOCs were detected; however, sample preparation may have resulted in the volatilization of these constituents, if present.

Ten groundwater samples were collected in August 1991 in six core borings at discrete depth intervals using packers. Groundwater sample results are summarized in Table 4-7. The table gives the sampling interval for each groundwater sample collected.

Groundwater results from the core boring must be interpreted with caution. The packer sampling procedure can result in erroneous data due to a) packer by-pass and b) carry-down. In highly fractured rock the packers may not completely seal against the corewall, thus creating

the potential for water above the packer to bypass the packer seal and enter the sampling zone. Mud circulating in the coring equipment can also carry contaminants. Finally, the sampling zone may be rich in particulates due to the coring action, resulting in turbid samples with potentially elevated of constituent concentrations which are not representative of the undisturbed groundwater surrounding the core hole.

The core hole water sample results show detections of site-specific constituents in core borings CB-3 (33 to 36 ft), CB-6, (33 to 35 and 86 to 91 ft), CB-7 (82 to 94 ft) and CB-8 (28 to 33 and 89 to 94 ft) (Table 4-7). The results are consistent with monitoring well results, reported in the following section. Both SVOCs and VOCs were detected in the vicinity of former southern ponds and northern impoundments area. Results from CB-4 and CB-5 indicate that groundwater contamination from the southern ponds may not have migrated to the south.

4.3 GROUNDWATER SAMPLE RESULTS

Tables 4-8 through 4-12 summarize the results for five groundwater sampling events: October 1990, August 1991, December 1992, June 1993 and December 1993. Not all of the monitor wells were sampled during each event; each table presents data for wells sampled during that specific event.

Groundwater samples were analyzed for the site-specific constituents listed in Table 2-1. The discussions of groundwater results are presented in two sections: main facility wells and diesel fuel storage area wells. For purposes of comparison, total aggregate SVOC and total VOC results are discussed along with individual SVOC and VOC results. Results for total SVOCs and total VOCs are presented on Figure 4-6 by monitor well location.

4.3.1 Facility Monitor Well Sample Results

Site-specific constituents were detected in samples from 18 of 31 facility monitor wells during one or more sampling events. Target constituents are grouped into three categories: SVOCs (including total PA concentrations); pentachlorophenol (included in the total SVOC concentrations), and benzene, toluene, ethylbenzene, and xylenes (BTEX, included in the total VOC concentrations). Other VOCs (methylene chloride, 2-butanone [MEK]) also are discussed.

4.3.1.1 SVOC Groundwater Results

The predominant class of constituents detected, based on maximum concentrations, were SVOCs, which occurred in 11 facility monitor wells: MW-10A; MW-13A, B and C; MW-14A; MW-15A, B and C; and MW-16A, B and C. Detectable total SVOC concentrations ranged from 0.024 mg/L for the October 1990 event at well MW-10A (Table 4-8) to 320 mg/L for the August 1991 event at well MW-16A (Table 4-9). This latter result is inconsistent with the December 1992 and June 1993 total SVOC concentrations of 20 and 23 mg/L, respectively, for groundwater samples from well MW-16A (Tables 4-10 and 4-11). The presence of free-phase creosote in the August 1991 groundwater sample from well MW-16A may account for the anomalously high concentrations of SVOCs. Several individual constituents are reported present in this sample at levels exceeding their aqueous solubilities. For example, the reported aqueous solubility of phenanthrene, detected in the August 1991 groundwater sample from well MW-16A at a concentration of 65 mg/L, ranges from 0.71 to 1.29 mg/L at 25 degrees Centigrade (°C) (Montgomery and Welkom, 1990). The effective solubility of this constituent would be lower than that reported in the literature due to the effects of the other solutes in the groundwater. In addition, free product (apparently creosote) was observed coating the bailer during the collection of this groundwater sample. Therefore, the results for the August 1991 groundwater sample from well MW-16A should not be considered representative of dissolved constituents present in the groundwater.

PAHs accounted for more than one-half of the total SVOC concentrations in most of the groundwater samples in which SVOCs were detected. In general, those PAHs with fewer rings in their structures occurred in the highest concentrations. These more abundant PAHs include those with two aromatic rings (naphthalene, 2-methylnaphthalene, fluorene, and acenaphthene) and three aromatic rings (phenanthrene, anthracene, and fluoranthene). PAHs with more than three aromatic rings in their structures (chrysene, benzo[a]anthracene, benzo[b,k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-c,d]pyrene, and dibenzo[a,h]anthracene) were generally less abundant than the 2- and 3-ring PAHs in groundwater samples with detectable PAHs. This relative distribution pattern is expected, based upon the aqueous solubilities of the PAHs, which in general decrease with increasing numbers of aromatic rings in the structures.

No North Carolina groundwater standards (15A NCAC 2L, .0202) have been established for PAHs. For those constituents under 2L rules, concentrations above the analytical detection limits are presumed to exceed groundwater standards. At the time of this writing, however, draft North Carolina groundwater standards had been proposed for the following PAHs: fluorene (0.28 mg/L); naphthalene (0.021 mg/L); and phenanthrene (0.21 mg/L). All of these constituents were detected in one or more samples collected from site monitor wells.

Pentachlorophenol was detected in groundwater samples from eight facility monitor wells during one or more sampling events: MW-13A, B and C; MW-15A and C; and MW-16A, B and C. The highest reported concentration of pentachlorophenol, 37 mg/L, occurred in the August 1991 groundwater sample from well MW-16A (Table 4-9). As previously discussed, this concentration is not expected to represent dissolved pentachlorophenol in the groundwater because it is higher than the published solubility for this constituent. The second-highest pentachlorophenol concentration is 20 mg/L, which occurred in the August 1991 groundwater sample from well MW-13B (Table 4-9). This concentration is consistent with published aqueous solubility values for pentachlorophenol, which range from 20 to 25 mg/L at 25° C (Montgomery and Welkom, 1990). Free product was not observed in this groundwater sample during sample

collection, but creosote material was observed at the bottom of well MW-13B when this well was sounded in August 1991.

The other detectable pentachlorophenol concentrations for groundwater samples ranged from 0.017 mg/L in the June 1993 groundwater sample from well MW-16C (Table 4-11) to 8.2 mg/L in the October 1990 groundwater sample from well MW-13A (Table 4-8). The North Carolina groundwater standard (15A NCAC 2L, .0202) for pentachlorophenol is 0.0003 mg/L, which is less than the reporting limit achieved for this constituent by the laboratories. Therefore, all detectable concentrations of pentachlorophenol exceed groundwater standards.

Other SVOCs detected in groundwater samples from facility wells during one or more sampling events include phenols (phenol; 2,4-dimethylphenol; 2,4,6-trichlorophenol; and 2,3,4,6-tetrachlorophenol), cresols (ortho-, meta-, paracresol, and p-chloro-m-cresol), and carbazole. None of these SVOCs has established North Carolina groundwater standards (15A NCAC 2L, .0202). At the time of this writing, however, a North Carolina groundwater standard of 0.30 mg/L had recently been proposed for phenol. Aniline was analyzed for but not detected in any groundwater samples.

For several facility monitor wells sampled during two or more sampling events, SVOC concentrations varied between events. Wells that had detectable SVOCs for at least two sampling events with total SVOC variations greater than one order of magnitude between sampling events include MW-13A, MW-14A, and MW-16A. The variation in SVOC concentrations between groundwater samples from well MW-16A is most likely caused by the presence of free-phase creosote in the vicinity of the screened interval. Of the five groundwater samples collected from well MW-14A, the June 1993 groundwater sample was the only sample with no detectable SVOCs. The total SVOC concentration of 0.75 mg/L in the December 1993 sample from well MW-14A (Table 4-12) was approximately one order of magnitude greater than the highest previous result of 0.082 mg/L, which occurred during the June 1993 groundwater sampling event (Table 4-11). The variation observed in total SVOC concentrations between

a standard of 0.029 mg/L. None of the detectable concentrations of toluene or xylenes exceed the North Carolina groundwater standards of 1.0 and 0.53 mg/L, respectively.

4.3.2 Diesel Fuel Storage Area/Off-site Monitor-Well Sample Results

Results for groundwater samples collected from monitor wells MW-1A, MW-1B, and MW-4A are included in Tables 4-8 through 4-12. Total SVOC and total VOC concentrations are shown on a map of the facility in Figure 4-1. Monitor wells MW-1A (deep) and MW-1B (shallow) are clustered and are located near the former diesel fuel storage area. Well MW-4A is hydraulically downgradient of the site. Both SVOC and VOC results for these wells will be discussed in this section. TPH results from wells MW-1A, MW-1B and from temporary monitor well HP-1 (not shown on Figure 4-1; see Figure 2-7) are summarized in Table 4-13.

SVOCs were detected in the groundwater sample from monitor well MW-1B (0.012 mg/L) during the June, 1993 sampling event (Table 4-11). These constituents have not been detected in groundwater samples from these wells during any of the previous or subsequent sampling events, they have never been detected in groundwater samples from wells MW-1A or MW-4A. The detected SVOCs are PAHs, specifically naphthalene and 2-methylnaphthalene, which are among the most soluble and therefore most mobile of the PAHs. These PAHs are minor components of diesel fuel. Because they are not repeatable, these results are most likely artifacts and do not indicate that site-related constituents are migrating off-site.

VOCs were detected in groundwater samples from all five sampling events at monitor well MW-1B. Benzene occurred in all groundwater samples from this well except the December 1992 groundwater sample. The variation in benzene concentrations in groundwater samples collected from this well over time is large, with the maximum concentration of 1.2 mg/L occurring in the June 1993 groundwater sample (Table 4-11). Ethylbenzene, toluene, and xylenes also were detected in groundwater samples collected from this well during one or more sampling events; concentrations of these constituents have not exceeded North Carolina

groundwater standards during any sampling event. Based on the results of the diesel fuel storage area soil boring program, a potential past release of petroleum in this area is the most likely source of the VOCs detected in groundwater samples from well MW-1B. VOCs were detected in only two of five groundwater samples collected from deep monitor well MW-1A (screened interval is 23.5 to 28.5 ft bls): the October 1990 (0.0026 mg/L benzene, Table 4-8) and December 1992 (0.006 mg/L MEK, Table 4-10) samples. Since the first sampling event, no BTEX constituents have been detected in any groundwater samples from this well. Therefore, the vertical extent of the VOCs detected in shallow monitor well MW-1B (screened interval is 5 to 15 ft bls) has been delineated, and petroleum-related constituents are not impacting deeper groundwater. The detection of MEK, a common laboratory contaminant (USEPA, 1990), in one groundwater sample from this well has not been confirmed and is suspected to be an artifact.

Groundwater samples collected in July 1993 from wells MW-1A, MW-1B and shallow temporary well HP-1 had TPH as gasoline concentrations of 0.35 mg/L, non-detectable, and 34 mg/L, respectively (Table 4-13). TPH as diesel fuel was not detected in groundwater samples from any of the wells. These data suggest that gasoline may have been part of a potential release of petroleum products from the diesel fuel storage area. The detection of 0.35 mg/L TPH as gasoline in deep monitor well MW-1A is unexpected, since no BTEX compounds had been detected in the June 1993 and December 1993 samples from this well (Tables 4-11 and 4-12).

4.4 RESIDENTIAL WELL SAMPLING RESULTS

Results for the groundwater sample collected from residential well adjacent to the site are summarized in Table 4-14. No site-specific constituents were detected in this sample.

4.5 SURFACE-WATER AND SEDIMENT SAMPLING RESULTS

Surface-water and stream sediment samples were collected in two events during this RI: May 1990 and August 1990. During the first sampling event, water and sediment samples were collected from the Little Cedar Creek along the northern facility property boundary and from the intermittent drainage ditch that flows to the north along the eastern property boundary. Selected locations along Little Cedar Creek were resampled in August 1990. The purpose of sampling in two events was to evaluate stream water and sediment quality during different seasonal periods. Results for the stream sampling events are summarized on Tables 4-15 and 4-16 and discussed below. Also included is a discussion of an upstream background sediment sample collected by USEPA in 1983 from Little Cedar Creek, which indicates the presence of non-site-related sources of the PAHs detected in creek sediments.

During the first stream sampling event in May 1990, site-related constituents were not detected in surface-water or sediment samples collected from Little Cedar Creek at locations 150 ft upstream (samples 8748 and 8751, respectively) and 150 ft downstream (samples 8746 and 8749, respectively) of its confluence with the drainage ditch. Site-related constituents were detected in surface-water sample 8747, with 0.15 mg/L total SVOCs, and sediment sample 8750, with 44 mg/kg dw total SVOCs and 0.45 mg/kg dw total VOCs, collected at the confluence of the site drainage ditch with Little Cedar Creek (Table 4-15). One SVOC, pentachlorophenol (0.15 mg/L), was detected in surface-water sample 8747 (Table 4-15); no other SVOCs or VOCs were detected in this sample. SVOCs detected in sediment sample 8750 from the same sampling location as surface water sample 8747 consist of four PAHs: acenaphthene (5.8 mg/kg dw), phenanthrene (17 mg/kg dw), fluoranthene (12 mg/kg dw), and fluorene (7.1 mg/kg dw) (Table 4-15).

Three sediment samples were collected from the drainage ditch along the northeastern property boundary (exclusive of the sample collected at the confluence) during the May 1990 sampling event; two had detectable concentrations of SVOCs. Total SVOC concentrations for

sediment samples 8754, collected at the upstream location, and 8753, collected approximately 350 ft downstream from sample 8754, were 2.4 and 67 mg/kg dw, respectively (Table 4-15). SVOCs detected in these samples consisted entirely of the following PAHs, with maximum concentrations (all maximums occur in sediment sample 8753) indicated: fluoranthene (19 mg/kg dw); chrysene (12 mg/kg dw), benzo(a)anthracene (7.8 mg/kg dw in sediment sample 8753 only), benzo(b)fluoranthene+benzo(k)fluoranthene (22 mg/kg dw), and benzo(a)pyrene (6.3 mg/kg in sediment sample 8753 only) (Table 4-15). No VOCs or SVOCs were detected in sediment sample 8752, collected from the drainage ditch at a location approximately 450 ft downstream from sediment sample 8753. This drainage ditch contains water only during wet-weather conditions and remains dry most of the year.

During the second surface-water and sediment sampling event conducted in August 1990, one sediment and three surface-water samples were collected from Little Cedar Creek. The samples were collected from two locations: at its confluence with the drainage ditch (surface-water sample 8867) and at a location approximately 150 feet downstream (surface-water samples 8868 and 8869, and sediment sample 8871) of its confluence with the drainage ditch. These are a subset of the locations at which surface-water and sediment samples were collected during the May 1990 sampling event.

SVOCs were detected in surface-water sample 8869 (total SVOCs: 0.13 mg/L) and sediment sample 8871 (total SVOCs: 27 mg/kg dw), collected at the downstream location in Little Cedar Creek during the August 1990 sampling event (Table 4-16). Surface-water sample 8869 was collected from stream water that was intentionally disturbed to increase the amount of suspended sediment in the sample. Undisturbed surface-water sample 8868, collected at the same location, did not contain detectable SVOCs or VOCs. This disturbed/undisturbed sampling was conducted to demonstrate that the heavier wood-treating constituents, when detected in surface-water samples, are expected to be primarily sediment-bound, rather than dissolved. Sediment-bound constituents are generally less available for uptake by biota than dissolved constituents. Surface-water sample 8869, therefore, was not, nor was it intended to be,

representative of stream-water quality under normal conditions. Surface-water and sediment samples collected at approximately this same location during the May 1990 sampling event contained no detectable SVOCs or VOCs.

A background Little Cedar Creek sediment sample collected by USEPA Region IV, Environmental Services Division in 1983 during a site investigation (USEPA, 1984) was found to contain several PAHs in concentrations higher than those found in sediment samples collected during this RI. The results for the USEPA background sample, designated SWP-009, are included in Tables 4-15 and 4-16 for comparison. Concentrations of the following PAHs detected in USEPA background sediment sample SWP-009 exceed the respective maximum concentrations detected in sediment samples collected during this RI: anthracene, fluoranthene, chrysene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene (USEPA, 1984). The USEPA background sample was collected at an upstream location that could not have been influenced by the site.

The occurrence of PAHs in the USEPA background sample illustrates the ubiquitous nature of these compounds in the environment. Potential non-site-related sources of PAHs in stream sediments include runoff from roads, burned debris, atmospheric fallout, and creosote-treated wood (telephone poles, railroad ties). The high background level of PAHs (i.e., higher than downstream sediment levels) casts doubt on the source of PAHs detected in the downstream sediment samples.

5.0 PRINCIPAL FINDINGS

Based upon the results of the soil, groundwater, and surface-water investigations conducted at the site, the following findings summarize the current understanding of site conditions:

GENERAL FINDINGS

The following general findings outline the current understanding of conditions at the site:

- Soil and groundwater at the site have been impacted by wood-preserving constituents. Identified sources are the impoundments (northern impoundments area and southern ponds area), the drip track area, and the diesel fuel storage area.

- Sediments in Little Cedar Creek contained detectable levels of SVOC wood preserving constituents. Background upstream sediments contained high levels of these constituents and downstream sediments.

- The constituents of concern at the former wood-preserving facility include creosote constituents, primarily PAHs and pentachlorophenol. Pentachlorophenol occurs in site groundwater but was not detected in site soils. Metals are not constituents of concern because the facility did not use chromated copper arsenate (CCA) or other inorganic wood-treating chemicals.

- Site geology and hydrogeology is complex. A major fault zone and a diabase dike transect the site. The Gulf fault zone and weathered zones on either side of the diabase dike may have increased secondary porosity and higher transmissivities than surrounding rock. The diabase dike itself may behave as a

flow barrier. Site ponds were located directly above or in close proximity to these structural features.

SOIL CONDITIONS

- Soils in the northern impoundments area are impacted by creosote-related compounds, primarily PAHs. Cresols and carbazole are also present in lower concentrations than the PAHs. Pentachlorophenol was not detected in northern impoundments area soils during this RI. Oily, creosote-containing materials have been observed in this area, at depths below the water table. The total volume of contaminated soils is estimated to be approximately 140,000 cubic yards. Contaminated woody debris (e.g., discarded pole pieces and ties) is present in several locations in the northern impoundments area.

- Surficial soils and shallow (to a depth of 4 ft bls) subsoils in the drip track area are impacted by PAHs and carbazole. Pentachlorophenol was not detected in any soil samples collected in the drip track area. The horizontal extent of soil impacts has not been fully delineated in this area.

- A limited area of petroleum contaminated soils with concentrations above state action levels was discovered in the diesel fuel storage area.

- Soil borings conducted in the vicinity of the eastern stormwater pond indicate that site-specific constituents may be present in this area. A surficial sample collected in this area during the USEPA SI had no detectable or quantifiable concentrations of site-related constituents.

- Pentachlorophenol was not detected in any soil boring samples collected during this RI. Pentachlorophenol was detected in two soil samples, at concentrations

of 11 and 700 mg/kg, collected by USEPA ESD during the SI in 1983. The sample reported to contain 700 mg/kg pentachlorophenol was collected from the Southern Ponds Area. These Ponds were excavated in 1990 and filled with clean soil.

GROUNDWATER CONDITIONS

- Groundwater flow directions vary across the site. Groundwater in the northern portion of the site, including all of the Pekin formation, flows to the north. A groundwater flow divide extends west to east across the site coincident with Gulf fault and the Cumnock formation. South of the divide, groundwater flows south-southeast. In the eastern end of the site, water flows east to northeast.

- Groundwater in the northern portion of the site in the vicinity of the northern impoundments area has been impacted by wood-preserving constituents, specifically in samples from monitor wells in clusters MW-13, MW-15, and MW-16. Repeatable (between sampling events) detections of site-specific constituents have not occurred in samples from any other monitor wells on the former facility, with the exception of monitor well MW-14A. The probable source of the wood preserving constituents detected in samples from these monitor wells are the northern impoundments and possibly the southern impoundments.

- Aquifer hydraulic conductivities measured in shallow (< 40 bls) soil/saprolite monitoring wells were very low even in areas of the fault zone and diabase dike. It is possible that the soil/saprolite zone acts as a limitation to contaminant transport except in the pond areas where excavations and hydraulic pressure breached the lower permeable zones.

- Dense, non-aqueous phase liquids (DNAPL), which are most likely creosote, have likely migrated vertically downward beneath the impoundments to an unknown depth. DNAPL was observed in the bottom of monitor wells MW-13A (a depth of 15 ft bls), and MW-15A (a depth of 18 ft bls) during the most recent sampling event in December 1993. The August 1991 groundwater sample collected from monitor well MW-16A had concentrations of several SVOCs exceeding their respective aqueous solubilities, suggesting that DNAPL was present in the aquifer near the well screen interval. In addition, core sample CB-9C (90-100 ft bls) was found to contain 58.13 mg/kg total SVOCs; and core hole water samples from CB-3, CB-6, and CB-7 showed SVOC concentrations.

- Petroleum-related constituents were detected in groundwater samples collected from monitor wells in the diesel fuel storage area (outside the main facility site), indicating that a release of petroleum product has occurred in this area. The constituents detected in groundwater samples are primarily common volatile aromatic components of petroleum fuels, and are not related to the wood-preserving constituents detected in groundwater samples collected from facility monitor wells. PAHs were detected in the June 1993 groundwater samples collected from these monitor wells, but not during the previous or subsequent sampling events.

- There are no existing analytical data confirming that site-specific constituents in groundwater have migrated off-site. Site-specific constituents have been detected in groundwater samples from monitor wells in clusters MW-13, MW-15, and MW-16, located on the northeastern facility property boundary. Because the direction of shallow groundwater flow is northeasterly, off-site migration of site-related constituents is possible. However, the diabase dike, located essentially between the contaminated wells and the adjacent property, may act as a physical barrier to plume migration. SWP has requested permission from the adjacent land

owner to install monitor well(s) off the facility property, but permission has been denied. The plume may migrate along the diabase dike off-site to the north and/or may discharge to Little Cedar Creek. Creek surface-water sample results do not indicate groundwater discharge; however, this finding may not reflect accurately the relation of the groundwater to the creek.

- Groundwater is not used for drinking water in the Gulf area. Local residences are supplied water by the Goldston-Gulf Sanitary District.

- The nearest downgradient residential well located southeast of the site did not contain detectable levels of site-specific constituents.

SURFACE-WATER CONDITIONS

- Relatively low, non-reproducible concentrations of wood-preserving constituents have been detected in the surface water and sediment of Little Cedar Creek. Past discharges from the former facility may have impacted sediments in the creek downstream of the investigation area. However, an upstream sediment sample collected from Little Cedar Creek by USEPA (USEPA, 1984) contained concentrations of several parts in excess of the maximum concentrations detected in creek sediment samples collected during this RI. This indicates the presence of other significant sources of PAHs to the sediments of Little Cedar Creek.

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TABLES

Table 2-1. Site-Specific Constituents, Southern Wood Piedmont, Gulf, North Carolina.

Semivolatile Organic Compounds (Method 8270)	Volatile Organic Compounds (VOCs) (Methods 8010, 8020, and 8240)
2-Chlorophenol	Toluene
Phenol	Benzene
2,4-Dimethylphenol	Methylene chloride
2,4,6-Trichlorophenol	2-Butanone
p-Chloro-m-cresol	Ethylbenzene
Pentachlorophenol	Xylenes
Naphthalene	
Acenaphthene	Inorganics[2] (Method 6010 Except As Noted)
Phenanthrene	
Anthracene	Arsenic (Method 7060)
Fluoranthene	Barium
Chrysene	Cadmium
Benzo(a)anthracene	Chromium
Benzo(b,k)fluoranthene[1]	Copper
Benzo(a)pyrene	Lead (Method 7421)
Indeno(1,2,3-cd)pyrene	Mercury (Methods 7470/7471)
Dibenzo(a,h)anthracene	Selenium
Carbazole	Silver
o-Cresol	
m+p-Cresol	
Aniline	
Fluorene	
2-Methylnaphthalene	
2,3,4,6-Tetrachlorophenol	

1 Benzo(b)fluoranthene and benzo(k)fluoranthene isomers were reported together for all site sample analyses except during the June, 1993 and December, 1993 groundwater sampling events. These isomers were reported separately for groundwater samples collected during these two sampling events.

2 Inorganics were analyzed for during the background soil sampling program and the removal confirmation soil sampling program conducted October, 1990. No other site samples were analyzed for inorganics.

All methods from: Test Methods for Evaluating Solid Waste, Third Edition, SW-846. U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response, Washington, DC.

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Table 2-2 Summary of Monitor Well Identification Changes and Construction Details, Southern Wood Piedmont, Gulf, North Carolina.

Current Monitor Well ID	Previous Monitor Well ID	Drilling Method(s)	Type of Well (Single, double, or triple-cased)	Total Depth of Well (ft bls)	Total Depth of Well and Sand Pack (ft bls)	Screened Interval (ft bls)	Well Material (SS or PVC)	Date of Installation
MW-1A	ETE-1	Hollow stem	Single	28.5	28.5	23.5 - 28.5	PVC	11/30/88
MW-1B	GM-1S	Air hammer	Double	15	16	5.0 - 15.0	PVC	8/30/90
MW-2A	ETE-2	Hollow stem	Single	33.5	33.5	23.5 - 28.5	PVC	11/30/88
MW-2B	GM-2S	Air hammer	Double	20	21	5.0 - 2.0	PVC	8/90
MW-3A	ETE-3	Hollow stem	Single	23.5	23.5	18.5 - 23.5	PVC	11/30/88
MW-3B	GM-3S	Hollow stem	Single	12	12.5	4.5 - 20.0	PVC	8/24/90
MW-3C	-	Casing advancer	Single	45	45	35.0 - 45.0	PVC	5/12/93
MW-4A	ETE-4	Hollow stem	Single	28.5	28.5	23.5 - 28.5	PVC	11/30/88
MW-5A	ETE-5	Hollow stem	Single	16	16	11.0 - 16.0	PVC	11/30/88
MW-6A	GM-6S	Air hammer	Single	14	16	4.0 - 14.0	SS	5/17/91
MW-7A	GM-7S	Hollow stem	Single	14	15	4.0 - 14.0	PVC	8/28/90
MW-7B	GM-7D	Hollow stem	Single	25	26	20.0 - 25.0	PVC	8/28/90
MW-8A	GM-8S	Hollow stem	Single	16.5	17	4.0 - 16.5	PVC	8/22/90
MW-9A	GM-9S	Air hammer	Double	18	19	5.5 - 18.0	PVC	8/30/90
MW-9B	GM-9D	Air hammer	Double	36	39	26.0 - 36.0	PVC	1/22/91
MW-10A	GM-10S	Air hammer	Double	40	41	20.0 - 40.0	PVC	8/30/90
MW-10B	GM-10D	Air hammer	Single	55	55	45.0 - 55.0	PVC	1/25/91
MW-10C	-	Air hammer	Single	125	125	105 - 125	PVC	5/20/93
MW-11A	GM-11S	Air hammer	Double	20	21	25.0 - 35.0	PVC	8/30/90
MW-11B	GM-11RM	Air hammer	Double	62	62	52.0 - 62.0	PVC	7/15/91
MW-11C	GM-11RD	Air hammer	Double	96.5	100	86.5 - 96.5	PVC	7/11/91
MW-12A	GM-12S	Hollow stem	Single	13	13.5	3.0 - 13.0	PVC	8/27/90
MW-13A	GM-13S	Hollow stem	Single	15	15	5.0 - 15.0	PVC	8/21/90
MW-13B	GM-13D	Air hammer	Double	30	31	20.0 - 30.0	PVC	8/30/90
MW-13C	-	Air hammer	Triple	95	96	85.0 - 95.0	SS	7/2/92

ft bls Feet below land surface
SS Stainless steel
PVC Polyvinyl chloride.

Table 2-2 Summary of Monitor Well Identification Changes and Construction Details, Southern Wood Piedmont, Gulf, North Carolina.

Current Monitor Well ID	Previous Monitor Well ID	Drilling Method(s)	Type of Well (Single, double, or triple-cased)	Total Depth of Well (ft bls)	Total Depth of Well and Sand Pack (ft bls)	Screened Interval (ft bls)	Well Material (SS or PVC)	Date of Installation
MW-14A	GM-14S	Air hammer	Single	18	19	3.0 - 18.0	PVC	8/22/90
MW-15A	GM-15S	Air hammer	Double	18	19	5.5 - 18.0	PVC	8/30/90
MW-15B	GM-15RM	Air hammer	Double	52.5	54	42.5 - 52.5	SS	7/9/91
MW-15C	GM-15RD	Air hammer	Double	95	95	85.0 - 95.0	SS	7/11/91
MW-16A	GM-16S	Hollow stem	Single	17.5	18	7.5 - 17.5	SS	2/5/91
MW-16B	GM-16D	Air hammer	Double	35	37	25.0 - 35.0	SS	2/5/91
MW-16C	GM-16RD	Air hammer	Double	95	95	85.0 - 95.0	SS	7/16/91
MW-17A	GM-17S	Air hammer	Single	23	30	13.0 - 23.0	PVC	5/17/91
MW-18A	-	Air hammer	Single	115.5	117	95.5 - 115.5	PVC	5/10/93

ft bls Feet below land surface
SS Stainless steel
PVC Polyvinyl chloride.

Table 3-1 Summary of Water Level Elevation Data, Southern Wood Piedmont, Gulf, North Carolina.

Current Monitor Well ID	Old Monitor Well ID	Top of Casing Elevation (ft MSL)	Jun-91 TOC (ft)	Jun-91 Elev. (ft MSL)	Sep-91 TOC (ft)	Sep-91 Elev. (ft MSL)	Nov-91 TOC (ft)	Nov-91 Elev. (ft MSL)	Mar-92 TOC (ft)	Mar-92 Elev. (ft MSL)	Jun-93 TOC (ft)	Jun-93 Elev. (ft MSL)	Dec-93 TOC (ft)	Dec-93 Elev. (ft MSL)
MW-1A	ETE-1	258.4	8.47	249.93	8.97	249.43	10.22	248.18	8.32	250.08	5.45	252.95	8.81	249.59
MW-1B	GM-1S	258.88	8.74	250.14	9.94	248.94	10.79	248.09	9.23	249.65	6.35	252.53	10.19	248.69
MW-2A	ETE-2	270.88	17.47	253.41	18.54	252.34	19.63	251.25	18.99	251.89	15.52	255.36	18.93	251.95
MW-2B	GM-2S	270.72	18.02	252.7	19.09	251.63	20.15	250.57	19.99	250.73	15.25	255.47	19.34	251.38
MW-3A	ETE-3	262.3	NM	NM	12.14	250.16	13.01	249.29	12.08	250.22	7.55	254.75	11.79	250.51
MW-3B	GM-3S	262.54	11.02	251.52	12.27	250.27	13.28	249.26	12.31	250.23	7.8	254.74	12.07	250.47
MW-3C	-	262.91	NM	NM	NM	NM	NM	NM	NM	NM	7.85	255.06	11.73	251.18
MW-4A	ETE-4	249.49	NM	NM	6.44	243.05	6.48	243.01	4.4	245.09	3.25	246.24	6.34	243.15
MW-5A	ETE-5	261.46	14.85	246.61	16.35	245.11	17.13	244.33	16.23	245.23	12.5	248.96	17.05	244.41
MW-6A	GM-6S	260.16	8.46	251.7	9.79	250.37	10.7	249.46	9.75	250.41	5	255.16	9.18	250.98
MW-7A	GM-7S	243.82	6.29	237.53	7.05	236.77	7.16	236.66	4.45	239.37	4.95	238.87	6.78	237.04
MW-7B	GM-7D	243.91	6.28	237.63	6.44	237.47	6.95	236.96	4.54	239.37	4.75	239.16	6.3	237.61
MW-8A	GM-8S	255.88	14.92	240.96	15.21	240.67	15.86	240.02	13.93	241.95	13.1	242.78	15.52	240.36
MW-9A	GM-9S	264.67	13.44	251.23	14.22	250.45	16.6	248.07	15.12	249.55	11.54	253.13	15.87	248.8
MW-9B	GM-9D	263.51	14.01	249.5	15.57	247.94	16.32	247.19	14.98	248.53	10.95	252.56	15.31	248.2
MW-10A	GM-10S	273.09	25.47	247.62	25.75	247.34	26.65	246.44	25.93	247.16	25.55	247.54	27.41	245.68
MW-10B	GM-10D	272.37	26.2	246.17	31.99	240.38	27.29	245.08	26.35	246.02	27.9	244.47	29.46	242.91
MW-10C	-	273.03	NM	NM	NM	NM	NM	NM	NM	NM	99.41	173.62	37.49	235.54
MW-11A	GM-11S	262.4	24.37	238.03	24.09	238.31	24.42	237.98	23.58	238.82	22.54	239.86	25.09	237.31
MW-11B	GM-11RM	263.2	NM	NM	28.02	235.18	28.15	235.05	23.7	239.5	21.86	241.34	25.46	237.74
MW-11C	GM-11RD	262.55	NM	NM	35.71	226.84	35.8	226.75	33.86	228.69	33.1	229.45	33.5	229.05
MW-12A	GM-12S	230.88	8.57	222.31	11.2	219.68	12.35	218.53	3.61	227.27	6.66	224.22	11.55	219.33
MW-13A	GM-13S	241.3	12.46	228.84	13.17	228.13	13.04	228.26	11.06	230.24	11.56	229.74	12.27	229.03
MW-13B	GM-13D	241.68	12.76	228.92	13.41	228.27	13.32	228.36	11.35	230.33	NM	NM	12.68	229
MW-13C	-	241.66	NM	NM	NM	NM	NM	NM	NM	NM	12.19	229.47	12.77	228.89

ft MSL Feet above mean sea level
TOC Top of well casing
NM Not measured

Table 3-1 Summary of Water Level Elevation Data, Southern Wood Piedmont, Gulf, North Carolina.

Current Monitor Well ID	Old Monitor Well ID	Top of Casing Elevation (ft MSL)	Jun-91 TOC (ft)	Jun-91 Elev. (ft MSL)	Sep-91 TOC (ft)	Sep-91 Elev. (ft MSL)	Nov-91 TOC (ft)	Nov-91 Elev. (ft MSL)	Mar-92 TOC (ft)	Mar-92 Elev. (ft MSL)	Jun-93 TOC (ft)	Jun-93 Elev. (ft MSL)	Dec-93 TOC (ft)	Dec-93 Elev. (ft MSL)
MW-14A	GM-14S	226.78	7.32	219.46	7.98	218.8	7.88	218.9	3.68	223.1	5.01	221.77	7.01	219.77
MW-15A	GM-15S	246.23	5.83	240.4	6.81	239.42	6.65	239.58	4.99	241.24	NM	NM	NM	NM
MW-15B	GM-15RM	248.6	NM	NM	8.38	240.22	8.54	240.06	6.83	241.77	11.61	236.99	14.74	233.86
MW-15C	GM-15RD	248.41	NM	NM	8.83	239.58	8.99	239.42	7.47	240.94	12.56	235.85	NM	NM
MW-16A	GM-16S	235.14	11.46	223.68	12.2	222.94	11.82	223.32	9.33	225.81	8.42	226.72	NM	NM
MW-16B	GM-16D	235.85	13.39	222.46	13.36	222.49	12.96	222.89	10.42	225.43	9.76	226.09	NM	NM
MW-16C	GM-16RD	235.25	NM	NM	13.81	221.44	12.75	222.5	10.11	225.14	9.63	225.62	10	225.25
MW-17A	GM-17S	273.73	18.86	254.87	20.13	253.6	21.27	252.46	20.11	253.62	15.28	258.45	20.73	253
MW-18A	-	255.32	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	31.09	224.23

ft MSL Feet above mean sea level
TOC Top of well casing
NM Not measured

Table 4-1. Background Soil Sample Results, October 1990, Southern Wood Piedmont Site, Gulf, North Carolina.

SWP Sample Identification #:	9149	9150	9151	9152	9153	9154
Sampling Location:	B-1	B-2	B-3	B-4	B-5	B-6
Constituents (mg/kg dw)						
Volatile Organic Compounds (8240)						
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND
TOTAL VOCs:	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Semi-Volatile Organic Compounds (8270)						
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND
2-Chlorophenol	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	0.3
Aniline	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	1.5	ND	0.56
Benzo(a)anthracene	ND	ND	ND	0.81	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND

mg/kg dw Milligrams per kilogram on a dry-weight basis.
ND Constituent was not detected.

Table 4-1. Background Soil Sample Results, October 1990, Southern Wood Piedmont Site, Gulf, North Carolina.

SWP Sample Identification #	9149	9150	9151	9152	9153	9154
Sampling Location:	B-1	B-2	B-3	B-4	B-5	B-6
Constituents (mg/kg dw)						
Semi-Volatile Organic Compounds (8270)						
Benzo(b,k)fluoranthene	ND	0.31	ND	1.3	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	1.3	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	0.58	ND	1.3	ND	1.2
Fluorene	ND	ND	ND	ND	ND	0.43
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	1.9
Phenol	ND	ND	ND	ND	ND	ND
TOTAL SVOCS:	**ND**	**0.89**	**ND**	**6.21**	**ND**	**4.39**

mg/kg dw Milligrams per kilogram on a dry-weight basis.
ND Constituent was not detected.

Table 4-1. Background Soil Sample Results, October 1990, Southern Wood Piedmont Site, Gulf, North Carolina.

SWP Sample Identification #	9149	9150	9151	9152	9153	9154
Sampling Location:	B-1	B-2	B-3	B-4	B-5	B-6
Constituents (mg/kg dw)						
Metals						
Arsenic	5.4	5.2	6.8	14	8.2	5.2
Barium	190	180	120	220	56	57
Cadmium	ND	ND	ND	ND	ND	ND
Chromium	30	19	14	19	15	14
Copper	48	48	37	51	13	16
Lead	13	11	10	30	10	8.4
Mercury	0.018	0.012	0.013	0.021	0.02	0.026
Selenium	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND
Percent Solids	83	81	83	89	87	84

mg/kg dw Milligrams per kilogram on a dry-weight basis.
ND Constituent was not detected.

Table 4-2. Removal Confirmation Sampling Results, Southern Ponds, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9119	9120	9121	9122	9123	9124	9125	9126
Pond Sample Location:	P-1-A	P-1-B	P-1-C	P-1-D	P-2-A	P-2-B	P-3-A	P-O
Constituents (mg/kg dw)								
Volatile Organic Compounds (8240)								
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	0.012	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.043	0.17	0.56	0.31	0.024	0.24	1	0.038
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.0084	0.043	0.016	0.015	0.072	0.12	0.21	0.0069
Xylenes	0.025	0.28	0.29	0.28	0.072	0.77	1.6	0.05
TOTAL VOCs	**0.0764**	**0.505**	**0.866**	**0.605**	**0.168**	**1.13**	**2.81**	**0.0949**
Semi-Volatile Organic Compounds (8270)								
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	30	13	39	56	25	220	96	34
Anthracene	75	40	62	96	52	100	160	82
Benzo(a)anthracene	ND	ND	ND	8.9	7.6	ND	22	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	15	9.3	12	12	15	ND	37	10
Carbazole	ND	ND	ND	13	ND	ND	23	18
Chrysene	8.6	ND	ND	8.7	8.3	ND	19	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	51	27	38	48	38	240	86	18
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	33	ND	890	85	20
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	24	ND	18	17	22	850	30	17
Phenol	ND	ND	ND	ND	ND	ND	ND	ND

mg/kg dw Milligrams per kilogram on a dry-weight basis.
ND Constituent was not detected.

Table 4-2. Removal Confirmation Sampling Results, Southern Ponds, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9119	9120	9121	9122	9123	9124	9125	9126
Pond Sample Location:	P-1-A	P-1-B	P-1-C	P-1-D	P-2-A	P-2-B	P-3-A	P-O
Constituents (mg/kg dw)								
Semi-Volatile Organic Compounds (8270), continued								
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	30	12	31	53	22	310	76	44
2-Methylnaphthalene	ND	ND	ND	51	ND	150	86	8.6
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCS	**233.6**	**101.3**	**200**	**396.6**	**189.9**	**2760**	**720**	**251.6**
Metals								
Arsenic	ND	9.3	2.1	3.9	2.4	4.5	14	5
Barium	160	240	260	130	140	78	200	210
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	40	90	16	23	39	27	15	35
Lead	13	19	10	6.3	6.1	11	21	9.5
Mercury	0.028	0.024	ND	ND	ND	0.024	0.026	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND
Copper	32	26	42	34	34	13	42	39
Percent Solids	79	80	90	82	78	83	90	81

mg/kg dw Milligrams per kilogram on a dry-weight basis.
ND Constituent was not detected.

Table 4-3. Northern Impoundments Area Soil Sample Results, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #	9515	9516	9517	9518	9519	9520	9521	9522
Grid Location:	BG-1	E4A	E4B	E4C	G4A	G4B	G4C	H6A
Depth (ft):		0-2	2-4	8-10	0-2	2-4	8-10	0-2
Constituents (mg/kg dw)								
Volatile Organic Compounds (8240)								
Toluene	ND	ND	0.92	ND	ND	10	ND	0.054
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	2.2	ND	ND	11	ND	0.11
Xylenes	ND	ND	6.9	ND	0.26	37	ND	0.39
TOTAL VOCs	**ND**	**ND**	**10.02**	**ND**	**0.26**	**58**	**ND**	**0.554**
Semi-Volatile Organic Compounds (8270)								
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	3.1	ND	ND	0.33	33
Acenaphthene	ND	0.95	670	2.3	ND	730	0.43	120
Phenanthrene	ND	2.2	660	3.6	ND	710	1.1	260
Anthracene	ND	0.61	280	1.7	ND	200	ND	110

mg/kg dw Milligrams per kilograms on a dry-weight basis.
ND Constituent was not detected.

Table 4-3. Northern Impoundments Area Soil Sample Results, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #	9515	9516	9517	9518	9519	9520	9521	9522
Grid Location:	BG-1	E4A	E4B	E4C	G4A	G4B	G4C	H6A
Depth (ft):		0-2	2-4	8-10	0-2	2-4	8-10	0-2
Constituents (mg/kg dw)								
Semi-Volatile Organic Compounds (8270)								
Fluoranthene	ND	2.7	430	3.2	46	420	0.67	190
Chrysene	ND	0.81	82	1.3	ND	71	ND	40
Benzo(a)anthracene	ND	0.96	ND	1.5	ND	ND	ND	40
Benzo(b,k)fluoranthene	ND	0.47	ND	0.56	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	120	0.51	ND	78	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	1.1	810	3.1	ND	840	0.53	160
2-Methylnaphthalene	ND	ND	980	2.2	ND	ND	0.43	47
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs:	**ND**	**9.8**	**4032**	**23.07**	**46**	**3049**	**3.49**	**1000**
Percent Solids	79	88	70	84	86	77	85	81

mg/kg dw Milligrams per kilograms on a dry-weight basis.
ND Constituent was not detected.

Table 4-3. Northern Impoundments Area Soil Sample Results, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9523	9524	9525	9526	9527
Grid Location:	H6B	H6C	I6A	I6B	I6C
Depth (ft):	4-6	8-9	0-2	4-6	
Constituents (mg/kg dw)					
Volatile Organic Compounds (8240)					
Toluene	0.024	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND
Ethylbenzene	0.039	ND	ND	ND	0.043
Xylenes	0.12	ND	ND	0.7	0.15
TOTAL VOCs	**0.183**	**ND**	**ND**	**0.7**	**0.193**
Semi-Volatile Organic Compounds (8270)					
2-Chlorophenol	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND
Naphthalene	23	6.3	ND	310	22
Acenaphthene	21	14	8.7	290	20
Phenanthrene	39	28	24	440	33
Anthracene	8	9	20	190	15

mg/kg dw Milligrams per kilograms on a dry-weight basis.
ND Constituent was not detected.

Table 4-3. Northern Impoundments Area Soil Sample Results, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9523	9524	9525	9526	9527
Grid Location:	H6B	H6C	I6A	I6B	I6C
Depth (ft):	4-6	8-9	0-2	4-6	
Constituents (mg/kg dw)					
Semi-Volatile Organic Compounds (8270)					
Fluoranthene	28	23	23	360	32
Chrysene	7.3	5	7	7.5	6.5
Benzo(a)anthracene	7.3	5	6	7.5	6.2
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND
Carbazole	ND	3.3	3.7	110	7.2
Cresol (o)	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND
Fluorene	31	21	14	420	33
2-Methylnaphthalene	18	8.3	ND	230	13
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND
TOTAL SVOCs:	**182.6**	**122.9**	**106.4**	**2365**	**187.9**
Percent Solids	80	81	77	79	84

mg/kg dw Milligrams per kilograms on a dry-weight basis.
ND Constituent was not detected.

Table 4-4. Drip Track Area Soil Sample Results, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9502	9503	9504	9505	9506	9507	9508	9509	9510
Boring Identification:	DTB-1A	DTB-1B	DTB-1C	DTB-4A	DTB-4B	DTB-4C	DTB-9A	DTB-9B	DTB-9C
Depth (ft):	0-2	2-4	4-6	0-2	2-4	4-6	0-2	2-4	4-6
Constituents (mg/kg dw)									
Volatile Organic Compounds(8240)									
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	0.012	ND	ND	0.0086	0.092
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs:	**ND**	**ND**	**ND**	**ND**	**0.012**	**ND**	**ND**	**0.0086**	**0.092**
Semi-Volatile Organic Compounds (8270)									
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	1.50	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	54.00	1.50	ND	4.20	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	35.00	0.47	ND	3.50	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	5.70	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	1.50	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	2.80	ND	ND
Carbazole	ND	ND	ND	ND	0.44	ND	1.40	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	5.00	ND	ND

mg/kg dw Milligrams per kilograms on a dry-weight basis.
ND Constituent was not detected.

Table 4-4. Drip Track Area Soil Sample Results, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9502	9503	9504	9505	9506	9507	9508	9509	9510
Boring Identification:	DTB-1A	DTB-1B	DTB-1C	DTB-4A	DTB-4B	DTB-4C	DTB-9A	DTB-9B	DTB-9C
Depth (ft):	0-2	2-4	4-6	0-2	2-4	4-6	0-2	2-4	4-6
Constituents (mg/kg dw)									
Semi-Volatile Organic Compounds (8270)									
Cresol m&p	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol(ortho)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	0.70	0.66	ND	94.00	1.80	ND	4.20	ND	ND
Fluorene	ND	ND	ND	ND	1.50	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	0.53	ND	ND
Naphthalene	0.70	ND	ND	44.00	5.60	ND	1.50	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	0.79	ND	120.00	3.50	ND	17.00	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs:	**1.4**	**1.45**	**ND**	**347**	**16.322**	**ND**	**47.33**	**ND**	**ND**

mg/kg dw Milligrams per kilograms on a dry-weight basis.
ND Constituent was not detected.

Table 4-5. Diesel Fuel Storage Area Soil Sampling Results, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	11340	11341	11342	11343	11344	11345	11346
Soil Boring/Sample ID:	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7
Sampling Depth (ft bls):	2-4	2-4	2-4	2-4	2-4	2-4	2-4
Constituents (mg/kg dw)							
Total Petroleum Hydrocarbons (TPH) as Gasoline (EPA 5030/Modified 815)							
TPH as Gasoline	ND	ND	ND	ND	25	ND	ND
Total Petroleum Hydrocarbons (TPH), High-Boiling Fraction (EPA 5030/Modified 815)							
TPH as Kerosene	ND	ND	ND	ND	ND	ND	ND
TPH as Diesel Fuel	ND	ND	ND	ND	56	ND	ND
TPH as Heavy Oils	ND	ND	ND	ND	ND	ND	ND
TPH as Mineral Spirits	ND	ND	ND	ND	ND	ND	ND
TPH as Varsol	ND	ND	ND	ND	ND	ND	ND
TPH as Fuel Oil	ND	ND	ND	ND	ND	ND	ND

mg/kg dw Milligrams per kilogram, dry weight basis
ND Constituent was not detected.

Table 4-6. CB-9 Core Rock Sample Results, Southern Wood Piedmont, Gulf, North Carolina.

Sample Identification #:	9642	9643	9644	9645
Core-Boring Identification:	CB-9A	CB-9B	CB-9C	CB-9D
Depth (ft bls):	395-400	240-250	90-100	195-200
Constituents (mg/kg dw)				
Volatile Organic Compounds (8240)				
Toluene	ND	ND	ND	ND
Benzene	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND
TOTAL VOCs	**ND**	**ND**	**ND**	**ND**
Semi-Volatile Organic Compounds (8270)				
2-Chlorophenol	ND	ND	ND	ND
Phenol	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND
p-Chloro-m-Cresol	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND
Naphthalene	ND	ND	1.90	ND
Acenaphthene	ND	ND	5.00	ND
Phenanthrene	ND	ND	18.00	ND
Anthracene	ND	ND	3.30	ND
Fluoranthene	ND	ND	12.00	ND
Chrysene	ND	ND	2.00	ND
Benzo(a)anthracene	ND	ND	1.80	ND
Benzo(b,k)fluoranthene	ND	ND	1.40	ND
Benzo(a)pyrene	ND	ND	0.53	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND
Carbazole	ND	ND	2.10	ND
Cresol (o)	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND
Aniline	ND	ND	ND	ND
Fluorene	ND	ND	7.30	ND
2-Methylnaphthalene	ND	ND	2.80	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND
TOTAL SVOCS	**ND**	**ND**	**58.13**	**ND**
Percent Solids	100	99	99	99

ft bls Feet below land surface
mg/kg dw Milligrams per kilogram, dry-weight basis.
ND Constituent was not detected.

1542rwp

Table 4-7. Groundwater Sampling Results, Core-Boring Packer Tests, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9406	9426A	9426B	9427A	9427B	9428A	9428B	9429A	9430A	9430B
Core Boring Identification:	CB-3A	CB-4	CB-4B	CB-5A	CB-5B	CB-6A	CB-6B	CB-7A	CB-8A	CB-8B
Depth (ft)	33-36	30-35	71-76	22-25	89-94	30-35	86-91	82-94	28-33	89-94
Constituents (mg/L)										
Semi-Volatile Organic Compounds (8270)										
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	0.48	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	0.017	ND	1.60	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	0.029	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	6.80	0.60	ND	ND	ND
Naphthalene	8.10	ND	ND	ND	ND	3.50	1.90	6.60	1.10	0.051
Acenaphthene	1.80	ND	ND	ND	ND	0.86	0.54	0.44	0.24	0.015
Phenanthrene	2.40	ND	ND	ND	ND	1.10	0.65	0.26	0.44	0.043
Anthracene	0.28	ND	ND	ND	ND	0.12	0.12	0.03	0.056	ND
Fluoranthene	0.81	ND	ND	ND	ND	0.43	0.25	0.042	0.17	0.022
Chrysene	0.099	ND	ND	ND	ND	0.069	0.037	ND	0.018	ND
Benzo(a)anthracene	0.11	ND	ND	ND	ND	0.066	0.041	ND	0.017	ND
Benzo(b,k)fluoranthene	0.025	ND	ND	ND	ND	0.043	0.026	ND	0.012	ND
Benzo(a)pyrene	0.028	ND	ND	ND	ND	0.022	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	0.017	ND	ND	ND	ND	0.15	0.14	0.16	0.084	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	1.20	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	0.015	ND	2.10	ND	ND
Aniline	0.063	ND	ND	ND	ND	0.022	ND	ND	ND	ND
Fluorene	1.50	ND	ND	ND	ND	0.56	0.45	0.26	0.2	0.017
2-Methylnaphthalene	2.90	ND	ND	ND	ND	0.90	0.60	0.93	0.34	0.018
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**18.132**	**ND**	**ND**	**ND**	**ND**	**14.703**	**5.354**	**14.102**	**2.677**	**0.166**

mg/L Milligrams per liter.
CB Core boring.
ND Constituent was not detected.

Table 4-7. Groundwater Sampling Results, Core-Boring Packer Tests, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9406	9426A	9426B	9427A	9427B	9428A	9428B	9429A	9430A	9430B
Core Boring Identification:	CB-3A	CB-4	CB-4B	CB-5A	CB-5B	CB-6A	CB-6B	CB-7A	CB-8A	CB-8B
Depth (ft)	33-36	30-35	71-76	22-25	89-94	30-35	86-91	82-94	28-33	89-94
Constituents (mg/L)										
Volatile Organic Compounds (8240)										
Toluene	0.11	ND	ND	ND	ND	0.069	0.018	0.42	0.0057	ND
Benzene	0.052	ND	ND	ND	ND	0.03	0.0067	0.27	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.18	ND	ND	ND	ND	0.052	0.018	0.13	0.005	ND
Xylenes	0.52	ND	ND	ND	ND	0.02	0.058	0.47	0.016	ND
TOTAL VOCs	**0.862**	**ND**	**ND**	**ND**	**ND**	**0.171**	**0.1007**	**1.29**	**0.0267**	**ND**

ND Constituent was not detected.
mg/L Milligrams per liter.
CB Core boring.

Table 4-8. Groundwater Sample Results, October 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9081	9086	9082	9087	9083	9084	9085	9089
Well Identification:	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-4A	MW-5A	MW-7A
Constituents (mg/L)								
Semi-Volatile Organic Compounds (8270)								
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

mg/L Milligrams per liter.
REP Replicate of MW-13A.
ND Constituent was not detected.

Table 4-8. Groundwater Sample Results, October 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9081	9086	9082	9087	9083	9084	9085	9089
Well Identification:	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-4A	MW-5A	MW-7A
Constituents (mg/L)								
Volatile Organic Compounds (8240)								
Toluene	ND	0.33	ND	ND	ND	ND	ND	ND
Benzene	0.0026	0.66	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	0.14	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**0.0026**	**1.13**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

mg/L Milligrams per liter.
REP Replicate of MW-13A.
ND Constituent was not detected.

Table 4-8. Groundwater Sample Results, October 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9090	9091	9092	9093	9094	9098	9096
Well Identification:	MW-7B	MW-8A	MW-9A	MW-10A	MW-13A	REP-1	MW-14A
Constituents (mg/L)							
Semi-Volatile Organic Compounds (8270)							
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	8.2	6.5	ND
Naphthalene	ND	ND	ND	0.024	1.9	1.5	ND
Acenaphthene	ND	ND	ND	ND	0.24	0.22	0.015
Phenanthrene	ND	ND	ND	ND	0.27	0.21	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	0.018
Cresol (o)	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	0.24	0.21	ND
2-Methylnaphthalene	ND	ND	ND	ND	0.42	0.28	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	0.17	0.16	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**0.024**	**11.44**	**9.08**	**0.033**

mg/L Milligrams per liter.
REP Replicate of MW-13A.
ND Constituent was not detected.

Table 4-8. Groundwater Sample Results, October 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9090	9091	9092	9093	9094	9098	9096
Well Identification:	MW-7B	MW-8A	MW-9A	MW-10A	MW-13A	REP-1	MW-14A
Constituents (mg/L)							
Volatile Organic Compounds (8240)							
Toluene	ND	ND	ND	ND	0.004	0.003	ND
Benzene	ND	ND	ND	ND	0.022	0.021	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	0.007	0.006	ND
Xylenes	ND	ND	ND	ND	0.021	0.019	ND
TOTAL VOCs	**ND**	**ND**	**ND**	**ND**	**0.054**	**0.049**	**ND**

mg/L Milligrams per liter.
REP Replicate of MW-13A.
ND Constituent was not detected.

Table 4-9. Groundwater Sample Results, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9611	9616	9612	9617	9613	9618	9614	9615	9619	9620	9621
Well Identification:	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-4A	MW-5A	MW-6A	MW-7A	MW-7B
Constituents (mg/L)											
Semi-Volatile Organic Compounds (8270)											
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

mg/L Milligrams per liter.
REP Replicate.
ND Constituent was not detected.

Table 4-9. Groundwater Sample Results, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9611	9616	9612	9617	9613	9618	9614	9615	9619	9620	9621
Well Identification:	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-4A	MW-5A	MW-6A	MW-7A	MW-7B
Constituents (mg/L)											
Volatile Organic Compounds (8240)											
Toluene	ND	0.012	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	0.025	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	0.0087	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	0.039	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**ND**	**0.0847**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
pH (Laboratory)	7.8	8	NA	NA	6.9	NA	NA	7.6	6.9	7.5	7.6

mg/L Milligrams per liter.
REP Replicate.
ND Constituent was not detected.

Table 4-9. Groundwater Sample Results, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9622	9623	9624	9625	9626	9627	9628	9629	9630	9631	9632
Well Identification:	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-11A	MW-11B	MW-11C	MW-12A	MW-13A	MW-13B
Constituents (mg/L)											
Semi-Volatile Organic Compounds (8270)											
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.9	20
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77	7.6
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.078	2.2
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	5.1
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.013	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.011	2.3
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18	1.3
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14	2.3
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	1.8
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**3.372**	**42.6**

mg/L Milligrams per liter.
REP Replicate.
ND Constituent was not detected.

Table 4-9. Groundwater Sample Results, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9622	9623	9624	9625	9626	9627	9628	9629	9630	9631	9632
Well Identification:	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-11A	MW-11B	MW-11C	MW-12A	MW-13A	MW-13B
Constituents (mg/L)											
Volatile Organic Compounds (8240)											
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.03
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	0.05
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.004	0.01
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	0.04
TOTAL VOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.044**	**0.13**
pH (Laboratory)	7	7.4	7.4	7.6	8.1	7.9	8.2	8.3	7	NA	NA

mg/L Milligrams per liter.
REP Replicate.
ND Constituent was not detected.

Table 4-9. Groundwater Sample Results, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9633	9634	9635	9636	9637	9638	9639	9640	REP-1	REP-2
Well Identification:	MW-14A	MW-15A	MW-15B	MW-15C	MW-16A	MW-16B	MW-16C	MW-17A	(MW-14A)	(MW-13A)
Constituents (mg/L)										
Semi-Volatile Organic Compounds (8270)										
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	0.069	0.62	1.1	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	0.043	2.3	0.73	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	0.087	ND	0.95	37	1.1	1.2	ND	ND	2.4
Naphthalene	ND	5	0.57	6.1	52	3.7	0.051	ND	ND	0.46
Acenaphthene	0.029	1.5	0.059	1.1	29	0.48	0.038	ND	0.033	0.065
Phenanthrene	ND	2.1	0.033	1.2	65	0.3	0.054	ND	ND	0.13
Anthracene	ND	0.25	ND	ND	10	0.023	ND	ND	ND	0.013
Fluoranthene	ND	0.86	0.014	ND	41	0.061	0.02	ND	ND	0.011
Chrysene	ND	0.095	ND	ND	5.3	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	0.1	ND	ND	5.8	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	0.072	ND	ND	4.7	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	0.03	ND	ND	1.9	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	0.025	0.026	0.021	0.91	6.1	0.3	ND	ND	0.018	0.14
Cresol (o)	ND	ND	0.065	1.5	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	0.098	2.4	0.68	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	0.24	ND	ND	ND	ND	ND
Fluorene	ND	1.1	0.031	0.8	34	0.3	0.042	ND	ND	0.19
2-Methylnaphthalene	0.014	2.2	0.097	1.4	27	0.65	0.038	ND	0.014	0.046
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**0.068**	**13.42**	**1.1**	**19.28**	**321.95**	**6.914**	**1.443**	**ND**	**0.065**	**3.455**

mg/L Milligrams per liter.
REP Replicate.
ND Constituent was not detected.

Table 4-9. Groundwater Sample Results, August 1991, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9633	9634	9635	9636	9637	9638	9639	9640	REP-1	REP-2
Well Identification:	MW-14A	MW-15A	MW-15B	MW-15C	MW-16A	MW-16B	MW-16C	MW-17A	(MW-14A)	(MW-13A)
Constituents (mg/L)										
Volatile Organic Compounds (8240)										
Toluene	ND	0.003	0.01	0.25	0.1	0.02	ND	ND	ND	0.001
Benzene	ND	0.02	0.01	0.25	0.1	0.018	ND	ND	ND	0.01
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	0.02	0.004	0.06	0.1	0.02	ND	ND	ND	0.002
Xylenes	ND	0.06	0.01	0.25	0.2	0.024	ND	ND	ND	0.01
TOTAL VOCs	**ND**	**0.103**	**0.034**	**0.81**	**0.5**	**0.082**	**ND**	**ND**	**ND**	**0.023**
pH (Laboratory)	7.9	7.4	7.4	NA	7.5	7.5	NA	NA	7.2	NA

mg/L Milligrams per liter.
REP Replicate.
ND Constituent was not detected.

Table 4-10. Groundwater Sample Results, December 1992, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-4A	MW-5A	MW-6A	MW-7A
Constituents (mg/L)										
Semi-Volatile Organic Compounds (8270)										
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-10. Groundwater Sample Results, December 1992, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-4A	MW-5A	MW-6A	MW-7A
Constituents (mg/L)										
Volatile Organic Compounds (8240)										
Toluene	ND	0.01	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**0.006**	**0.01**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-10. Groundwater Sample Results, December 1992, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-7B	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-11A	MW-11B	MW-11C	MW-12A	MW-13A
Constituents (mg/L)											
Semi-Volatile Organic Compounds (8270)											
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-10. Groundwater Sample Results, December 1992, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-7B	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-11A	MW-11B	MW-11C	MW-12A	MW-13A
Constituents (mg/L)											
Volatile Organic Compounds (8240)											
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-10. Groundwater Sample Results, December 1992, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-13C	MW-14A	MW-15B	MW-16A	MW-16B	MW-16C	MW-17A
Constituents (mg/L)							
Semi-Volatile Organic Compounds (8270)							
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND
Phenol	0.059	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	0.25	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	11	ND	0.16	ND
Naphthalene	1.5	0.055	0.2	4.8	3.7	0.06	ND
Acenaphthene	ND	0.027	0.039	ND	ND	0.024	ND
Phenanthrene	ND	ND	0.028	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND
Benzo(b,k)fluoranthene	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	0.11	ND	ND	ND	ND	ND	ND
Cresol (m&p)	0.2	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND
Fluorene	1.8	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	0.063	ND	0.035	ND	ND	0.026	ND
2,3,4,6-Tetrachlorophenol	0.56	ND	ND	4.4	ND	1.2	ND
TOTAL SVOCs	**4.542**	**0.082**	**0.302**	**20.2**	**3.7**	**1.47**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-10. Groundwater Sample Results, December 1992, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-13C	MW-14A	MW-15B	MW-16A	MW-16B	MW-16C	MW-17A
Constituents (mg/L)							
Volatile Organic Compounds (8240)							
Toluene	0.1	ND	0.004	0.069	0.024	ND	ND
Benzene	0.071	ND	0.014	0.16	0.019	0.022	0.0034
Methylene chloride	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	0.007	ND	ND	ND	ND
Ethylbenzene	0.041	ND	0.006	0.011	0.012	ND	ND
Xylenes	0.08	ND	0.012	0.38	0.046	ND	0.004
TOTAL VOCs	**0.292**	**ND**	**0.043**	**0.62**	**0.101**	**0.022**	**0.0074**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-11. Groundwater Sample Results, June 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-3C	MW-4A	MW-5A	MW-6A	MW-7A
Constituents (mg/L)											
Semi-Volatile Organic Compounds (8270)											
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.012	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**0.012**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-11. Groundwater Sample Results, June 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-3C	MW-4A	MW-5A	MW-6A	MW-7A
Constituents (mg/L)											
Volatile Organic Compounds (8010/8020)											
Toluene	ND	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	1.2	ND	ND	ND	ND	0.002	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**ND**	**1.7**	**ND**	**ND**	**ND**	**ND**	**0.002**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.
NR No result reported for constituent

Table 4-11. Groundwater Sample Results, June 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-7B	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-10C	MW-11A	MW-11B
Constituents (mg/L)									
Semi-Volatile Organic Compounds (8270)									
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

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Table 4-11. Groundwater Sample Results, June 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-7B	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-10C	MW-11A	MW-11B
Constituents (mg/L)									
Volatile Organic Compounds (8240)									
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	0.007	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.007**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-11. Groundwater Sample Results, June 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-11C	MW-12A	MW-13A	MW-13C	MW-14A	MW-15B	MW-15C	MW-16A	MW-16B	MW-16C	MW-17A
Constituents (mg/L)											
Semi-Volatile Organic Compounds (8270)											
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	0.045	ND	ND	0.2	0.46	0.022	0.035	ND
2,4-Dimethylphenol	ND	ND	ND	0.31	ND	0.017	0.32	0.06	0.038	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	0.026	ND	ND	0.031	ND	0.031	0.042	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	0.39	0.65	ND	ND	ND	14	4.3	ND	ND
Naphthalene	ND	ND	ND	3	ND	1.1	0.63	4.9	4.7	0.038	ND
Acenaphthene	ND	ND	ND	0.097	ND	0.14	0.12	0.27	0.29	0.024	ND
Phenanthrene	ND	ND	ND	ND	ND	0.087	0.19	0.35	0.32	0.014	ND
Anthracene	ND	ND	ND	ND	ND	ND	0.023	0.035	0.032	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	0.028	0.086	0.081	0.12	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	0.018	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	0.011	0.011	0.023	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	0.012	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	0.015	0.1	ND	0.049	0.055	0.11	0.13	ND	ND
Cresol (o)	ND	ND	ND	0.068	ND	ND	0.2	0.22	0.01	ND	ND
Cresol (m&p)	ND	ND	ND	0.1	ND	ND	0.6	0.84	0.043	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	0.063	0.09	0.21	0.16	ND	ND
2-Methylnaphthalene	ND	ND	ND	0.13	ND	0.088	0.085	0.38	0.26	0.011	ND
2,3,4,6-Tetrachlorophenol	ND	ND	0.29	0.46	ND	ND	0.11	1	0.24	0.42	ND
TOTAL SVOCs	**ND**	**ND**	**0.695**	**4.986**	**ND**	**1.572**	**2.751**	**22.927**	**10.749**	**0.584**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-11. Groundwater Sample Results, June 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-11C	MW-12A	MW-13A	MW-13C	MW-14A	MW-15B	MW-15C	MW-16A	MW-16B	MW-16C	MW-17A
Constituents (mg/L)											
Volatile Organic Compounds (8240)											
Toluene	0.032	ND	ND	0.13	ND	ND	0.52	0.068	0.038	ND	ND
Benzene	0.022	ND	0.004	0.081	ND	0.028	0.53	0.12	0.025	ND	ND
Methylene chloride	ND	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.016	ND	ND	0.064	ND	0.012	0.073	0.034	0.019	ND	ND
Xylenes	0.052	ND	ND	0.11	ND	0.025	0.42	0.092	0.059	ND	ND
TOTAL VOCs	**0.122**	**ND**	**0.004**	**0.385**	**0.002**	**0.065**	**1.543**	**0.314**	**0.141**	**ND**	**ND**

1 Groundwater samples collected by ETE personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.
NR No result reported for constituent

Table 4-12. Groundwater Sample Results, December 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-3C	MW-4A	MW-5A	MW-6A
Constituents (mg/L)										
Semi-Volatile Organic Compounds (8270)										
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by Viro Group personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-12. Groundwater Sample Results, December 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-1A	MW-1B	MW-2A	MW-2B	MW-3A	MW-3B	MW-3C	MW-4A	MW-5A	MW-6A
Constituents (mg/L)										
Volatile Organic Compounds (8010/8020)										
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	0.018	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**ND**	**0.018**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by Viro Group personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-12. Groundwater Sample Results, December 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-7A	MW-7B	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-10C	MW-11A	MW-11B
Constituents (mg/L)										
Semi-Volatile Organic Compounds (8270)										
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibeno(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

1 Groundwater samples collected by Viro Group personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-12. Groundwater Sample Results, December 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-7A	MW-7B	MW-8A	MW-9A	MW-9B	MW-10A	MW-10B	MW-10C	MW-11A	MW-11B
Constituents (mg/L)										
Volatile Organic Compounds (8240)										
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	0.011	ND	ND	ND	0.0024	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**ND**	**ND**	**ND**	**0.011**	**ND**	**ND**	**ND**	**0.0024**	**ND**	**ND**

1 Groundwater samples collected by Viro Group personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-12. Groundwater Sample Results, December 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-11C	MW-12A	MW-13A	MW-13C	MW-14A	MW-15B	MW-16C	MW-17A	MW-18A
Constituents (mg/L)									
Semi-Volatile Organic Compounds (8270)									
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND	0.31	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	0.06	0.35	ND	ND	0.1	ND	ND
Naphthalene	ND	ND	ND	4.1	0.57	1.4	0.047	ND	ND
Acenaphthene	ND	ND	ND	0.14	0.078	0.11	0.018	ND	ND
Phenanthrene	ND	ND	ND	ND	0.013	ND	0.011	ND	ND
Anthracene	ND	ND	ND	ND	ND	0.02	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (o)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cresol (m&p)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	0.027	0.02	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	0.31	0.066	0.12	0.028	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL SVOCs	**ND**	**ND**	**0.06**	**5.21**	**0.754**	**1.67**	**0.204**	**ND**	**ND**

1 Groundwater samples collected by Viro Group personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-12. Groundwater Sample Results, December 1993, Southern Wood Piedmont, Gulf, North Carolina.

Well Identification (1):	MW-11C	MW-12A	MW-13A	MW-13C	MW-14A	MW-15B	MW-16C	MW-17A	MW-18A
Constituents (mg/L)									
Volatile Organic Compounds (8240)									
Toluene	ND	ND	ND	0.077	ND	0.0035	ND	ND	ND
Benzene	ND	ND	ND	0.056	ND	0.025	0.0036	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	0.087	ND	0.026	ND	ND	ND
Ethylbenzene	ND	ND	ND	0.045	ND	0.013	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOCs	**ND**	**ND**	**ND**	**0.265**	**ND**	**0.0675**	**0.0036**	**ND**	**ND**

1 Groundwater samples collected by Viro Group personnel.
mg/L Milligrams per liter.
ND Constituent was not detected.

Table 4-13. Diesel Fuel Storage Area Groundwater Sampling Results, July 1993, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	11348	11347	11349
Monitor Well/Sample ID:	MW-1A	MW-1B	HP-1
Constituents (mg/L)			
Total Petroleum Hydrocarbons (TPH) as Gasoline (USEPA Modified Method 8015, Purgeable)			
TPH as Gasoline	0.35	ND	34
Total Petroleum Hydrocarbons (TPH), High-Boiling Fraction (USEPA Modified Method 8015, Extractable)			
TPH as Kerosene	ND	ND	ND
TPH as Diesel Fuel	ND	ND	ND
TPH as Heavy Oils	ND	ND	ND
TPH as Mineral Spirits	ND	ND	ND
TPH as Varsol	ND	ND	ND
TPH as Fuel Oil	ND	ND	ND

mg/L Milligrams per liter
ND Constituent was not detected.

1542swp

Table 4-14. Residential Well Sample Results, August 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identification #:	9015
Constituents (mg/L)	
Semi-Volatile Organic Compounds (8270)	
2-Chlorophenol	ND
Phenol	ND
2,4-Dimethylphenol	ND
2,4,6-Trichlorophenol	ND
p-Chloro-m-cresol	ND
Pentachlorophenol	ND
Naphthalene	ND
Acenaphthene	ND
Phenanthrene	ND
Anthracene	ND
Fluoranthene	ND
Chrysene	ND
Benzo(a)anthracene	ND
Benzo(b,k)fluoranthene	ND
Benzo(a)pyrene	ND
Ideno(1,2,3-c,d)pyrene	ND
Dibeno(a,h)anthracene	ND
Carbazole	ND
Cresol (o)	ND
Cresol (m&p)	ND
Aniline	ND
Fluorene	ND
2-Methylnaphthalene	ND
2,3,4,6-Tetrachlorophenol	ND
Volatile Organic Compounds (8240)	
Toluene	ND
Benzene	ND
Methylene chloride	ND
2-Butanone (MEK)	ND
Ethylbenzene	ND
Xylenes	ND
Chloroform (601/602)	0.0086
Total Suspended Solids	ND

1	Private well located on the property of Mrs. Margaret Jordon-Ellis, Jordon Place, R. Jordon Road.
mg/L	Milligrams per liter.
ND	Constituent was not detected.

1542swp

Table 4-15. Little Cedar Creek/Drainage Ditch Samples Collected on May 3, 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample ID #:	8746	8747	8748			8749	8750	8751	8752	8753	8754	SWP-009[1]
Sample Type/Matrix	Surf. Water	Surf. Water	Surf. Water	Field Blank	Trip Blank	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Bkgd. Sediment
Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw
Constituents												
Volatile Organic Compounds (8240)												
Toluene	ND	ND	ND	ND	ND	ND	0.0086	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
2-butanone(MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
Ethylbenzene	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	0.34	ND	ND	ND	ND	ND
TOTAL VOCs:	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.4486**	**ND**	**ND**	**ND**	**ND**	**ND**
Semi-Volatile Organic Componds (8270)												
2-Chlorophenol	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
Phenol	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
2,4-Dimethylphenol	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
2,4,6-Trichlorophenol	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
p-Chloro-m-cresol	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
Pentachlorophenol	ND	0.15	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	NA	ND	5.8	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	NA	ND	17	ND	ND	ND	ND	2.5
Anthracene	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	3.8

mg/L Milligrams per liter
mg/kg dw Milligrams per kilogram on a dry weight basis
ND Constituent was not detected
NA Sample was not analyzed for constituent
[1] Background Little Cedar Creek sediment sample collected by USEPA in 1983 (USEPA, 1984).

Table 4-14. Little Cedar Creek/Drainage Ditch Samples Collected on May 3, 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample Identificatio	8746	8747	8748			8749	8750	8751	8752	8753	8754	SWP-009[1]
Sample Type/Matrix	Surf. Water	Surf. Water	Surf. Water	Field Blank	Trip Blank	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Bkgd. Sediment
Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw
Constituents												
Semi-Volatile Organic Componds (8270)												
Fluoranthene	ND	ND	ND	ND	NA	ND	12	ND	ND	19	0.88	14
Chrysene	ND	ND	ND	ND	NA	ND	ND	ND	ND	12	0.45	19
Benzo(a)anthracene	ND	ND	ND	ND	NA	ND	ND	ND	ND	7.8	ND	5.7
Benzo(b,k)fluoranthene	ND	ND	ND	ND	NA	ND	ND	ND	ND	22	1.1	13
Benzo(a)pyrene	ND	ND	ND	ND	NA	ND	ND	ND	ND	6.3	ND	9.1
Ideno(1,2,3-c,d)pyrene	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	4.4
Dibenzo(a,h)anthracene	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Cresol(ortho)	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
Cresol m&p	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
Aniline	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
Fluorene	ND	ND	ND	ND	NA	ND	7.1	ND	ND	ND	ND	0.34 J
2-Methylnaphthalene	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	NA
TOTAL SVOCs:	**ND**	**0.15**	**ND**	**ND**	**NA**	**ND**	**41.9**	**ND**	**ND**	**67.1**	**2.43**	**71.84**

mg/L	Milligrams per liter
mg/kg dw	Milligrams per kilogram on a dry weight basis
NA	Sample was not analyzed for constituent
ND	Constituent was not detected
J	Estimated concentration
1	Background Little Cedar Creek sediment sample collected by USEPA in 1983 (USEPA, 1984).

Table 4-16. Little Cedar Creek Surface Water and Sediment Sample Results, August 13, 1990, Southern Wood Piedmont, Gulf, North Carolina.

SWP Sample ID:	8867	8868	8869	8871	SWP-009[1]
Sample Type/Matrix:	Surf. Water	Surf. Water	Surf. Water	Sediment	Bkgd. Sediment
Units:	mg/L	mg/L	mg/L	mg/kg dw	mg/kg dw
Constituents					
Volatile Organic Compounds (8240)					
Toluene	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	NA
2-Butanone(MEK)	ND	ND	ND	ND	NA
Ethylbenzene	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds (8270)					
2-Chlorophenol	ND	ND	ND	ND	NA
Phenol	ND	ND	ND	ND	NA
2,4-Dimethylphenol	ND	ND	ND	ND	NA
2,4,6-Trichlorophenol	ND	ND	ND	ND	NA
p-Chloro-m-Cresol	ND	ND	ND	ND	NA
Pentachlorophenol	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	1.5	ND
Phenanthrene	ND	ND	0.057	5.2	2.5
Anthracene	ND	ND	ND	2.1	3.8
Fluoranthene	ND	ND	0.058	7.5	14
Chrysene	ND	ND	ND	2.5	19
Benzo(a)Anthracene	ND	ND	ND	1.9	5.7
Benzo(b,k)Fluoranthene	ND	ND	ND	3.1	13
Benzo(a)Pyrene	ND	ND	ND	0.86	9.1
Ideno(1,2,3-cd)Pyrene	ND	ND	ND	ND	4.4
Dibenzo(a,h)Anthracene	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND
Cresol(ortho)	ND	ND	ND	ND	NA
Cresol m&p	ND	ND	ND	ND	NA
Aniline	ND	ND	ND	ND	NA
Fluorene	ND	ND	0.013	1.9	0.34 J
2-Methylnaphthalene	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ND	NA
TOTAL SVOCs:	**ND**	**ND**	**0.128**	**26.56**	**71.84**
Total Suspended Solids	110	ND	21	-	

mg/L	Milligrams per liter
mg/kg dw	Milligrams per kilogram on a dry weight basis
ND	Constituent was not detected
NA	Constituent was not analyzed
J	Estimated concentration
[1]	Background Little Cedar Creek sediment sample collected by USEPA in 1983 (USEPA, 1984).

FIGURES

FIGURES

NC0028004\1630rwp\rivoli.rpt\07Oct94

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000

SCALE 1:24000

County Location

Contour Interval 10 Feet Datum is Mean Sea Level
U.S.G.S. 7.5 Minute Series GOLDSTON, N.C. Topographic Quadrangle.

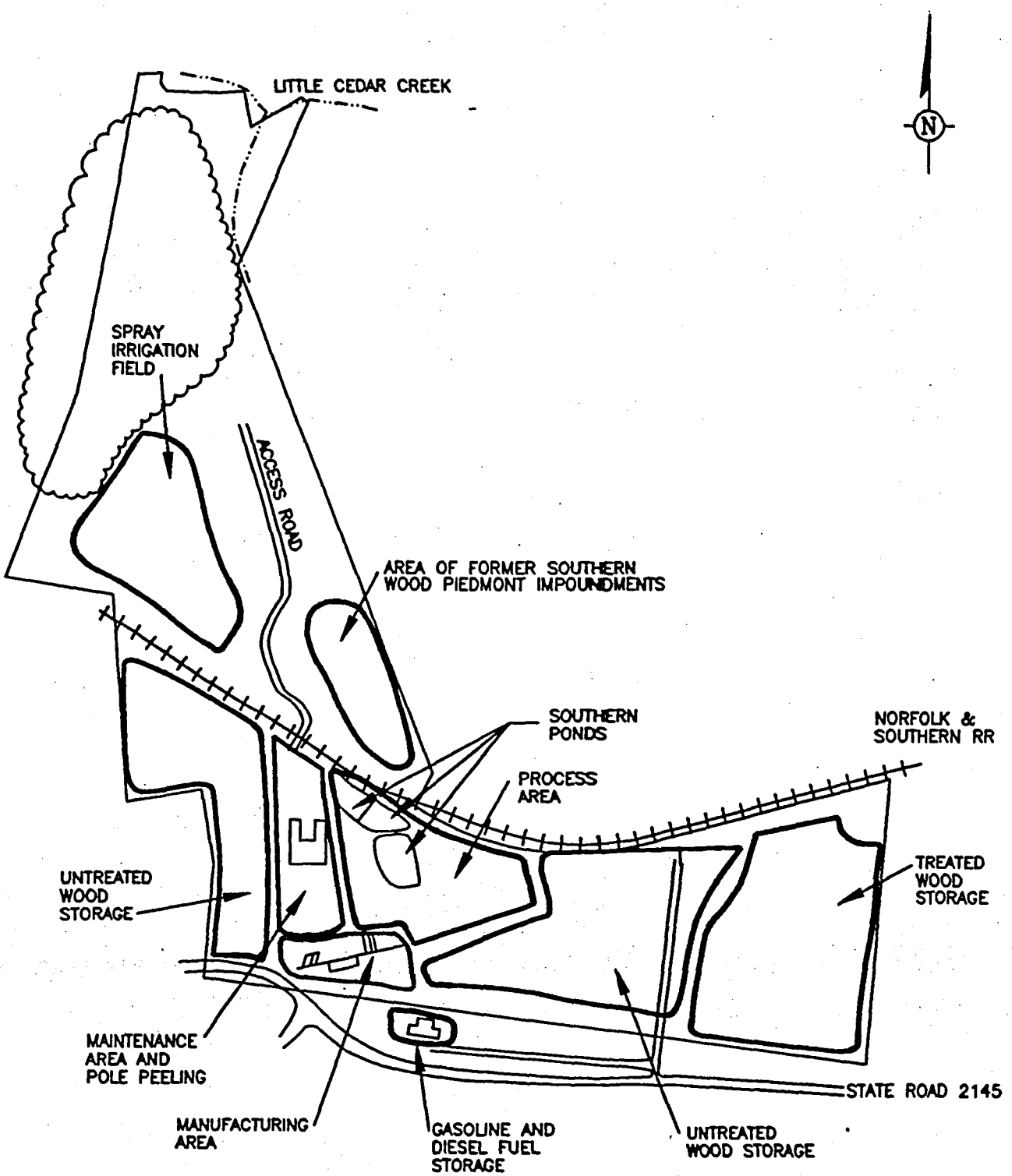
GERAGHTY & MILLER, INC.
Environmental Services

SITE LOCATION TOPOGRAPHIC MAP

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
1-1

DRAFTER: N. JOHNSON | APPROVED: C. LOYDAHL | CHECKED: C. LOYDAHL | DRAWING: TOPO | FILE NO.: MISC | PRJCT NO.: NC0028.004 | DWG DATE: 30 MAR 94



GERAGHTY & MILLER, INC.
Environmental Services

0 400 FEET

FORMER FACILITY LAYOUT

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
1-2

DWG DATE: 29 MAR 94 | PRJCT NO.: NC00028.004 | FILE NO.: SWP-GULF | DRAWING: SITE2 | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON

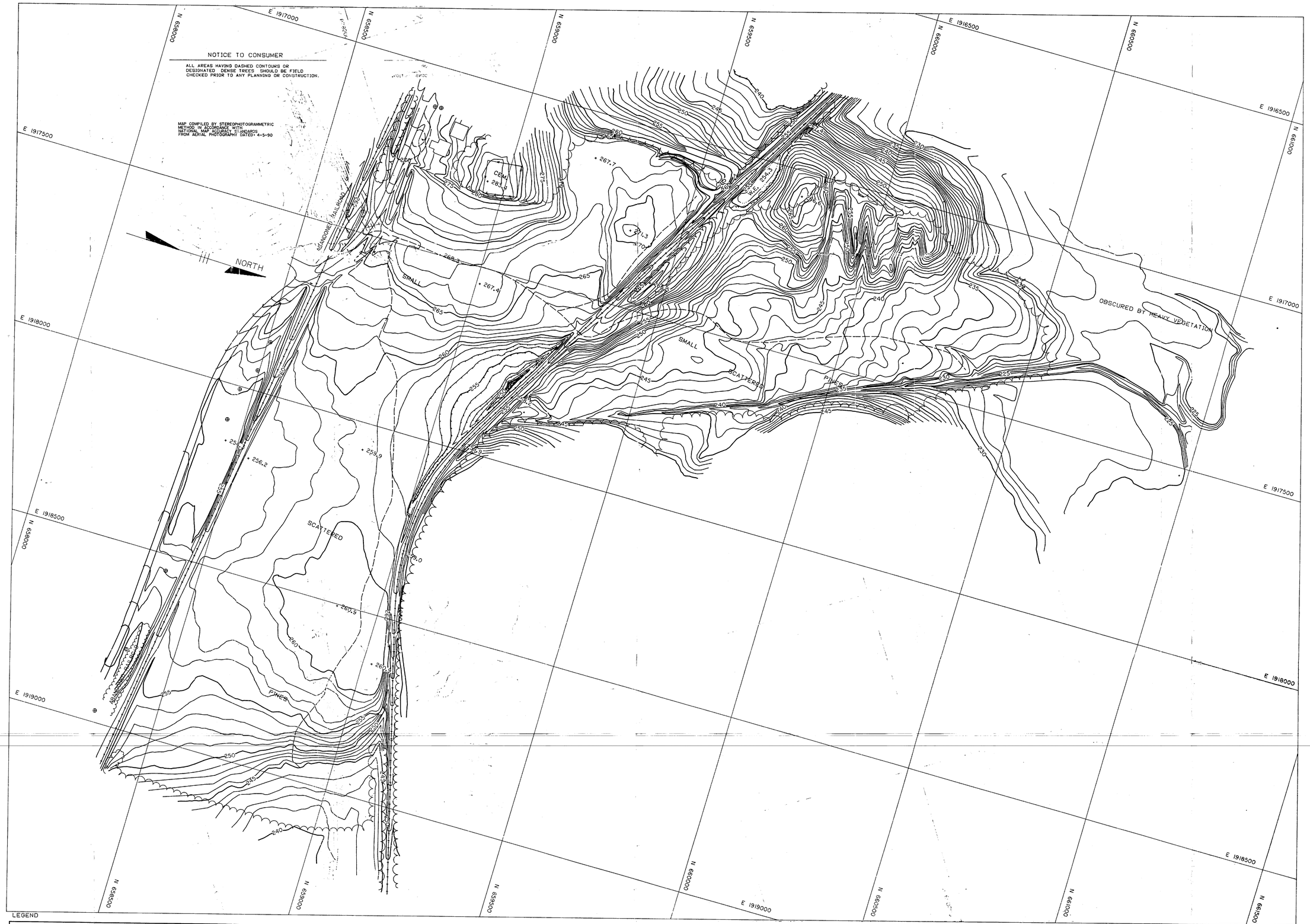


FIGURE 2-1

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NO	DATE	BY	REVISION

RAGSDALE CONSULTANTS, P.A.
ENGINEERS, LANDSCAPE ARCHITECTS & SURVEYORS
P.O. BOX 1749, 310 E. JOHNSTON STREET, SMITHFIELD, NC 27577
4601 LAKE BOONE TRAIL, RALEIGH, NC 27607
P.O. BOX 760, 1210 MAIN STREET, ELLINGTON, NC 27546

SEAL

SCALE
DATE
DRAWN BY
CHECKED BY
APPROVED BY
PROJECT NO

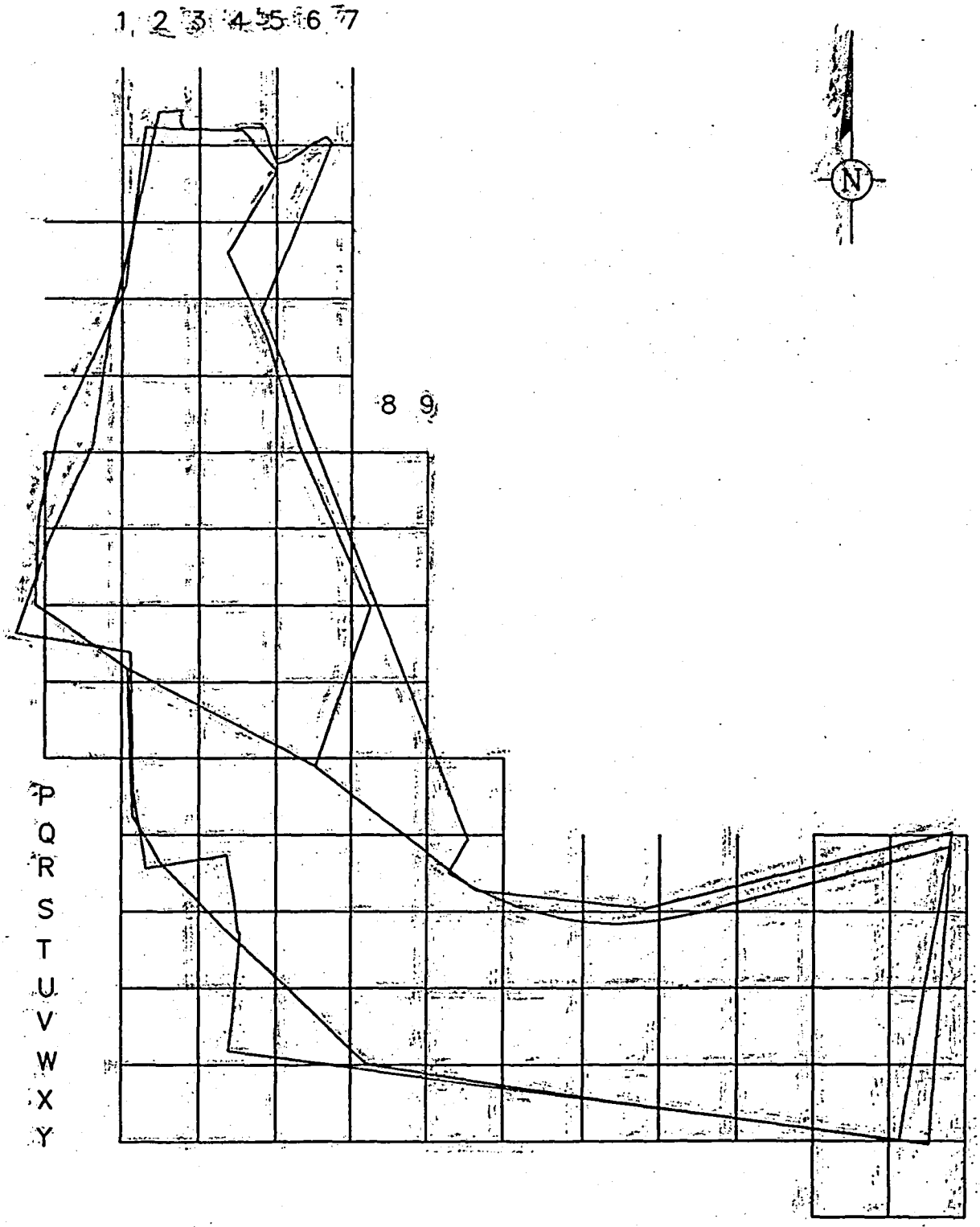
SITE TOPOGRAPHIC MAP

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

DRAWING NO

OF

american blueprint of columbia



GERAGHTY & MILLER, INC.
Environmental Services

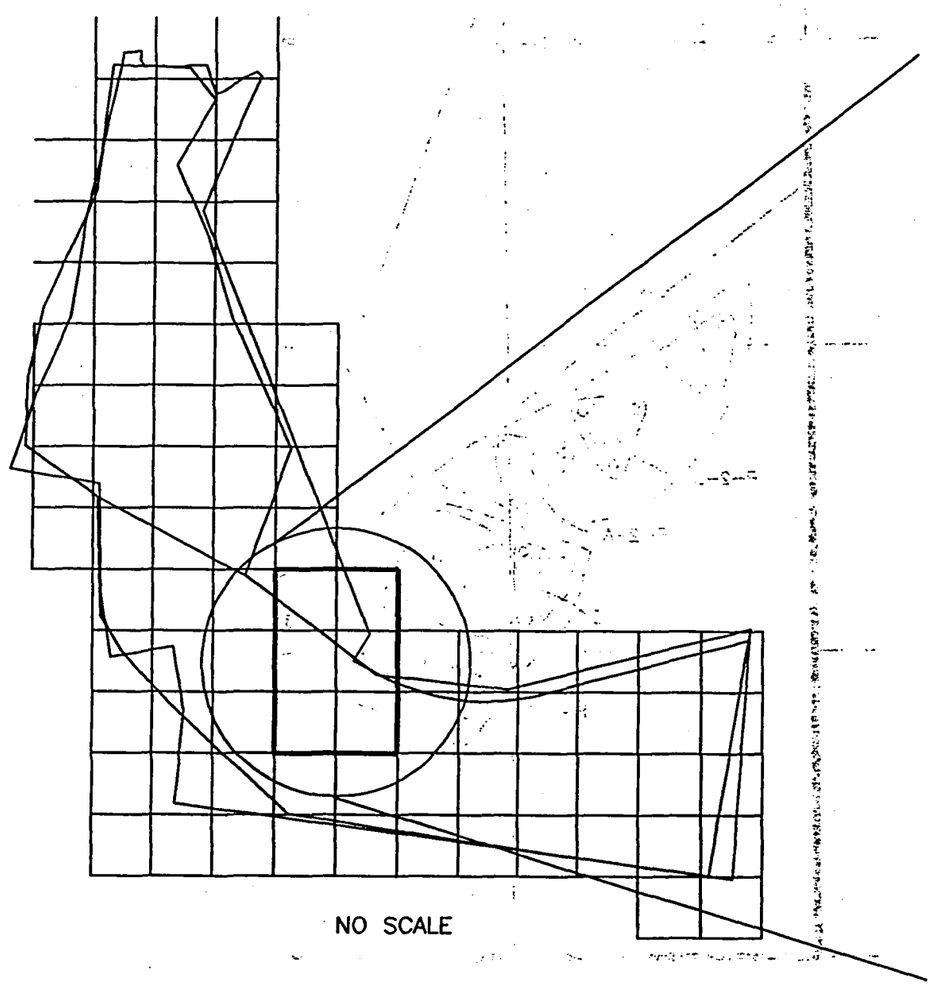
0 400 FT

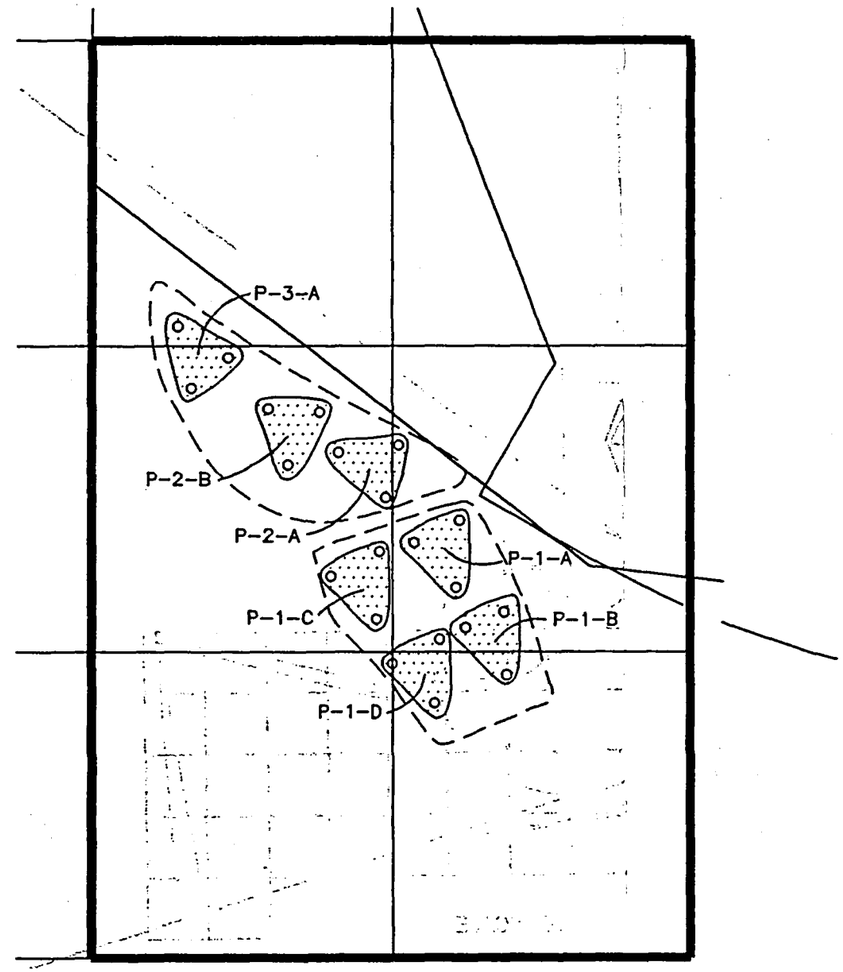
200 X 200 FOOT GRID SYSTEM

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE 2-2

DWG DATE: 26 MAR 94 | PRJCT NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: SITE5 | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON





LEGEND

EXTENT OF FORMER SOUTHERN PONDS (REMOVED)

COMPOSITE SOIL SAMPLING LOCATION (APPROXIMATE). THREE SUBSAMPLES WERE COMPOSITED INTO ONE FOR EACH COMPOSITE

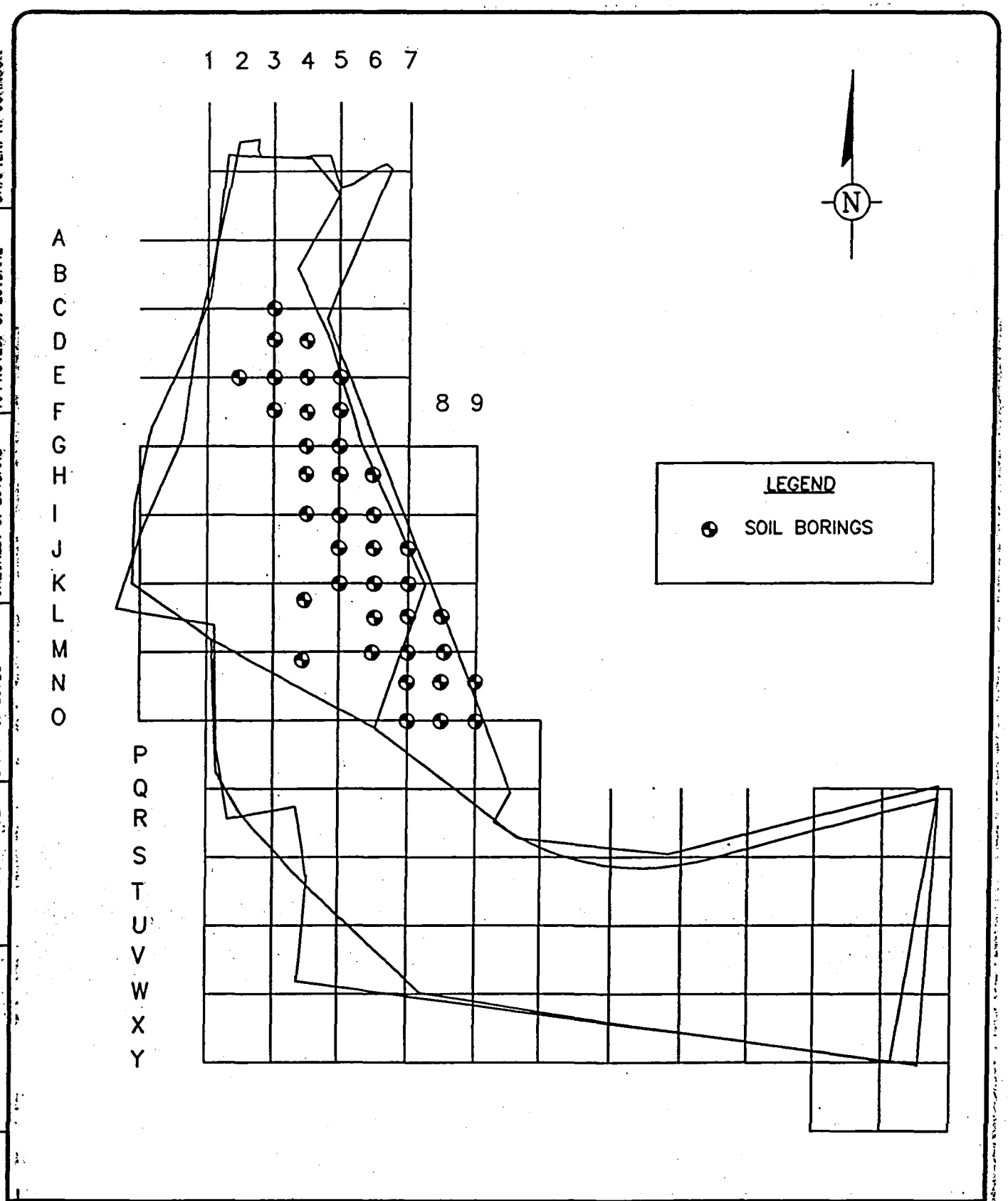
GERAGHTY & MILLER, INC.
Environmental Services

REMOVAL CONFIRMATION SOIL SAMPLING LOCATIONS

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
2-3

DWG DATE: 29 MAR 94 | PROJCT NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: SITE3 | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON



DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SITE6 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 29 MAR 94

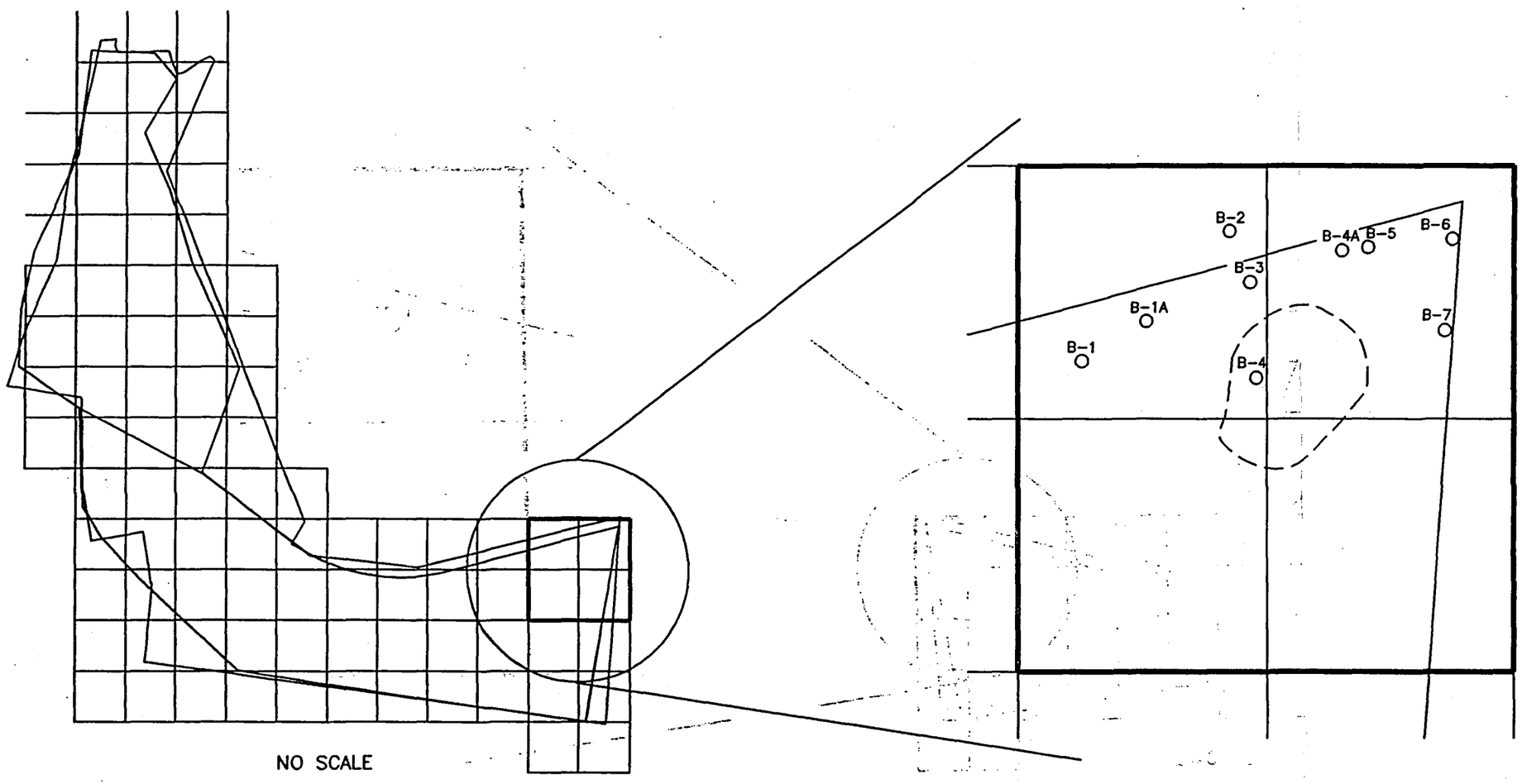
GERAGHTY & MILLER, INC.
Environmental Services

0 400 FT

NORTHERN IMPOUNDMENTS AREA SOIL BORING LOCATIONS

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE 2-4



LEGEND

○ APPROXIMATE LOCATION OF SOIL BORING

APPROXIMATE BOUNDARY OF POND

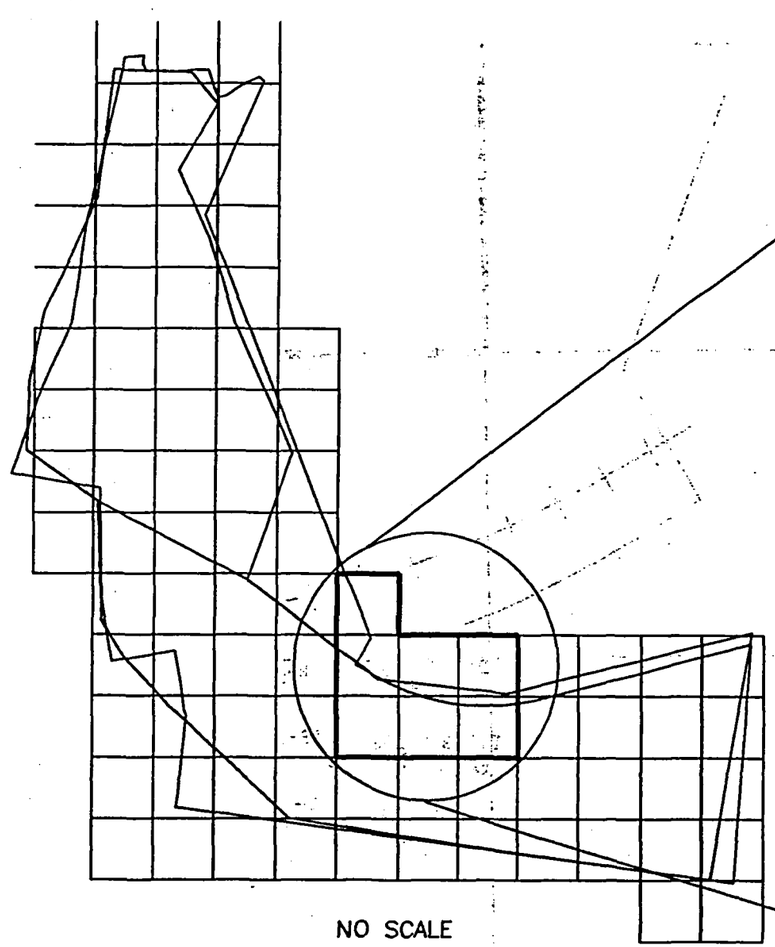
GERAGHTY & MILLER, INC.
Environmental Services

EASTERN STORMWATER POND SOIL BORING LOCATIONS

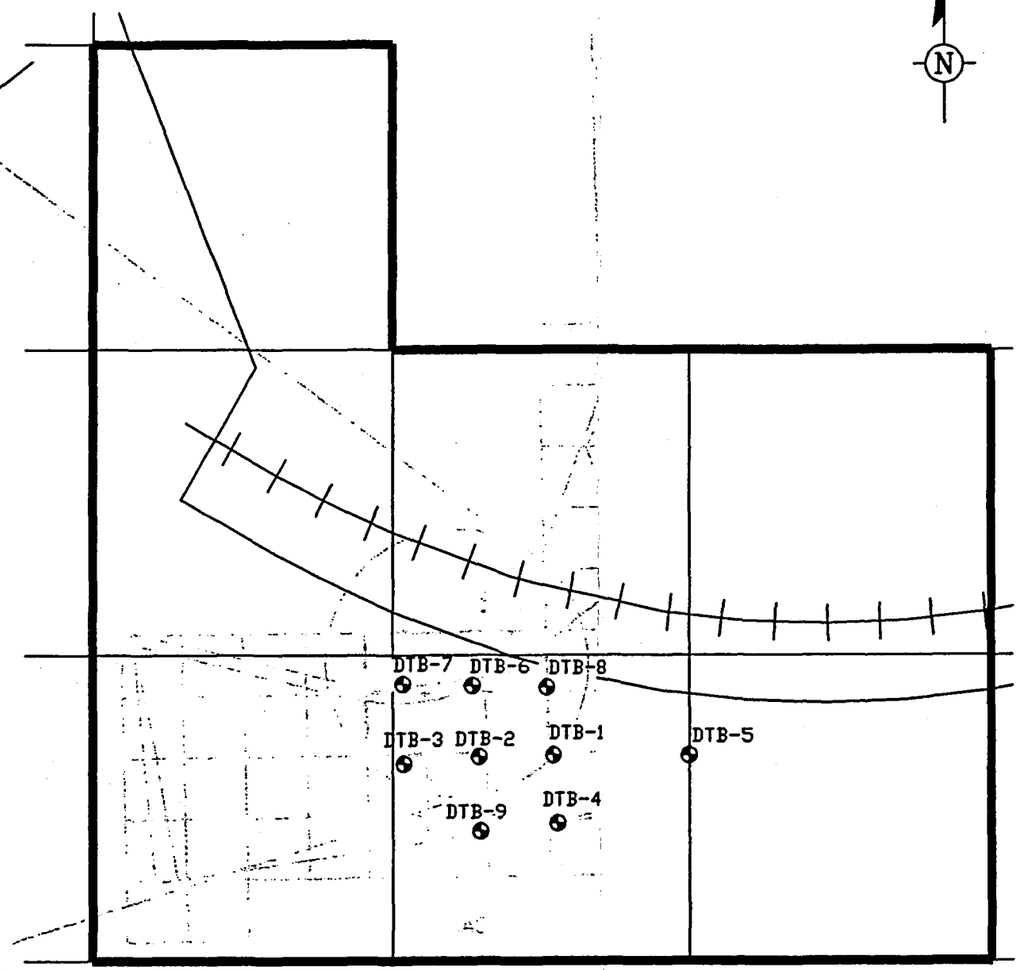
SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
2-5

DWG DATE: 31 MAR 94 | PRJCT NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: SITE12 | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON



NO SCALE



1" = 100'

GERAGHTY & MILLER, INC.
Environmental Services

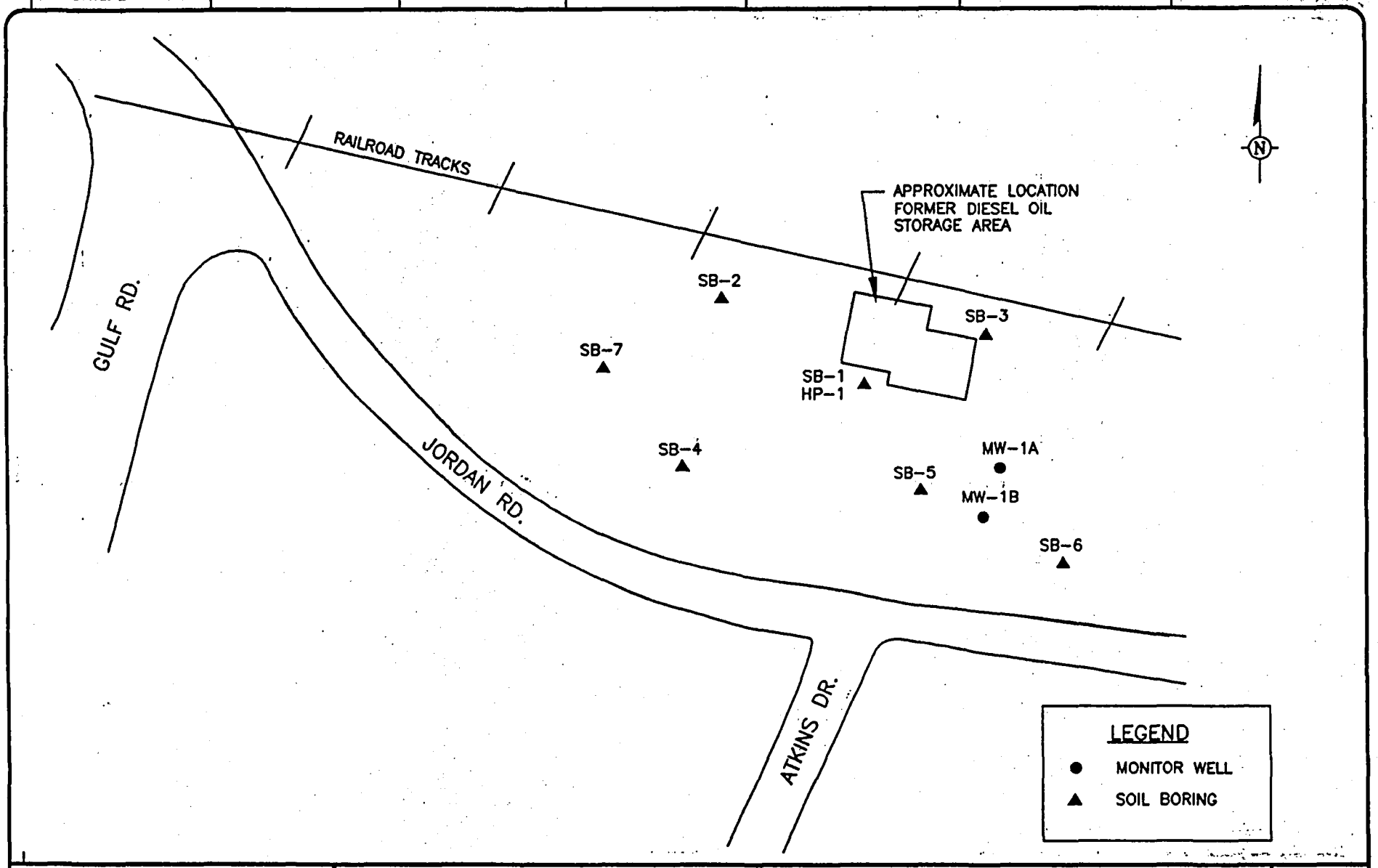
DRIP TRACK AREA BORINGS

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
2-6

DWG DATE: 31 MAR 94 | PRJCT NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: SITE3 | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON

DWG DATE: 29 MAR 94 | PRJCT NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: SITE1 | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON



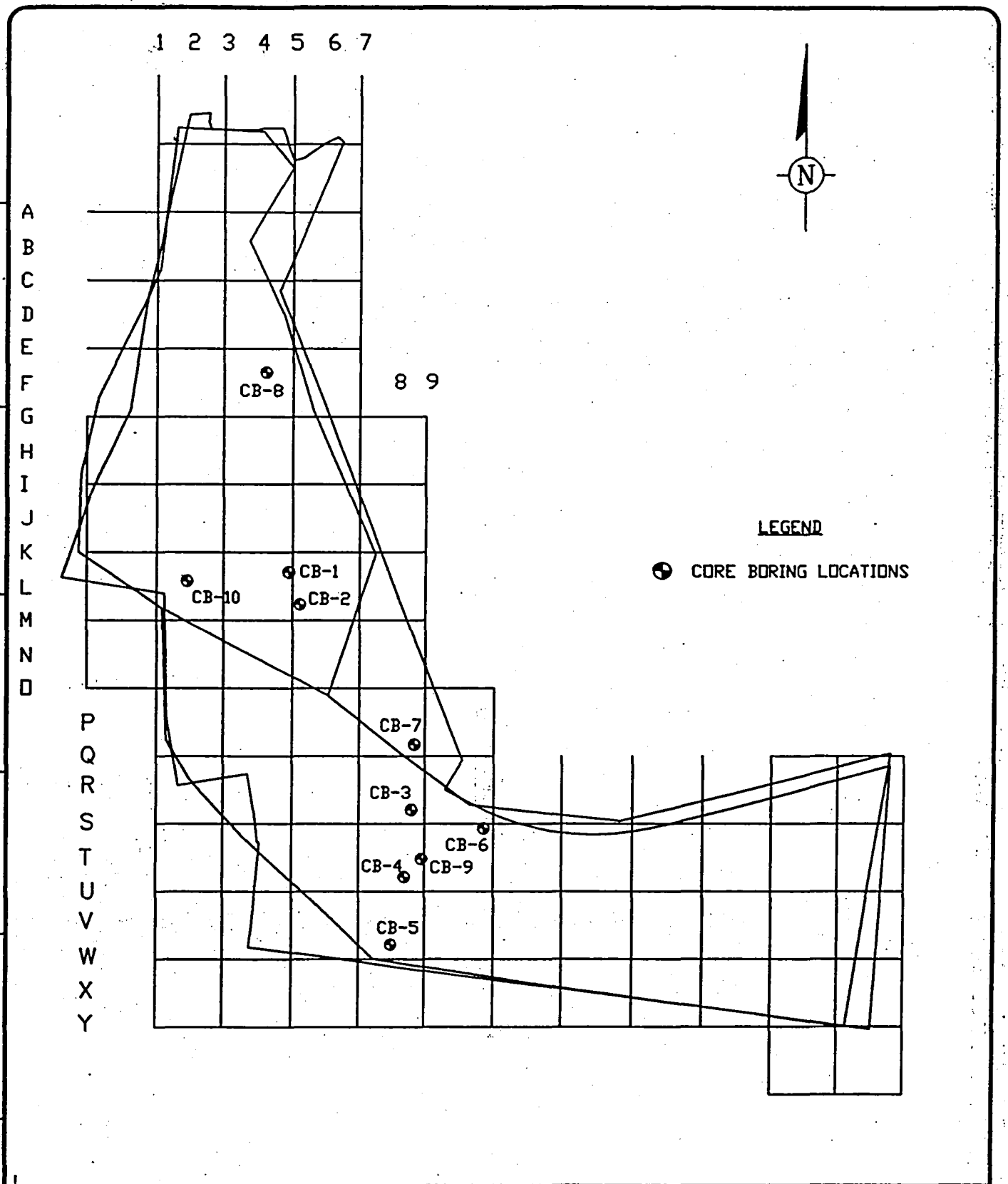
GERAGHTY & MILLER, INC.
Environmental Services

0 30 FEET

SOIL BORING AND MONITOR WELL LOCATIONS
DIESEL FUEL STORAGE AREA

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
2-7



DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SITE7 | FILE NO.: SWP-GULF | PROJECT NO.: NC0028.004 | DWG DATE: 26 MAR 94

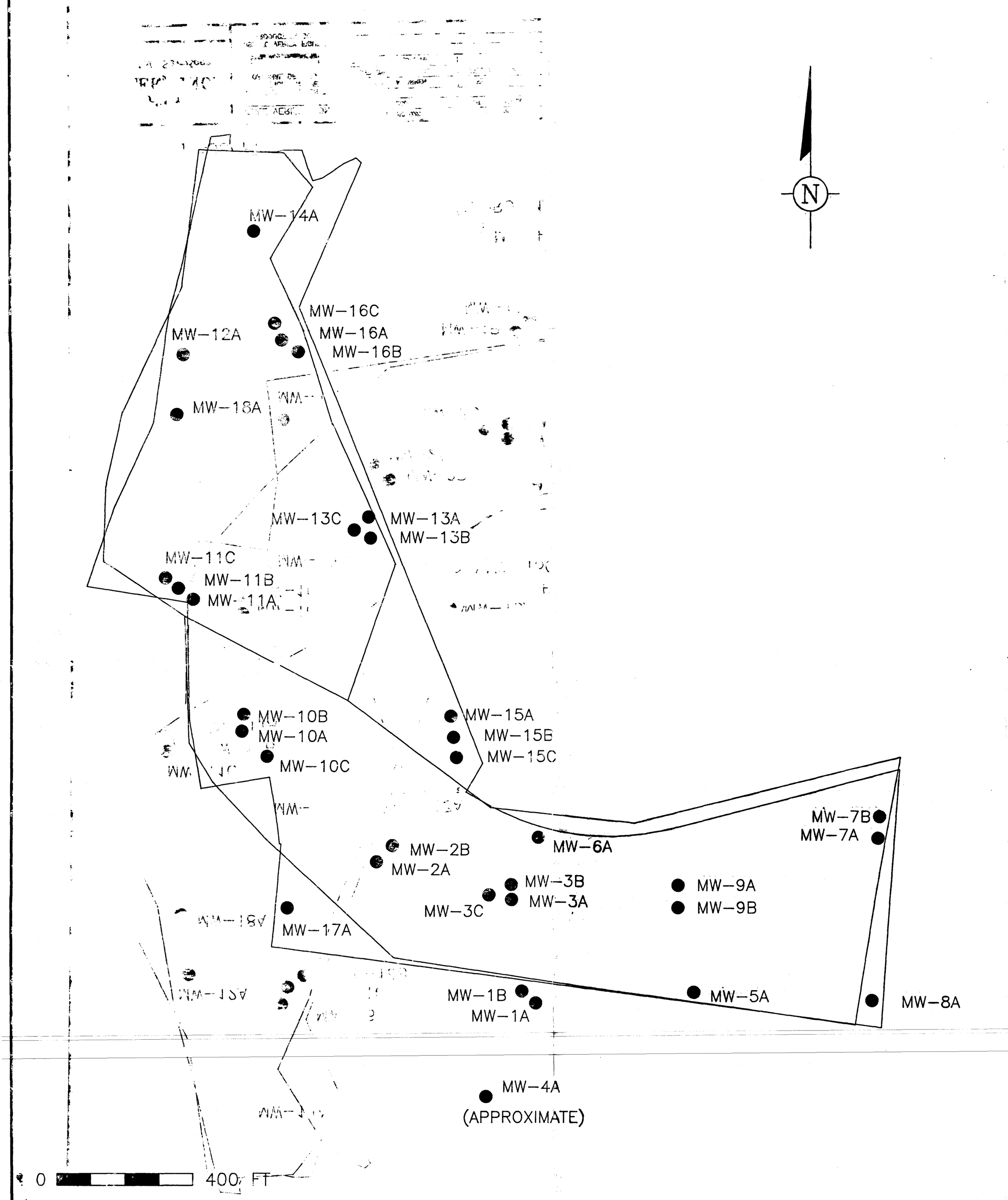
GERAGHTY & MILLER, INC.
Environmental Services

0 400 FT

CORE BORING LOCATIONS

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
2-8



GERAGHTY & MILLER, INC.
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SCALE VERIFICATION

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING

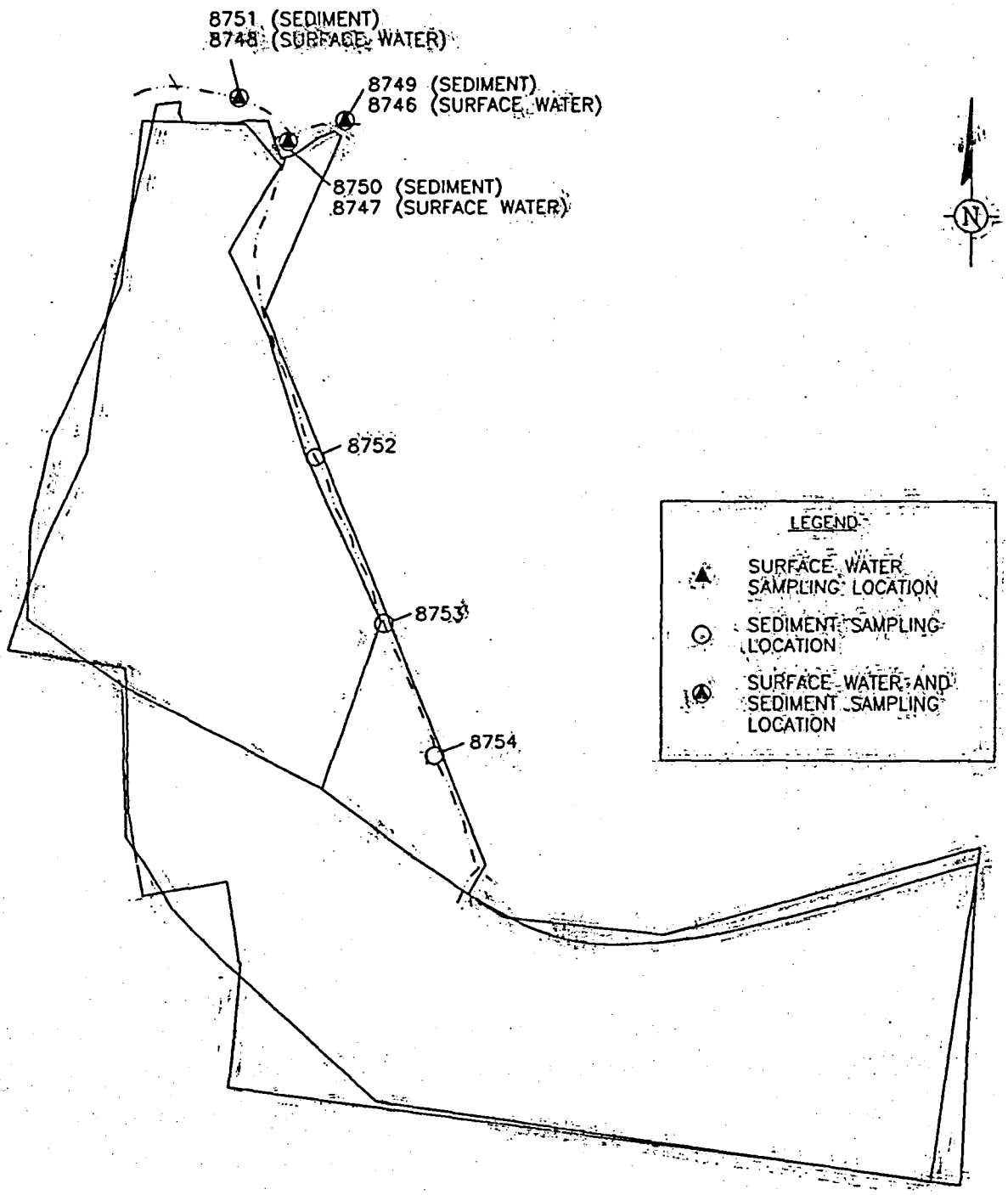
USE TO VERIFY FIGURE REPRODUCTION SCALE

PROJECT NO.:	NC0028.004	FILE NO: SWP-GULF	
DRAWING:	2804K-A	PLOT SIZE: 1"=200'	
DRAFTED BY:	A.WARREN	DATE: 06OCT94	
CHECKED BY:	C.LOVDAHL	DATE: 06OCT94	
APPROVED BY:	C.LOVDAHL	DATE: 06OCT94	

SITE MONITOR WELLS

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
2-9



GERAGHTY & MILLER, INC.
Environmental Services

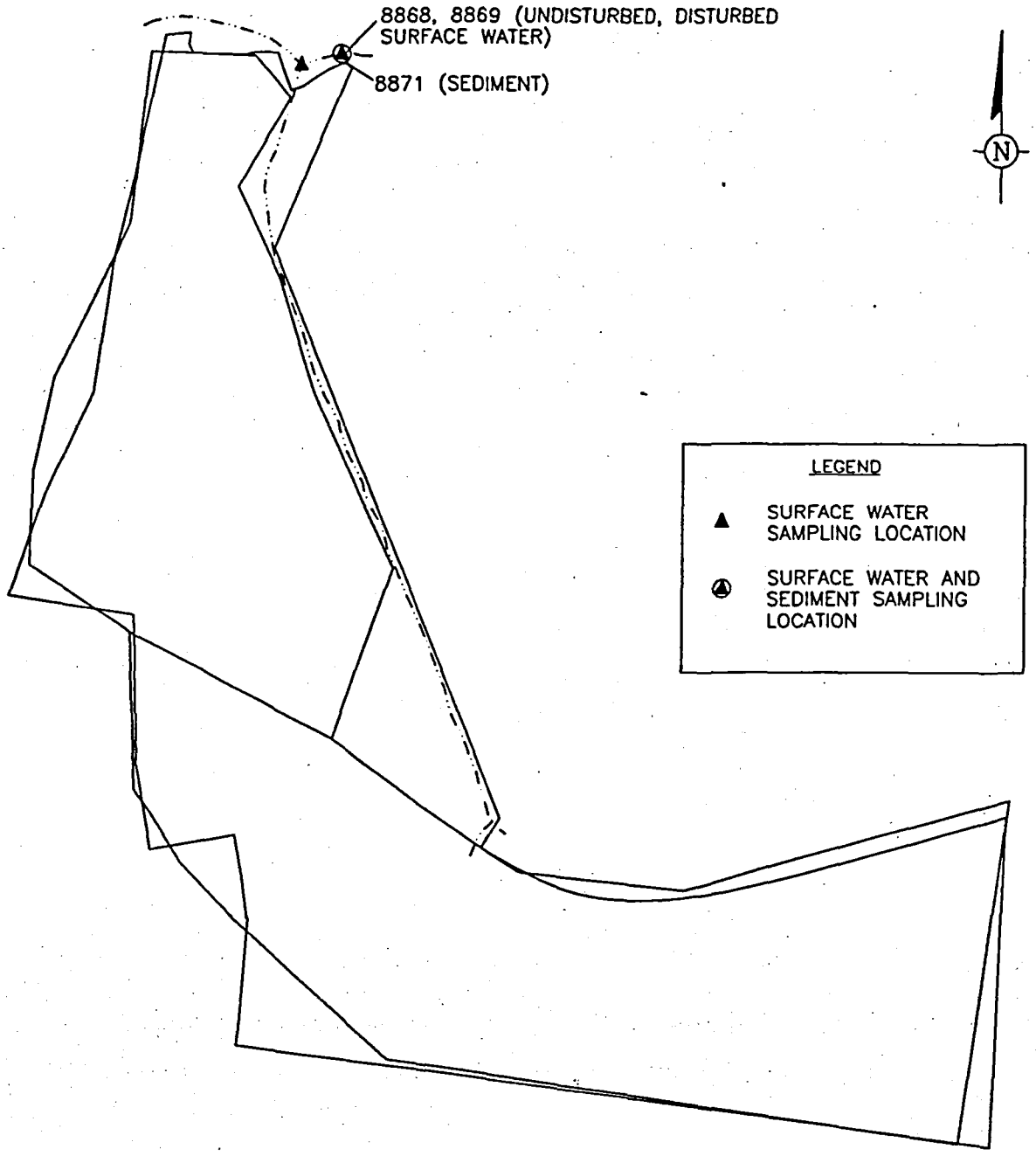
0' 400 FT

SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS FOR THE MAY, 1990 SAMPLING EVENT

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE 2-10

DWG DATE: 050694 | PROJ NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: SITE8 | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON



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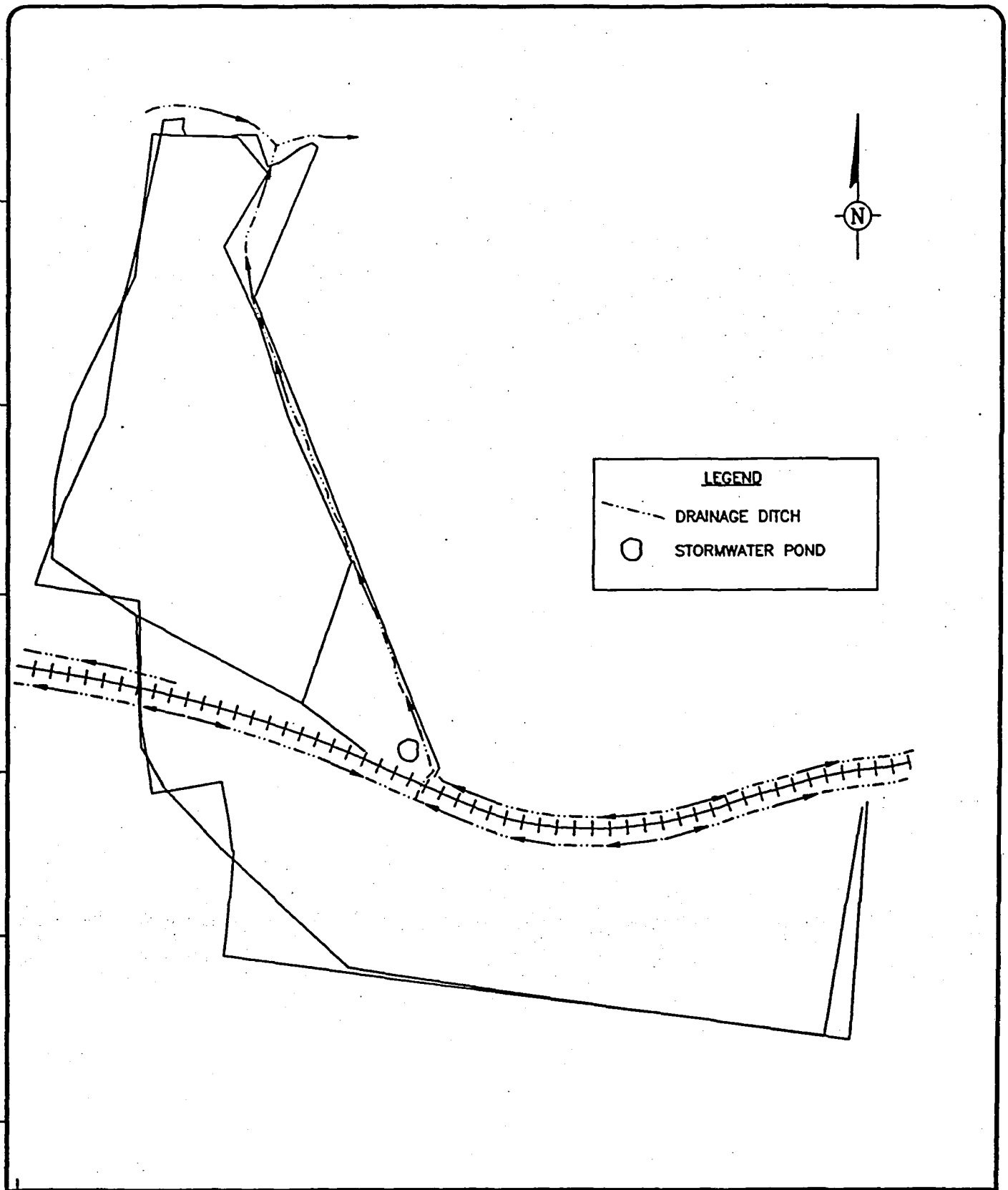
GERAGHTY & MILLER, INC.
Environmental Services

0 400 FT

SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS FOR THE AUGUST, 1990 SAMPLING EVENT

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
2-11



DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SITE8 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 29 MAR 94

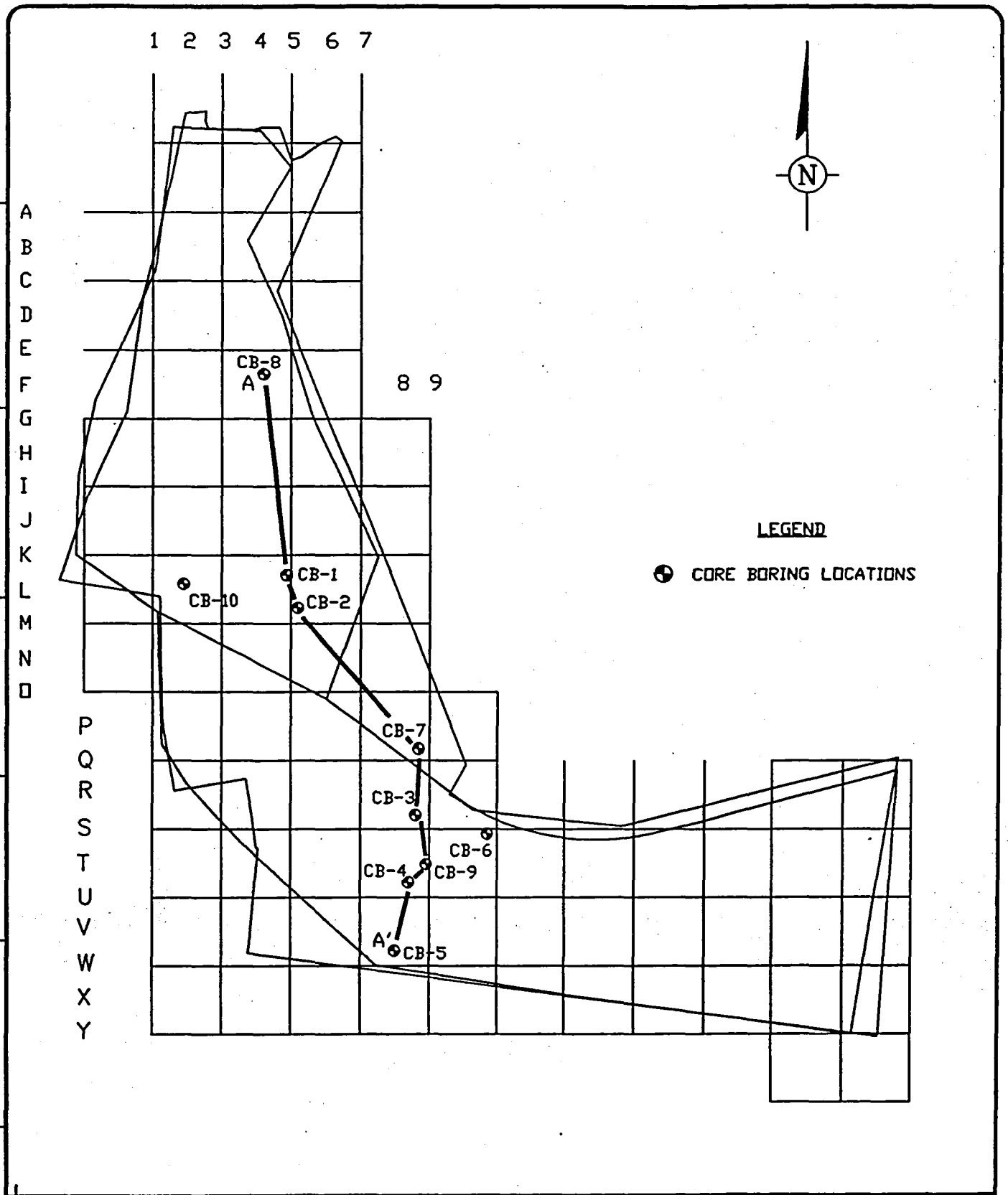
GERAGHTY & MILLER, INC.
Environmental Services

0 400 FT

SITE SURFACE WATER FEATURES

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-1



DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SITE7 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 29 MAR 94

GERAGHTY & MILLER, INC.
Environmental Services

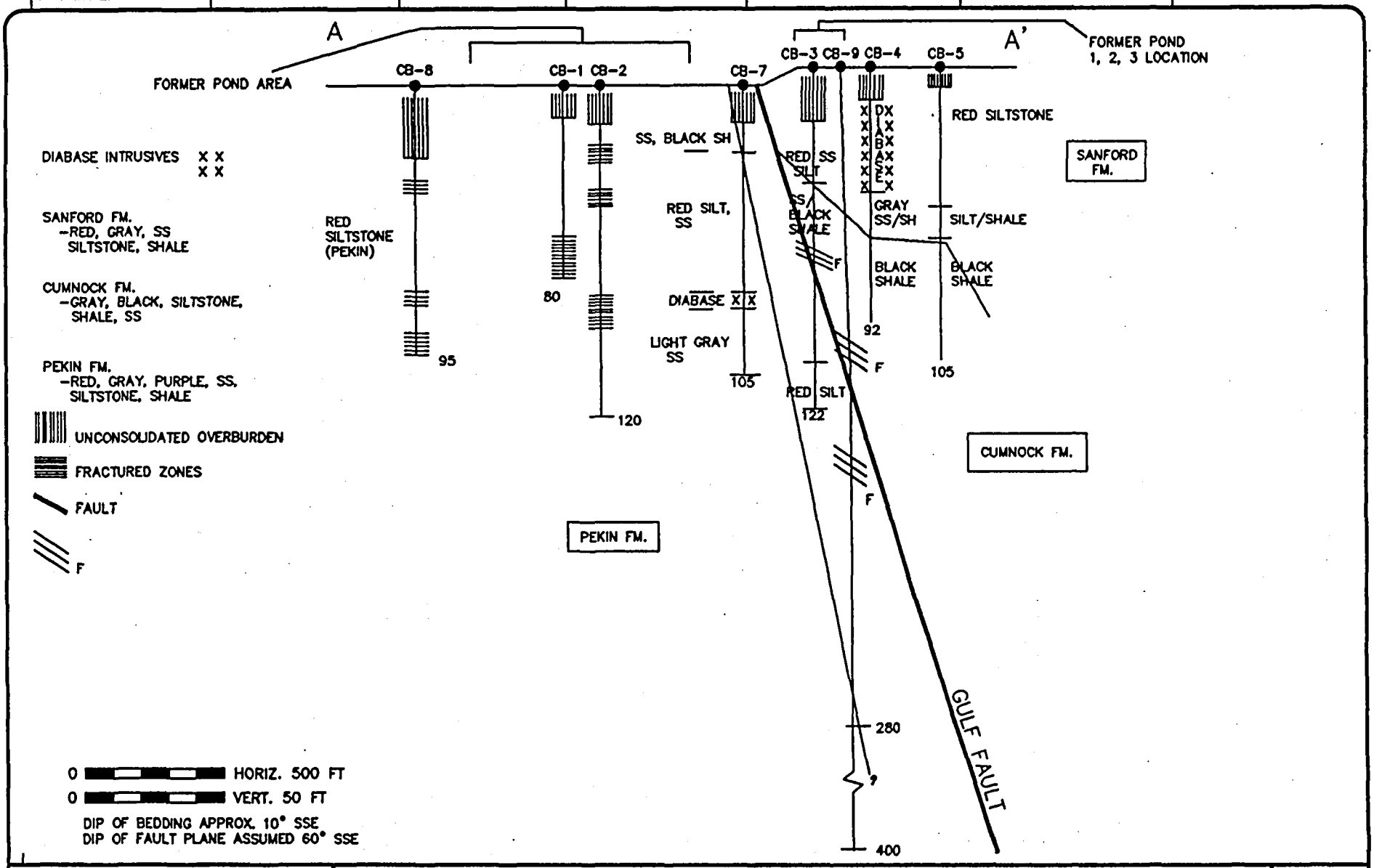
0 400 FT

GEOLOGIC CROSS-SECTION LOCATION MAP

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-2

DWG DATE: 29 MAR 94	PRJCT NO.: NC0028.004	FILE NO.: SWP-GULF	DRAWING: NC02804J	CHECKED: C. LOVDAHL	APPROVED: C. LOVDAHL	DRAFTER: N. JOHNSON

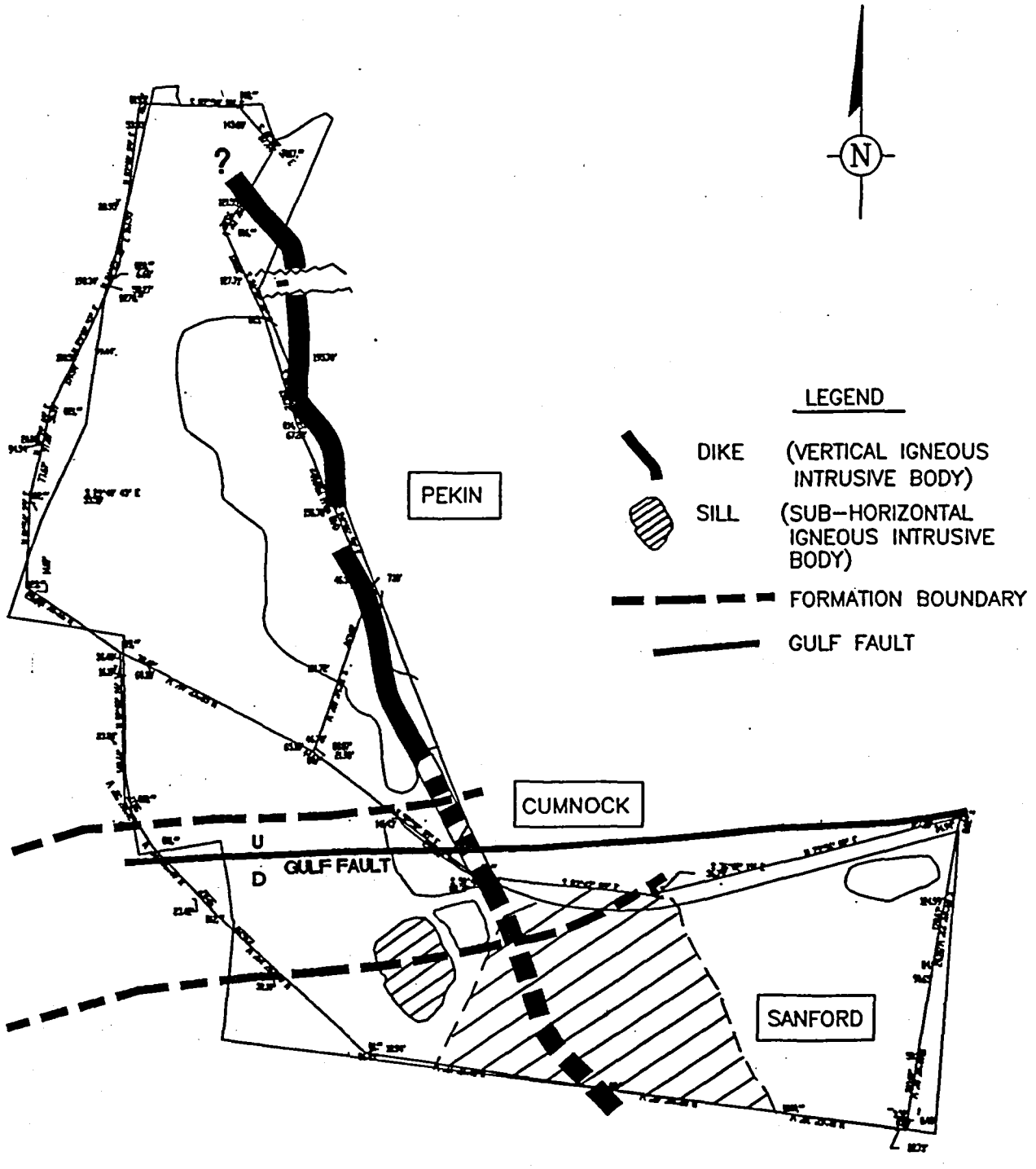


GERAGHTY & MILLER, INC.
Environmental Services

NORTH - SOUTH GEOLOGIC CROSS SECTION

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-3



GERAGHTY & MILLER, INC.
Environmental Services

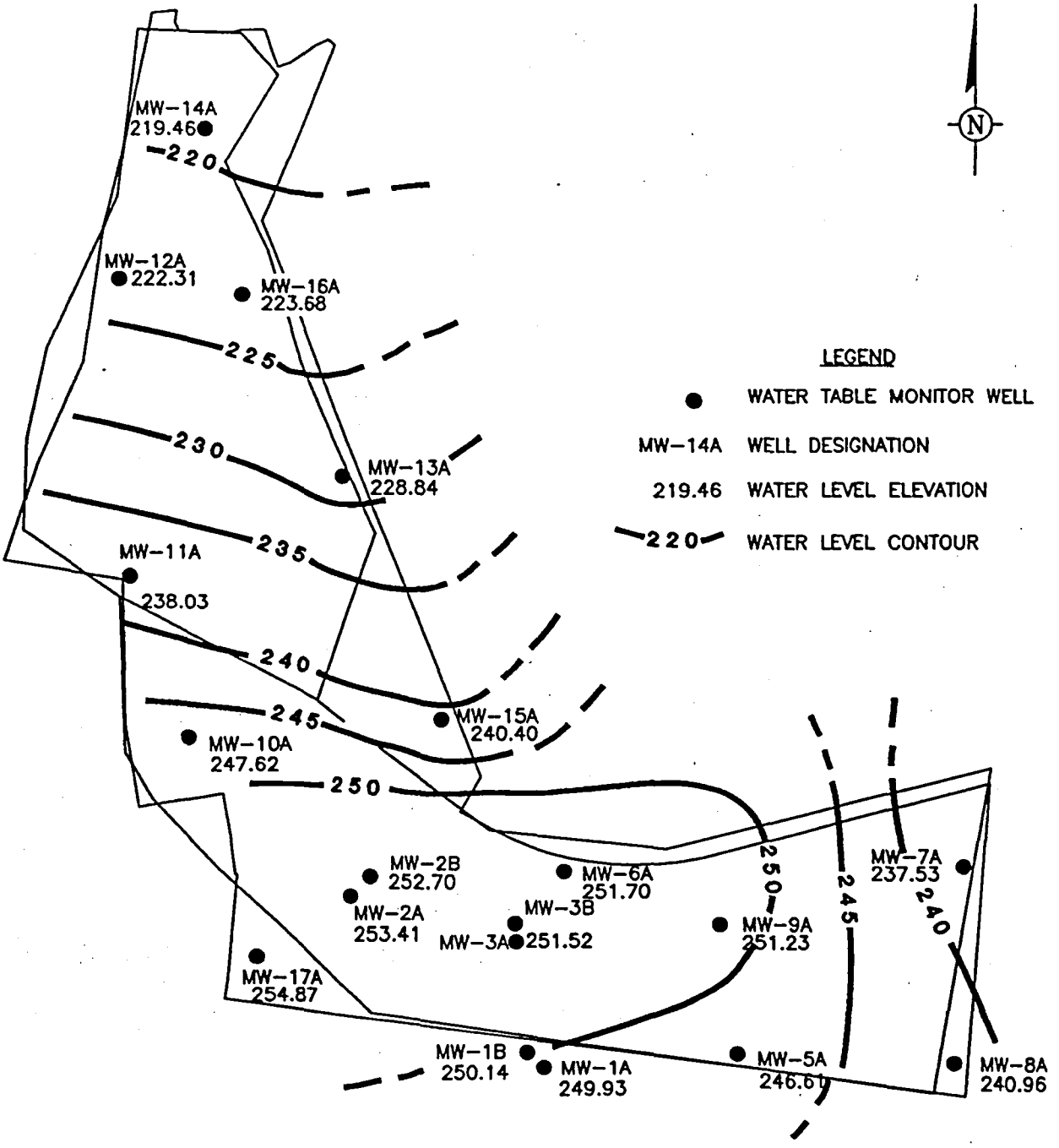
0 400 FT

GEOLOGIC INTERPRETATION OF MAGNETOMETER DATA, SURFACE OUTCROPPINGS, AND CORE BORINGS

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-4

DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: NC02804M | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 27 MAR 94



GERAGHTY & MILLER, INC.
Environmental Services

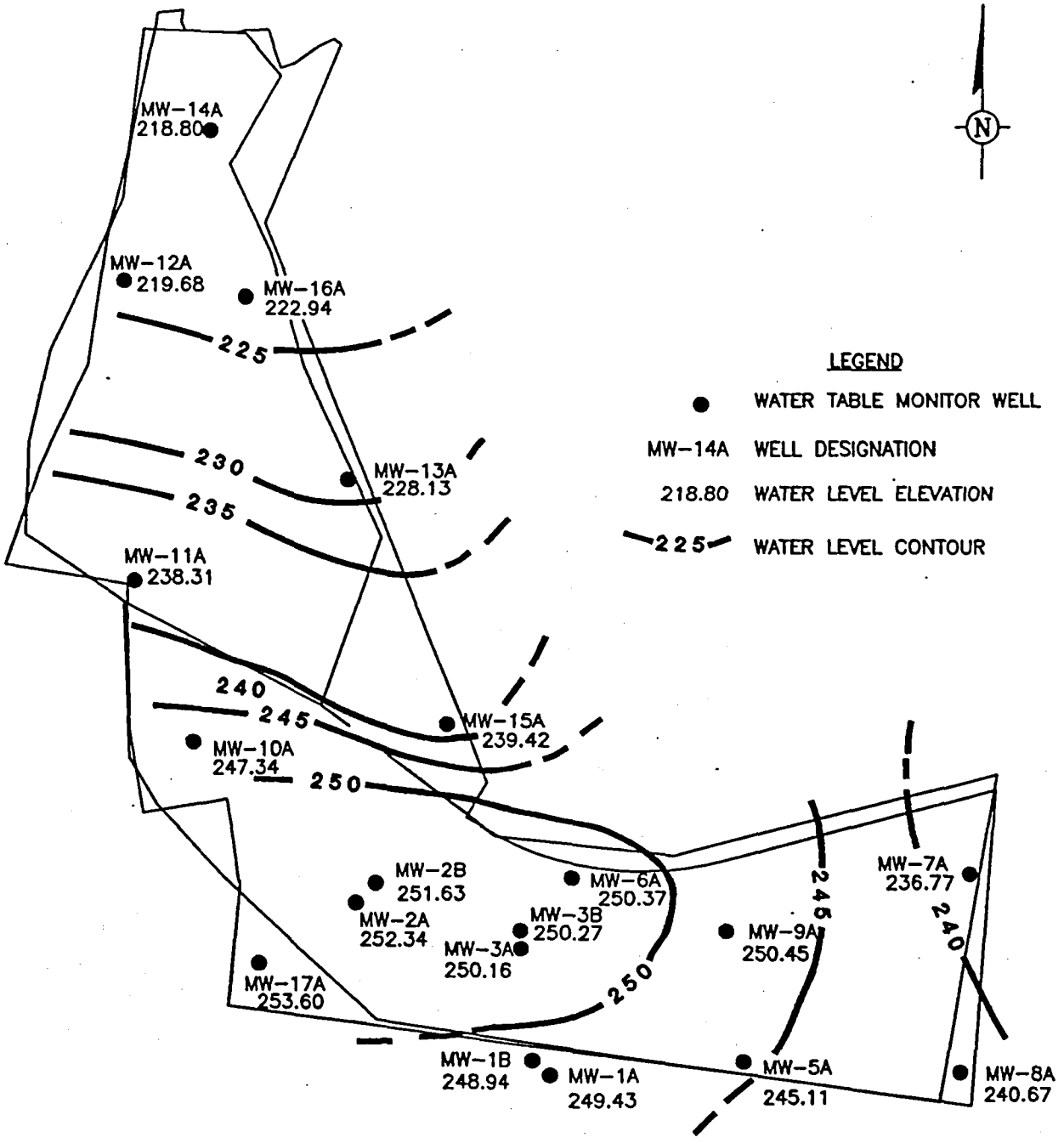
0 400 FT

WATER TABLE ELEVATIONS JUNE 19, 1991

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE 3-5

DWG DATE: 28 MAR 94 | PRJCT NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: 6-19-91 | CHECKED: C. LOYDAHL | APPROVED: C. LOYDAHL | DRAFTER: N. JOHNSON



DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: 6-19-91 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 28 MAR 94

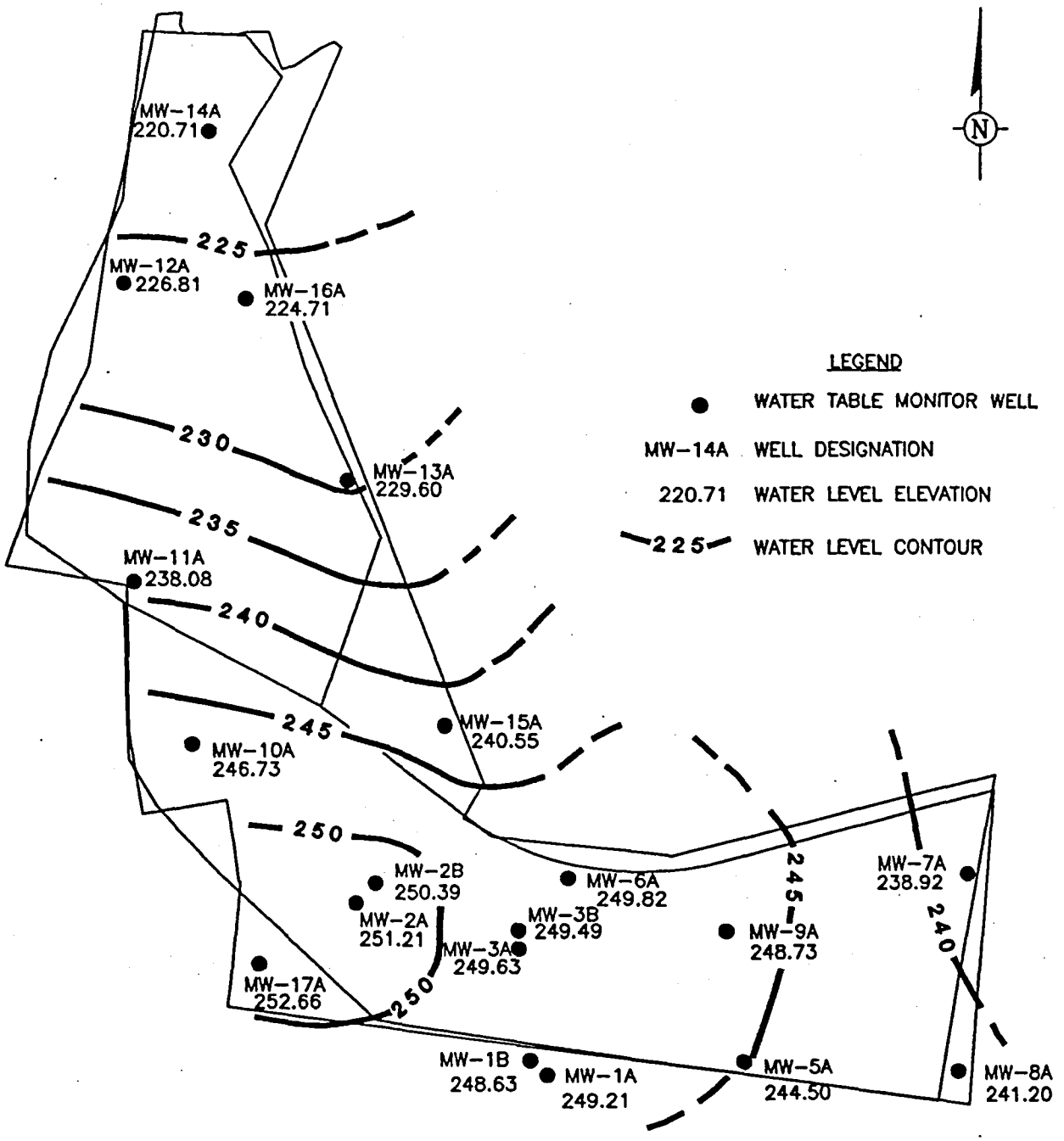
GERAGHTY & MILLER, INC.
Environmental Services

0 400 FT

WATER TABLE ELEVATIONS SEPTEMBER 27, 1991

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-6



GERAGHTY & MILLER, INC.
Environmental Services

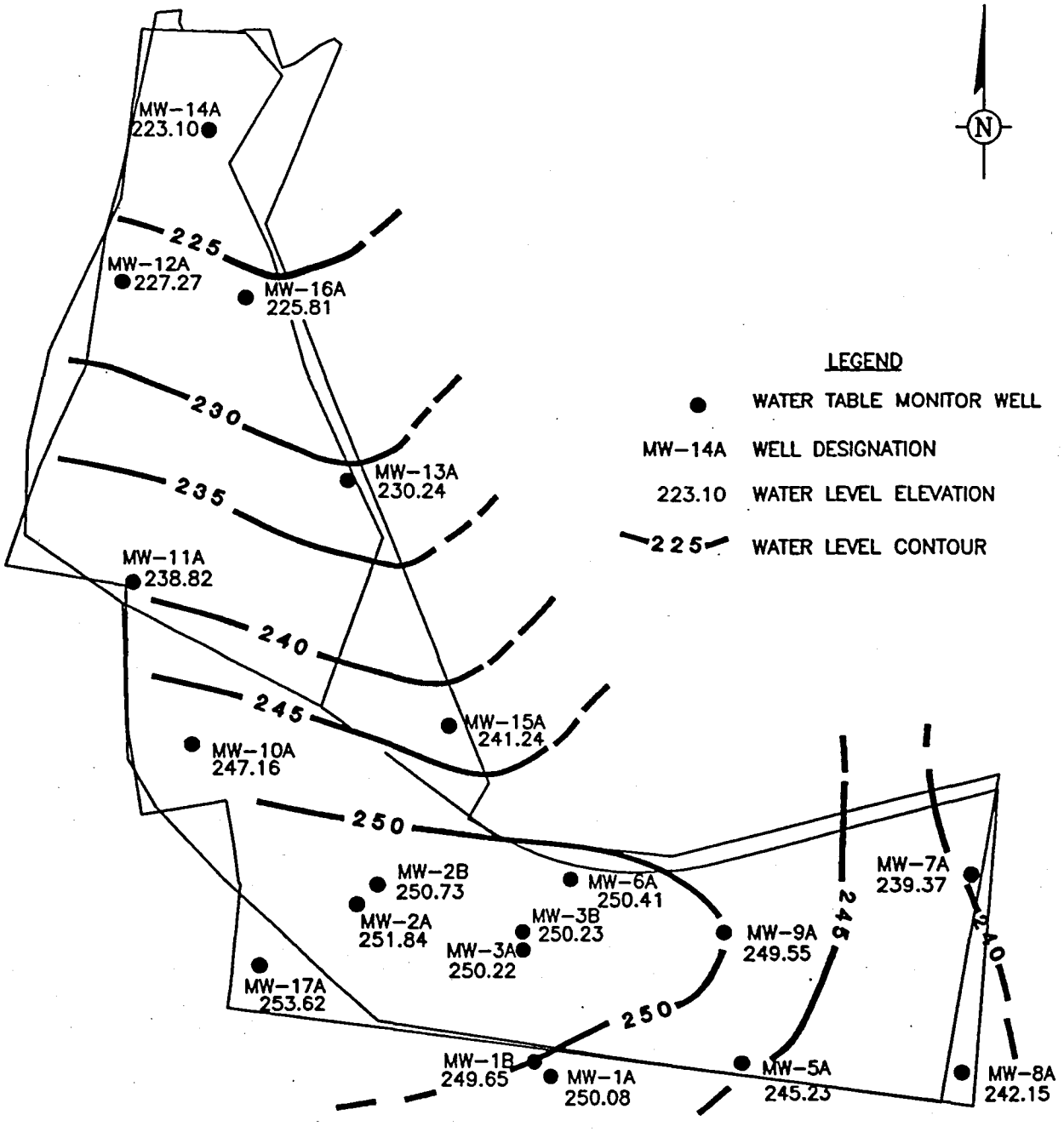
0 400 FT

WATER TABLE ELEVATIONS JANUARY 31, 1992

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE 3-7

DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: 6-19-91 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 28 MAR 94



GERAGHTY & MILLER, INC.
Environmental Services

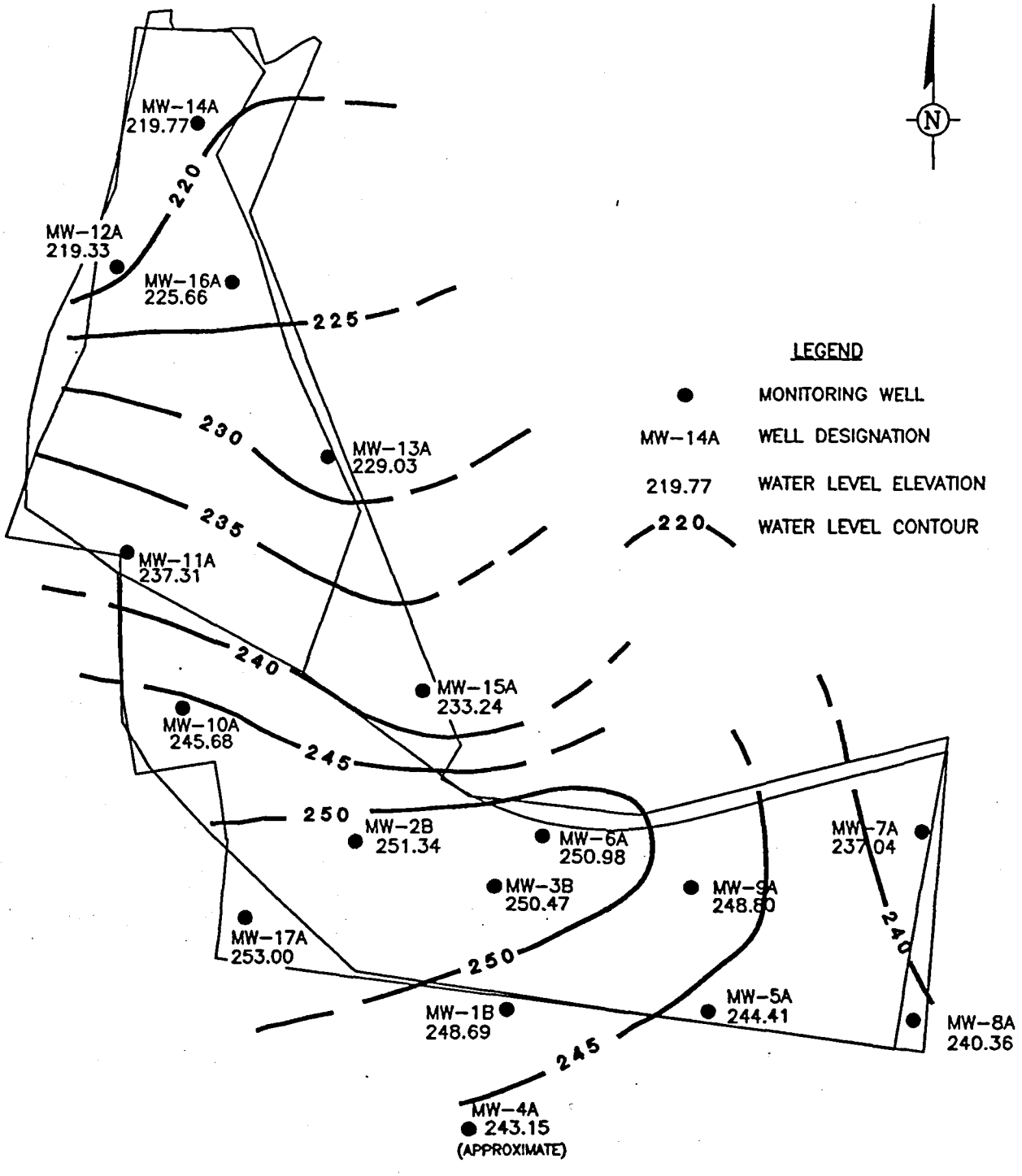
0 400 FT

WATER TABLE ELEVATIONS MARCH 31, 1992

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-8

DRAFTER: N. JOHNSON | APPROVED: C. LOYDAHL | CHECKED: C. LOYDAHL | DRAWING: 6-19-91 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 28 MAR 94



GERAGHTY & MILLER, INC.
Environmental Services

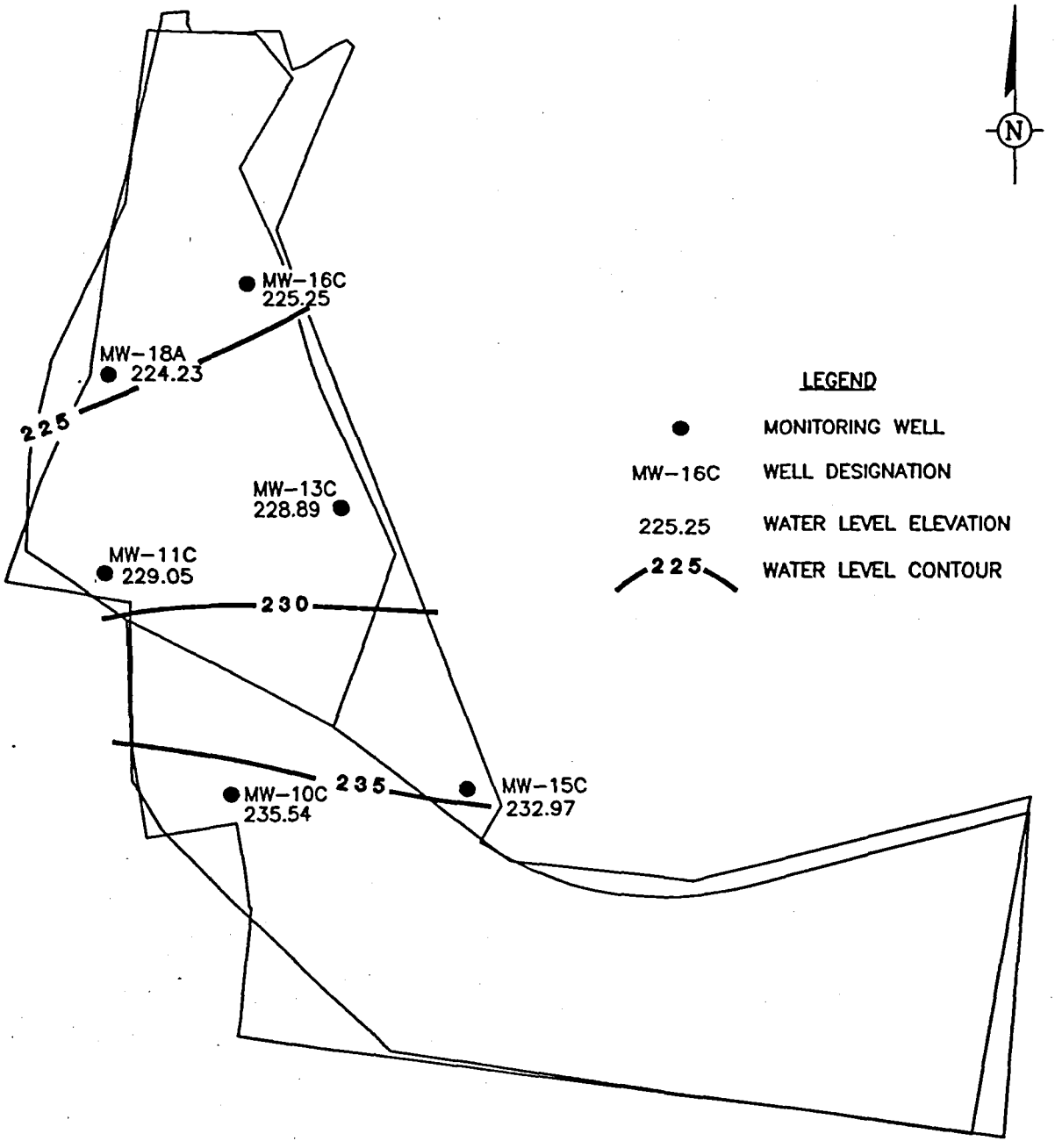
0 400 FT

WATER TABLE ELEVATIONS
DECEMBER 7 & 8, 1993

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-9

DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SITE10 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 29 MAR 94



GERAGHTY & MILLER, INC.
Environmental Services

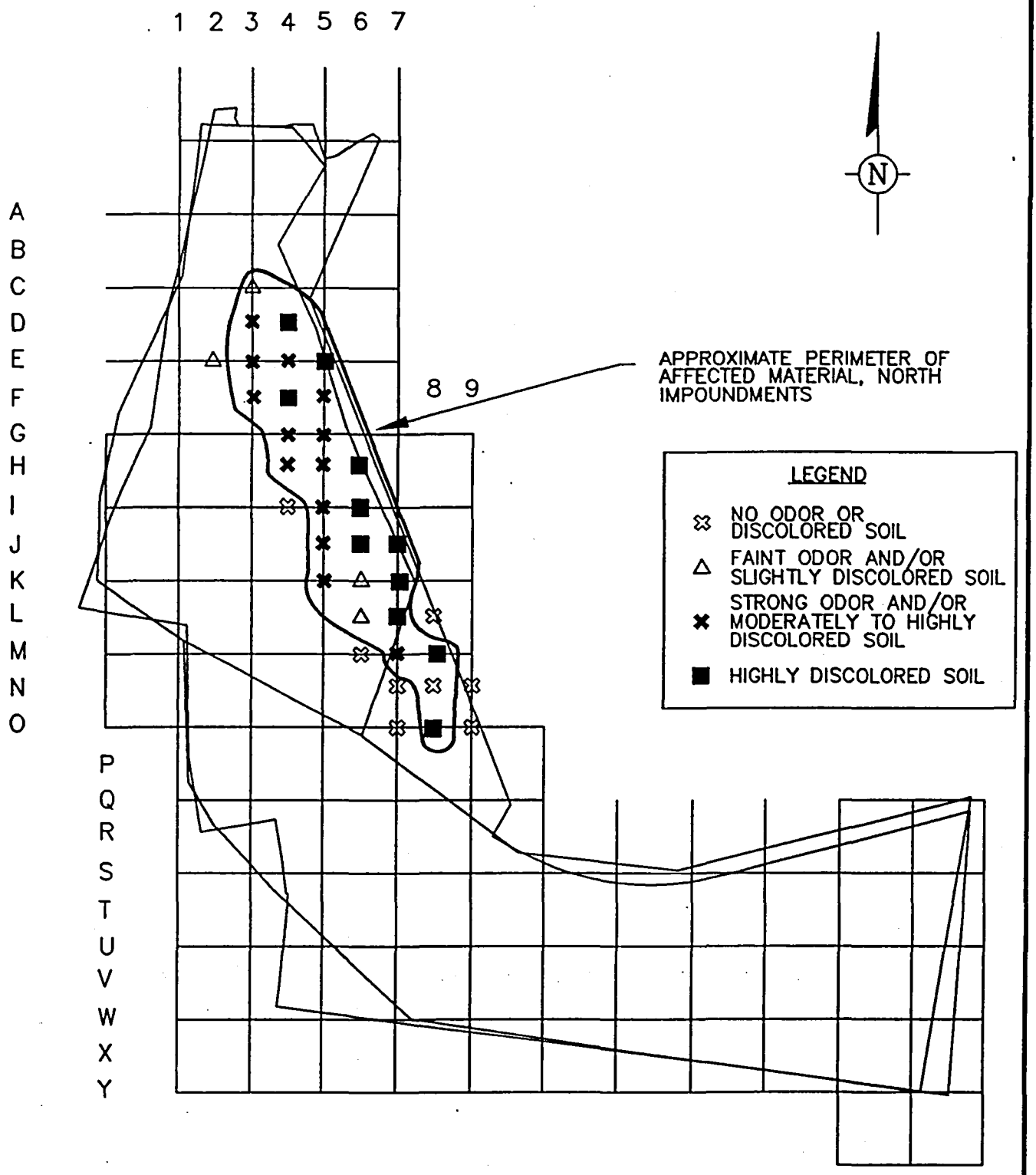
0 400 FT

BEDROCK ZONE WATER LEVELS
DECEMBER 7 & 8, 1993

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
3-10

DRAFTER: N. JOHNSON | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SITE9 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 29 MAR 94



GERAGHTY & MILLER, INC.
Environmental Services

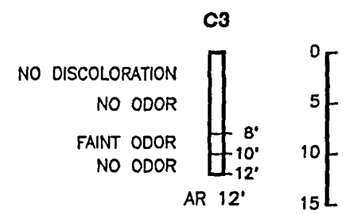
0 400 FT

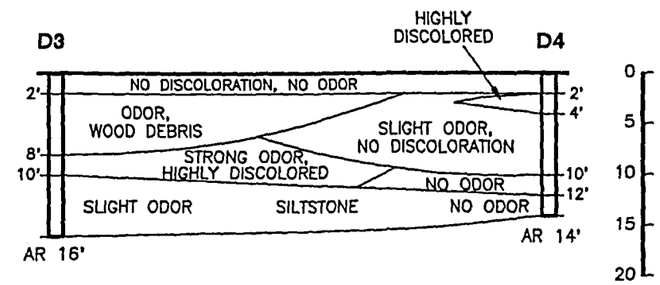
NORTHERN IMPOUNDMENTS AREA SOIL BORING OBSERVATIONS

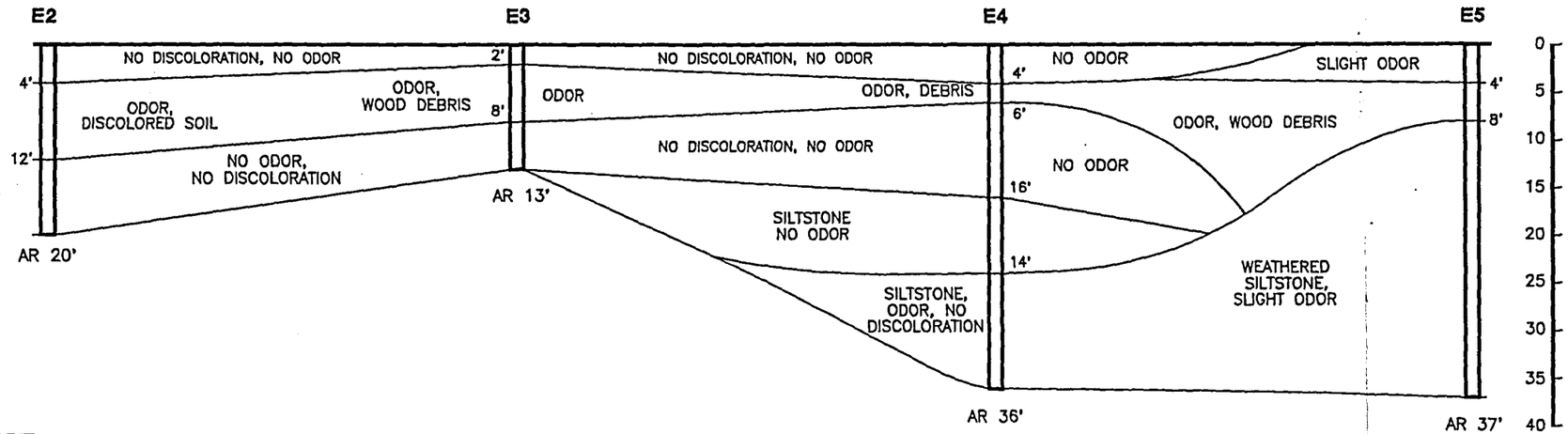
SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE 4-1

DWG DATE: 26 MAR 94 | PRJCT NO.: NC0028.004 | FILE NO.: SWP-GULF | DRAWING: NC02804L | CHECKED: C. LOVDAHL | APPROVED: C. LOVDAHL | DRAFTER: N. JOHNSON







LEGEND

AR 18' AUGER REFUSAL AT 18 FEET BLS

VERTICAL SCALE:
0 15 FEET

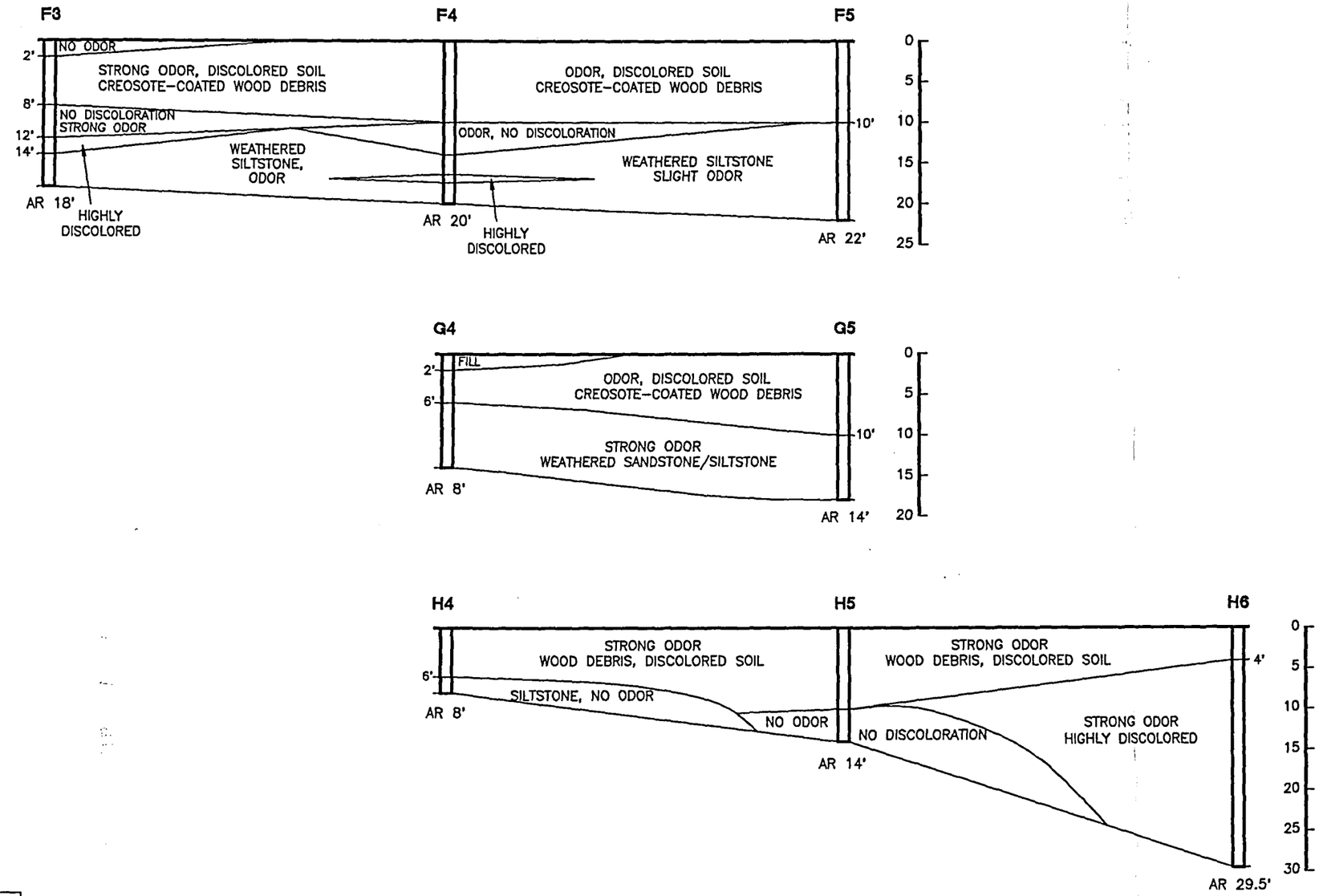
HORIZONTAL SCALE:
0 30 FEET

GERAGHTY & MILLER, INC.
Environmental Services

NORTHERN IMPOUNDMENTS AREA
VISUAL OBSERVATIONS OF IMPACTED SOILS
CROSS-SECTIONS C3, D3 TO D4, AND E2 TO E5
SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
4-2

DRAFTER: A. WARREN | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SWPGULF3 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 10FEB94



LEGEND

AR 18' AUGER REFUSAL AT 18 FEET BLS

VERTICAL SCALE:
0 15 FEET

HORIZONTAL SCALE:
0 30 FEET

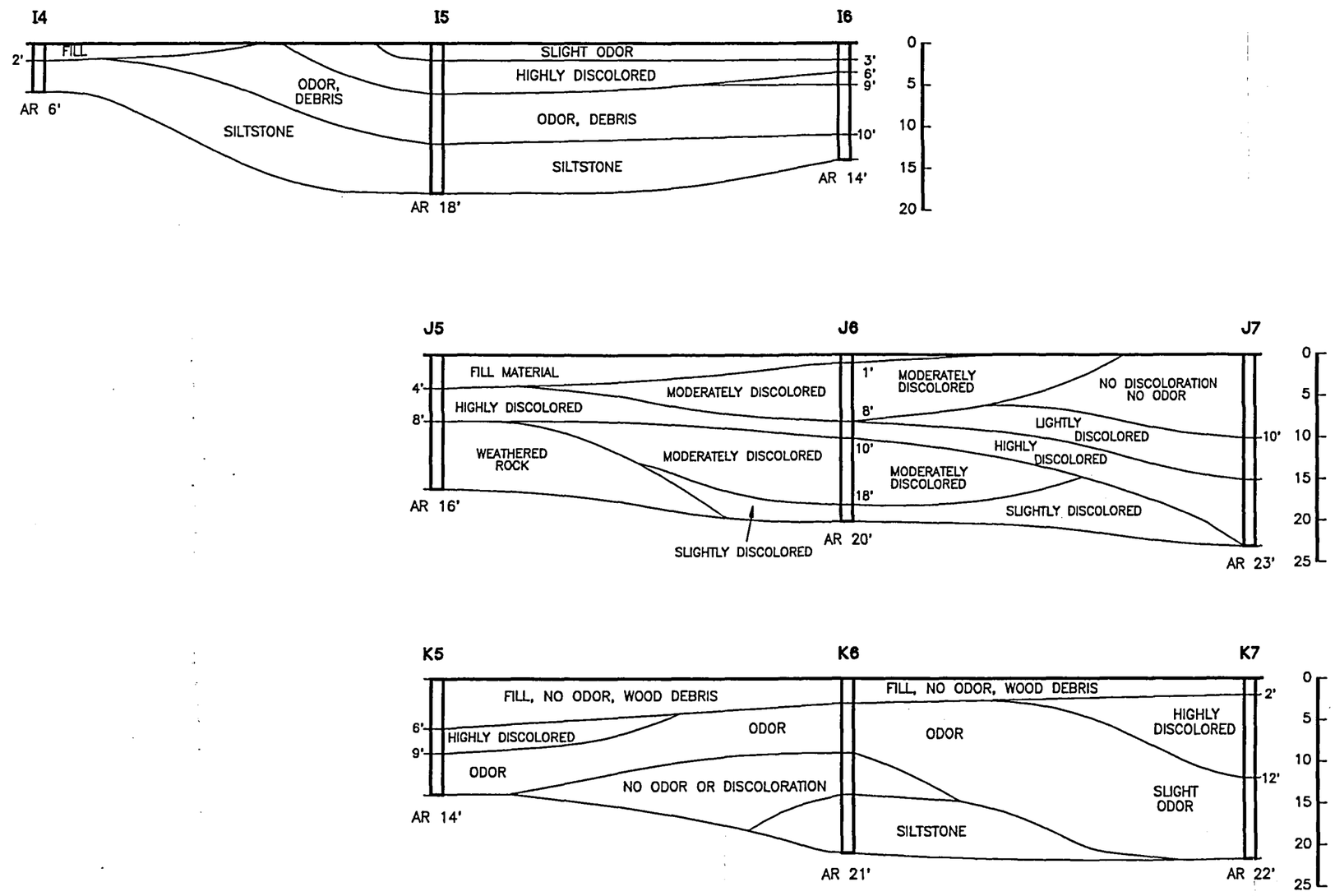
GERAGHTY & MILLER, INC.
Environmental Services

NORTHERN IMPOUNDMENTS AREA
VISUAL OBSERVATIONS OF IMPACTED SOILS
CROSS-SECTIONS F3 TO F5, G4 TO G5, AND H4 TO H6

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
4-3

DRAFTER: A. WARREN | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SWP-GULF1 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 28MAR94



LEGEND

AR 18' AUGER REFUSAL AT 18 FEET BLS

VERTICAL SCALE:
0 15 FEET

HORIZONTAL SCALE:
0 30 FEET

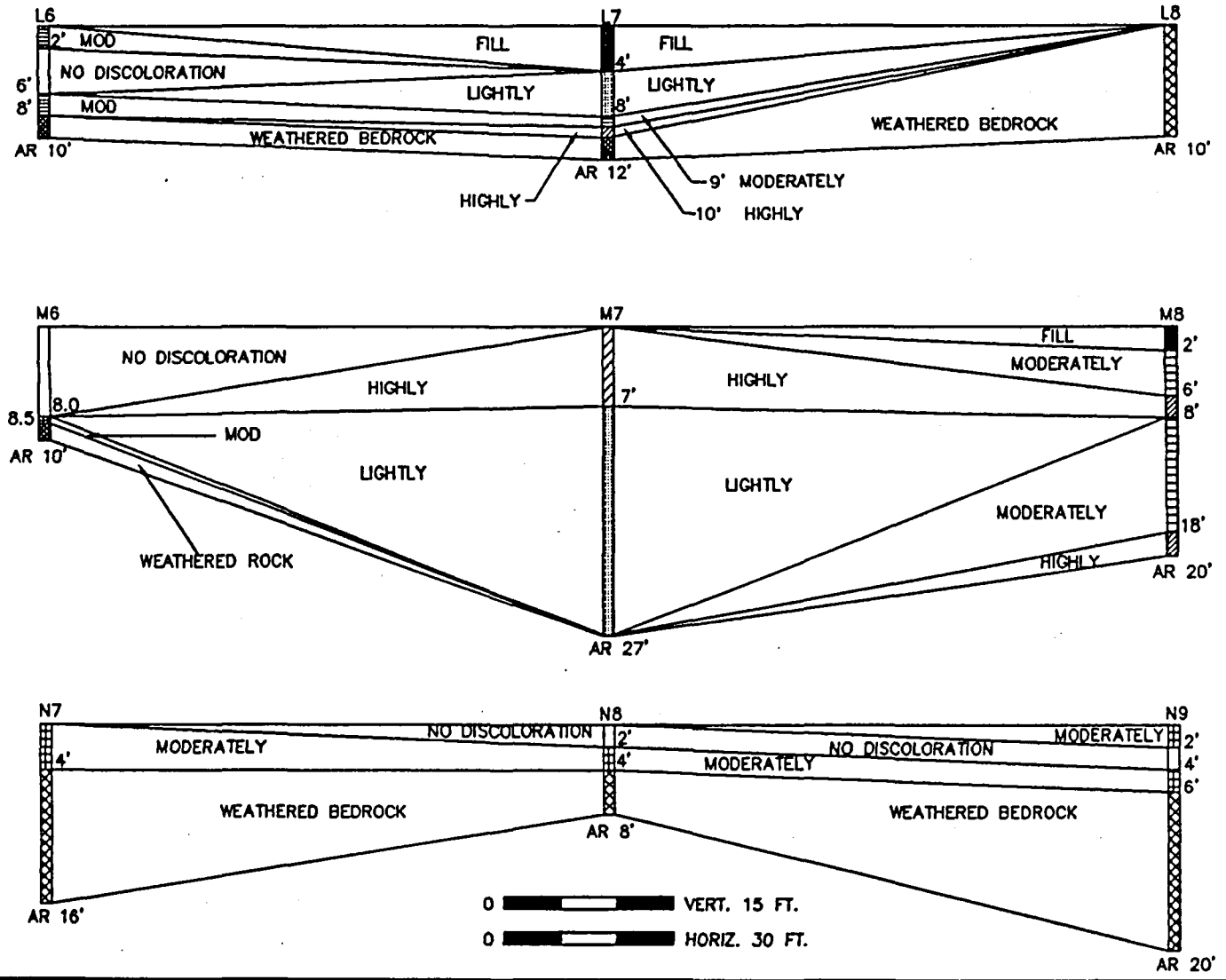
GERAGHTY & MILLER, INC.
Environmental Services

NORTHERN IMPOUNDMENTS AREA
VISUAL OBSERVATIONS OF IMPACTED SOILS
CROSS-SECTIONS I4 TO I6, J5 TO J7, AND K5 TO K7
SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
4-4

DRAFTER: A. WARREN | APPROVED: C. LOVDAHL | CHECKED: C. LOVDAHL | DRAWING: SWPGULF2 | FILE NO.: SWP-GULF | PRJCT NO.: NC0028.004 | DWG DATE: 28MAR94

DWG DATE: 29 MAR 94	PRJCT NO.: NC0028.004	FILE NO.: SWP-GULF	DRAWING: CS2804A	CHECKED: C. LOVDAHL	APPROVED: C. LOVDAHL	DRAFTER: N. JOHNSON

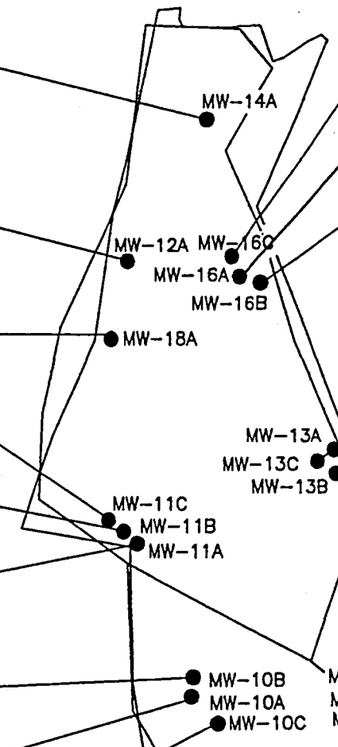


GERAGHTY & MILLER, INC.
Environmental Services

NORTHERN IMPOUNDMENTS AREA
VISUAL OBSERVATIONS OF IMPACTED SOILS,
CROSS-SECTIONS L6-L8, M6-M8, AND N7-N9

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
4-5



MW-14A	0.033	0.068	0.082	ND	0.75
	ND	ND	ND	0.002	ND

MW-12A	NS	ND	ND	ND	ND
	NS	ND	ND	ND	ND

MW-18A	NS	NS	NS	NS	ND
	NS	NS	NS	NS	ND

MW-11C	NS	ND	ND	ND	ND
	NS	ND	ND	0.12	ND

MW-11B	NS	ND	ND	ND	ND
	NS	ND	ND	ND	ND

MW-11A	NS	ND	ND	ND	ND
	NS	ND	ND	ND	ND

MW-10B	NS	ND	ND	ND	ND
	NS	ND	ND	ND	ND

MW-10A	0.024	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-10C	NS	NS	NS	ND	ND
	NS	NS	NS	0.007	0.0024

MW-2B	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-2A	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-17A	NS	ND	ND	ND	ND
	NS	ND	0.0074	ND	ND

MW-3C	NS	NS	NS	ND	ND
	NS	NS	NS	0.002	ND

MW-3B	NS	ND	ND	ND	ND
	NS	ND	ND	ND	ND

MW-3A	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-16C	NS	1.4	1.5	0.58	0.20
	NS	ND	0.022	ND	0.0036

MW-16A	NS	320	20	23	NS
	NS	0.5	0.62	0.31	NS

MW-16B	NS	6.9	3.7	11	NS
	NS	0.082	0.10	0.14	NS

MW-13A	11	3.4	ND	0.7	0.060
	0.054	0.044	ND	0.004	ND

MW-13C	NS	NS	4.5	5.0	5.2
	NS	NS	0.29	0.39	0.27

MW-13B	NS	43	NS	NS	NS
	NS	0.13	NS	NS	NS

MW-15A	NS	13	NS	NS	NS
	NS	0.1	NS	NS	NS

MW-15B	NS	1.1	0.30	1.6	1.7
	NS	0.034	0.043	0.065	0.068

MW-15C	NS	19	NS	2.8	NS
	NS	0.81	NS	1.5	NS

MW-6A	NS	ND	ND	ND	ND
	NS	ND	ND	ND	ND

MW-9A	ND	ND	ND	ND	ND
	ND	ND	ND	ND	0.011

MW-9B	NS	ND	ND	ND	ND
	NS	ND	ND	ND	ND

MW-7B	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-7A	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-5A	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-8A	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

MW-1B	ND	ND	ND	0.012	ND
	1.1	0.085	0.01	1.7	0.018

MW-1A	ND	ND	ND	ND	ND
	0.0026	ND	0.006	ND	ND

MW-4A	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND

LEGEND

MW-13B MONITOR WELL

	10/90	8/91	12/92	6/93	12/93	
MW-9B	NS	ND	ND	ND	ND	TOTAL SVOC's
	NS	ND	ND	ND	ND	TOTAL VOC's

CONCENTRATIONS FOR SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs) AND VOLATILE ORGANIC COMPOUNDS (VOCs) ARE SUMMED TOTALS FOR EACH SAMPLING ROUND, IN UNITS OF MG/L.

ND CONSTITUENTS NOT DETECTED

NS WELL NOT SAMPLED

GERAGHTY & MILLER, INC.
Environmental Services

0 400 FT

SUMMARY OF GROUNDWATER SAMPLING DATA FOR THE OCTOBER 1990, AUGUST 1991, DECEMBER 1992, JUNE 1993 AND DECEMBER 1993 SAMPLING EVENTS

SOUTHERN WOOD PIEDMONT
GULF, NORTH CAROLINA

FIGURE
4-6

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