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# Expanded Site Inspection
# of
# Southern Wood Piedmont
# Wilmington, New Hanover County, North Carolina

**EPA ID No. NCD058517467**
**WasteLAN No. 02821**

**Prepared Under:**
**Contract No. 68-W9-0055**
**For The**
**Waste Management Division**
**U.S. Environmental Protection Agency**

**Prepared By:**
**Black & Veatch Special Projects Corp.**
**BVSPC Project Nº 52014.755**

**July 16, 1997**

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# Executive Summary

The purpose of the Expanded Site Inspection (ESI) for the Southern Wood Piedmont (SWP) site in Wilmington, New Hanover County, North Carolina is to further determine the nature of contaminants present at the site, to determine if a release of hazardous materials to the environment has occurred or may occur and, if a release has occurred, to determine attribution of those contaminants to the site. Furthermore, this inspection sought to further define the possible pathways by which contamination could migrate from the site and the populations and environments it potentially affects as well as to provide information needed to evaluate the site using the Hazard Ranking System (HRS) scoring stategies. The sampling investigation included the collection of 31 groundwater, 8 surface water, 21 surface soil, 21 subsurface soil, 18 sediment, and 3 biological tissue samples. The biological tissue samples were analyzed for pesticides, PCBs, and extractable organics. All other samples collected were analyzed for extractable and purgeable organic compounds, pesticides, PCBs, cyanide, and metals. In addition, 7 of the 21 surface soil samples were analyzed for dioxins and furans.

The results of the field investigation indicate elevated concentrations of extractable organics, pesticides, PCBs, dioxins/furans and inorganics in surface soil samples. Elevated concentrations of extractable and purgeable organics, pesticides, PCBs, and inorganics were also noted in subsurface soil samples. Sediment samples obtained during this investigation revealed elevated concentrations of extractable and purgeable organics, pesticides, PCBs, and inorganics. Elevated concentrations of pesticides, PCBs, and inorganics were also noted in surface water samples. Groundwater samples in the shallow, intermediate, and deep aquifers revealed elevated concentrations of extractable and purgeable organics and inorganics. All soil samples collected during the field investigation were considered source samples.

The groundwater migration pathway is of moderate concern. The majority of residents within a 4-mile radius of the site are supplied water by the Wilmington Water Department or the Leland Sanitary District Water Department. Both of these municipal water systems are supplied water by surface water intakes located approximately 23 miles upstream of the site. Approximately 437 persons are estimated to obtain drinking water from private wells within 4 miles of the site. A

community water system is located at the Runnymeade subdivision approximately 3.75 miles northeast of the site. The community system utilizes two wells which draw from the Castle Hayne limestone aquifer. Approximately 622 persons are estimated to obtain drinking water from the Runnymeade subdivision community system. Analytical results obtained verify the presence of purgeable and extractable organics in groundwater samples from monitoring wells located at the SWP site. Elevated constituents that were detected in these groundwater samples can be attributed to past site activities. Approximately 1,059 persons (including Runnymeade subdivision residents and private well users) residing within a 4-mile radius of the Southern Wood Piedmont site obtain potable water from groundwater supply wells.

The surface water migration pathway is of major concern and was evaluated based on site-related contaminants detected in the onsite canal, Greenfield Creek, and the Cape Fear River. Elevated constituents that were detected onsite can be attributed to past site activities. The overland drainage from the site flows either east to a drainage ditch, south into Greenfield Creek, or west into the Cape Fear River. The surface water migration pathway continues in the Cape Fear River for approximately 14 miles both upstream and downstream due to tidal influence from the Atlantic Ocean. There are extensive wetland frontage located both upstream and downstream along the 15-mile surface water migration pathway. Surface water intakes utilized by the Wilmington Water Department and the Leland Sanitary District are located more than 15 miles upstream of the site. The surface water pathway is known to support both recreational and commercial fishing, as well as recreational boating. The American alligator (*Alligator mississippiensis*) is classified as a federally-designated threatened species which is known to inhabit the Cape Fear River. The federally-designated endangered shortnose sturgeon (*Acipenser brevirostrum*) has been observed in the Lower Cape Fear River. The West Indian manatee (*Trichechus manatus*) is classified as a federally-designated endangered species known to have habitat locations in the Cape Fear estuary, approximately 7.4 and 12 miles downstream of the site. The Southern Wood Piedmont site lies within a 100-year flood plain.

The soil exposure and air pathways are of minimal concern due to several factors including a lack of resident population, presence of vegetative cover on the site, and lack of an observed release. The SWP site is currently inactive and all previous site structures have been demolished and removed. Unpaved site areas are covered by

grass and other vegetation. The site is not fenced, but does have a gated entrance to prevent vehicular traffic. The site is accessible by foot on the rail bed.

Further action under CERCLA is recommended for the Southern Wood Piedmont site in Wilmington, New Hanover County, North Carolina.

**DRAFT**

# EXPANDED SITE INSPECTION
## Southern Wood Piedmont
### Wilmington, New Hanover County, North Carolina
### EPA ID No. NCD058517467
### WasteLAN No. 02821

## 1.0 Introduction

Black & Veatch Special Projects Corp. (Black & Veatch) was tasked by the U. S. Environmental Protection Agency (EPA), Waste Management Division, Region IV to conduct an Expanded Site Inspection (ESI) at the former Southern Wood Piedmont (SWP) site in Wilmington, New Hanover County, North Carolina. The inspection was performed under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). This ESI was performed in accordance with the objectives specified in the scoping meetings for this site conducted on February 8, and April 11, 1996.

### 1.1 Objectives

The objectives of the ESI are to further determine the nature of contaminants present at the site, to determine if a release of hazardous materials to the environment has occurred or may occur, and if a release has occurred, to determine attribution of those contaminants to the site. Furthermore, this inspection seeks to further define the possible pathways by which contamination could migrate from the site and the populations and environments it potentially affects. The purpose of this inspection is to provide data and information needed to evaluate and score the site using the Hazard Ranking System (HRS).

Specific elements include:

- Outline the major milestones, develop a schedule, and determine the level of effort (LOE) required to complete the ESI.
- Identify the data gaps that need to be addressed by the ESI.

- Further define the site characteristics and contaminant sources, including waste type and volume.
- Determine the human population, sensitive environments, and fisheries that are threatened or potentially threatened by releases of hazardous materials from the site.
- Develop a sampling strategy to obtain the additional analytical data to support the HRS score.

## 1.2 Scope of Work

The scope of this investigation includes the following activities:

- Obtain and review background materials relevant to assessing the potential health and environmental hazards posed by the site.
- Obtain aerial photographs and maps of site, if possible.
- Obtain information on local water systems.
- Evaluate target populations associated with the groundwater, surface water, and air migration pathways and the onsite soil exposure pathway.
- Determine location and distance to nearest potable well.
- Develop a site sketch.
- Install and sample groundwater monitoring wells.
- Sample existing groundwater monitoring wells.
- Collect various types of environmental samples including biological samples.
- Characterize source areas at the site.

# 2.0 Location, Site Description, Operational History and Waste Characteristics

## 2.1 Location

The SWP site is located on Greenfield Street in Wilmington, New Hanover County, North Carolina (Refs. 1; 2; Figure 1). The geologic coordinates of the site are 34° 12' 59" North latitude and 77° 57' 07" West longitude (Ref. 3). The climate of New Hanover County is characterized by hot and humid summers and cool winters with occasional cold spells of short duration (Ref. 4, p. 1). The January average daily temperature is 45.6 degrees Fahrenheit and the July average daily temperature is 80.1 degrees Fahrenheit (Ref. 4, Table 1). Mean annual precipitation is approximately 54 inches in the Wilmington area (Ref. 4, Table 1). The mean lake evaporation is approximately 42 inches, yielding a net annual precipitation of 12 inches (Ref. 5). The 2-year, 24-hour rainfall is approximately 5 inches (Ref. 6). Topography in the region extends from flat, low-lying swamps and marshes, 3 to 6 feet above mean sea level (amsl), to rolling uplands, approximately 300 to 800 feet amsl (Ref. 7, p. 271). More specifically, the site lies approximately 5 feet amsl (Ref.1).

## 2.2 Site Description

The SWP site consists of approximately 52 acres of vacant land along the east bank of the Cape Fear River (Ref. 2). There are no structures on the site and it is inactive at the present time. The site is currently owned by the City of Wilmington (COW) and the North Carolina State Ports Authority (NCSPA). Thirty-five acres in the northern and central portion of the site are owned by the COW, and the remaining seventeen acres are owned by the NCSPA (Ref. 2). The site is bordered by the Amerada Hess Petroleum Terminal to the north, by the Paktank Petroleum Terminal to the south, by the Cape Fear River to the west, and by Optimist Park and Front Street to the east (Ref. 4, Fig. 3). The site layout and sample locations are shown on Figures 1 and 2, respectively.

## 2.3 Operational History and Waste Characteristics

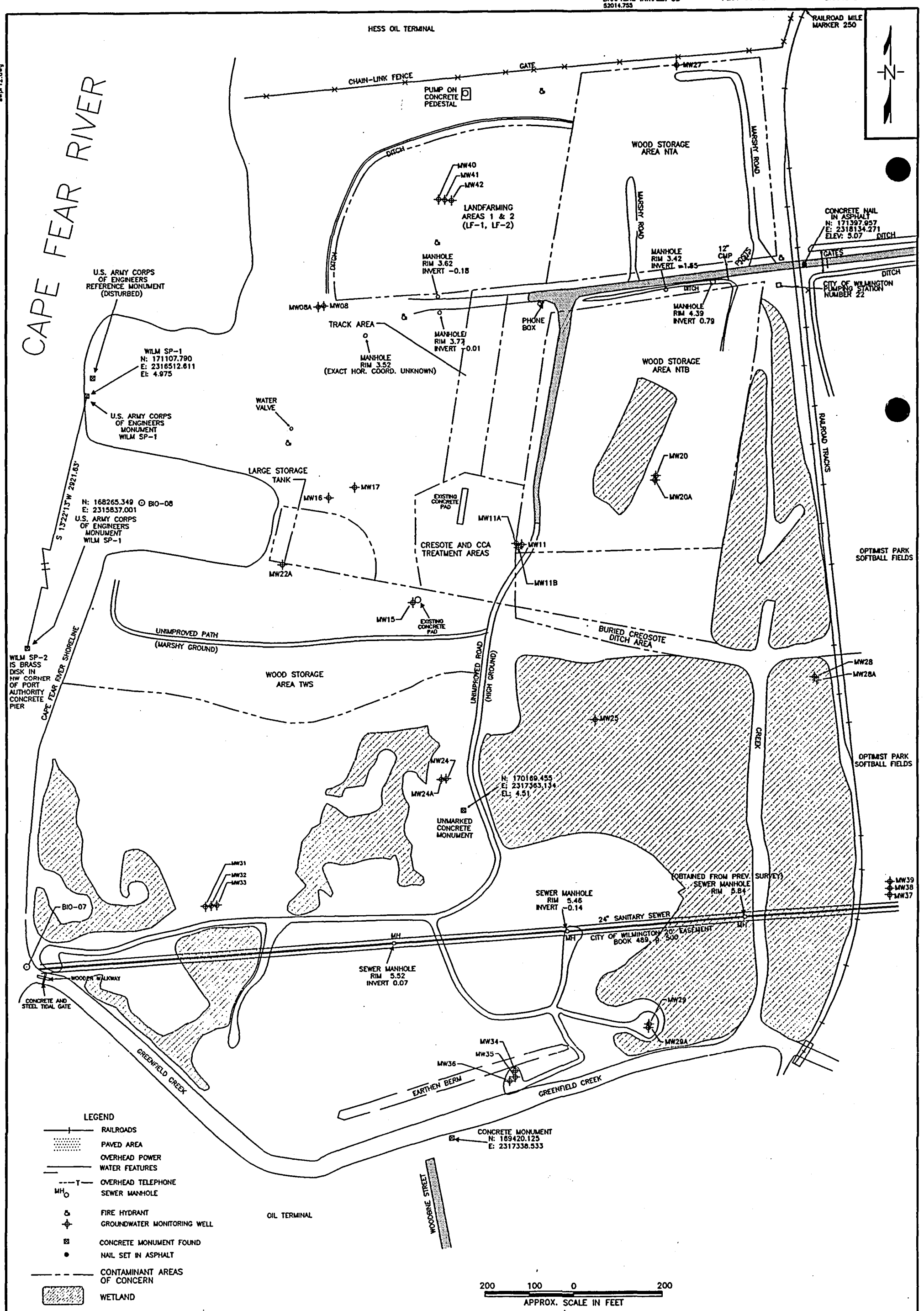
The SWP site was developed for construction of concrete barges and ships during World War I. Operations at the site changed to wood-treating beginning in the 1930s. Southern Wood Preserving Company (presently Southern Wood Piedmont)

CAD DWG NO: ESSWLY11
CREATION DATE: 3-25-97
DRAFTERS INITIALS: GB
52014.755

ORIGINAL DWG SIZE
11 x 17
PLOT SCALE: 1=200

MOST RECENT REVISION:
REVISION DATE:
DRAFTERS INITIALS:

swpr12.dwg




SITE LAYOUT MAP
SOUTHERN WOOD PIEDMONT
WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA

FIGURE 1

began operating in 1964 at the site. Prior to 1972, creosote was the only wood preservative in use at the site. Chromated copper arsenate (CCA) was introduced at the site after 1972 as a wood preservative. Pentachlorophenol (PCP) was added as a wood preservative after 1980. Site closure activities began about 1975 when SWP obtained a permit to bury an onsite drainage ditch which contained creosote sludge. The ditch was subsequently covered with fill material. In May 1983, wood treatment operations on site ceased and the site equipment was removed (Ref. 8). In 1981, COW authorized Soil and Materials Engineering, Inc. (SME) to install five soil borings on the thirty-five acres of the site which the COW owns. Four of the borings were completed as shallow monitoring wells (screened above the peat). The additional boring was completed as an intermediate monitoring well (screened below the peat, but above the limestone believed to be the Pee Dee formation). As part of this field work, groundwater samples were obtained for inorganic and organic analyses.

A Preliminary Assessment of the site was completed in July 1984 by the North Carolina Department of Human Resources (Ref. 9). Representatives of NCDHR observed visibly stained soil in the main production area, near a cluster of creosote storage tanks, and in the vicinity of the covered sludge ditch. Surface water and shallow groundwater were both noted as having an oily sheen present at several locations (Ref. 9). No samples were believed to have been collected during the Preliminary Assessment. A recommendation of a medium priority site inspection was made.

A Screening Site Investigation (SSI) was conducted for the EPA by Halliburton Corporation (NUS) in January 1985. Sampling for this investigation included the following: four of the five COW groundwater monitoring wells, one groundwater monitoring well at Greenfield Lake, and subsurface soil samples in the land farming areas, on the jetty, and near the boat slips. In addition, NUS representatives collected one surface water and one sediment sample adjacent to the site in the Cape Fear River. A background surface water and sediment sample were obtained from the overflow stream from Greenfield Lake (Ref. 10). Sample results indicated the presence of organic constituents of creosote and inorganics associated with chromated copper arsenate (CCA) in soil and groundwater (Ref 10).

An Administrative Order of Consent between the State of North Carolina and SWP was agreed upon in May of 1985 (Ref. 11). As part of the order, one upgradient and three downgradient wells were installed to monitor groundwater during the landfarming activities outlined in the Order. Periodic land farm soil monitoring and biannual water quality monitoring were also part of the Administrative Order. Land farming continued from the mid-1980s through the early 1990s. During this time, SWP collected 59 composite soil samples from Land Farming Area 1 (LF-1) and 37 composite soil samples from Land Farming Area 2 (LF-2) (Ref. 2). Analyses included the detection of phosphorous, chloride, total organic carbon (TOC), pH, polynuclear aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), phenol, and microbial content (Ref. 2).

In September 1985, Law Environmental installed four groundwater monitoring wells outside the perimeter of the landfill areas. These wells were sampled for PCP and semivolatile organics between 1985 and 1990 (Ref. 2). Geraghty & Miller, Inc. (G & M), conducted soil investigations in 1991 at three areas (outdoor wood storage areas) which were not excavated for land farming. A total of forty-eight shallow soil samples were collected from two nontreated wood storage areas and one treated wood storage area. G & M also conducted soil borings and sampling at LF-1 and LF-2 in October 1990 and October 1991. Composite soil samples were obtained from five locations within each landfarm during these investigations and groundwater samples were taken from the four groundwater monitoring wells installed at the perimeter of the land farming areas (Ref. 12). Sample results indicated the presence of organic constituents of creosote and inorganics in soil and groundwater. In addition, polychlorinated dibenzodioxins and dibenzofurans were detected in soil samples (Ref. 12). Pentachlorophenols used in wood preservation can contain relatively high levels of dioxins and furans. These dioxins and furans are inadvertently produced during manufacture of chlorophenols (Ref. 13).

In February 1992, Environmental Technology Engineering, Inc. (ETE), began a groundwater investigation comprised of three phases. During Phase I, five temporary and eight permanent groundwater monitoring wells were installed and subsequently sampled. Phase II consisted of the abandonment of the five temporary wells and the placement of an additional twelve permanent groundwater monitoring wells. In December 1992, soil and sediment samples were taken from surface drainage areas

including the onsite drainage ditch and Greenfield Creek. Phase III began in October 1993 and involved the installation of another eleven permanent groundwater monitoring wells, sampling of these wells, and the resampling of the preexisting wells (Ref. 14). Sample results indicated organic constituents of creosote and inorganics in soil and groundwater. The locations of the preexisting monitoring wells and newly installed monitoring wells are presented on Figure 2.

The North Carolina Department of Health, Environment, and Natural Resources (NCDEHNR) conducted a Site Inspection Prioritization (SIP) in January 1995 for the purpose of collecting sufficient information to assess threats to human health and the environment. Based on the information collected, the SWP site was recommended as a high priority for an Expanded Site Inspection (Ref. 2).

## 3.0 Field Investigation

An initial site reconnaissance and walk-over was performed at the SWP site on May 20, 1996, by a representative of BVSPC, 3 representatives of the USEPA Region IV, and a representative of SWPs environmental consultant, Virogroup. Proposed boring locations were observed and discussed, photographs were taken, and general observations of site conditions were made. Field work for the ESI conducted by BVSPC commenced on October 3, 1996 and continued through October 9, 1996, at which time Tropical Storm Josephine and flooding of the Cape Fear River caused a demobilization of personnel and equipment (Refs. 15; 16). Field work resumed on November 4, 1996 and continued through December 23, 1996. Surveying of the groundwater monitoring wells occurred from January 27, 1997 to January 29, 1997. The sampling investigation included the collection of groundwater, surface water, surface soil, subsurface soil, sediment, and biological tissue samples. All samples collected were analyzed for extractable and purgeable organic compounds, pesticides, PCBs, cyanide, and metals. In addition, select samples were analyzed for dioxins and furans. Most sample analyses was performed under the Contract Laboratory Program (CLP) for routine analytical services (RAS). Dioxin/furan analyses were performed under CLP for special analytical services (SAS). All water samples were field tested for temperature, turbidity, pH, and conductivity. Quality Assurance/Quality Control (QA/QC) samples were also collected. QA/QC samples included a trip blank, and a preservative blank for each week of sampling, and a matrix duplicate for every 20 samples in each media (soil and water). Twelve monitoring wells were installed by a drilling subcontractor. Four shallow wells were constructed with screen sections intersecting the unconfined water table aquifer. Four intermediate wells were screened in the semi-confined aquifer beneath the peat/clay layer. Four deep wells were screened in the confined to semi-confined limestone of the Upper PeeDee Formation. The wells provided information required to help characterize the site hydrogeology and assess the nature and extent of groundwater contamination. The monitoring well locations are presented on Figure 2. Details of the shallow, intermediate, and deep monitoring well construction are shown on Figure 3.

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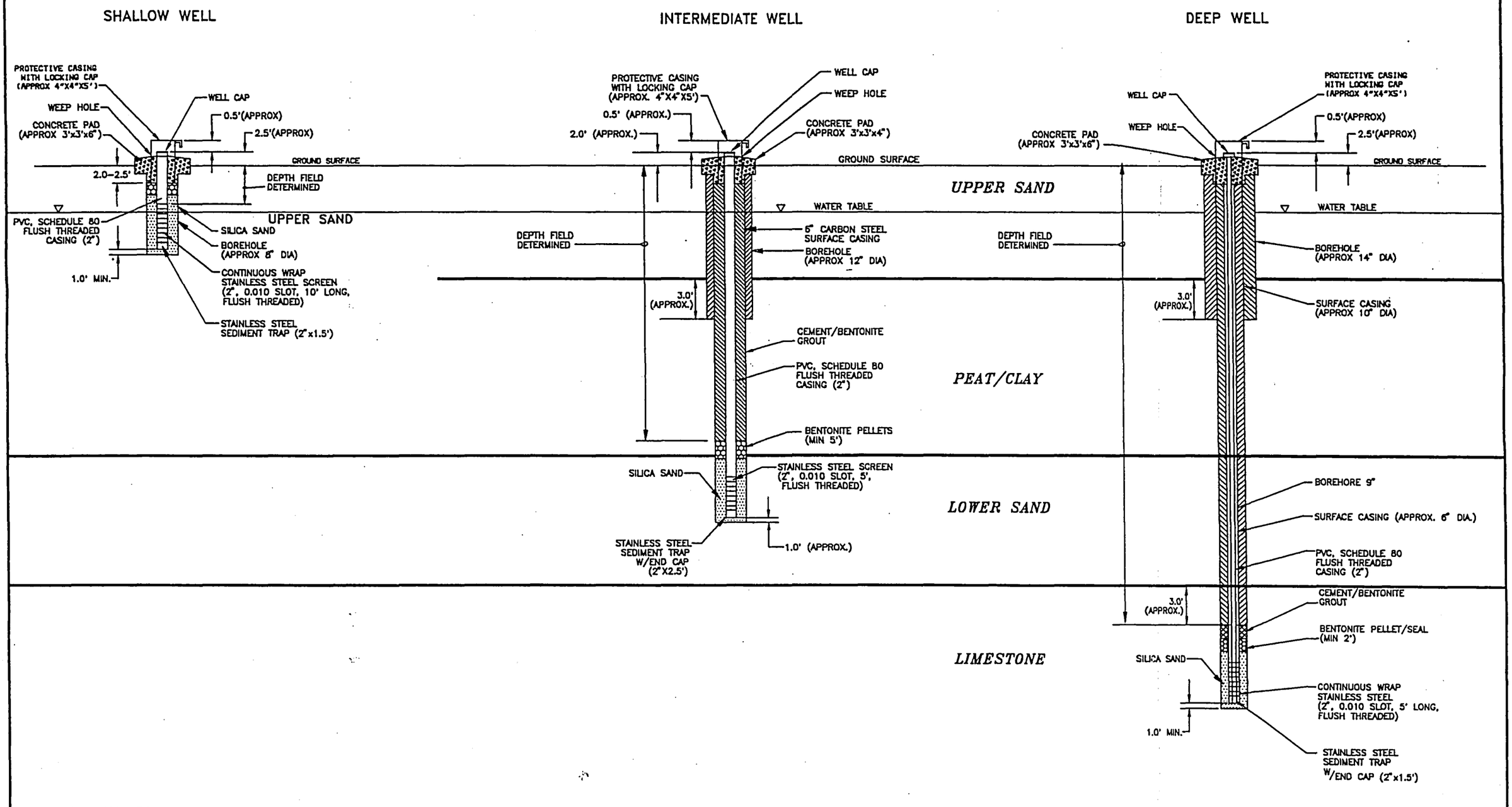
CREATION DATE: 3-13-94
DRAFTERS INITIALS: GB
52014755

ORIGINAL DWG SIZE
17 x 11
PLOT SCALE: 1=1

MOST RECENT REVISION:
REVISION DATE: 4-16-96
DRAFTERS INITIALS: GB




| | | | |
|---|---|---|---|
| RV | SOUTHERN WOOD PIEDMONT<br>WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA | MONITORING WELL CONSTRUCTION DIAGRAM | FIGURE<br>3 |

The following deviations to the sampling plan occurred during field work at the SWP site (Refs. 15; 16). All deviations from the FSP were reported to the EPA Site Assessment Manager (SAM) :

- Sample SP-SW-02 was not obtained due to an inability to gain access to the sample location.
- Biotic samples SP-BIO-01, -02, -03, -04, and -05 were not collected due to the absence of sessile benthic habitats and organisms.
- Sample SP-SD-02 was not collected due to an inability to gain access by boat or using waders.

## 3.1 Sample Collection

The sampling investigation included the collection of 31 groundwater, 8 surface water, 21 surface soil, 21 subsurface soil, 18 sediment, and 3 biological tissue samples. All samples collected were analyzed for extractable and purgeable organic compounds, pesticides, PCBs, cyanide, and metals. Additionally, 7 of the 21 surface soil samples were analyzed for dioxins and furans.

## 3.2 Sample Collection Methodology

### *3.2.1 Surface Soil and Sediment Samples*

Surface soil and sediment samples were collected using a stainless steel spoon and a 2-quart or equivalent glass bowl. Some sediment samples were collected using stainless steel open or closed bucket hand augers, and/or a stainless steel, Ponar dredge sampler. Samples being analyzed for volatile organic compounds (VOC), were collected first and placed directly into the appropriate containers. The remainder of the sample was placed into the bowl, mixed thoroughly, then distributed to the appropriate containers. The surface soil samples were collected from a depth of no greater than two feet below land surface (bls).

### *3.2.2 Subsurface Soil Samples*

Subsurface soil samples for chemical analyses were collected by using a stainless steel spoon or a stainless steel, 24 inch long split spoon sampler and a 2-quart or equivalent glass bowl. Typically, a subsurface soil sample was obtained using a hand auger, if possible, from a depth of greater than 2 feet bls but above the water table. If a hand auger was inadequate, a drill rig using hollow stem augers and split spoon samplers of the appropriate type were used. The VOC sample was collected first

and placed directly into the appropriate sample container. The remainder of the sample was thoroughly mixed in the bowl and placed into the appropriate containers.

### *3.2.3 Groundwater Samples*

Groundwater samples from the 12 monitoring wells installed during this field investigation were collected after the wells had been installed, developed, and purged. Groundwater samples from 19 of the existing monitoring wells on site were collected after the wells were purged. Details of the 12, newly installed monitoring wells are presented on Figure 3.

Plastic sheeting was placed around the well to keep equipment from coming in contact with the ground surface. A previously decontaminated electric, water level indicator was placed into the well to measure the depth of the static water level and total depth of the well. Measurements were measured to the nearest 0.01 foot and taken from a reference notch etched at the top of the casing. The volume of the well casing was then calculated. Depth measurements and volume calculations were recorded in the field logbook. A decontaminated, submersible pump was used to develop the wells in a manner that minimized water turbidity. Care was exercised in maintaining the location of the pump or teflon hose just below the level of water in the well to assure that the entire static volume was removed. After the pump was removed from the well, all wetted portions of the pump and related tubing were decontaminated. The pump used was a submersible pump constructed of stainless steel and equipped with new, polyethylene tubing at each well location.

During well purging, field parameters (pH, temperature, specific conductance, and turbidity) was measured and recorded. Purging terminated when a minimum of three casing volumes had been withdrawn and field parameter readings had stabilized (pH readings within 0.1 units, temperature within 0.5 degrees Celsius, specific conductance within three percent, and turbidity at or below 20 nephelometric units) or upon removal of five casing volumes from each well. Water from well purging activities was containerized in Department of Transportation (DOT) approved 55-gallon drums.

Prior to sampling, new, decontaminated Teflon tubing was inserted into the well casing. A peristaltic pump was used to remove groundwater from the well and place

it into the appropriate sample containers. The time of sampling was recorded in the field logbook. VOC samples were collected by manually creating a vacuum which traps water in the Teflon tubing, removing the tubing from the well and then filling VOA containers with this water by releasing the vacuum. The volatile organic fraction of the sample was collected first and placed directly into pre-preserved VOA vials. The vials were filled such that headspace was eliminated and no air bubbles were present. The remainder of the sample was placed into a one gallon amber glass jug and subsequently transferred into the remaining containers. Temperature, turbidity, pH, and conductivity measurements were taken upon collection of each groundwater sample. Each portion of the sample was properly preserved upon collection.

### *3.2.4 Surface Water Samples*

Surface water sample locations on the Cape Fear River and Greenfield Creek were accessed by use of a small boat. The most downstream sample was collected first and obtained by orienting the sampler and sample container upstream of the boat. The intent of this sampling method was to obtain the most representative and least disturbed surface water samples. At each sample location, the volatile organic fraction of the sample was collected first and placed directly into pre-preserved VOA vials. The vials were filled such that headspace was eliminated and no air bubbles were present. The remainder of the sample was placed into a one gallon amber glass jug and subsequently transferred into the other containers. Temperature, turbidity, pH, and conductivity measurements were taken upon collection of each surface water sample. Samples were properly preserved upon collection.

### *3.2.5 Biological Tissue Samples*

Biological tissue samples were collected from the Cape Fear River and Greenfield Lake by use of hook and line from a small boat. Biological tissue samples consisted of fish tissue only.

Three fish tissue samples were collected to determine the human health exposure risk from the site. The target species for this sampling event were recreational species. Species collected were Speckled Perch, Spot, and Channel Catfish. Two samples were collected in the Cape Fear River and one background sample was collected in Greenfield Lake.

Upon collection of the desired fish species, the specimens were rinsed with surface water from the collection point, identified, weighed, measured, catalogued, and visually inspected for any lesions or other physical abnormalities. The recommended weight for each sample was 500 grams. Attempts were made to obtain more than one specimen of the same species if the weight of one organism was inadequate. The combined fish sample was then prepared for shipment to the analytical laboratory. The whole fish samples were wrapped in new aluminum foil, placed in a waterproof freezer bag, labelled, stored on wet ice, and shipped to the laboratory following laboratory protocols. A chain of custody record was completed by the sampler and included in the shipment of the samples to the laboratory.

## 3.3 Duplicate Samples

Duplicate samples were offered to Mr. Raymond Knox, Project Manager with ViroGroup (Southern Wood Piedmonts' consultant). Mr. Knox declined to split samples.

## 3.4 Description of Sample Locations

### *3.4.1 Surface Soil Sampling*

Twenty-one surface soil samples were collected in association with the SWP site at depths no greater than two feet bls. Six samples were taken in former wood storage and landfarming areas. Five samples were located in previously identified contamination source areas. Seven samples were taken in areas which have not been previously sampled. Three background samples were also collected. Two of these background samples were located northeast and southeast of the site. An additional background sample was collected along the north property boundary, between LF-1 & LF-2 and the Amerada Hess Terminal. Sample codes and descriptions are listed in Table 1 and are shown on Figures 1 and 2.

### *3.4.2 Subsurface Soil Sampling*

Twenty-one subsurface soil samples were collected at the same locations as the surface soil samples, including the background locations. The samples were collected at depths greater than two feet bls, but above the water table. Sample codes and descriptions are listed in Table 1 and are shown on Figures 1 and 2.

# Table 1
## Sample Codes, Descriptions, Locations, and Rationale
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Sample Code | Sample Description | Sample Location | Rationale |
|---|---|---|---|
| SP-SS-01 / SP-SB-01 | Surface Soil / Subsurface Soil | North of LF-1 & LF-2. | To establish background levels. |
| SP-SS-02 / SP-SB-02 | Surface Soil / Subsurface Soil | Northeast of the site. | To establish background levels. |
| SP-SS-03 / SP-SB-03 | Surface Soil / Subsurface Soil | Southeast of the site. | To establish background levels. |
| SP-SS-04 / SP-SB-04 | Surface Soil / Subsurface Soil | Wood Storage Area (NTA). | To confirm presence or absence of contamination. |
| SP-SS-05 / SP-SB-05 | Surface Soil / Subsurface Soil | Wood Storage Area (NTB). | To confirm presence or absence of contamination. |
| SP-SS-06 / SP-SB-06 | Surface Soil / Subsurface Soil | CCA and Creosote Treatment Area, center of the site. | To confirm presence or absence of contamination. |
| SP-SS-07 / SP-SB-07 | Surface Soil / Subsurface Soil | CCA and Creosote Treatment Area, center of the site. | To confirm presence or absence of contamination. |
| SP-SS-08 / SP-SB-08 | Surface Soil / Subsurface Soil | CCA and Creosote Treatment Area, center of the site. | To confirm presence or absence of contamination. |
| SP-SS-09 / SP-SB-09 | Surface Soil / Subsurface Soil | Wood Storage Area (TWS). | To confirm presence or absence of contamination. |
| SP-SS-10 / SP-SB-10 | Surface Soil / Subsurface Soil | Wood Storage Area (TWS). | To confirm presence or absence of contamination. |
| SP-SS-11 / SP-SB-11 | Surface Soil / Subsurface Soil | Large Storage Tank Area. | To confirm presence or absence of contamination. |
| SP-SS-12 / SP-SB-12 | Surface Soil / Subsurface Soil | West of road near center of site. | To confirm presence or absence of contamination. |
| SP-SS-13 / SP-SB-13 | Surface Soil / Subsurface Soil | Buried Creosote Ditch Area. | To confirm presence or absence of contamination. |
| SP-SS-14 / SP-SB-14 | Surface Soil / Subsurface Soil | LF-1 and LF-2 | To confirm presence or absence of contamination. |
| SP-SS-15 / SP-SB-15 | Surface Soil / Subsurface Soil | Buried Creosote Ditch Area. | To confirm presence or absence of contamination. |
| SP-SS-16 / SP-SB-16 | Surface Soil / Subsurface Soil | Southwest corner of the site. | To confirm presence or absence of contamination. |
| SP-SS-17 / SP-SB-17 | Surface Soil / Subsurface Soil | Between Greenfield Creek and the earthen berm. | To confirm presence or absence of contamination. |
| SP-SS-18 / SP-SB-18 | Surface Soil / Subsurface Soil | South central portion of the site. | To confirm presence or absence of contamination. |

## Table 1 (continued)
## Sample Codes, Descriptions, Locations, and Rationale
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Sample Code | Sample Description | Sample Location | Rationale |
|---|---|---|---|
| SP-SS-19 / SP-SB-19 | Surface Soil / Subsurface Soil | South of Wood Storage Area (TWS). | To confirm presence or absence of contamination. |
| SP-SS-20 / SP-SB-20 | Surface Soil / Subsurface Soil | West of Track Area. | To confirm presence or absence of contamination. |
| SP-SS-21 / SP-SB-21 | Surface Soil / Subsurface Soil | Track area. | To confirm presence or absence of contamination. |
| SP-SD-01 | Sediment | East of the site near the entrance gates. | To establish background levels. |
| SP-SD-03 | Sediment | East of the site in the offsite drainage. | To determine presence or absence of contamination. |
| SP-SD-05 | Sediment | Ditch south of Northeast Wood Storage Area (NTA). | To determine presence or absence of contamination. |
| SP-SD-06 | Sediment | Onsite creek southeast of Southeast Wood Storage Area (NTB). | To determine presence or absence of contamination. |
| SP-SD-07 | Sediment | Onsite drainage ditch west of Optimist Park. | To determine presence or absence of contamination. |
| SP-SD-08 | Sediment | Greenfield Creek downstream of the confluence with the on site drainage ditch. | To determine presence or absence of contamination. |
| SP-SD-09 | Sediment | Greenfield Creek downstream of SP-SD-08. | To determine presence or absence of contamination. |
| SP-SD-10 | Sediment | Near the outfall of Greenfield Creek into Cape Fear River. | To determine presence or absence of contamination. |
| SP-SD-11 | Sediment | In the Cape Fear River west of Large Storage Tank Area. | To determine presence or absence of contamination. |
| SP-SD-12 | Sediment | Northwest property boundary at the Cape Fear River. | To determine presence or absence of contamination. |
| SP-SD-13 | Sediment | Wood Storage Area (NTB) near MW-20. | To determine presence or absence of contamination. |
| SP-SD-14 | Sediment | South of the Buried Creosote Ditch Area. | To determine presence or absence of contamination. |

## Table 1 (continued)
## Sample Codes, Descriptions, Locations, and Rationale
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Sample Code | Sample Dscription | Sample Location | Rationale |
|---|---|---|---|
| SP-SD-15 | Sediment | South central portion of the site. | To determine presence or absence of contamination. |
| SP-SD-16 | Sediment | Southwestern portion of the site. | To determine presence or absence of contamination. |
| SP-SD-17 | Sediment | Southwestern portion of the site. | To determine presence or absence of contamination. |
| SP-SD-18 | Sediment | Southwestern portion of the site. | To determine presence or absence of contamination. |
| SP-SD-19 | Sediment | Southwestern portion of the site. | To determine presence or absence of contamination. |
| SP-SD-20 | Sediment | Southeastern portion of the site, north of manhole. | To determine presence or absence of contamination. |
| SP-SW-01 | Surface Water | Same location as SP-SD-01. | To establish background levels. |
| SP-SW-03 | Surface Water | East of the railroad crossing Greenfield Creek. | To determine presence or absence of contamination. |
| SP-SW-04 | Surface Water | Same location as SP-SD-07. | To determine presence or absence of contamination. |
| SP-SW-05 | Surface Water | Same location as SP-SD-08. | To determine presence or absence of contamination. |
| SP-SW-06 | Surface Water | Same location as SP-SD-09. | To determine presence or absence of contamination. |
| SP-SW-07 | Surface Water | Same location as SP-SD-10. | To determine presence or absence of contamination. |
| SP-SW-08 | Surface Water | Same location as SP-SD-11. | To determine presence or absence of contamination. |
| SP-SW-09 | Surface Water | Same location as SP-SD-12. | To determine presence or absence of contamination. |

## Table 1 (continued)
## Sample Codes, Descriptions, Locations, and Rationale
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Sample Code | Sample Description | Sample Location | Rationale |
|---|---|---|---|
| SP-MW-08 | Groundwater | Southwest of LF-1 and LF-2. | To determine presence or absence of contamination. |
| SP-MW-08A | Groundwater | West of MW-08. | To determine presence or absence of contamination. |
| SP-MW-11 | Groundwater | East of the CCA and Creosote Treatment Area. | To determine presence or absence of contamination. |
| SP-MW-11A | Groundwater | Northwest of MW-11. | To determine presence or absence of contamination. |
| SP-MW-11B | Groundwater | Southwest of MW-11. | To determine presence or absence of contamination. |
| SP-MW-15 | Groundwater | Large Storage Tank Area. | To determine presence or absence of contamination. |
| SP-MW-16 | Groundwater | North of Large Storage Tank Area. | To determine presence or absence of contamination. |
| SP-MW-17 | Groundwater | North of Large Storage Tank Area. | To determine presence or absence of contamination. |
| SP-MW-20 | Groundwater | Wood Storage Area NTB. | To determine presence or absence of contamination. |
| SP-MW-20A | Groundwater | South of MW-20. | To determine presence or absence of contamination. |
| SP-MW-22A | Groundwater | Large Storage Area. | To determine presence or absence of contamination. |
| SP-MW-24 | Groundwater | South central portion of the site. | To determine presence or absence of contamination. |
| SP-MW-24A | Groundwater | West of MW-24. | To determine presence or absence of contamination. |
| SP-MW-25 | Groundwater | South of Buried Creosote Ditch Area. | To determine presence or absence of contamination. |
| SP-MW-27 | Groundwater | Northeast corner of site. | To determine presence or absence of contamination. |

## Table 1 (continued)
## Sample Codes, Descriptions, Locations, and Rationale
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Sample Code | Sample Description | Sample Location | Rationale |
|---|---|---|---|
| SP-MW-28 | Groundwater | West of railroad tracks along eastern boundary of the site. | To determine presence or absence of contamination. |
| SP-MW-28A | Groundwater | Southeast of MW-28. | To determine presence or absence of contamination. |
| SP-MW-29 | Groundwater | Southeastern portion of site. | To determine presence or absence of contamination. |
| SP-MW-29A | Groundwater | South of MW-29. | To determine presence or absence of contamination. |
| SP-MW-31 | Groundwater | Southwest corner of the site. | To determine presence or absence of contamination. |
| SP-MW-32 | Groundwater | East of MW-31. | To determine presence or absence of contamination. |
| SP-MW-33 | Groundwater | East of MW-32. | To determine presence or absence of contamination. |
| SP-MW-34 | Groundwater | Southern boundary of the site. | To determine presence or absence of contamination. |
| SP-MW-35 | Groundwater | South of MW-34. | To determine presence or absence of contamination. |
| SP-MW-36 | Groundwater | Southwest of MW-35. | To determine presence or absence of contamination. |
| SP-MW-37 | Groundwater | South of softball fields. | To establish background levels. |
| SP-MW-38 | Groundwater | North of MW-37. | To establish background levels. |
| SP-MW-39 | Groundwater | North of MW-38. | To establish background levels. |
| SP-MW-40 | Groundwater | In LF-1 and LF-2. | To determine presence or absence of contamination. |
| SP-MW-41 | Groundwater | East of MW-40. | To determine presence or absence of contamination. |
| SP-MW-42 | Groundwater | East of MW-41. | To determine presence or absence of contamination. |

## Table 1 (continued)
## Sample Codes, Descriptions, Locations, and Rationale
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Sample Code | Sample Description | Sample Location | Rationale |
|---|---|---|---|
| SP-BIO-07 | Biological, Fish Tissue | In Cape Fear River near southwestern portion of site. | To determine presence or absence of contamination. |
| SP-BIO-08 | Biological, Fish Tissue | In the Cape Fear River west of Large Storage Tank Area. | To determine presence or absence of contamination. |
| SP-BIO-09 | Biological, Fish Tissue | East of site in Greenfield Lake. | To establish background levels. |

SP - Southern Wood Piedmont
SD - Sediment Sample
SS - Surface Soil Sample
SB - Subsurface Soil Sample
MW - Monitoring Well
SW - Surface Water
BIO - Biological Sample
LF - Land Farm Area
NTA - Non-Treated Wood Area
NTB - Non-Treated Wood Area
CCA - Chromated Copper Arsenate Area
TWS - Treated Wood Storage Area

### 3.4.3 Groundwater Sampling

To characterize the groundwater at the SWP site, groundwater samples were collected from 31 permanent monitoring wells. Nineteen of the wells were previously installed and 12 wells were installed during field work for this ESI. Sample codes and descriptions are listed in Table 1 and shown on Figure 2. Figure 1 describes source areas of the site.

### 3.4.4 Surface Water Sampling

Eight surface water samples were collected at the same locations as eight of the sediment samples. The eight sediment sample locations chosen for surface water collection are as follows: SP-SD-01, and SP-SD-03 through SP-SD-09. A background surface water sample was taken from SP-SD-01 location. Sample codes and descriptions are listed in Table 1 and shown on Figure 2.

### 3.4.5 Sediment Sampling

Eighteen sediment samples were collected during the ESI at the SWP site. One of the sediment samples was collected as a background sample, inland and upgradient of the site. Three sediment samples were collected in the Cape Fear River, one at the northwest property boundary, one in the south boat slip, and one at the outfall of Greenfield Creek into the Cape Fear River. Three sediment samples were taken from Greenfield Creek. Two samples were collected in the onsite drainage feature. One sediment sample came from an offsite drainage feature which lies parallel to the train tracks along the eastern property boundary. A total of five sediment samples were taken in the wetland areas located in the southwestern portion of the site. Two samples were from the wetland area south of the buried creosote sludge ditch. The remaining two sediment samples were taken from wetlands in and around the southeast wood storage area (NTB). Sample codes and descriptions are listed in Table 1 and shown on Figure 2.

### 3.4.6 Biological Sampling

Three biological tissue samples were collected in the surface waters near to the site. One sample was collected at the outfall of Greenfield Creek into the Cape Fear River, one was collected in the south slip on the western portion of the site, and one was collected upgradient and offsite as a background sample in Greenfield Lake. Sample codes and descriptions are listed in Table 1 and shown on Figure 2.

## 3.5 Analytical Support and Methodology

All sample collection, sample preservation, and chain-of-custody procedures used during this investigation was in accordance with the standard operating procedures as specified in the USEPA Region 4, Environmental Services Division, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May, 1996, (EISOPQAM). Water matrix trip blanks were collected weekly for quality control purposes.

All laboratory analyses and laboratory quality assurance procedures used during this investigation were in accordance with standard procedures and protocols as specified in the Analytical Support Branch's Laboratory Operations and Quality Control Manual, United States Environmental Protection Agency Region IV, Environmental Services Division, October 1990, or as specified by the existing United States Environmental Protection Agency standard procedures and protocols for the Contract Laboratory Program (CLP). Analysis for dioxins was by EPA SW-846 method 8290 for select soil samples. All samples were submitted to CLP laboratories, as appropriate, at the time of sampling.

## 3.6 Analytical Data and Data Qualifiers

All analytical data were subjected to a quality assurance review as described in the EPA Environmental Services Division laboratory data evaluation guidelines. In the tables presented, some of the concentrations of the organic and inorganic analytes may have been assigned a "J" qualifier. This indicates that the qualitative analysis was acceptable, but the quantitative value is an estimate. Other analytes may have been assigned an "N" qualifier, indicating that they were detected based on the presumptive evidence of their presence. This means that the compound is only tentatively identified, and its detection cannot be a positive indication of its presence. The results for some of the samples are assigned a "U" qualifier. This qualifier indicates that the contaminant was analyzed for but not detected above the sample quantitation limit for that sample (SQL). The reported number is the laboratory derived sample quantitation limit for the compound or element in that sample. At times, miscellaneous organic compounds that do not appear on the target compound list are reported with a data set. These compounds are assigned a "JN" qualifier, indicating that they are tentatively identified at estimated quantities. Because these compounds are not routinely analyzed for, background levels or SQL levels are not

generally available for comparison. The complete analytical data sheets are provided in Appendix A of this report.

Samples containing concentrations of contaminants greater than three times those of the background sample are considered to be elevated. In the cases where there was no detection of a contaminant at the background location, any sample with a concentration above its sample quantitation limit (SQL) and above the background SQL is considered to be elevated. These samples are noted in the text and are shaded in the tables.

# 4.0 Waste Sources

## 4.1 Source Descriptions

The source area for soil contamination at the SWP site is approximately 35 acres of land which lie from the north central to southeastern portion of the site. Included are areas which were once utilized for wood preserving and wood storage activities, the large storage tank area, the creosote treatment area, the covered sludge ditch, small diesel storage area, and landfarming activities. Potential source areas are illustrated on Figure 1.

## 4.2 Source Sample Locations

Twenty-one surface and twenty-one subsurface soil samples were collected in association with the SWP site at depths from 0 to 2 feet bls and at depths greater than 2 feet but above the water table, respectively. Six samples were taken in former wood storage and landfarming areas. Five samples were located in previously identified contamination source areas. Seven samples were taken in areas which were not previously sampled. Three samples were collected as background samples, with two of these located northeast and southeast of the site. An additional background sample was collected along the north property boundary, between LF-1 & LF-2 and the Amerada Hess Terminal. Sample codes and descriptions are listed in Table 1 and are shown on Figure 2.

## 4.3 Source Sampling Results

### *4.3.1 Source Organic Analytical Results*

Elevated levels of extractable organic constituents were detected in surface soil samples SP-SS-05, SP-SS-06, SP-SS-07, SP-SS-08, SP-SS-09, SP-SS-10, SP-SS-11, SP-SS-13, SP-SS-14, SP-SS-17, and SP-SS-21. Extractable organic constituents detected at elevated levels in surface soil samples include: naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, pentachlorophenol, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)anthracene, chrysene, bis(2-ethylhexyl)phthalate, benzo (b and/or k) fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene. No purgeable organic constituents were detected in surface soil samples obtained during this

investigation. Elevated levels of pesticides were detected in surface soil samples SP-SS-03, SP-SS-05, SP-SS-08, and SP-SS-21. Pesticides detected at elevated levels in surface soils include: endosulfan I (alpha) and 4,4'-DDE (P,P'-DDE). Dioxin/furan constituents were detected in surface soil samples SP-SS-06, SP-SS-13, SP-SS-14, SP-SS-17, and SP-SS-19. Dioxin/furan compounds detected at elevated levels in surface soil samples include 2,3,7,8-tetrachlorodibenzodioxin, tetrachlorodibenzodioxin (total), 1,2,3,7,8-pentachlorodibenzodioxin, pentachlorodibenzodioxin (total), 1,2,3,4,7,8-hexachlorodibenzodioxin, 1,2,3,6,7,8-hexa-chlorodibenzodioxin, 1,2,3,7,8,9-hexachlorodibenzodioxin, hexachlorodibenzodioxin (total), 1,2,3,4,6,7,8-heptachlorodibenzodioxin, heptachlorodibenzodioxin (total), octa-chlorodibenzodioxin, 2,3,7,8-tetrachlorodibenzofuran, tetrachlorodibenzofuran (total), 2,3,4,7,8-pentachlorodibenzofuran, pentachlorodibenzofuran (total), 1,2,3,6,7,8-hexachlorodibenzofuran, 2,3,4,6,7,8-hexachlorodibenzofuran, hexachlorodibenzofuran (total), 1,2,3,4,6,7,8-heptachlorodibenzofuran, 1,2,3,4,,7,8,9-heptachlorodibenzofuran, heptachlorodibenzofuran (total), and octachlorodibenzofuran (total). Toxicity Equivalency Values (TEQ) ranged from 250 to 3,100 ng/kg for the surface soil source sample. The surface soil source sample organic analytical results for extractables, pesticides/PCBs, and dioxin/furans are summarized in Tables 2, 3, and 4, respectively. Elevated levels of extractable organic constituents were detected in subsurface soil samples SP-SB-03, SP-SB-04, SP-SB-05, SP-SB-07, SP-SB-08, SP-SB-09, SP-SB-10, SP-SB-11, SP-SB-12, SP-SB-13, SP-SB-14, SP-SB-17, SP-SB-20, and SP-SB-21. Extractable organic constituents detected at elevated levels in subsurface soil samples include: naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo (b and/or k) fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene. Elevated levels of purgeable organic constituents were detected in subsurface soil samples SP-SB-03, SA-SB-05, SP-SB-07, SP-SB-08, and SP-SB-11. These purgeable organic constituents included benzene, ethyl benzene, methyl ethyl ketone, toluene and total xylenes.

# Table 2
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background SP-SS-01 | SP-SS-02 | SP-SS-03 | SP-SS-04 | SP-SS-05 | SP-SS-06 |
|---|---|---|---|---|---|---|
| **Extractable Organic Compounds** | | | | | | |
| 2-Chlorophenol | 390 U | - | - | - | - | - |
| 2,4 -Dimethylphenol | 390 U | - | - | - | - | - |
| Naphthalene | 390 U | 85 J | 62 J | - | - | 42 J |
| 2-Methylnaphthalene | 390 U | 120 J | - | - | - | - |
| Acenaphthylene | 390 U | - | - | - | 38 J | 160 J |
| Acenaphthene | 390 U | - | - | - | - | 110 J |
| Dibenzofuran | 390 U | 46 J | - | - | 42 J | 84 J |
| Fluorene | 390 U | - | - | - | - | 130 J |
| Hexachlorobenzene | 390 U | - | - | - | - | - |
| Pentachlorophenol | 970 U | - | - | - | 170 J | 4,800 |
| Phenanthrene | 390 U | 140J | 72 J | 59 J | 390 | 1,500 |
| Anthracene | 390 U | - | - | 50 J | 220 J | 2,200 |
| Carbazole | 390 U | - | - | 77 J | 220 J | 320 J |
| Di-n-Butyl Phthalate | 390 U | 100 J | - | - | - | - |
| Fluoranthene | 250 J | - | 160 J | 520 | 1,600 | 9,800 |
| Pyrene | 220 J | 96 J | 180 J | 400 J | 1,500 J | 8,000 J |
| Benzo(a)anthracene | 390 U | - | 110 J | - | 740 | 2,700 J |
| Chrysene | 220 J | 100 J | 150 J | 310 J | 1,300 | 3,900 J |
| Bis(2-ethylhexyl) Phthalate | 390 U | - | - | - | - | - |
| Benzo (b and/or k) Fluoranthene | 220 J | 150 J | 260 J | 300 J | 1,600 | 2,800 J |
| Benzo(a)Pyrene | 150 J | 87 J | 140 J | 110 J | 140 J | 1,400 J |
| Indeno (1,2,3 -cd) Pyrene | 110 J | 63 J | 140 J | 92 J | 290 J | 910 J |
| Benzo (g,h,i) Perylene | 110 J | 56 J | 180 J | 79 J | 260 J | 910 J |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| 1- Methylnaphthalene | | 90 JN | | | | |
| Biphenyl | | | | | | |
| Methylnaphthalene | | | | | | |
| Dimethylnaphthalene | | 90 JN | | | | |
| Methyldibenzofuran | | | | | | |
| Fluorenone | | | | | 80 JN | |
| Methylanthracene | | | | | | |
| Methylanthracene ( 2 isomers) | | | | | 200 JN | |
| Methylphenanthrene | | | | | 400 JN | |
| Phenylnaphthalene | | | | | 90 JN | |
| Anthracenedione | | | | | 300 JN | |
| Dimethylphenanthrene | | | | | | |

# Table 2 (continued)
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background SP-SS-01 | SP-SS-02 | SP-SS-03 | SP-SS-04 | SP-SS-05 | SP-SS-06 |
|---|---|---|---|---|---|---|
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Dimethylphenanthrene (2 isomers) | | | | | 500 JN | |
| Cyclopentaphenanthrenone | | | | | 300 JN | |
| Benzacephenanthrylene | | | | | | |
| Ethyleneglycol | | | | | | |
| Benzofluorene | | | | | | |
| Methylpyrene | 100 JN | | | | 90 JN | |
| Methylpyrene (2 isomers) | | | | | | |
| Benzoanthracenone | | | | | | |
| Benzoanthracenone (2 isomers) | | | | | 300 JN | |
| Benzonaphthothiophene | | | | | 200 JN | |
| Methylbenzanthracene | | | | | 600 JN | |
| Perylene | 200 JN | 100 JN | | 400 JN | 200 JN | |
| Benzanthracenone | | | | | | |
| Carboxylic Acid | | | 700 JN | | | |
| Benzofluoranthene (not B or K) | | | | | | |
| Benzopyrene (not A) | | | | | | |
| Unidentified Compounds / # | 6,000 J/ 4 | 3,000 J / 4 | 1,000 J/2 | 3,000 J/3 | 2,000 J/3 | |
| Alkanes | | | | | | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SS Surface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 2 (continued)
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-07 | SP-SS-08 | SP-SS-09 | SP-SS-10 | SP-SS-11 |
| **Extractable Organic Compounds** | | | | | | |
| 2-Chlorophenol | 390 U | - | - | - | - | - |
| 2,4-Dimethylphenol | 390 U | - | - | - | - | - |
| Naphthalene | 390 U | 570 J | 620 | - | 250 J | - |
| 2-Methylnaphthalene | 390 U | 470 J | 360 J | - | 230 J | - |
| Acenaphthylene | 390 U | 470 J | 160 J | - | 190 J | - |
| Acenaphthene | 390 U | - | 300 J | - | - | - |
| Dibenzofuran | 390 U | 360 J | 590 | - | 220 J | - |
| Fluorene | 390 U | - | 230 J | - | - | - |
| Hexachlorobenzene | 390 U | - | - | - | - | - |
| Pentachlorophenol | 970 U | - | 1,200 | - | - | - |
| Phenanthrene | 390 U | 1,600 J | 1,900 | 71 J | 920 | - |
| Anthracene | 390 U | 800 J | 670 | 220 J | 510 J | - |
| Carbazole | 390 U | 400 J | 270 J | 97 J | 360 J | |
| Di-n-butyl Phthalate | 390 U | - | - | - | - | - |
| Fluoranthene | 250 J | 5,500 | 5,200 | 380 | 5,000 | - |
| Pyrene | 220 J | 9,400 J | 4,900 J | 580 J | 4,900 J | - |
| Benzo(a)anthracene | 390 U | 4,200 | 1,500 | 170 J | 1,800 | - |
| Chrysene | 220 J | 6,600 | 2,700 | 340 J | 3,600 | - |
| Bis(2-ethylhexyl)phthalate | 390 U | - | - | - | - | 800 |
| Benzo(b and/or k) fluoranthene | 220 J | 13,000 | 6,200 | 830 J | 5,500 | - |
| Benzo(a)pyrene | 150 J | 5,300 | 1,000 | 180 J | 1,300 | - |
| Indeno(1,2,3-cd)pyrene | 110 J | 5,000 | 1,600 | 190 J | 240 J | - |
| Benzo(g,h,i)perylene | 110 J | 5,100 | 1,900 | 200 J | 1,300 | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| 1- Methylnaphthalene | | | 100 JN | | | |
| Biphenyl | | | 200 JN | | | |
| Methylnaphthalene | | | | | 200 JN | |
| Dimethylnaphthalene | | 400 JN | 200 JN | | 400 JN | |
| Methyldibenzofuran | | | | | 200 JN | |
| Fluorenone | | | 200 JN | | 600 JN | |
| Methylanthracene | | 500 JN | 300 JN | | | |
| Methylanthracene ( 2 isomers) | | | | | | |
| Methylphenanthrene | | | 200 JN | | | |
| Phenylnaphthalene | | | | | | |
| Anthracenedione | | 600 JN | 1,000 JN | | | |
| Dimethylphenanthrene | | | | | | |

## Table 2 (continued)
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-07 | SP-SS-08 | SP-SS-09 | SP-SS-10 | SP-SS-11 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Dimethylphenanthrene (2 isomers) | | | | | | |
| Cyclopentaphenanthrenone | | 600 JN | 300 JN | | | |
| Benzacephenanthrylene | | 4,000 JN | | | | |
| Ethyleneglycol | | | | | | |
| Benzofluorene | | | | | 700 JN | |
| Methylpyrene | 100 JN | | | | | |
| Methylpyrene (2 isomers) | | | 4,000 JN | | | |
| Benzoanthracenone | | | | | | |
| Benzoanthracenone (2 isomers) | | | | | | |
| Benzonaphthothiophene | | | 1,000 JN | | 300 JN | |
| Methylbenzanthracene | | | | | | |
| Perylene | 200 JN | | 90 JN | | 200 JN | |
| Benzanthracenone | | | 800 JN | 100 JN | | |
| Carboxylic Acid | | | | 500 JN | | |
| Benzofluoranthene (not B or K) | | | | | | |
| Benzopyrene (not A) | | | | | | |
| Unidentified Compounds / # | 6,000 J/ 4 | | 2,000 J/4 | 900 J/2 | | 2,000 J/3 |
| Alkanes | | | 400 J | | 4,000 J | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SS Surface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 2 (continued)
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | Source Samples | | | | |
|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-12 | SP-SS-13 | SP-SS-14 | SP-SS-15 | SP-SS-16 |
| **Extractable Organic Compounds** | | | | | | |
| 2-Chlorophenol | 390 U | - | - | 39 J | - | - |
| 2,4-Dimethylphenol | 390 U | - | - | 70 J | - | - |
| Naphthalene | 390 U | 180 J | 65 J | 620 | - | - |
| 2-Methylnaphthalene | 390 U | 66 J | - | 250 J | - | - |
| Acenaphthylene | 390 U | - | 120 J | 11,000 | - | - |
| Acenaphthene | 390 U | 53 J | 39 J | 510 | - | - |
| Dibenzofuran | 390 U | 66 J | 47 J | 380 | - | - |
| Fluorene | 390 U | - | 55 J | 690 | - | - |
| Hexachlorobenzene | 390 U | - | 40 J | - | - | - |
| Pentachlorophenol | 970 U | - | 160 J | 1,900 | - | - |
| Phenanthrene | 390 U | 240 J | 210 J | 3,600 J | - | - |
| Anthracene | 390 U | 120 J | 370 | 33,000 | - | - |
| Carbazole | 390 U | 48 J | 96 J | 3,500 J | - | - |
| Di-n-butyl Phthalate | 390 U | - | - | - | - | - |
| Fluoranthene | 250 J | 430 J | 400 | 23,000 | - | - |
| Pyrene | 220 J | 360 J | 340 J | 41,000 J | - | - |
| Benzo(a)anthracene | 390 U | 200 J | 190 J | 21,000 J | - | - |
| Chrysene | 220 J | 270 J | 280 J | 28,000 J | - | - |
| Bis(2-ethylhexyl)phthalate | 390 U | - | - | - | - | - |
| Benzo(b and/or k) fluoranthene | 220 J | 460 J | 780 J | 34,000 J | - | - |
| Benzo(a)pyrene | 150 J | 130 J | 310 J | 29,000 J | - | - |
| Indeno(1,2,3-cd)pyrene | 110 J | 170 J | 550 | 17,000 J | - | - |
| Benzo(g,h,i)perylene | 110 J | 200 J | 580 | 17,000 J | - | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| 1- Methylnaphthalene | | | | | | |
| Biphenyl | | | | | | |
| Methylnaphthalene | | | | | | |
| Dimethylnaphthalene | | | | | | |
| Methyldibenzofuran | | | | | | |
| Fluorenone | | | | | | |
| Methylanthracene | | | | | | |
| Methylanthracene ( 2 isomers) | | | | | | |
| Methylphenanthrene | | | | | | |
| Phenylnaphthalene | | | | | | |
| Anthracenedione | | | | | | |
| Dimethylphenanthrene | | | | | | |

# Table 2 (continued)
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | Source Samples | | | | |
|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-12 | SP-SS-13 | SP-SS-14 | SP-SS-15 | SP-SS-16 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Dimethylphenanthrene (2 isomers) | | | | | | |
| Cyclopentaphenanthrenone | | | | | | |
| Benzacephenanthrylene | | | | | | |
| Ethyleneglycol | | | | | | |
| Benzofluorene | | | | | | |
| Methylpyrene | 100 JN | | | | | |
| Methylpyrene (2 isomers) | | | | | | |
| Benzoanthracenone | | | | | | |
| Benzoanthracenone (2 isomers) | | | | | | |
| Benzonaphthothiophene | | | | | | |
| Methylbenzanthracene | | | | | | |
| Perylene | 200 JN | 200 JN | 200 JN | | | |
| Benzanthracenone | | | | | | |
| Carboxylic Acid | | 600 JN | | | | 3,000 J |
| Benzofluoranthene (not B or K) | | | | | | |
| Benzopyrene (not A) | | | | | | |
| Unidentified Compounds / # | 6,000 J/ 4 | 2,000 J/4 | 5,000 J/6 | | 4,000 J/4 | 700 J/1 |
| Alkanes | | 5,000 J | | | | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SS Surface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 2 (continued)
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | Source Samples | | | | |
|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-17 | SP-SS-18 | SP-SS-19 | SP-SS-20 | SP-SS-21 |
| **Extractable Organic Compounds** | | | | | | |
| 2-Chlorophenol | 390 U | - | - | - | - | - |
| 2,4-Dimethylphenol | 390 U | - | - | - | - | - |
| Naphthalene | 390 U | 480 J | - | - | - | 82 J |
| 2-Methylnaphthalene | 390 U | 420 J | - | - | - | 47 J |
| Acenaphthylene | 390 U | 360 J | - | - | - | 37 J |
| Acenaphthene | 390 U | - | - | - | - | - |
| Dibenzofuran | 390 U | 300 J | - | - | - | 54 J |
| Fluorene | 390 U | - | - | - | - | - |
| Hexachlorobenzene (HCB) | 390 U | - | - | - | - | - |
| Pentachlorophenol | 970 U | - | - | - | - | - |
| Phenanthrene | 390 U | 1,400 J | 150 J | 55 J | 38 J | 210 J |
| Anthracene | 390 U | 670 J | - | - | 34 J | 110 J |
| Carbazole | 390 U | 320 J | - | - | 46 J | 63 J |
| Di-n-butyl Phthalate | 390 U | - | - | - | - | - |
| Fluoranthene | 250 J | 4,800 | 620 | 210 J | 360 J | 520 |
| Pyrene | 220 J | 7,200 J | 560 | 230 J | 340 J | 710 J |
| Benzo(a)anthracene | 390 U | 3,700 | 350 J | 200 J | 140 J | 270 J |
| Chrysene | 220 J | 5,700 | 300 J | 220 J | 290 J | 480 |
| Bis(2-ethylhexyl)phthalate | 390 U | - | - | - | - | - |
| Benzo(b and/or k) fluoranthene | 220 J | 12,000 | 330 J | 280 J | 450 J | 1,100 |
| Benzo(a)pyrene | 150 J | 4,700 | 340 J | 250 J | 95 J | 260 J |
| Indeno(1,2,3-cd)pyrene | 110 J | 4,500 | 210 J | 130 J | 97 J | 340 J |
| Benzo(g,h,i)perylene | 110 J | 4,600 | 250 J | 160 J | 98 J | 360 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| 1- Methylnaphthalene | | | | | | |
| Biphenyl | | | | | | |
| Methylnaphthalene | | | | | | |
| Dimethylnaphthalene | | 400 JN | | | | |
| Methyldibenzofuran | | | | | | |
| Fluorenone | | 400 JN | | | | |
| Methylanthracene | | 200 JN | | | | |
| Methylanthracene ( 2 isomers) | | | | | | |
| Methylphenanthrene | | | | | | |
| Phenylnaphthalene | | | | | | |
| Anthracenedione | | 700 JN | | | | 400 JN |
| Dimethylphenanthrene | | 400 JN | | | | |

## Table 2 (continued)
## Surface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | Source Samples | | | | |
|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-17 | SP-SS-18 | SP-SS-19 | SP-SS-20 | SP-SS-21 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Dimethylphenanthrene (2 isomers) | | | | | | |
| Cyclopentaphenanthrenone | | 500 JN | | | | 100 JN |
| Benzacephenanthrylene | | | | | | |
| Ethyleneglycol | | | | | 300 JN | |
| Benzofluorene | | | | | 100 JN | |
| Methylpyrene | 100 JN | | | | 400 JN | 200 JN |
| Methylpyrene (2 isomers) | | | | | | |
| Benzoanthracenone | | 500 JN | | | | |
| Benzoanthracenone (2 isomers) | | | | | | |
| Benzonaphthothiophene | | | 100 JN | | 100 JN | |
| Methylbenzanthracene | | | 100 JN | | | |
| Perylene | 200 JN | 3,000 JN | 200 JN | 200 JN | 100 JN | |
| Benzanthracenone | | | | | 100 JN | |
| Carboxylic Acid | | | | | | |
| Benzofluoranthene (not B or K) | | | | | | 80 JN |
| Benzopyrene (not A) | | | | | | 80 JN |
| Unidentified Compounds / # | 6,000 J/ 4 | | 4,000 J/3 | 6,000 J/5 | 600 J/1 | 600 J/1 |
| Alkanes | | | | | 1,000 J | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SS Surface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 3
## Surface Soil Pesticide/PCB Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | Source Samples | | | | |
|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-02 | SP-SS-03 | SP-SS-04 | SP-SS-05 | SP-SS-06 |
| **Pesticides / PCB Compounds** | | | | | | |
| Endosulfan I (Alpha) | 2.0 U | - | - | - | 75 J | - |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | 15 J | - | - | - |
| Endrin | 3.9 U | - | - | - | - | - |
| 4,4' -DDT (P,P' -DDT) | 3.9 U | - | 10 JN | - | - | - |
| **Pesticides / PCB Compounds** | **SP-SS-01** | **SP-SS-07** | **SP-SS-08** | **SP-SS-09** | **SP-SS-10** | **SP-SS-11** |
| Endosulfan I (Alpha) | 2.0 U | 130 N | 78 J | - | - | - |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | - | - | - | - |
| Endrin | 3.9 U | - | - | - | - | - |
| 4,4' -DDT (P,P' -DDT) | 3.9 U | - | - | - | - | - |
| **Pesticides / PCB Compounds** | **SP-SS-01** | **SP-SS-12** | **SP-SS-13** | **SP-SS-14** | **SP-SS-15** | **SP-SS-16** |
| Endosulfan I (Alpha) | 2.0 U | 6.0 N | - | - | - | - |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | - | - | - | - |
| Endrin | 3.9 U | - | - | 150 N | - | - |
| 4,4' -DDT (P,P' -DDT) | 3.9 U | - | - | - | - | - |
| **Pesticides / PCB Compounds** | **SP-SS-01** | **SP-SS-17** | **SP-SS-18** | **SP-SS-19** | **SP-SS-20** | **SP-SS-21** |
| Endosulfan I (Alpha) | 2.0 U | - | - | - | 5.2 N | 16 |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | - | - | - | - |
| Endrin | 3.9 U | - | - | - | - | - |
| 4,4' -DDT (P,P' -DDT) | 3.9 U | - | - | - | - | - |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SS Surface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

## TABLE 4
## Surface Soil Dioxin/Furan Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ng/kg) | Control | Source Sample | | | | | |
|---|---|---|---|---|---|---|---|
| | SP-SS-02 | SP-SS-06 | SP-SS-13 | SP-SS-14 | SP-SS-15 | SP-SS-17 | SP-SS-19 |
| 2,3,7,8-Tetrachlorodibenzodioxin | 2.2 U | 23 | - | - | - | - | 0.90 J |
| Tetrachlorodibenzodioxin (Total) | 2.8 J | 1,200 J | - | 82 J | - | - | 2.3 J |
| 1,2,3,7,8-Pentachlorodibenzodioxin | 0.76 J | 360 | 12 J | 40 | - | - | 2.6 J |
| Pentachlorodibenzodioxin (Total) | 4.1 J | 4,300 J | 12 J | 750 J | - | 16 J | 14 J |
| 1,2,3,4,7,8-Hexachlorodibenzodioxin | 5.5 U | 1,100 | 44 J | 250 | - | 46 J | 7.0 |
| 1,2,3,6,7,8-Hexachlorodibenzodioxin | 5.5 U | 2,500 | 130 | 1,700 | - | 350 | 12 |
| 1,2,3,7,8,9-Hexachlorodibenzodioxin | 1.3 J | 1,800 | 130 | 660 | - | 120 | 14 |
| Hexachlorodibenzodioxin (Total) | 18 J | 22,000 J | 2,500 J | 28,000 J | 4.8 J | 4,600 J | 130 J |
| 1,2,3,4,6,7,8-Heptachlorodibenzodioxin | 30 U | 84,000 | 7,900 J | 76,000 | - | 24,000 | 460 |
| Heptachlorodibenzodioxin (Total) | 80 UJ | 180,000 J | 33,000 J | 460,000 J | 47 J | 110,000 J | 1,200 J |
| Octachlorodibenzodioxin (Total) | 300 U | 1,000,000 | 100,000 | 940,000 | - | 300,000 | 4,400 J |
| 2,3,7,8-Tetrachlorodibenzofuran | 2.2 U | 100 J | - | 16 J | - | - | - |
| Tetrachlorodibenzofuran (Total) | 46 J | 470 J | - | 71 J | - | - | - |
| 2,3,4,7,8-Pentachlorodibenzofuran | 3.2 J | 170 | - | 66 | - | - | 1.2 J |
| Pentachlorodibenzofuran (Total) | 370 J | 2,800 J | 58 J | 1,300 J | 4.9 J | 100 J | 19 J |
| 1,2,3,6,7,8-Hexachlorodibenzofuran | 4.0 J | 550 | - | 390 | 2.0 J | - | 2.1 J |
| 2,3,4,6,7,8-Hexachlorodibenzofuran | 17 | 1,100 | - | 580 | 2.6 J | - | - |
| Hexachlorodibenzofuran (Total) | 230 J | 12,000 J | 1,100 J | 15,000 J | 180 J | 1,800 J | 77 J |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran | 42 | 12,000 | 2,500 | 94,000 | 410 | 3,100 | 160 |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran | 1.0 J | 850 | 68 J | 1,100 | 4.6 J | 99 J | - |
| Heptachlorodibenzofuran (Total) | 43 J | 13,000 J | 2,600 J | 95,000 J | 420 J | 3,200 J | 160 J |
| Octachlorodibenzofuran (Total) | 28 | 52,000 | 5,000 | 75,000 | 210 | 11,000 | 250 |
| TEQ* (Toxicity Equivalents Value) | 4.7 J | 3,000 | 250 | 3,100 | 4.8 J | 640 | 17 J |

**NOTES:**

- \- Material analyzed for but not detected
- SP Southern Wood Piedmont
- SS Surface Soil
- ng/kg Nanograms per kilogram
- J Estimated Value.
- U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
- * The total amount of toxic dioxin and furan concentrations present at a site is usually expressed as toxic equivalents (TEQ) of 2,3,7,8-tetrachlorodibenzodioxion (TCDD) present.

Elevated levels which are greater than three times background level or greater than the SQL.

Elevated levels of pesticides were detected in subsurface soil samples SP-SB-03, SP-SB-04, SP-SB-05, SP-SB-09, SP-SB-11, SP-SB-20, and SP-SB-21. Pesticides detected at elevated levels in subsurface soils include: endosulfan I (alpha), 4,4'-DDE (P,P'-DDE), and 4,4'-DDD (P,P'-DDD). Subsurface soil samples were not analyzed for dioxin/furans during this investigation. The subsurface soil source sample extractable, purgeable, and pesticide/PCB analytical results are summarized in Tables 5, 6, and 7, respectively.

### *4.3.2 Source Inorganic Analytical Results*

Inorganic analytes were detected at elevated levels in all surface and subsurface soil source samples when compared to background levels of naturally occurring levels for the area. Inorganic analytes were detected at elevated levels in surface soil samples SP-SS-02, SP-SS-03, SP-SS-04, SP-SS-05, SP-SS-06, SP-SS-07, SP-SS-08, SP-SS-09, SP-SS-10, SP-SS-11, SP-SS-12, SP-SS-14, SP-SS-19, SP-SS-20, and SP-SS-21 and in subsurface soil samples SP-SB-02, SP-SB-03, SP-SB-04, SP-SB-06, SP-SB-07, SP-SB-08, SP-SB-09, SP-SB-10, SP-SB-11, SP-SB-12, SP-SB-14, and SP-SB-18. Inorganic analytes detected at elevated levels in both surface and subsurface soil include aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc. No additional inorganic analytes were detected in surface soil samples. A more detailed summary of surface and subsurface soil inorganic analytical results are presented in Tables 8 and 9. The complete set of analytical data is presented in Appendix A.

# Table 5
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-02 | SP-SB-03 | SP-SB-04 | SP-SB-05 | SP-SB-06 |
| **Extractable Organic Componds** | | | | | | |
| Acenaphthene | 390 U | - | - | - | 9,400 J | 360 J |
| Acenaphthylene | 390 U | - | - | - | - | - |
| Anthracene | 390 U | - | 56 J | 43 J | 21,000 J | 58 J |
| Benzo(a)anthracene | 390 U | - | 57 J | - | 29,000 J | 42 J |
| Benzo(a)pyrene | 390 U | - | - | 100 J | - | 51 J |
| Benzo(b and/or k)fluoranthene | 44 J | - | 110 J | 160 J | 24,000 J | 77 J |
| Benzo(g,h,i)perylene | 390 U | - | - | 77 J | - | 42 J |
| Carbazole | 390 U | - | - | - | - | - |
| Chrysene | 390 U | - | 81 J | 160 J | 35,000 J | 78 J |
| Dibenzofuran | 390 U | - | - | - | 69,000 | 82 J |
| Fluoranthene | 390 U | - | 220 J | 180 J | 210,000 | 77 J |
| Fluorene | 390 U | - | - | - | 150,000 | 190 J |
| Indeno(1,2,3-cd)pyrene | 390 U | - | - | 86 J | - | - |
| 2-Methylnaphthalene | 390 U | - | - | - | - | - |
| Naphthalene | 390 U | - | - | - | - | - |
| Phenanthrene | 390 U | - | 120 J | 100 J | 430,000 | 67 J |
| Pyrene | 49 J | - | 210 J | 190 J | 97,000 J | 71 J |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Methylnaphthalene | | | | | | |
| 1 -Methylnaphthalene | | | | | | |
| Biphenyl | | | | | | |
| Ethylnaphthalene | | | | | | |
| Dimethylnaphthalene | | | | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | | | |
| Trimethylnaphthalene | | | | | | |
| Methylbiphenyl | | | | | | |
| Vanillin | | | | | | |
| Methyldibenzofuran | | | | | 30,000 JN | |
| Methylfluorene | | | | | | |
| Dibenzothiophene | | | | | | |
| Methylanthracene | | | | | | |
| Methyl (Methylethyl) Phenanthrene | | | | | | |

## Table 5 (continued)
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-02 | SP-SB-03 | SP-SB-04 | SP-SB-05 | SP-SB-06 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Benzonaphthothiophene | | | | | | |
| Cyclopentaphenanthrenone | | | | | | |
| Indenosoquinoline | | | | | | |
| Acenaphthopyridine | | | | | | |
| Benzofluorene | | | | | 20,000 JN | |
| Benzofluorene (2 isomers) | | | | | | |
| Benzanthracenone | | | | | | |
| Cyclopentapyrene | | | | | | |
| Methylphenanthrene | | | | | | |
| Anthracenedione | | | | | 20, 000 JN | |
| Methylpyrene | | | | | | |
| Methylpyrene (2 isomers) | | | | | | |
| Tetramethylphenanthrene | | | | 6,000 JN | | |
| Benzopyrene (not A) | | | | | | |
| Benzofluoranthene (not b or k) | | | | | 100,000 JN | |
| Methylchrysene | | | | | | |
| Perylene | | | | 100 JN | | |
| Naphthochrysene | | | | | | |
| Carboxylic Acids | | | | | | |
| Benzoic Acid | 80 JN | | | | | |
| Hexahydrohydroxytrimethyl Phenanthrenone | | | | | | |
| Unidentified Compounds / # | 2,000 J/1 | 1,000 J/2 | 7,000 J/4 | 7,000 J/6 | | |
| Branched Alkane | | | | | | |
| Alkanes | | | 6,000 J | | | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SB Subsurface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected.

Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 5 (continued)
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-07 | SP-SB-08 | SP-SB-09 | SP-SB-10 | SP-SB-11 |
| **Extractable Organic Componds** | | | | | | |
| Acenaphthene | 390 U | 20,000 | 4,900,000 | 59 J | 53 J | 270,000 J |
| Acenaphthylene | 390 U | 1,500 J | - | 62 J | - | 2,300 J |
| Anthracene | 390 U | 5,800 | 4,600,000 | 91 J | - | 32,000 J |
| Benzo(a)anthracene | 390 U | 6,700 | 1,400,000 | 530 | 120 J | 26,000 J |
| Benzo(a)pyrene | 390 U | 26,000 | 370,000 J | 580 | 120 J | 9,300 J |
| Benzo(b and/or k)fluoranthene | 44 J | 55,000 | 1,000,000 J | 960 J | 220 J | 21,000 J |
| Benzo(g,h,i)perylene | 390 U | 16,000 | - | 450 J | 72 J | 3,300 J |
| Carbazole | 390 U | 4,400 J | 1,200,000 J | - | - | 20,000 J |
| Chrysene | 390 U | 19,000 | 1,400,000 | 740 | 150 J | 25,000 J |
| Dibenzofuran | 390 U | 15,000 | 4,000,000 | - | - | 82,000 J |
| Fluoranthene | 390 U | 11,000 | 7,300,000 | 670 | 130 J | 250,000 J |
| Fluorene | 390 U | 18,000 | 7,000,000 | 69 J | - | 170,000 J |
| Indeno(1,2,3-cd)pyrene | 390 U | 16,000 | 84,000 J | 350 J | 57 J | 3,300 J |
| 2-Methylnaphthalene | 390 U | 7,200 | 2,400,000 | 42 J | 51 J | 240,000 J |
| Naphthalene | 390 U | 11,000 | 2,900,000 | 54 J | 130 J | 360,000 J |
| Phenanthrene | 390 U | 26,000 | 15,000,000 | 370 J | 110 J | 470,000 J |
| Pyrene | 49 J | 23,000 J | 4,600,000 J | 930 J | 240 J | 80,000 J |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Methylnaphthalene | | 3,000 JN | 1,000,000 JN | | | |
| 1 -Methylnaphthalene | | | | | | 8,000 JN |
| Biphenyl | | | 500,000 JN | | | 5,000 JN |
| Ethylnaphthalene | | | 300,000 JN | | | |
| Dimethylnaphthalene | | 2,000 JN | | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | 7,000 JN |
| Dimethylnaphthalene (3 isomers) | | | 3,000,000 JN | | | |
| Trimethylnaphthalene | | | 400,000 JN | | | |
| Methylbiphenyl | | 1,000 JN | 1,000,000 JN | | | 5,000 JN |
| Vanillin | | | | | | |
| Methyldibenzofuran | | 1,000 JN | 700,000 JN | | | 5,000 JN |
| Methylfluorene | | | | | | 4,000 JN |
| Dibenzothiophene | | 2,000 JN | 400,000 JN | | | |
| Methylanthracene | | 1,000 JN | | | | |
| Methyl (Methylethyl) Phenanthrene | | | | | | |

## Table 5 (continued)
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-07 | SP-SB-08 | SP-SB-09 | SP-SB-10 | SP-SB-11 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Benzonaphthothiophene | | | | | | |
| Cyclopentaphenanthrenone | | 10,000 JN | 500,000 JN | | | 3,000 JN |
| Indenosoquinoline | | 1,000 JN | | | | |
| Acenaphthopyridine | | 2,000 JN | | | | |
| Benzofluorene | | 4,000 JN | 400,000 JN | | | |
| Benzofluorene (2 isomers) | | | | | | 10,000 JN |
| Benzanthracenone | | | | | | |
| Cyclopentapyrene | | | | | | |
| Methylphenanthrene | | | | | | |
| Anthracenedione | | | | | | |
| Methylpyrene | | | | | | 10,000 JN |
| Methylpyrene (2 isomers) | | 10,000 JN | 1,000,000 JN | | | |
| Tetramethylphenanthrene | | | | | | |
| Benzopyrene (not A) | | | | | | |
| Benzofluoranthene (not b or k) | | 3,000 JN | | | | |
| Methylchrysene | | 10,000 JN | | | | |
| Perylene | | 2,000 JN | | | | 6,000 JN |
| Naphthochrysene | | 1,000 JN | | | | |
| Carboxylic Acids | | | | | | |
| Benzoic Acid | | | | | | |
| Hexahydrohydroxytrimethyl (Methylethyl) Phenanthrenone | | | | | | |
| Unidentified Compounds / # | | 10,000 J/1 | | 4,000 J/5 | 5,000 J/5 | |
| Branched Alkane | | 10,000 J | | | | |
| Alkanes | | | | 1,000 J | 1,000 J | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SB Subsurface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected.

Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 5 (continued)
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-12 | SP-SB-13 | SP-SB-14 | SP-SB-15 | SP-SB-16 |
| **Extractable Organic Componds** | | | | | | |
| Acenaphthene | 390 U | 9,300 | 660 | - | - | - |
| Acenaphthylene | 390 U | 210 J | - | 42 J | - | - |
| Anthracene | 390 U | 1,900 | 55 J | 160 J | - | - |
| Benzo(a)anthracene | 390 U | 1,900 | 37 J | 200 J | - | - |
| Benzo(a)pyrene | 390 U | 1,500 | 31 J | 150 J | - | - |
| Benzo(b and/or k)fluoranthene | 44 J | 3,300 | 120 J | 230 J | 52 J | - |
| Benzo(g,h,i)perylene | 390 U | 790 | - | 110 J | - | - |
| Carbazole | 390 U | 190 J | - | 39 J | - | - |
| Chrysene | 390 U | 2,700 | 120 J | 270 J | - | - |
| Dibenzofuran | 390 U | 2,200 | 85 J | - | - | - |
| Fluoranthene | 390 U | 8,200 | 160 J | 290 J | 85 J | - |
| Fluorene | 390 U | 4,200 | 170 J | - | - | - |
| Indeno(1,2,3-cd)pyrene | 390 U | 830 | - | 94 J | - | - |
| 2-Methylnaphthalene | 390 U | 480 J | 450 | - | - | - |
| Naphthalene | 390 U | 1,100 | - | - | - | - |
| Phenanthrene | 390 U | 7,100 | 83 J | 110 J | - | - |
| Pyrene | 49 J | 4,900 J | 97 J | 320 J | 64 J | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Methylnaphthalene | | | | | | |
| 1 -Methylnaphthalene | | | 300 JN | | | |
| Biphenyl | | | | | | |
| Ethylnaphthalene | | | | | | |
| Dimethylnaphthalene | | 400 JN | | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | | | |
| Trimethylnaphthalene | | | | | | |
| Methylbiphenyl | | | | | | |
| Vanillin | | 100 JN | | | | |
| Methyldibenzofuran | | 300 JN | | | | |
| Methylfluorene | | | | | | |
| Dibenzothiophene | | | | | | |
| Methylanthracene | | 400 JN | | | | |
| Methyl (Methylethyl) Phenanthrene | | 1,000 JN | | | | |

## Table 5 (continued)
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-12 | SP-SB-13 | SP-SB-14 | SP-SB-15 | SP-SB-16 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Benzonaphthothiophene | | 1,000 JN | | | | |
| Cyclopentaphenanthrenone | | | | | | |
| Indenosoquinoline | | | | | | |
| Acenaphthopyridine | | | | | | |
| Benzofluorene | | | | | | |
| Benzofluorene (2 isomers) | | | | | | |
| Benzanthracenone | | | | | | |
| Cyclopentapyrene | | | | | | |
| Methylphenanthrene | | | | | | |
| Anthracenedione | | | | | | |
| Methylpyrene | | | | | | |
| Methylpyrene (2 isomers) | | | | | | |
| Tetramethylphenanthrene | | | 200 JN | | | |
| Benzopyrene (not A) | | | | | | |
| Benzofluoranthene (not b or k) | | | | | | |
| Methylchrysene | | | | | | |
| Perylene | | | | | | |
| Naphthochrysene | | | | | | |
| Carboxylic Acids | | 2,000 J | | | | |
| Benzoic Acid | | | | | | |
| Hexahydrohydroxytrimethyl (Methylethyl) Phenanthrenone | | | | | | |
| Unidentified Compounds / # | | 20,000 J/8 | | | 1,000 J/2 | 2,000 J/3 |
| Branched Alkane | | | | | | |
| Alkanes | | | | | | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SB Subsurface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected.

Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 5 (continued)
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-17 | SP-SB-18 | SP-SB-19 | SP-SB-20 | SP-SB-21 |
| **Extractable Organic Componds** | | | | | | |
| Acenaphthene | 390 U | - | - | - | - | 69 J |
| Acenaphthylene | 390 U | - | - | - | 71 J | 58 J |
| Anthracene | 390 U | 37 J | - | - | 180 J | 130 J |
| Benzo(a)anthracene | 390 U | 190 J | - | - | 510 | 410 |
| Benzo(a)pyrene | 390 U | 140 J | - | 41 J | 480 | 540 |
| Benzo(b and/or k)fluoranthene | 44 J | 420 J | - | 52 J | 790 J | 1,600 |
| Benzo(g,h,i)perylene | 390 U | 120 J | - | - | 540 | 470 |
| Carbazole | 390 U | - | - | - | - | 110 J |
| Chrysene | 390 U | 260 J | - | 41 J | 680 | 850 |
| Dibenzofuran | 390 U | - | - | - | - | 79 J |
| Fluoranthene | 390 U | 390 | - | - | 640 | 850 |
| Fluorene | 390 U | - | - | - | - | 100 J |
| Indeno(1,2,3-cd)pyrene | 390 U | 99 J | - | - | 420 | 440 |
| 2-Methylnaphthalene | 390 U | - | - | - | - | 65 J |
| Naphthalene | 390 U | - | - | - | - | 150 J |
| Phenanthrene | 390 U | 60 J | - | - | 300 J | 360 J |
| Pyrene | 49 J | 350 J | - | - | 800 J | 990 J |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Methylnaphthalene | | | | | | |
| 1 -Methylnaphthalene | | | | | | |
| Biphenyl | | | | | | |
| Ethylnaphthalene | | | | | | |
| Dimethylnaphthalene | | | | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | | | |
| Trimethylnaphthalene | | | | | | |
| Methylbiphenyl | | | | | | |
| Vanillin | | | | | | |
| Methyldibenzofuran | | | | | | |
| Methylfluorene | | | | | | |
| Dibenzothiophene | | | | | | |
| Methylanthracene | | | | | | |
| Methyl (Methylethyl) Phenanthrene | | | | | | |

# Table 5 (continued)
## Subsurface Soil Extractable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-17 | SP-SB-18 | SP-SB-19 | SP-SB-20 | SP-SB-21 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Benzonaphthothiophene | | | | | | |
| Cyclopentaphenanthrenone | | | | | | |
| Indenosoquinoline | | | | | | |
| Acenaphthopyridine | | | | | | |
| Benzofluorene | | | | | | |
| Benzofluorene (2 isomers) | | | | | | 200 JN |
| Benzanthracenone | | | | | | 100 JN |
| Cyclopentapyrene | | | | | | 100 JN |
| Methylphenanthrene | | | | | | 100 JN |
| Anthracenedione | | | | | | 800 JN |
| Methylpyrene | | | | | | 90 JN |
| Methylpyrene (2 isomers) | | | | | | |
| Tetramethylphenanthrene | | | | | 400 JN | |
| Benzopyrene (not A) | | | | | 100 JN | |
| Benzofluoranthene (not b or k) | | | | | | 300 JN |
| Methylchrysene | | | | | | |
| Perylene | | 100 JN | | | 100 JN | |
| Naphthochrysene | | | | | | |
| Carboxylic Acids | | | | | | |
| Benzoic Acid | | | | | | |
| Hexahydrohydroxytrimethyl (Methylethyl) Phenanthrenone | | | | 90 JN | | |
| Unidentified Compounds / # | | | 4,000 J/4 | 2,000 J/2 | 2,000 J/3 | 1,000 J/2 |
| Branched Alkane | | | | | | |
| Alkanes | | | | | | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SB Subsurface Soil
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL).
\- Not detected.

Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 6
## Subsurface Soil Purgeable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background SP-SB-01 | SP-SB-02 | SP-SB-03 | SP-SB-04 | SP-SB-05 | SP-SB-06 |
|---|---|---|---|---|---|---|
| **Purgeable Organic Compounds** | | | | | | |
| Methyl Ethyl Ketone | 14 U | - | 44 J | - | 30 J | - |
| Benzene | 14 U | - | - | - | - | - |
| Toluene | 14 U | - | - | - | - | - |
| Ethyl Benzene | 14 U | - | - | - | - | - |
| Total Xylenes | 14 U | - | - | - | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | |
| Unidentified Compounds/# | | | | | | |
| Cyclic Alkanes | | | | | | |
| Branched Alkane | | | | | | |
| Alkanes | | | | | | |
| (Methylethyl) Benzene | | | | | | |
| Ethylmethyl Benzene (2 isomers) | | | | | | |
| Trimethylbenzene (3 isomers) | | | | | | |
| Methyl (Methylethyl) Benzene | | | | | | |
| (Methylphenyl) Ethanone | | | | | | |
| Indene | | | | | | |
| Ethyldimethylbenzene | | | | | | |
| Dihydromethylindene | | | | | | |
| Ethenylbenzaldehyde | | | | | | |
| Phenylpropenal | | | | | | |
| Dihydromethylindene (2 isomers) | | | | | | |
| Dihydrodimethylindene | | | | | | |
| Pinene | | | | | | |
| Ethylmethylbenzene | | | | | | |
| Benzofuran | | | | | | |
| Indane | | | | | | |
| Ethynylmethylbenzene | | | | | | |
| Methylbenzofuran | | | | | | |
| Methyl(Methylethyl)Benzene (3 isomers) | | | | | | |
| Ethenylmethylbenzene | | | | | | |
| Methyl(Propenyl)Benzene | | | | | | |

## Table 6 (continued)
## Subsurface Soil Purgeable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background SP-SB-01 | SP-SB-07 | SP-SB-08 | SP-SB-09 | SP-SB-10 | SP-SB-11 |
|---|---|---|---|---|---|---|
| **Purgeable Organic Compounds** | | | | | | |
| Methyl Ethyl Ketone | 14 U | 19 J | 71 J | - | - | - |
| Benzene | 14 U | - | 78 J | - | - | - |
| Toluene | 14 U | - | 550 J | - | - | - |
| Ethyl Benzene | 14 U | 21 | 530 J | - | - | 510 |
| Total Xylenes | 14 U | 47 | 2,300 J | - | - | 910 |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | |
| Unidentified Compounds/# | | 700 J/2 | 10,000 J/4 | | | 2,000 J/3 |
| Cyclic Alkanes | | | | | | 400 J |
| Branched Alkane | | | | | | 200 J |
| Alkanes | | | | | | 1,000 J |
| (Methylethyl) Benzene | | 10 JN | | | | 700 JN |
| Ethylmethylbenzene (2 isomers) | | 80 JN | | | | 3,000 JN |
| Trimethylbenzene (3 isomers) | | 200 JN | 6,000 JN | | | 5,000 JN |
| Methyl (Methylethyl) Benzene | | 40 JN | 800 JN | | | |
| (Methylphenyl) Ethanone | | 30 JN | | | | |
| Indene | | 30 JN | | | | |
| Ethyldimethylbenzene | | 20 JN | 500 JN | | | |
| Dihydromethylindene | | 100 JN | | | | |
| Ethenylbenzaldehyde | | 30 JN | | | | |
| Phenylpropenal | | 100 JN | | | | 4,000 JN |
| Dihydromethylindene (2 isomers) | | 400 JN | | | | |
| Dihydrodimethylindene | | 40 JN | | | | |
| Pinene | | | 1,000 JN | | | |
| Ethylmethylbenzene | | | 1,000 JN | | | |
| Benzofuran | | | 1,000 JN | | | |
| Indane | | | 9,000 JN | | | |
| Ethynylmethylbenzene | | | 4,000 JN | | | |
| Methylbenzofuran | | | 700 JN | | | |
| Methyl(Methylethyl)Benzene (3 isomers) | | | | | | 2,000 JN |
| Ethenylmethylbenzene | | | | | | 30,000 JN |
| Methyl(Propenyl)Benzene | | | | | | 2,000 JN |

## Table 6 (continued)
## Subsurface Soil Purgeable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-12 | SP-SB-13 | SP-SB-14 | SP-SB-15 | SP-SB-16 |
| **Purgeable Organic Compounds** | | | | | | |
| Methyl Ethyl Ketone | 14 U | - | - | - | - | - |
| Benzene | 14 U | - | - | - | - | - |
| Toluene | 14 U | - | - | - | - | - |
| Ethyl Benzene | 14 U | - | - | - | - | - |
| Total Xylenes | 14 U | - | - | - | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | |
| Unidentified Compounds/# | | | 50 J/1 | | | |
| Cyclic Alkanes | | | | | | |
| Branched Alkane | | | | | | |
| Alkanes | | | | | | |
| (Methylethyl) Benzene | | | | | | |
| Ethylmethyl Benzene (2 isomers) | | | | | | |
| Trimethylbenzene (3 isomers) | | | | | | |
| Methyl (Methylethyl) Benzene | | | | | | |
| (Methylphenyl) Ethanone | | | | | | |
| Indene | | | | | | |
| Ethyldimethylbenzene | | | | | | |
| Dihydromethylindene | | | | | | |
| Ethenylbenzaldehyde | | | | | | |
| Phenylpropenal | | | | | | |
| Dihydromethylindene (2 isomers) | | | 30 JN | | | |
| Dihydrodimethylindene | | | | | | |
| Pinene | | | | | | |
| Ethylmethylbenzene | | | | | | |
| Benzofuran | | | | | | |
| Indane | | | | | | |
| Ethynylmethylbenzene | | | | | | |
| Methylbenzofuran | | | | | | |
| Methyl(Methylethyl)Benzene (3 isomers) | | | | | | |
| Ethenylmethylbenzene | | | | | | |
| Methyl(Propenyl)Benzene | | | | | | |

## Table 6 (continued)
## Subsurface Soil Purgeable Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-17 | SP-SB-18 | SP-SB-19 | SP-SB-20 | SP-SB-21 |
| **Purgeable Organic Compounds** | | | | | | |
| Methyl Ethyl Ketone | 14 U | - | - | - | - | - |
| Benzene | 14 U | - | - | - | - | - |
| Toluene | 14 U | - | - | - | - | - |
| Ethyl Benzene | 14 U | - | - | - | - | - |
| Total Xylenes | 14 U | - | - | - | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | |
| Unidentified Compounds/# | | | | | | |
| Cyclic Alkanes | | | | | | |
| Branched Alkane | | | | | | |
| Alkanes | | | | | | |
| (Methylethyl) Benzene | | | | | | |
| Ethylmethyl Benzene (2 isomers) | | | | | | |
| Trimethylbenzene (3 isomers) | | | | | | |
| Methyl (Methylethyl) Benzene | | | | | | |
| (Methylphenyl) Ethanone | | | | | | |
| Indene | | | | | | |
| Ethyldimethylbenzene | | | | | | |
| Dihydromethylindene | | | | | | |
| Ethenylbenzaldehyde | | | | | | |
| Phenylpropenal | | | | | | |
| Dihydromethylindene (2 isomers) | | | | | | |
| Dihydrodimethylindene | | | | | | |
| Pinene | | | | | | |
| Ethylmethylbenzene | | | | | | |
| Benzofuran | | | | | | |
| Indane | | | | | | |
| Ethynylmethylbenzene | | | | | | |
| Methylbenzofuran | | | | | | |
| Methyl(Methylethyl)Benzene (3 isomers) | | | | | | |
| Ethenylmethylbenzene | | | | | | |
| Methyl(Propenyl)Benzene | | | | | | |

**NOTES**

| | |
|---|---|
| ug/kg | micrograms per kilogram |
| SP | Southern Wood Piedment. |
| SB | Subsurface Boring. |
| J | Estimated value. |
| N | Presumptive evidence of presence of material. |
| U | Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL). |
| - | Not detected. |
| | Elevated levels which are greater than three times the background level or greater than the SQL. |

# Table 7
## Subsurface Soil Pesticide/PCB Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | Source Samples | | | | |
|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-02 | SP-SB-03 | SP-SB-04 | SP-SB-05 | SP-SB-06 |
| Pesticides / PCB Compounds | | | | | | |
| Endosulfan I (Alpha) | 2.0 U | - | 2.4 N | - | 89 J | - |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | 35 J | 6.3 | - | - |
| 4,4' -DDT (P,P' - DDT) | 3.9 U | - | 7.5 JN | - | - | - |
| 4,4' -DDD (P,P' -DDD) | 3.9 U | - | 44 | 20 | - | - |
| Alpha-Chlordane/2 | 2.0 U | - | - | - | - | - |
| Dieldrin | 3.9 U | - | - | - | - | - |
| **Pesticides / PCB Compounds** | **SP-SB-01** | **SP-SB-07** | **SP-SB-08** | **SP-SB-09** | **SP-SB-10** | **SP-SB-11** |
| Endosulfan I (Alpha) | 2.0 U | - | | 8.0 | - | - |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | - | - | - | - |
| 4,4' -DDT (P,P' - DDT) | 3.9 U | - | - | - | - | - |
| 4,4' -DDD (P,P' -DDD) | 3.9 U | - | - | - | - | 64 |
| Alpha-Chlordane/2 | 2.0 U | 150 JN | - | - | - | - |
| Dieldrin | 3.9 U | - | - | - | - | - |
| **Pesticides / PCB Compounds** | **SP-SB-01** | **SP-SB-12** | **SP-SB-13** | **SP-SB-14** | **SP-SB-15** | **SP-SB-16** |
| Endosulfan I (Alpha) | 2.0 U | 23 N | - | - | - | - |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | - | - | - | - |
| 4,4' -DDT (P,P' - DDT) | 3.9 U | - | - | - | - | - |
| 4,4' -DDD (P,P' -DDD) | 3.9 U | - | - | - | - | - |
| Alpha-Chlordane/2 | 2.0 U | - | - | - | - | - |
| Dieldrin | 3.9 U | 14 N | - | - | - | - |
| **Pesticides / PCB Compounds** | **SP-SS-01** | **SP-SB-17** | **SP-SB-18** | **SP-SB-19** | **SP-SB-20** | **SP-SB-21** |
| Endosulfan I (Alpha) | 2.0 U | 5.4 N | - | - | 3.2 | 17 |
| 4,4' -DDE (P,P' -DDE) | 3.9 U | - | - | - | - | - |
| 4,4' -DDT (P,P' - DDT) | 3.9 U | - | - | - | - | - |
| 4,4' -DDD (P,P' -DDD) | 3.9 U | - | - | - | - | - |
| Alpha-Chlordane/2 | 2.0 U | - | - | - | - | - |
| Dieldrin | 3.9 U | - | - | - | - | - |

ug/kg Micrograms per kilogram
SP Southern Wood Piedmont
SB Subsurface Soil
J Estimated value
N Presumptive evidence indicates the presence of material
U Material was analyzed for but not detected. The number is the sample quantitation limit (SQL).
\- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 8
## Surface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-02 | SP-SS-03 | SP-SS-04 | SP-SS-05 | SP-SS-06 | |
| Aluminum | 990 | 2,400 | 4,700 | 710 | 710 | 1,200 | 7,000 - 15,000 |
| Arsenic | 1.8 J | 56 J | 5.4 | - | 2.2 | 210 | 0 - 2.6 |
| Barium | 8.8 | 27 | 43 | 13 | 4.6 | 28 | 10 - 200 |
| Cadmium | 0.26 U | - | - | - | - | - | n/a |
| Calcium | 1,200 J | 580 J | 4,800 | 260 J | 230 | 22,000 | 0 - 2,300 |
| Chromium | 3.6 | 3.5 J | 10.9 | 2.2 J | 2.2 | 130 J | 0 - 20 |
| Cobalt | 1 U | 1.4 J | 1.8 J | - | - | 1.6 J | < 3 |
| Copper | 19 | 24 | 24. | 5.7 J | 14 | 170 J | 0 - 10 |
| Iron | 2,000 J | 5,000 J | 6,600 | 2,300 J | 1,300 | 11,000 | 0 - 10,000 |
| Lead | 25 J | 54 J | 100 | 5.6 J | 2.6 | 19 J | < 10 |
| Magnesium | 200 | 220 | 640 | 84 | 110 | 480 J | 0 - 1,500 |
| Manganese | 11 | 60 | 65 | 21 | 8.8 J | 110 J | 0 - 150 |
| Mercury | 0.11 U | - | - | - | - | 0.17 | 0 - 0.051 |
| Nickel | 1.3 J | 3.3 J | - | - | - | - | 0 - 5 |
| Potassium | 220 | 170 | 300 | 120 | - | 150 | 0 - 6,800 |
| Sodium | 26 | 16 J | 270 | 13 J | 87 | 62 | 0 - 2,000 |
| Vanadium | 4.3 J | 4.7 J | 12 | 3.5 J | 2.4 J | 4.1 J | 0 - 20 |
| Zinc | 11 | 18 | 100 | 40 | 13 | 57 | < 0 |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

mg/kg milligrams per kilogram
SP Southern Wood Piedmont
SS Surface Soil
< Less than

J Estimated value

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

\- Not detected

Elevated levels which are greater than three times background level or greater than the SQL.

## Table 8 (continued)
## Surface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-07 | SP-SS-08 | SP-SS-09 | SP-SS-10 | SP-SS-11 | |
| Aluminum | 990 | 1,200 | 1,900 | 1,500 | 1,900 | 2,400 | 7,000 - 15,000 |
| Arsenic | 1.8 J | 16 | 27 | - | 18 | - | 0 - 2.6 |
| Barium | 8.8 | 22 | 21 | 3.2 | 12 | 17 | 10 - 200 |
| Cadmium | 0.26 U | - | - | - | - | - | n/a |
| Calcium | 1,200 J | 720 | 15,000 | 5,200 | 710 | 640 | 0 - 2,300 |
| Chromium | 3.6 | 9.2 | 22 | 2.8 | 8.7 | 6.3 | 0 - 20 |
| Cobalt | 1 U | - | 0.80 J | - | - | - | < 3 |
| Copper | 19 | 16 | 55 | - | 16 | - | 0 - 10 |
| Iron | 2,000 J | 2,500 | 3,500 | 1,300 | 3,100 | 1,100 | 0 - 10,000 |
| Lead | 25 J | 37 | 19 | 2.7 | 9.9 | 24 | < 10 |
| Magnesium | 200 | 140 | 610 | 170 | 140 | 91 | 0 - 1,500 |
| Manganese | 11 | 40 J | 120 | 11 J | 28 J | 6.4 J | 0 - 150 |
| Mercury | 0.11 U | 0.12 | 0.22 | - | 0.15 | - | 0 - 0.051 |
| Nickel | 1.3 J | - | - | - | - | - | 0 - 5 |
| Potassium | 220 | - | 310 | - | - | - | 0 - 6,800 |
| Sodium | 26 | 34 | 230 | 110 | 120 | - | 0 - 2,000 |
| Vanadium | 4.3 J | 4.6 J | 5.7 J | 2.4 J | 5.9 J | 6.2 J | 0 - 20 |
| Zinc | 11 | 32 | 43 | 6.7 | 14 | 57 | < 0 |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

mg/kg milligrams per kilogram
SP Southern Wood Piedmont
SS Surface Soil
< Less than

J Estimated value

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

\- Not detected

Elevated levels which are greater than three times background level or greater than the SQL.

# Table 8 (continued)
## Surface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-12 | SP-SS-13 | SP-SS-14 | SP-SS-15 | SP-SS-16 | |
| Aluminum | 990 | 2,300 | 2,000 | 3,700 | 640 | 310 | 7,000 - 15,000 |
| Arsenic | 1.8 J | 12 | 3.1 | 5 | - | - | 0 - 2.6 |
| Barium | 8.8 | 11 | 3 | 15 | 2.3 | 2 | 10 - 200 |
| Cadmium | 0.26 U | - | - | - | - | - | n/a |
| Calcium | 1,200 J | 7,700 | 280 | 1,200 | 33 J | - | 0 - 2,300 |
| Chromium | 3.6 | 18 | 4.1 | 7.8 J | 2.9 | 1.7 J | 0 - 20 |
| Cobalt | 1 U | - | - | - | - | - | < 3 |
| Copper | 19 | 11 | - | 35 J | - | - | 0 - 10 |
| Iron | 2,000 J | 2,400 | 1,600 | 4,600 | 1,100 J | 650 | 0 - 10,000 |
| Lead | 25 J | 45 | 3.2 | 16 J | 2.6 J | 2.8 | < 10 |
| Magnesium | 200 | 260 | 88 | 370 J | 96 | - | 0 - 1,500 |
| Manganese | 11 | 34 | 8 | 53 J | 6.9 | 3.8 J | 0 - 150 |
| Mercury | 0.11 U | - | - | 0.77 | - | - | 0 - 0.051 |
| Nickel | 1.3 J | - | - | - | - | - | 0 - 5 |
| Potassium | 220 | 240 J | - | 230 | 180 | - | 0 - 6,800 |
| Sodium | 26 | 100 | - | 46 | - | - | 0 - 2,000 |
| Vanadium | 4.3 J | 5.4 J | 3.6 J | 9 J | 3.6 J | - | 0 - 20 |
| Zinc | 11 | 32 | 7 | 37 | 1.8 J | 5.8 | < 0 |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

mg/kg milligrams per kilogram
SP Southern Wood Piedmont
SS Surface Soil
< Less than
J Estimated value
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
\- Not detected
Elevated levels which are greater than three times background level or greater than the SQL.

# Table 8 (continued)
## Surface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SS-01 | SP-SS-17 | SP-SS-18 | SP-SS-19 | SP-SS-20 | SP-SS-21 | |
| Aluminum | 990 | 650 | 1,200 | 3,400 | 1,000 | 2,100 | 7,000 - 15,000 |
| Arsenic | 1.8 J | - | - | 3 J | 83 | 43 | 0 - 2.6 |
| Barium | 8.8 | 4.1 | 3 | 7.7 | 4.5 | 7.2 | 10 - 200 |
| Cadmium | 0.26 U | - | - | - | 1 J | - | n/a |
| Calcium | 1,200 J | - | 15 J | 37 J | 130,000 | 9,700 | 0 - 2,300 |
| Chromium | 3.6 | 2.2 J | 4 | 9.2 | 61 | 19 | 0 - 20 |
| Cobalt | 1 U | - | - | - | 2.8 J | - | < 3 |
| Copper | 19 | - | - | - | 110 | 29 | 0 - 10 |
| Iron | 2,000 J | 1,300 | 2,200 J | 4,700 J | 20,000 | 1,300 | 0 - 10,000 |
| Lead | 25 J | 6.5 | 5.5 J | 6.1 J | 6.1 | 8 | < 10 |
| Magnesium | 200 | 82 | 170 | 430 | 4,700 | 290 | 0 - 1,500 |
| Manganese | 11 | 4.9 J | 9.2 | 14 | 230 | 13 J | 0 - 150 |
| Mercury | 0.11 U | - | - | - | - | - | 0 - 0.051 |
| Nickel | 1.3 J | - | - | - | 6 J | - | 0 - 5 |
| Potassium | 220 | - | 210 | 600 | 280 | - | 0 - 6,800 |
| Sodium | 26 | - | - | - | 260 | 92 | 0 - 2,000 |
| Vanadium | 4.3 J | 2.6 J | 6.3 J | 14 | 19 | 3.6 J | 0 - 20 |
| Zinc | 11 | 6.9 | 5.6 | 8.3 | 11 | 12 | < 0 |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

mg/kg milligrams per kilogram
SP Southern Wood Piedmont
SS Surface Soil
< Less than

J Estimated value

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

\- Not detected

Elevated levels which are greater than three times background level or greater than the SQL.

# Table 9
## Subsurface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-02 | SP-SB-03 | SP-SB-04 | SP-SB-05 | SP-SB-06 | |
| Aluminum | 770 | 2,600 | 3,700 | 1,100 | 1,000 | 1,100 | 7,000 - 15,000 |
| Arsenic | 2 UJ | 9.2 J | - | 4.2 J | - | - | 0 - 2.6 |
| Barium | 4.4 | 1.9 | 16 | 25 | 4.5 | 7.3 | 10 - 200 |
| Cadmium | 0.28 U | - | - | - | - | - | n/a |
| Calcium | 1,400 J | 170 J | 17,000 | 490 J | 470 | 230 | 0 - 2,300 |
| Chromium | 2.9 | 1.8 J | 10 | 3.4 J | 2.3 J | 2.8 J | 0 - 20 |
| Cobalt | 1 U | - | 1.5 J | 0.77 J | - | - | < 3 |
| Copper | 3.1 J | 4.2 J | - | 30 | - | 8 J | 0 - 10 |
| Iron | 1,600 J | 720 J | 4,000 | 3,600 J | 1,600 | 1,400 | 0 - 10,000 |
| Lead | 1.6 J | 5.4 J | 15 | 180 J | 3.7 | 2.8 J | < 10 |
| Magnesium | 160 | 14 J | 1,800 | 120 | 110 | 140 J | 0 - 1,500 |
| Manganese | 6 | 2.2 J | 24 | 26 | 8.1 | - | 0 - 150 |
| Mercury | 0.11 U | - | - | 0.48 | - | - | 0 - 0.051 |
| Nickel | 1 U | - | - | - | - | - | 0 - 5 |
| Potassium | 130 | 50 J | 450 | 180 | 220 J | 230 | 0 - 6,800 |
| Sodium | 65 | - | 280 | 12 J | - | - | 0 - 2,000 |
| Vanadium | 3.2 J | 2.1 J | 12 J | 3.7 J | 3.2 J | 3.1 J | 0 - 20 |
| Zinc | 5.9 | - | 24 | 48 | 18 | 23 | <0 |
| Cyanide | 0.14 U | - | - | - | - | - | n/a |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

mg/kg milligrams per kilogram
SP Southern Wood Piedmont
SB Subsurface Soil
< Less than
J Estimated value
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 9 (continued)
## Subsurface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-07 | SP-SB-08 | SP-SB-09 | SP-SB-10 | SP-SB-11 | |
| Aluminum | 770 | 920 | 1,600 | 13,000 | 7,400 | 1,100 | 7,000 - |
| Arsenic | 2 UJ | - | 19 | 5.2 | - | 2.9 | 0 - 2.6 |
| Barium | 4.4 | 18 | 47 | 39 | 21 | 24 | 10 - 200 |
| Cadmium | 0.28 U | - | 0.96 J | - | - | - | n/a |
| Calcium | 1,400 J | 380 | 8,700 | 820 | 800 | 970 | 0 - 2,300 |
| Chromium | 2.9 | 2.5 | 12 | 18 | 12 | 6.5 | 0 - 20 |
| Cobalt | 1 U | 0.75 J | 2.7 J | 6.2 J | 3.6 J | - | < 3 |
| Copper | 3.1 J | - | 100 | 11 | - | 7.9 | 0 - 10 |
| Iron | 1,600 J | 1,900 | 17,000 | 14,000 | 7,200 | 2,600 | 0 - 10,000 |
| Lead | 1.6 J | 7.4 | 110 | 14 | 3.8 | 58 | < 10 |
| Magnesium | 160 | 96 | 420 | 1,300 | 910 | 180 | 0 - 1,500 |
| Manganese | 6 | 10 | 130 | 110 | 130 | 18 | 0 - 150 |
| Mercury | 0.11 U | - | 1.0 | - | - | - | 0 - 0.051 |
| Nickel | 1 U | - | 11 | - | - | - | 0 - 5 |
| Potassium | 130 | - | - | 780 | 560 J | 170 | 0 - 6,800 |
| Sodium | 65 | - | 150 | 110 | 180 | - | 0 - 2,000 |
| Vanadium | 3.2 J | 3.3 J | 8.7 J | 34 | 18 | 4.7 J | 0 - 20 |
| Zinc | 5.9 | 22 | 120 | 73 | 36 | 82 | < 0 |
| Cyanide | 0.14 U | - | 12 | - | - | - | n/a |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

| | |
|---|---|
| mg/kg | milligrams per kilogram |
| SP | Southern Wood Piedmont |
| SB | Subsurface Soil |
| < | Less than |
| J | Estimated value |
| U | Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL). |
| - | Not detected |
| | Elevated levels which are greater than three times the background level or greater than the SQL. |

# Table 9 (continued)
## Subsurface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-12 | SP-SB-13 | SP-SB-14 | SP-SB-15 | SP-SB-16 | |
| Aluminum | 770 | 1,800 | 2,100 | 800 | 440 | 350 | 7,000 - 15,000 |
| Arsenic | 2 UJ | 4.2 | - | 2.3 | - | - | 0 - 2.6 |
| Barium | 4.4 | 18 | 2.3 | 11 | 2 | 2.4 | 10 - 200 |
| Cadmium | 0.28 U | - | - | - | - | - | n/a |
| Calcium | 1,400 J | 13,000 | - | 230 | 41 J | 150 | 0 - 2,300 |
| Chromium | 2.9 | 6.4 | 1.6 J | 3.4 J | 2.4 J | 1.5 J | 0 - 20 |
| Cobalt | 1 U | - | - | - | - | - | < 3 |
| Copper | 3.1 J | 12 | - | 6.3 J | - | - | 0 - 10 |
| Iron | 1,600 J | 2,700 | 1,300 | 2,100 | 970 J | 570 | 0 - 10,000 |
| Lead | 1.6 J | 38 | 2 | 8.1 J | 0.94 J | 1.3 | < 10 |
| Magnesium | 160 | 900 | - | - | 90 | - | 0 - 1,500 |
| Manganese | 6 | 51 | 4.1 | 9.5 J | 5.1 | - | 0 - 150 |
| Mercury | 0.11 U | - | - | - | - | - | 0 - 0.051 |
| Nickel | 1 U | - | - | - | - | - | 0 - 5 |
| Potassium | 130 | - | - | 210 | 170 | - | 0 - 6,800 |
| Sodium | 65 | 620 | - | - | - | - | 0 - 2,000 |
| Vanadium | 3.2 J | 6.1 J | 3.6 J | 3 J | 2.3 J | 1.7 J | 0 - 20 |
| Zinc | 5.9 | 60 | 5.1 | 19 | 2.2 J | 8.6 | < 0 |
| Cyanide | 0.14 U | - | - | - | - | - | n/a |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

mg/kg milligrams per kilogram
SP Southern Wood Piedmont
SB Subsurface Soil
< Less than
J Estimated value
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
\- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 9 (continued)
## Subsurface Soil Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | Naturally Occurring Levels* |
|---|---|---|---|---|---|---|---|
| | SP-SB-01 | SP-SB-17 | SP-SB-18 | SP-SB-19 | SP-SB-20 | SP-SB-21 | |
| Aluminum | 770 | 950 | 440 | 340 | 2,100 | 1,100 | 7,000 - 15,000 |
| Arsenic | 2 UJ | - | - | - | - | - | 0 - 2.6 |
| Barium | 4.4 | 5.2 | 0.99 J | 0.74 J | 6 | 5.9 | 10 - 200 |
| Cadmium | 0.28 U | - | - | - | - | - | n/a |
| Calcium | 1,400 J | 71 | 170 J | 2.7 J | 550 | 460 | 0 - 2,300 |
| Chromium | 2.9 | 3.2 | - | - | 5.8 | 6.1 | 0 - 20 |
| Cobalt | 1 U | - | - | - | - | - | < 3 |
| Copper | 3.1 J | - | - | - | - | - | 0 - 10 |
| Iron | 1,600 J | 1,500 | 1,000 J | 840 J | 1,900 | 1,500 | 0 - 10,000 |
| Lead | 1.6 J | 2 | 7.4 J | 0.93 J | 2 | 2.6 | < 10 |
| Magnesium | 160 | 150 | 23 | 22 | 340 | 120 | 0 - 1,500 |
| Manganese | 6 | 6.1 | 4.1 | 4.4 | 10 | 8.8 | 0 - 150 |
| Mercury | 0.11 U | - | - | - | - | - | 0 - 0.051 |
| Nickel | 1 U | - | - | - | - | - | 0 - 5 |
| Potassium | 130 | 330 J | 67 | 84 | 320 | - | 0 - 6,800 |
| Sodium | 65 | - | - | - | 120 | - | 0 - 2,000 |
| Vanadium | 3.2 J | 4.2 J | - | 1.4 J | 5.1 J | 3.8 J | 0 - 20 |
| Zinc | 5.9 | 9.2 | 3.6 J | 2.2 J | 7.7 | 15 | < 0 |
| Cyanide | - | - | - | - | - | - | n/a |

Notes:

* Hanford T. Shacklette and Josephine G. Boerngen, U.S. Geological Survey, Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Paper 1270, Washington D.C.: GPO, 1984.

mg/kg milligrams per kilogram
SP Souhtern Wood Piedmont
SB Subsurface Soil
< Less than

J Estimated value

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

\- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

## 4.4 Source Conclusions

Surface and subsurface soils at the SWP site in Wilmington, North Carolina represent a source of organic and inorganic contamination. In addition, dioxins and furans were detected in surface soil samples. Pentachlorophenols used in wood preservation can contain relatively high levels of dioxins and furans. These dioxins and furans are inadvertently produced during manufacture of chlorophenols and are the likely source of surface soil dioxin/furan contamination. The results of surface and subsurface soils collected from the central two-thirds of the site suggest that significant contamination is present in the surface and subsurface soil. The highest concentrations and frequency of detections were found in sample locations SP-SS/SB-08 located near the former CCA and Creosote Treatment Areas and sample SP-SS/SB-11 located near the former Large Storage Tank Area.

# 5.0 Groundwater Pathway

## 5.1 Hydrogeologic Setting

The SWP site lies within the Coastal Plain physiographic region in southeast North Carolina (Ref. 17). Topography in the region extends from flat, low-lying swamps and marshes 3 to 6 feet above mean sea level (amsl) to rolling uplands, 300 to 600 feet amsl (Refs. 1; 7, p. 271). More specifically, the site lies approximately 5 feet amsl on urban lands derived from Urban land complex (Refs. 1; 4, pp. 7, 13, sheet 18). These complexes consist of sands and sandy loams which have been disturbed and appear to be derived from poorly drained floodplain or tidal sediments surrounding the site (Ref. 4, pp. 7, 13). The soil encountered beneath the existing drainage ditch and the southeastern portion of the site is believed to be in the Dorovan Series (Ref. 4, sheet 18).

The region is covered by unconsolidated sediments that thicken toward the coast. These sediments consist of sands, silts, and clays which are generally of fluvial origin (Ref. 7, p. 271). These sediments are usually about 50 feet thick and overlie the Castle Hayne Marl of the late Eocene age (Ref. 18, p. 221). Beneath the unconsolidated sediments, three prominent geologic formations are typically present throughout most of New Hanover County. These formations are, in descending order: The Castle Hayne Limestone (also known as the Castle Hayne Marl, the Peedee Formation, and the Black Creek Formation (Ref. 19, p. 8).

The Castle Hayne Limestone is of middle and late Eocene age, and typically consists of shell, marl, sand, and limestone with beds of clay and sandy clay present in the upper portion of the unit (Refs. 19, p. 13; 20, Figure 8, p. 25). This unit is reported to be as thick as 150 feet in some areas of New Hanover County; however, it is very thin and possibly absent in the vicinity of SWP (Ref. 19, Figure 9). The Castle Hayne Limestone rests unconformably upon the Peedee Formation (Ref. 19, p. 13).

The Peedee Formation is of Cretaceous age and is comprised primarily of unconsolidated greenish-gray to dark gray silt, olive green to gray sand, and massive black clay interbedded with impure limestones and consolidated sandstones (Ref. 19, p. 9). This formation is largely glauconitic and generally decreases in clay content in the upper portions except for approximately 15 feet at the top of the formation which

is clay (Ref. 19, p. 9, Figure 8). This unit may be over 700 feet thick in some areas of the county (Ref. 19, p. 9). The Peedee Formation rests conformably upon the Black Creek Formation (Ref. 19, p. 9).

The Black Creek Formation is Upper Cretaceous in age and is approximately 380 feet thick in New Hanover County (Ref. 19, p. 9). This formation ranges from around 700 to 1,100 feet below land surface in New Hanover County and is comprised of thinly laminated gray to black clay interbedded with gray to tan sands (Refs. 19, p. 9; 20, p. 30). The upper portion of the Black Creek Formation increases in clay content (Ref. 20, Figure 8).

Three principal aquifers are present throughout most of New Hanover: the upper sandy aquifer, the limestone aquifer, and the lower sandy aquifer. The uppermost aquifer is the upper sand aquifer, or water table aquifer, which is has a saturated thickness range of 20 to 60 feet thick in New Hanover County; however, it is likely no more than 46 feet thick beneath the facility (Ref. 19, Figure 7; 20, p. 30). This aquifer is primarily comprised of the unconsolidated surficial sands (Refs. 18, p. 221; 19, p. 21, 24, 30, 33). This unit typically rests upon approximately 10 feet of lower permeability deposits in the upper portion of the Castle Hayne Limestone; however, these deposits are not believed to form a competent confining unit separating the surficial aquifer from underlying aquifers and the Castle Hayne Limestone may not be present beneath the SWP facility (Refs. 19, Figure 9; 20, Figure 8, p. 25).

The limestone aquifer (also known as the Castle Hayne Aquifer) is comprised of permeable deposits (primarily limestone and sand) of the Castle Hayne Limestone (Refs. 19, p. 24; 20, p. 25). This unit is very thin (less than 25 feet thick) or absent beneath the SWP facility, but is reportedly over 100 feet thick in the southern part of New Hanover County (Ref. 19, p. 26, Figure 3, Figure 4, Figure 9). The hydraulic conductivity of this aquifer ranges from 15 feet per day, where comprised of fine sand, to approximately 200 feet per day where comprised of porous limestone (Ref. 20, p. 25). The Castle Hayne Aquifer, where present, rests upon a clay confining unit which is approximately 15 feet thick beneath the SWP facility (Ref. 19, Figure 8).

The lower sandy aquifer (also known as the sandstone aquifer) is the most important aquifer in New Hanover County and is comprised of calcareous sand within the upper

portion of the Peedee Formation (Ref. 19, pp. 9, 24, 25, Figure 13). This aquifer is approximately 35 feet thick and is confined above by a clay layer within the Peedee Formation which is approximately 15 feet thick beneath the SWP facility (Ref. 19, p. 24; Figure 8). The top of this aquifer is approximately 46 feet beneath the SWP facility and the average horizontal hydraulic conductivity is estimated to be approximately 33 ft/d (Refs. 19, Figure 7; 21 p. 29). There are three more aquifers contained within the Peedee Formation; however, these contain brackish water and are of limited significance to the scope of this investigation (Ref. 19, p. 9).

Both the limestone aquifer and the upper sandy aquifer are capable of yielding significant water supplies. Groundwater in the unconfined surficial (upper sandy) aquifer can be obtained within 10 feet bls in New Hanover County (Ref. 19, p.2). During this investigation, groundwater in the surficial aquifer was encountered at depths ranging from land surface to 5 feet bls. Within the region, saltwater encroachment from the ocean and the Cape Fear River affects water quality approximately 225 feet bls (Ref. 19, Figure 5). Beneath the site, groundwater flow is to the south and southeast toward Greenfield Creek and southeast toward the onsite drainage ditch in the shallow and intermediate wells and toward the west in the deep wells. Hydraulic conductivities for clays similar to those present in the upper portion of the PeeDee Formation range from $10^{-9}$ to $10^{-5}$ cm/sec (Ref. 21, p.29).

Groundwater levels were measured from a fixed point at the top of casing (TOC) on January 28, 1997 for Southern Wood Piedmont monitoring wells. The water levels are presented on Table 10. A general groundwater flow direction was determined for the surficial wells, the intermediate wells, and the deep wells and is identified on Figures 4, 5, and 6.

## 5.2 Groundwater Pathway Targets

There are no municipal water supply wells within 4 miles of the site (Refs. 2; 22). The majority of residents within a 4-mile radius of the site are supplied water by the City of Wilmington Water Department or the Leland Sanitary District (Refs. 1; 22; 23; 24). The City of Wilmington Water Department serves the area east of the Cape Fear River, south of Smith Creek, and north of the Wilmington Corporate Limit at Barnards Creek (Refs. 23; 25; 26). The Leland Sanitary District serves the area west

of the Cape Fear and Brunswick Rivers (Refs. 1; 23; 24). Both of these municipal water systems are supplied water by surface water intakes located 23 miles upstream of the site on the Cape Fear River (Ref. 23). Approximately 437 persons are estimated to obtain drinking water from private wells within 4 miles of the site (Ref. 25; 27; 28; 29). Additionally, one community system, Runnymeade subdivision, is located within a 4-mile radius of the site. The Runnymeade subdivision community water system is located approximately 3.75 miles northeast of the site (Ref. 27). This community system utilizes two wells which draw from the Castle Hayne Limestone aquifer. Approximately 622 persons are estimated to obtain drinking water from this community system (Refs. 1; 27; 28; 29). Approximately 1,059 persons obtain drinking water from groundwater supply within 4 miles of the site (Refs. 1; 27; 28; 29). No wellhead protection areas exist within a 4-mile radius of the SWP site (Ref. 30). The population within a 4-mile radius which uses groundwater is shown below.

| **Radial Distance** (miles) | **Target Population** (Groundwater) |
|---|---|
| 0.00 - 0.25 | 0 |
| >0.25 - 0.50 | 0 |
| >0.50 - 1.00 | 0 |
| >1.00 - 2.00 | 0 |
| >2.00 - 3.00 | 24 |
| >3.00 - 4.00 | 1,035 |

## Table 10
## Groundwater Level Measurements
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Monitoring Well Number | Top of Casing Elevation in Feet (AMSL) | Depth To Water (BTOC) in Feet | Water Elevation in Feet (AMSL) | Total Depth of Well (BTOC) in Feet |
|---|---|---|---|---|
| MW-08 | 6.84 | 4.68 | 2.16 | 21.95 |
| MW-08A | 6.46 | 4.25 | 2.21 | 33.04 |
| MW-11 | 8.05 | 5.46 | 2.59 | 14.26 |
| MW-11A | 6.45 | 4.18 | 2.27 | 36.39 |
| MW-11B | 6.34 | 4.07 | 2.27 | 44.09 |
| MW-15 | 7.10 | 4.50 | 2.60 | 14.15 |
| MW-16 | 7.70 | 5.58 | 2.12 | 14.47 |
| MW-17 | 7.69 | 5.42 | 2.27 | 14.77 |
| MW-20 | 5.48 | 3.27 | 2.21 | 14.83 |
| MW-20A | 5.21 | 2.93 | 2.28 | 33.17 |
| MW-22A | 5.39 | 3.18 | 2.21 | 34.06 |
| MW-24 | 6.03 | 3.38 | 2.65 | 15.18 |
| MW-24A | 5.87 | 3.52 | 2.35 | 36.32 |
| MW-25 | 3.88 | 2.05 | 1.83 | 15.37 |
| MW-27 | 5.47 | 2.11 | 3.36 | 7.52 |
| MW-28 | 5.20 | 4.20 | 1.00 | 15.43 |
| MW-28A | 5.51 | 3.88 | 1.63 | 27.87 |
| MW-29 | 5.36 | 3.96 | 1.40 | 9.52 |
| MW-29A | 5.20 | 3.22 | 1.98 | 40.69 |
| MW-31 | 6.63 | 3.38 | 3.25 | 16.75 |
| MW-32 | 6.22 | 3.94 | 2.28 | 46.84 |
| MW-33 | 5.92 | 3.39 | 2.53 | 55.70 |
| MW-34 | 8.13 | 7.54 | 0.59 | 17.02 |

## Table 10 (continued)
## Groundwater Level Measurements
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Monitoring Well Number | Top of Casing Elevation in Feet (AMSL) | Depth To Water (BTOC) in Feet | Water Elevation in Feet (AMSL) | Total Depth of Well (BTOC) in Feet |
|---|---|---|---|---|
| MW-35 | 7.71 | 5.50 | 2.21 | 39.14 |
| MW-36 | 7.93 | 5.72 | 2.21 | 51.69 |
| MW-37 | 5.97 | 4.44 | 1.53 | 17.47 |
| MW-38 | 5.91 | 4.36 | 1.55 | 27.40 |
| MW-39 | 5.75 | 0.10 | 5.65 | 52.80 |
| MW-40 | 8.20 | 6.01 | 2.19 | 16.96 |
| MW-41 | 7.66 | 5.22 | 2.44 | 40.65 |
| MW-42 | 7.68 | 5.12 | 2.56 | 67.64 |

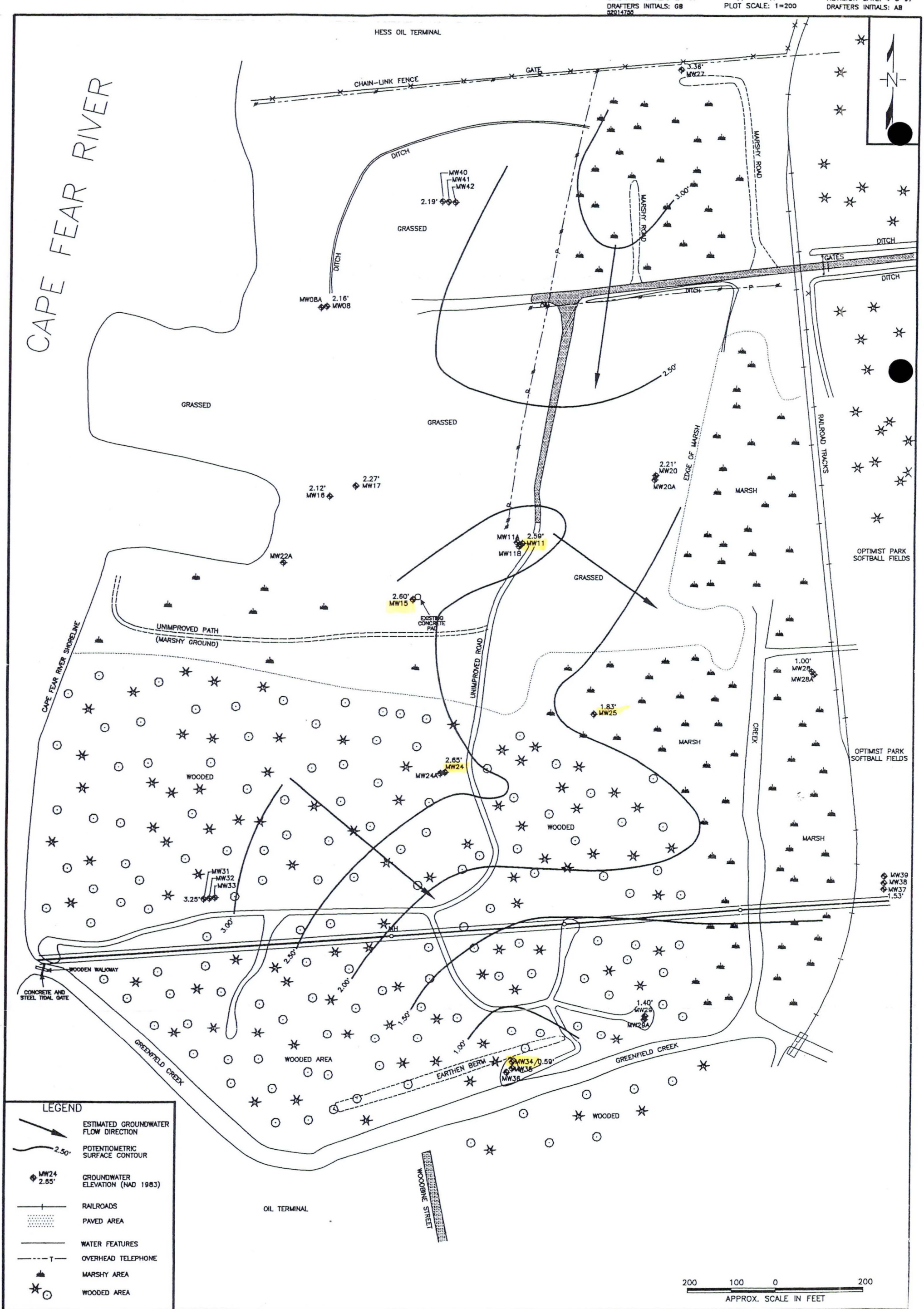
NOTES:

| | |
|---|---|
| AMSL | Above Mean Sea Level |
| MW | Monitoring Well |
| BTOC | Below Top Of Casing |
| SP | Southern Wood Piedmont |

CAD DWG NO: ESSWPSSW
CREATION DATE: 3-24-97
DRAFTERS INITIALS: GB
32014750

ORIGINAL DWG SIZE
11 x 17
PLOT SCALE: 1=200

MOST RECENT REVISION:
REVISION DATE: 4-3-97
DRAFTERS INITIALS: AB



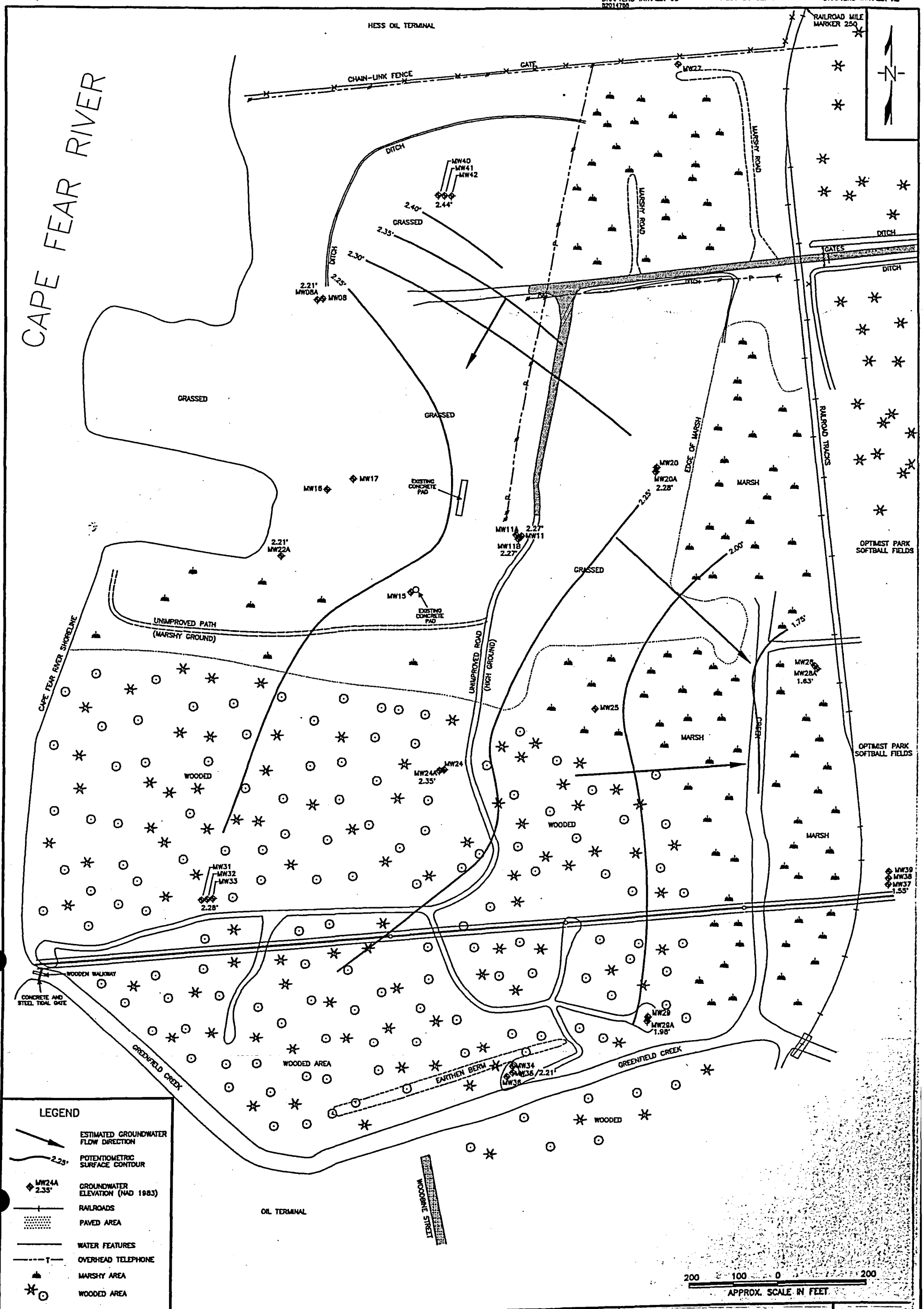

POTENTIOMETRIC SURFACE MAP SHALLOW WELLS ON 1/28/97
SOUTHERN WOOD PIEDMONT
WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA

FIGURE
4

CAD DWG NO: ESSWPSW
CREATION DATE: 3-24-97
DRAFTERS INITIALS: GB
92014788

ORIGINAL DWG SIZE
11 x 17
PLOT SCALE: 1=200

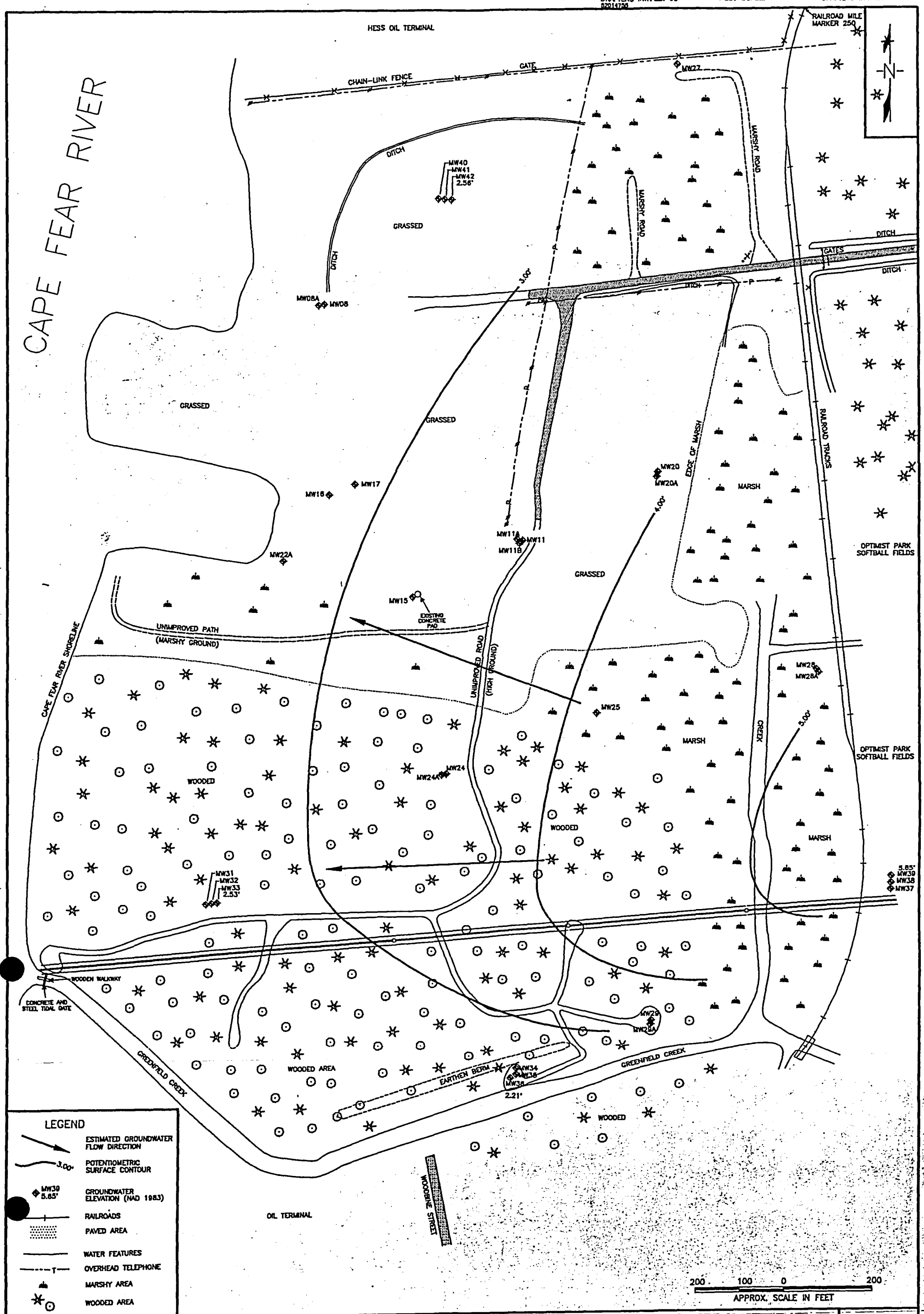
MOST RECENT REVISION:
REVISION DATE: 4-3-97
DRAFTERS INITIALS: AB




POTENTIOMETRIC SURFACE MAP INTERMEDIATE WELLS ON 1/28/97
SOUTHERN WOOD PIEDMONT
WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA

FIGURE 5

CAD DWG NO: ESSWPSDW
CREATION DATE: 3-24-97
DRAFTERS INITIALS: GB
ORIGINAL DWG SIZE 11 x 17
PLOT SCALE: 1=200
MOST RECENT REVISION:
REVISION DATE:
DRAFTERS INITIALS:




POTENTIOMETRIC SURFACE MAP DEEP WELLS ON 1/28/97
SOUTHERN WOOD PIEDMONT
WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA

FIGURE 6

## 5.3 Groundwater Pathway Sample Locations and Analytical Results

Groundwater samples were collected from 31 permanent monitoring wells. Nineteen of the wells were previously installed and 12 wells were installed during field work for this ESI. Eleven of the nineteen existing wells are screened in the shallow aquifer and eight are screened in the intermediate aquifer. Four of the new wells are screened in the shallow aquifer, four are screened in the intermediate aquifer, and four are screened in the deep aquifer. Sample codes and descriptions are listed in Table 1 and are shown on Figure 2. Field measurements of groundwater parameters taken during sampling are listed on Table 11.

### *5.3.1 Shallow Organic Analytical Results*

Elevated levels of extractable organic constituents were detected in groundwater samples SP-MW-11, SP-MW-15, SP-MW-24, SP-MW-25, and SP-MW-34. Extractable organic constituents detected at elevated levels in groundwater samples include: phenol, 2-methylphenol, (3- and/ or 4-) methylphenol, 2,4-dimethylphenol, naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)anthracene, chrysene, bis (2-ethylhexyl) phthalate, benzo (b and/or k) fluoranthene, benzo(a)pyrene, indeno (1,2,3-cd) pyrene, and benzo (g,h,i) perylene. Elevated levels of purgeable organic constituents were detected in groundwater samples SP-MW-11, SP-MW-15, and SP-MW-17. Purgeable organic constituents detected at elevated levels in groundwater samples include: benzene, methyl isobutyl ketone, methyl butyl ketone, toluene, ethyl benzene, and total xylenes. Elevated pesticide constituents include alpha-chlordane/2 and 4,4'-DDE (P,P-DDE) which were detected in samples SP-MW-11 and SP-MW-34, respectively. A more detailed summary of shallow groundwater organic analytical results are presented on Table 12 and in Appendix A.

### *5.3.2 Intermediate Organic Analytical Results*

Elevated levels of extractable organic constituents were detected in groundwater samples SP-MW-11A, SP-MW-11B, SP-MW-28A, SP-MW-29A, and SP-MW-35. Extractable organic constituents detected at elevated levels in groundwater samples include: 2,4 dimethylphenol, naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, and

# Table 11
## Field Measurements of Groundwater Samples
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Sample Code | pH | Conductivity (µmhos/cm) | Temperature (°F) | Turbidity (NTU) |
|---|---|---|---|---|
| SP-MW-08 | 6.14 | 662 | 60.4 | 19.4 |
| SP-MW-08A | 6.50 | 455 | 61.2 | 2.3 |
| SP-MW-11 | 6.26 | 1050 | 61.9 | 91.5 |
| SP-MW-11A | 6.87 | 35.9 | 60 | 6.04 |
| SP-MW-11B | 6.94 | 353 | 56.7 | 0.87 |
| SP-MW-15 | 6.63 | 1420 | 59.9 | 2.1 |
| SP-MW-16 | 5.64 | 424 | 68.8 | 2.4 |
| SP-MW-17 | 6.45 | 1090 | 64.9 | 2.6 |
| SP-MW-20 | 6.36 | 1276 | 70.4 | 5.1 |
| SP-MW-20A | 6.81 | 337 | 67.6 | 0.7 |
| SP-MW-22A | 5.67 | 310 | 67.9 | 0.67 |
| SP-MW-24 | 6.02 | 1899 | 64.6 | 10.9 |
| SP-MW-24A | 5.98 | 374 | 62.6 | 0.43 |
| SP-MW-25 | 5.96 | 1292 | 63.6 | 28.3 |
| SP-MW-27 | 6.24 | 700 | 61.5 | 7.78 |
| SP-MW-28 | 6.56 | 2170 | 67.1 | 3.93 |
| SP-MW-28A | 6.15 | 246 | 66.3 | 0.34 |
| SP-MW-29 | 5.79 | 3890 | 61.6 | 6.22 |
| SP-MW-29A | 6.80 | 475 | 61.5 | 1.24 |

NOTES:

| | |
|---|---|
| µmhos/cm | micromhos per centimeter |
| °F | degrees Fahrenheit |
| NTU | Nephelometric Turbidity Units |
| SP | Southern Wood Piedmont |
| MW | Monitoring Well |

## Table 11 (continued)
## Field Measurements of Groundwater Samples
### Southern Wood Piedmont
### Wilmington, New Hanover County, North Carolina

| Sample Code | pH | Conductivity (µmhos/cm) | Temperature (°F) | Turbidity (NTU) |
|---|---|---|---|---|
| SP-MW-31 | 7.78 | 824 | 58.6 | 1.2 |
| SP-MW-32 | 8.02 | 396 | 60.1 | 5.5 |
| SP-MW-33 | 8.73 | 598 | 60.2 | 3.0 |
| SP-MW-34 | 6.58 | 737 | 69.1 | 0.8 |
| SP-MW-35 | 7.04 | 399 | 67.3 | 4.6 |
| SP-MW-36 | 7.28 | 395 | 63.8 | 0.96 |
| SP-MW-37 | 6.43 | 458 | 67.2 | 8.02 |
| SP-MW-38 | 6.46 | 397 | 67.8 | 1.41 |
| SP-MW-39 | 7.51 | 300 | 66.4 | 4.12 |
| SP-MW-40 | 7.98 | 579 | 58.9 | 2.0 |
| SP-MW-41 | 7.92 | 335 | 60.5 | 5.2 |
| SP-MW-42 | 8.44 | 450 | 61.3 | 0.80 |

NOTES:

| | |
|---|---|
| µmhos/cm | micromhos per centimeter |
| °F | degrees Fahrenheit |
| NTU | Nephelometric Turbidity Units |
| SP | Southern Wood Piedmont |
| MW | Monitoring Well |

# Table 12
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-08 | SP-MW-11 | SP-MW-15 | SP-MW-16 | SF-MW-17 | SP-MW-20 | SP-MW-24 |
| **Extractable Organic Compounds** | | | | | | | | |
| Phenol | 10 U | - | 210 J | - | - | - | - | - |
| 2-Methylphenol | 10 U | - | 530 J | - | - | - | - | - |
| (3- and/or 4-) Methylphenol | 10 U | - | 890 J | - | - | - | - | - |
| 2,4-Dimethylphenol | 10 U | - | 220 J | 16 | - | - | - | - |
| Naphthalene | 10 U | - | 85 J | 380 | - | - | - | - |
| 2-Methylnaphthalene | 5 J | - | 67 | 48 | - | - | - | - |
| Acenaphthylene | 10 U | - | 34 | 2 J | - | - | - | - |
| Acenaphthene | 51 | - | 720 J | 140 | - | 10 | 14 | 200 |
| Dibenzofuran | 10 U | - | 540 J | 50 | - | 2 J | - | 41 J |
| Fluorene | 7 J | - | 660 J | 29 | - | 9 J | 1 J | 72 J |
| Phenanthrene | 3 J | - | 4,800 J | 15 | - | 2 J | - | 22 J |
| Anthracene | 10 U | - | 990 J | 4 J | 1 J | 3 J | 1 J | - |
| Carbazole | 1 J | - | 1,600 J | 9 J | - | - | - | - |
| Fluoranthene | 10 U | - | 3,000 J | - | - | 2 J | 1 J | - |
| Pyrene | 10 U | - | 570 J | - | - | 2 J | | - |
| Benzo (a) Anthracene | 10 U | - | 220 J | - | - | - | - | - |
| Chrysene | 10 U | - | 220 J | - | - | - | - | - |
| Bis (2-ethylhexyl) Phthalate | 10 U | - | -- | - | - | - | - | - |
| Benzo (b and/or k) Fluoranthene | 10 U | - | 145 J | - | - | - | - | - |
| Benzo(a)Pyrene | 10 U | - | 67 | - | - | - | - | - |
| Indeno (1,2,3-CD) Pyrene | 10 U | - | 22 | - | - | - | - | - |
| Benzo Perylene | 10 U | - | 19 | - | - | - | - | - |

## Table 12 (continued)
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-08 | SP-MW-11 | SP-MW-15 | SP-MW-16 | SF-MW-17 | SP-MW-20 | SP-MW-24 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | | | |
| Indane | | | 20 JN | | | | | |
| Phenylpropenal | | | | 4 JN | | | | |
| Dimethylphenol (not 2,4) | | | | 4 JN | | | | |
| Ethylmethylphenol | | | 20 JN | 2 JN | | | | |
| Trimethylphenol | | | 30 JN | 2 JN | | | | |
| Biphenyl | | | 6 JN | 6 JN | | | | |
| 1-Methylnaphthalene | 8 JN | | | 9 JN | | | | |
| Dimethylnaphthalene (2 isomers) | 10 JN | | | | | | | |
| 1-Dimethylnaphthalene (3 isomers) | | | 20 JN | | | | | |
| Dimethylnaphthalene (5 isomers) | | | | | | | | |
| Methylbenzothiophene | 3 JN | | | | | | | |
| Methylindanol | | | 4 JN | | | | | |
| Phenylpyridine | | | 3 JN | | | | | |
| Trimethylnaphthalene | | | 4 JN | | | | | |
| Methylfluorene | | | 6 JN | | | | | |
| Methylfluorene (2 isomers) | | | | | | | | |
| Dibenzothiophene | | | 8 JN | | | | | |
| Dihydrobenzothiophene | | | | 3 JN | | | | |
| Benzofluorene (2 isomers) | | | 200 JN | | | | | |
| Methyltriphenylene | | | 10 JN | | | | | |
| Perylene | | | 3 JN | | | | | |
| Naphthalenecarbonitrile | | | | 4 JN | | | | |
| Naphthalenol | | | | 5 JN | | | | |
| Dimethylphenolisocyanate | | | | 7 JN | | | | |
| Isoquinolinone | | | | 20 JN | | | | |
| Methylnaphthalene | | | 10 JN | | | | | |
| Naphthalic Anhydride | | | | 8 JN | | | | |

# Table 12 (continued)
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-08 | SP-MW-11 | SP-MW-15 | SP-MW-16 | SF-MW-17 | SP-MW-20 | SP-MW-24 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | | | |
| Phenanthridinone | | | | 100 JN | | | | |
| Cyclopentaphenanthrenone | | | | 10 JN | | | | |
| (Methylehtyl) Benzene | | | | | | 3 JN | | |
| Ethyldimethylbenzene | | | | | | 3 JN | 7 JN | |
| Ethenlydimethylbenzene | | | | | | 8 JN | | |
| Dihydrodimethylindene | | | | | | 5 JN | 2 JN | |
| Dihydrodimethylindene (2 isomers) | | | | | | 20 JN | | |
| Dimethylnaphthalene | | | | 8 JN | | 7 JN | | |
| (Methylethylidene) Biphenol | | | | | | | | |
| Unidentified Compounds / # | 20 J/1 | 50 J/3 | 200 J/5 | 100 J/4 | 20 J/1 | 100 J/3 | 50 J/3 | |

ug/L micrograms per Liter
SP Southern Wood Piedmont
MW Monitoring Well

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
J Estimated Value.
N Presumptive evidence of presence of material.

\- Not detected

Elevated levels which are greater than three times the background level or greaterr than the SQL.

# Table 12 (continued)
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/L) | Backround | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-25 | SP-MW-27 | SP-MW-28 | SP-MW-29 | SP-MW-31 | SP-MW-34 | SP-MW-40 |
| **Extractable Organic Compounds** | | | | | | | | |
| Phenol | 10 U | - | - | - | - | - | - | - |
| 2-Methylphenol | 10 U | - | - | - | - | - | - | - |
| (3- and/or 4-) Methylphenol | 10 U | - | - | - | 4 J | - | - | - |
| 2,4-Dimethylphenol | 10 U | - | - | - | - | - | - | - |
| Naphthalene | 10 U | - | - | - | - | - | - | - |
| 2-Methylnaphthalene | 5 J | 1 J | - | - | - | - | - | - |
| Acenaphthylene | 10 U | - | - | - | - | - | - | - |
| Acenaphthene | 51 | 9 J | 1 J | 17 | - | - | 250 | - |
| Dibenzofuran | 10 U | 5 J | - | 6 J | - | - | 150 | - |
| Fluorene | 7 J | 8 J | - | 13 | - | - | 200 | - |
| Phenanthrene | 3 J | 17 | - | 3 J | - | - | 230 | - |
| Anthracene | 10 U | 6 J | - | - | - | - | 16 J | 2 J |
| Carbazole | 1 J | - | - | - | - | - | - | - |
| Fluoranthene | 10 U | 12 | - | 2 J | - | - | 36 J | - |
| Pyrene | 10 U | 8 J | - | 1 J | - | - | 22 J | - |
| Benzo (A) Anthracene | 10 U | - | - | - | - | - | - | - |
| Chrysene | 10 U | 1 J | - | - | - | - | - | - |
| Bis (2-ethylhexyl) Phthalate | 10 U | - | - | - | - | - | 68 | - |
| Benzo (b and/or k) Fluoranthene | 10 U | - | - | - | - | - | - | - |
| Benzo-A-Pyrene | 10 U | - | - | - | - | - | - | - |
| Indeno (1,2,3-CD) Pyrene | 10 U | - | - | - | - | - | - | - |
| Benzo (GHI) Perylene | 10 U | - | - | - | - | - | - | - |

# Table 12 (continued)
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/L) | Backround | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-25 | SP-MW-27 | SP-MW-28 | SP-MW-29 | SP-MW-31 | SP-MW-34 | SP-MW-40 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | | | |
| Indane | | | | | | | | |
| Phenylpropenal | | | | | | | | |
| Dimethylphenol (not 2,4) | | | | | | | | |
| Ethylmethylphenol | | | | | | | | |
| Trimethylphenol | | | | | | | | |
| Biphenyl | | | | | | | | |
| 1-Methylnaphthalene | 8 JN | | | | | | 80 JN | |
| Methylnaphthalene | | | | | | | | |
| Dimethylnaphthalene (2 isomers) | 10 JN | | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | | | | | |
| Dimethylnaphthalene (5 isomers) | | | | | | | 100 JN | |
| Methylbenzothiophene | 3 JN | | | | | | | |
| Methylindanol | | | | | | | | |
| Phenylpyridine | | | | | | | | |
| Trimethylnaphthalene | | | | | | | | |
| Methylfluorene | | | | | | | | |
| Methylfluorene (2 isomers) | | | | | | | 30 JN | |
| Dibenzothiophene | | | | | | | 20 JN | |
| Dihydrobenzothiophene | | | | | | | 10 JN | |
| Benzofluorene (2 isomers) | | | | | | | | |
| Methyltriphenylene | | | | | | | | |
| Perylene | | | | | | | | |
| Naphthalenecarbonitrile | | | | | | | 20 JN | |
| Naphthalenol | | | | | | | | |
| Dimethylphenolisocyanate | | | | | | | | |
| Isoquinolinone | | | | | | | | |
| Naphthalic Anhydride | | | | | | | | |

# Table 12 (continued)
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Willmington, New Hanover County, North Carolina

| Parameters (ug/L) | Backround | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-25 | SP-MW-27 | SP-MW-28 | SP-MW-29 | SP-MW-31 | SP-MW-34 | SP-MW-40 |
| **Miscellaneous Extractable Organic Compounds** | | | | | | | | |
| Phenanthridinone | | | | | | | | |
| Cyclopentaphenanthrenone | | | | | | | | |
| (Methylehtyl) Benzene | | | | | | | | |
| Ethyldimethylbenzene | | | | | | | | |
| Ethenlydimethylbenzene | | | | | | | | |
| Dihydrodimethylindene | | | | | | | | |
| Dihydrodimethylindene (2 isomers) | | | | | | | | |
| Dimethylnaphthalene | | | | | | | | |
| (Methylethylidene) Biphenol | | | | | | | | |
| Unidentified Compounds / # | 20 J/1 | | | | | | | |

ug/L micrograms per Liter
SP Southern Wood Piedmont
MW Monitoring Well

U Material analyzed for but not detected, number is the minimum quantitation limit.
J Estimated value.
N Presumptive evidence of presence of material.

\- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 12 (continued)
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-08 | SP-MW-11 | SP-MW-15 | SP-MW-16 | SP-MW-17 | SP-MW-20 | SP-MW-24 |
| **Purgeable Organic Compounds** | | | | | | | | |
| Benzene | 10 U | - | 130 | - | - | - | - | - |
| Methyl Isobutyl Ketone | 10 U | - | - | - | - | 15 | - | - |
| Methyl Butyl Keytone | 10 U | - | - | - | - | 17 | - | - |
| 1,1,2,2-Tetrachloroethane | 10 U | - | - | - | - | 6 J | - | - |
| Toluene | 10 U | - | 160 | - | - | - | - | - |
| Ethyl Benzene | 1 J | - | 130 | 6 J | - | - | - | - |
| Total Xylenes | 2 J | - | 250 | 9 J | - | - | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | | | |
| Ethylmethylbenzene | | | 70 JN | 6 JN | | | | |
| Trimethylbenzene | | | 100 JN | 10 JN | | | | |
| Benzofuran | | | 200 JN | | | | | |
| (Methyl Ethyl) Benzene | | | 50 JN | | | | | |
| Ethylmethylbenzene | | | 1,000 JN | | | | | |
| Indene | | | 100 JN | | | | | |
| Methylindan | | | 50 JN | 20 JN | | | | |
| Methylbenzofuran (2 Isomers) | | | 300 JN | 50 JN | | | | |
| Indane | 60 JN | | | 200 JN | | | | |
| Ethenyldimethylbenzene | 20 JN | | | | | | | |
| Dihydromethylindene (2 isomers) | 20 JN | | | | | | | |
| Benzothiophene | 7 JN | | | | | | | |
| Ethyldimethylbenzene | | | | | | | | |
| Tetramethylbenzene | | | | | | 10 JN | | |

ug/L microgram per lter.
SP Southern Wood Piedmont
MW Monitoring Well
J Estimated value.
N Presumptive evidence of presence of material.
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 12 (continued)
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SP-MW-37 | SP-MW-25 | SP-MW-27 | SP-MW-28 | SP-MW-29 | SP-MW-31 | SP-MW-34 | SP-MW-40 |
| **Purgeable Organic Compounds** | | | | | | | | |
| Benzene | 10 U | - | - | - | - | - | - | - |
| Methyl Isobutyl Ketone | 10 U | - | - | - | - | - | - | - |
| Methyl Butyl Keytone | 10 U | - | - | - | - | - | - | - |
| 1,1,2,2-Tetrachloroethane | 10 U | - | - | - | - | - | - | - |
| Toluene | 10 U | - | - | - | - | - | - | - |
| Ethyl Benzene | 1 J | - | - | - | - | - | - | - |
| Total Xylenes | 2 J | - | - | - | - | - | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | | | |
| Ethylmethylbenzene | | | | | | | | |
| Trimethylbenzene | | | | | | | | |
| Benzofuran | | | | | | | | |
| (Methyl Ethyl) Benzene | | | | | | | | |
| Ethylmethylbenzene | | | | | | | | |
| Indene | | | | | | | | |
| Methylindan | | | | | | | | |
| Methylbenzofuran (2 Isomers) | | | | | | | | |
| Indane | | | | | | | 30 JN | |
| Ethenyldimethylbenzene | | | | | | | 20 JN | |
| Dihydromethylindene (2 isomers) | | | | | | | 10 JN | |
| Benzothiophene | | | | | | | | |
| Ethyldimethylbenzene | | | | | | | 50 JN | |
| Tetramethylbenzene | | | | | | | | |

ug/L microgram per liter.
SP Southern Wood Piedmont
MW Monitoring Well
J Estimated value.
N Presumptive evidence of presence of material.
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 12
## Shallow Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | |
|---|---|---|---|
| | SP-MW-37 | SP-MW-11 | SP-MW-34 |
| Alpha-Chlordane/2 | 0.050 U | 1.2 J | - |
| 4,4' - DDE (P,P' - DDE) | .10U | - | 0.10 N |

Notes:

| | |
|---|---|
| ug/L | micrograms per Liter |
| J | Estimated value |
| U | Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL). |
| N | Presumptive evidence of presence of material. |
| - | Not detected |

Elevated levels which are greater than three times background levels or greater than the SQL.

pyrene. Elevated levels of purgeable organic constituents were detected in groundwater samples SP-MW-08A, SP-MW-11B, SP-MW-32, and SP-MW-35. Purgeable organic constituents detected at elevated levels in groundwater samples include: acetone, chloroform, ethyl benzene, and total xylenes. Pesticide/PCB analyses detected the constituent heptachlor in SP-MW-22A at greater than background. A more detailed summary of intermediate groundwater organic analytical results are presented in Appendix A and on Table 13.

### *5.3.3 Deep Organic Analytical Results*

Elevated levels of extractable organic constituents were detected in groundwater samples SP-MW-33 and SP-MW-36. Extractable organic constituents detected at elevated levels in groundwater samples include acenaphthene and fluorene. An elevated level of the purgeable organic chloroform was detected in groundwater sample SP-MW-36. A more detailed summary of deep groundwater organic analytical results are presented on Table 14.

### *5.3.4 Shallow Inorganic Analytical Results*

Inorganic analytes were detected at elevated levels in shallow groundwater samples SP-MW-08, SP-MW-11, SP-MW-15, SP-MW-16, SP-MW-17, SP-MW-20, SP-MW-24, SP-MW-25, SP-MW-27, SP-MW-28, SP-MW-29, SP-MW-31, SP-MW-34, and SP-MW-40. Inorganic analytes detected at elevated levels include: aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, potassium, selenium, sodium, vanadium, and zinc. A more detailed summary of shallow groundwater organic analytical results are presented on Table 15. The complete set of analytical data is presented in Appendix A.

### *5.3.5 Intermediate Inorganic Analytical Results*

Inorganic analytes were detected at elevated levels in intermediate groundwater samples SP-MW-08A, SP-MW-32, SP-MW-35, and SP-MW-41. Inorganic analytes detected at elevated levels include: chromium, copper, and lead. A more detailed summary of intermediate groundwater organic analytical results are presented on Table 16. The complete set of analytical data is presented in Appendix A.

### *5.3.6 Deep Inorganic Analytical Results*

Inorganic analytes were detected at elevated levels in deep groundwater samples SP-MW-33, SP-MW-36, and SP-MW-42. Inorganic analytes detected at elevated levels

include: barium, chromium, lead, potassium, sodium, vanadium, and zinc. A more detailed summary of deep groundwater organic analytical results are presented on Table 17. The complete set of analytical data is presented in Appendix A.

## 5.4 Groundwater Pathway Conclusions

Most of the people in the vicinity of the site use treated surface water for potable water. Therefore, the groundwater pathway is of moderate concern for this site due to the minimal population in the area which utilize potable groundwater. Groundwater samples indicate that several contaminants have migrated into the shallow, intermediate and deep monitoring wells beneath the SWP site.

# Table 13
## Intermediate Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | |
|---|---|---|---|---|---|---|---|
| | SP-MW-38 | SP-MW-08A | SP-MW-11A | SP-MW-11B | SP-MW-20A | SP-MW-22A | SP-MW-24A |
| **Extractable Organic Compounds** | | | | | | | |
| 2,4-Dimethylphenol | 10 U | - | 3 J | 54 | - | - | - |
| Naphthalene | 10 U | - | 86 | 880 | - | 9 J | - |
| 2-Methylnaphthalene | 10 U | - | 45 | 320 | - | - | - |
| Acenaphthene | 10 U | - | 38 | 260 | 3 J | 5 J | - |
| Dibenzofuran | 10 U | - | 21 | 150 | - | - | - |
| Fluorene | 10 U | - | 22 | 170 | - | - | - |
| Anthracene | 10 U | - | 3 J | 12 | - | - | - |
| Carbazole | 10 U | - | 17 J | 95 J | - | 1 J | - |
| Fluoranthene | 10 U | - | 4 J | 21 | - | - | - |
| Acenaphthylene | 10 U | - | - | 3 J | - | - | - |
| Phenanthrene | 10 U | - | 17 J | 89 J | - | - | - |
| Benzo (a) anthracene | 10 U | - | - | 1 J | - | - | - |
| Pyrene | 10 U | - | - | 12 J | - | - | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | | |
| Unidentified Compounds/No. | | | | | | | |
| (Methylethylindene) Biphenol | | | | | | | |
| Benzofuranone | | | | | | | |
| Dihydroindenol | | | | | | | |
| Dihydroindeniol | | | | | | | |
| Acridinone | | | | | | | |
| Methylbenzonitrile | | | | | | | |
| Methylindanol | | | | | | | |
| Caprolatam | 4 JN | | | | | | |
| Benzothiophene | | | 5 JN | | | | |
| Methylnaphthalene | | | 10 JN | | | | |

# Table 13 (continued)
## Intermediate Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | |
|---|---|---|---|---|---|---|---|
| | SP-MW-38 | SP-MW-08A | SP-MW-11A | SP-MW-11B | SP-MW-20A | SP-MW-22A | SP-MW-24A |
| **Miscellaneous Extractable Organic** | | | | | | | |
| Dimethylnaphthalene | | | 4 JN | | | | |
| Phenanthridinone | | | 7 JN | | | | |
| Indene | | | | 20 JN | | | |
| Ethylmethylphenol | | | | 2 JN | | | |
| Trimethylphenol | | | | 3 JN | | | |
| Thymol | | | | 3 JN | | | |
| Biphenyl | | | | 5 JN | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | 20 JN | | | |
| Naphthalenecarbonitrile | | | | 3 JN | | | |
| Naphthalenol | | | | 2 JN | | | |
| Methylbiphenyl | | | | 2 JN | | | |
| Hydroxbiphenyl | | | | 3 JN | | | |
| Methylquinolinone | | | | 4 JN | | | |
| 1-Methylnaphthalene | | | | 7 JN | | | |
| Aminofluorenone | | | | 20 JN | | | |

ug/L micrograms per liter
SP Southern Wood Piedmont
MW Monitoring Well

J Estimated value.
N Presumptive evidence of presence of material.

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

\- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 13 (continued)
## Intermediate Groundwate Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-MW-38 | SP-MW-28A | SP-MW-29A | SP-MW-32 | SP-MW-35 | SP-MW-41 |
| **Extractable Organic Compounds** | | | | | | |
| 2,4-Dimethylphenol | 10 U | - | - | - | - | - |
| Naphthalene | 10 U | 2 J | 54 | - | - | - |
| 2-Methylnaphthalene | 10 U | - | 130 | - | - | - |
| Acenaphthene | 10 U | 20 J | 160 | - | 110 | - |
| Dibenzofuran | 10 U | 3 J | 97 | - | 40 | - |
| Fluorene | 10 U | 3 J | 95 | - | 96 | - |
| Anthracene | 10 U | - | - | - | 7 J | - |
| Carbazole | 10 U | - | 72 | - | 110 | - |
| Fluoranthene | 10 U | 3 J | - | - | 7 J | - |
| Acenaphthylene | 10 U | - | - | - | - | - |
| Phenanthrene | 10 U | - | 50 J | - | - | - |
| Pyrene | 10 U | - | - | - | 3 J | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Unidentified Compounds/No. | | | | 200 JN/9 | 500 J/7 | |
| (Methylethylindene) Biphenol | | | | 10 JN | 20 JN | 20 JN |
| Benzofuranone | | | | 6 JN | | |
| Dihydroindenol | | | | | 200 JN | |
| Dihydroindeniol | | | | | 60 JN | |
| Acridinone | | | | | 40 JN | |
| Methylbenzonitrile | | | | | 40 JN | |
| Methylindanol | | | | | 20 JN | |
| Caprolactum | 4 JN | | | | | |
| Benzothiophene | | | | | | |
| Methylnaphthalene | | | | | | |

# Table 13 (continued)
## Intermediate Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-MW-38 | SP-MW-28A | SP-MW-29A | SP-MW-32 | SP-MW-35 | SP-MW-41 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Dimethylnaphthalene | | | | | | |
| Phenanthridinone | | | | | | |
| Indene | | | | | | |
| Ethylmethylphenol | | | | | | |
| Trimethylphenol | | | | | 20 JN | |
| Thymol | | | | | | |
| Biphenyl | | | | | | |
| Dimethylnaphthalene (2 isomers) | | | | | 60 JN | |
| Dimethylnaphthalene (3 isomers) | | | | | | |
| Naphthalenecarbonitrile | | | | | 40 JN | |
| Naphthalenol | | | | | | |
| Methylbiphenyl | | | | | | |
| Hydroxbiphenyl | | | | | | |
| Methylquinolinone | | | | | | |
| Aminofluorenone | | | | | | |

ug/l micrograms per liter
SP Southern Wood Piedmont
MW Monitoring Well

J Estimated value.
N Presumptive evidence of presence of material.

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 13 (continued)
## Intermediate Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background SP-MW-38 | SP-MW-08A | SP-MW-11A | SP-MW-11B | SP-MW-20A | SP-MW-22A | SP-MW-24A |
|---|---|---|---|---|---|---|---|
| **Purgeable Organic Compounds** | | | | | | | |
| Acetone | 10 U | 1,700 | - | - | - | - | - |
| 1,1,2-Trichloroethane | 10 U | - | 4 J | - | - | - | - |
| Chloroform | 10 U | - | - | - | - | - | - |
| Bromodichloromethane | 10 U | - | - | - | - | - | - |
| Benzene | 10 U | - | - | 8 J | - | - | - |
| 1,1,1-Trichloroethane | 1 J | - | - | - | - | - | - |
| Ethyl Benzene | 10 U | - | - | 17 | - | - | - |
| Total Xylenes | 10 U | - | - | 25 | - | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | | |
| Ethenyldimethyl benzene | | | | | | | |
| Benzothiophene | | | | | | | |
| Propanol | | 8,000 JN | | | | | |
| CyclopentathiapyNan | | 700 JN | | | | | |
| Indane | | 70 JN | 80 JN | 400 JN | | | |
| Methylbenzofuran | | | 6 JN | | | | |
| Benzofuran | | | | 8 JN | | | |
| Trimethylbenzene | | | | 10 JN | | | |
| Trimethylbenzene (2 isomers) | | | | | | | |
| (Methylpropenyl) Benzene | | | | 20 JN | | | |
| Methylbenzofuran | | | | | | | |
| Ethylmethylbenzene (2 isomers) | | | | | | | |
| Methyl benzofuran (2 isomers) | | | | 90 JN | | | |
| Ethylmethyl benzene | | | | 20 JN | | | |
| Ethyldimethylbenzene | | | | | | | |
| (Methylethyl) Benzene | | | | 7 JN | | | |
| Dihydromethylindene | | | | 20 JN | | | |
| Dihydromethylindene (2 isomers) | | | | | | | |
| Alkane | 20 JN | | | | | | |

ug/l micrograms per liter
SP Southern Wood Piedmont
MW Monitoring Well
J Estimated value.
N Presumptive evidence of presence of material.
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 13 (continued)
## Intermediate Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background SP-MW-38 | SP-MW-28A | SP-MW-29A | SP-MW-32 | SP-MW-35 | SP-MW-41 |
|---|---|---|---|---|---|---|
| **Purgeable Organic Compounds** | | | | | | |
| Acetone | 10 U | - | - | - | - | - |
| 1,1,2-Trichloroethane | 10 U | - | - | - | - | - |
| Chloroform | 10 U | - | - | 44 | 16 | - |
| Bromodichloromethane | 10 U | - | - | 5 J | 2 J | - |
| Benzene | 10 U | - | - | - | 4 J | - |
| 1,1,1-Trichloroethane | 1 J | - | - | - | - | - |
| Ethyl Benzene | 10 U | - | - | - | 26 | - |
| Total Xylenes | 10 U | - | - | - | 32 | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | |
| Ethenyldimethyl benzene | | | | | 20 JN | |
| Benzothiophene | | | | | 50 JN | |
| Propanol | | | | | | |
| Cyclopentathiapyran | | | | | | |
| Indane | | | | | 500 JN | |
| Methylbenzofuran | | | | | 60 JN | |
| Benzofuran | | | | | 9 JN | |
| Trimethylbenzene | | | | | | |
| Trimethylbenzene (2 isomers) | | | | | 60 JN | |
| (Methylpropenyl) Benzene | | | | | | |
| Methylbenzofuran | | | | | 20 JN | |
| Ethylmethylbenzene (2 isomers) | | | | | 20 JN | |
| Methyl benzofuran (2 isomers) | | | | | | |
| Ethylmethyl benzene | | | | | | |
| Ethyldimethylbenzene | | | | | 5 JN | |
| (Methylethyl) Benzene | | | | | 7 JN | |
| Dihydromethylindene | | | | | | |
| Dihydromethylindene (2 isomers) | | | | | 50 JN | |
| Alkane | | | | | | |

ug/l micrograms per liter
SP Southern Wood Piedmont
MW Monitoring Well
J Estimated value.
N Presumptive evidence of presence of material.
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 14
## Deep Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/l) | Background | | | |
|---|---|---|---|---|
| | SP-MW-39 | SP-MW-33 | SP-MW-36 | SP-MW-42 |
| **Extractable Organic Compounds** | | | | |
| Acenaphthene | 10 U | 20 | 45 | - |
| Fluorene | 10 U | 2 J | 15 | - |
| Carbazole | 10 U | 3 J | 3 J | - |
| Fluoranthene | 10 U | - | 3 J | - |
| Pyrene | 10 U | - | 2 J | - |
| **Miscellaneous Extractable Organic Compounds** | | | | |
| (Methylethylidene) Biphenol | | 30 JN | 50 JN | 20 JN |
| 1-Methylnaphthalene | | 9 JN | | |
| Benzofuranone | | 6 JN | | 9 JN |
| Dihydrobenzothiophene | | 2 JN | | |
| Iodonaphthol | | | 50 JN | |
| Dihydroindenol | | | 30 JN | |
| Hydroxbiphenyl | | | 30 JN | |
| Dihydroindenone | | | 30 JN | |
| Phenylpropenal | | | 20 JN | |
| Dihydroindenediol | | | 20 JN | |
| Hydroxybenzaldehyde | | | 20 JN | |
| Fluorenol | | | 10 JN | |
| Benzopyranone | | | 10 JN | |
| Naphthalenol | | | 8 JN | |
| Benzonaphthothiophene | | | 7 JN | |
| Benzothiophene | | | 7 JN | |
| Dimethylnaphthalene | | | 4 JN | |
| **Purgeable Organic Compounds** | | | | |
| Chloroform | 10 U | - | 28 | - |
| Bromodichloromethane | 10 U | - | 5 J | - |
| Ethylbenzene | 10 U | - | 3 J | - |
| Total Xylenes | 10 U | - | 4 J | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | |
| Indane | | 80 JN | 50 JN | |
| Trimethylbenzene | | | 10 JN | |
| Dihydromethylindene | | | 6 JN | |

ug/L micrograms per liter
SP Southern Wood Piedmont
MW Monitoring Well
J Estimated value
N Presumptive evidence of presence of material.
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
- Not detected.
Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 14-continued
## Deep Groundwater Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/l) | Background | | | |
|---|---|---|---|---|
| | SP-MW-39 | SP-MW-33 | SP-MW-36 | SP-MW-42 |
| **Purgeable Organic Compounds** | | | | |
| Chloroform | 10 U | 28 | - | - |
| Bromodichloromethane | 10 U | 5 J | - | - |
| Ethylbenzene | 10 U | 3 J | - | - |
| Total Xylenes | 10 U | 4 J | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | |
| Indane | | 80 JN | 50 JN | |
| Trimethylbenzene | | | 10 JN | |
| Dihydromethylindene | | | 6 JN | |

ug/L micrograms per liter

J Estimated value.
N Presumptive evidence of presence of material.

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 15
## Shallow Groundwater Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background SP-MW-37 | SP-MW-08 | SP-MW-11 | SP-MW-15 | SP-MW-16 | SP-MW-17 | SP-MW-20 | SP-MW-24 | SP-MW-25 | SP-MW-27 | SP-MW-28 | SP-MW-29 | SP-MW-31 | SP-MW-34 | SP-MW-40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 780 | - | 7,700 | - | - | - | 700 | 140 | 2,200 | 64 | 170 | 760 | 230 | 730 | 380 |
| Arsenic | 5 U | - | 12 | 68 | - | 10 | - | - | - | - | - | - | - | - | 220 |
| Barium | 34 | 50 | 170 | 94 | 44 | 150 | 190 | 320 | 47 | 240 | 280 | 140 | 47 | 44 | 85 |
| Cadmium | 1 U | - | - | - | - | - | - | - | - | - | - | - | 1 J | - | - |
| Calcium | 67,000 | 20,000 | 78,000 | 91,000 | 9,100 | 32,000 | 63,000 | 88,000 | 14,000 | 89,000 | 140,000 | 42,000 | 45,000 | 19,000 | 53,000 |
| Chromium | 2 J | - | 15 | 9 J | 6 J | - | - | - | 3.9 | - | - | 70 | 4 J | 3 J | 3 J |
| Cobalt | 1 U | - | 7 J | - | - | - | - | - | - | - | - | - | - | 1 J | 5 J |
| Copper | 1 U | - | 51 | - | - | - | - | - | - | - | - | - | 2 J | 3 J | 27 |
| Iron | 3,300 | 15,000 | 69,000 | 23,000 | 2,300 | 17,000 | 73,000 | 61,000 | 7,200 | 76,000 | 37,000 | 39,000 | 25,000 | 16,000 | 8,600 |
| Lead | 8 | - | 32 | - | - | - | - | - | 3 | - | 8 | - | - | - | - |
| Magnesium | 5,700 | 8,900 | 18,000 | 22,000 | 4,500 | 11,000 | 39,000 | 33,000 | 13,000 | 9,600 | 36,000 | 53,000 | 14,000 | 4,900 | 8,100 |
| Manganese | 160 | 240 | 2,000 | 1,800 | 63 | 400 | 2,200 | 3,600 | 250 | 1,200 | 630 | 1,400 | 610 | 340 | 640 |
| Mercury | 0.10 U | - | 0.42 | - | - | - | - | - | - | - | - | - | - | - | - |
| Nickel | 19 J | - | - | - | - | - | - | - | - | - | - | - | 17 J | 7 J | 12 J |
| Potassium | 4,400 | 2,100 | 15,000 | 11,000 | 6,000 | 10,000 | 17,000 | 8,900 | 5,700 | 4,100 | 14,000 | 9,900 | 6,400 | 2,900 | 6,700 |
| Selenium | 3 U | - | - | - | - | - | - | - | - | - | - | - | - | 4 J | 3 J |
| Sodium | 15,000 | 69,000 | 33,000 | 140,000 | 44,000 | 120,000 | 220,000 | 130,000 | 140,000 | 14,000 | 250,000 | 420,000 | 89,000 | 22,000 | 11,000 |
| Vanadium | 2 J | - | 30 J | - | - | - | 19 J | - | - | - | - | - | 11 J | 5 J | 4 J |
| Zinc | 11 J | 32 | 92 | 34 | 45 | - | - | - | 21 J | 27 J | - | 16 J | 9 J | 14 J | 27 |

NOTES:

| | |
|---|---|
| ug/L | micrograms per Liter |
| SP | Southern Wood Piedmont |
| MW | Monitoring Well |
| J | Estimated value. |
| U | Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL). |
| - | Not detected. |
| | Elevated levels which are greater than three times the background level or greater than the SQL. |

# Table 16
## Intermediate Groundwater Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | |
|---|---|---|---|---|---|---|---|
| | SP-MW-38 | SP-MW-08A | SP-MW-11A | SP-MW-11B | SP-MW-20A | SP-MW-22A | SP-MW-24A |
| Aluminum | 160 | - | - | - | - | 94 | 81 |
| Arsenic | 5 U | - | - | - | - | - | - |
| Barium | 61 | 27 | 16 | 29 | 13 | 33 | 77 |
| Cadmium | 1 U | - | - | - | - | - | - |
| Calcium | 47,000 | 48,000 | 3,800 | 52,000 | 43,000 | 12,000 | 17,000 |
| Chromium | 2 J | - | - | - | - | - | - |
| Copper | 1 U | - | - | - | - | - | - |
| Iron | 2,600 | 3,600 | 1,900 | 220 | 2,200 | 3,600 | 5,000 |
| Lead | 3 U | 12 | - | - | - | - | - |
| Magnesium | 3,900 | 3200 | 2,700 | 1,700 | 4,100 | 4,200 | 4,100 |
| Manganese | 240 | 78 | 62 | - | 330 | 73 | 160 |
| Nickel | 20 J | - | - | - | - | - | - |
| Potassium | 2,900 | 3,800 | 690 | 990 J | 3,500 | 2,000 | 1,400 |
| Sodium | 19,000 | 26,000 | 5,900 | 7,200 | 10,000 | 30,000 | 29,000 |
| Vanadium | 2 J | - | - | - | - | - | - |
| Zinc | 24 | 27 | 21 | - | - | - | - |

Notes:

ug/L micrograms per Liter
SP Southern Wood Piedmont
MW Monitoring Well

J Estimated value

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

\- Not detected

Elevated levels which are greater than three times the background levle or greater than the SQL.

## Table 16 (continued)
## Intermediate Groundwater Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-MW-38 | SP-MW-28A | SP-MW-29A | SP-MW-32 | SP-MW-35 | SP-MW-41 |
| Aluminum | 160 | - | - | 220 | 350 | 380 |
| Arsenic | 5 U | - | - | - | - | - |
| Barium | 61 | 15 | 18 | 34 | 20 | 34 |
| Cadmium | 1 U | - | - | - | - | 1 J |
| Calcium | 47,000 | 23,000 | 52,000 | 29,000 | 41,000 | 28,000 |
| Chromium | 2 J | - | - | 6 J | 4 J | 3 J |
| Copper | 1 U | - | - | 4 J | 17 J | 6 J |
| Iron | 2,600 | 1,600 | - | 380 | 390 | 1,200 |
| Lead | 3 U | - | - | 22 | 10 | 14 |
| Magnesium | 3,900 | 2,100 | 5,400 | 2,600 | 4,400 | 3,800 |
| Manganese | 240 | 41 | 37 | 37 | 41 | 310 |
| Nickel | 20 J | - | - | 4 J | 4 J | 41 |
| Potassium | 2,900 | 2,100 | 2,100 | 5,600 | 2,900 | 3,100 |
| Sodium | 19,000 | 8,600 | 20,000 | 43,000 | 25,000 | 23,000 |
| Vanadium | 2 J | - | - | 3 J | 3 J | - |
| Zinc | 24 | - | - | 10 | 9 J | 23 |

Notes:

ug/L micrograms per Liter
SP Southern Wood Piedmont
MW Monitoring Well

J Estimated value

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

- Not detected

Elevated levels which are greater than three times the background levle or greater than the SQL.

# Table 17
## Deep Groundwater Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | |
|---|---|---|---|---|
| | SP-MW-39 | SP-MW-33 | SP-MW-36 | SP-MW-42 |
| Aluminum | 95 | 71 | 270 | 49 |
| Barium | 12 | 43 | 88 | 200 |
| Calcium | 45,000 | 52,000 | 32,000 | 51,000 |
| Chromium | 1 J | - | 4 J | - |
| Copper | 8 J | 6 J | 21 J | 2 J |
| Iron | 140 | 150 | 220 | 55 |
| Lead | 3 J | 12 | 22 | 20 |
| Magnesium | 6,000 | 6,900 | 2,600 | 4,600 |
| Manganese | 21 | 34 | 16 | 6 J |
| Nickel | 3 U | 3 J | - | - |
| Potassium | 2,800 | 6,200 | 9,000 | 19,000 |
| Sodium | 11,000 | 52,000 | 54,000 | 46,000 |
| Vanadium | 2 U | - | 6 J | 2 J |
| Zinc | 3 J | 13 J | 22 | 4 J |

**NOTES:**

ug/L micrograms per Liter
SP Southern Wood Piedmont
MW Monitoring Well
J Estimated value.
U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).
\- Not detected.

Elevated levels which are greater than three times the background level or greater than the SQL.

# 6.0 Surface Water Pathway

## 6.1 Hydrologic Setting

Overland runoff from the site generally flows south and southeast toward the onsite drainage ditch and Greenfield Creek which discharges into the Cape Fear River (Refs. 1, 2). The surface water pathway begins in the upper end of the drainage ditch along the southeastern portion of the site. The pathway continues southward for approximately 1,500 feet, where it then empties into Greenfield Creek. The surface water pathway continues west approximately 1,800 feet before discharging into the Cape Fear River (Refs. 1; 2; Fig. 2). The surface water pathway continues in the Cape Fear River for a distance of approximately 14.4 miles both upstream and 14.4 miles downstream due to tidal influence from the Atlantic Ocean (Refs. 1; 31). The site is located within the 100 year floodplain (Ref. 32).

## 6.2 Surface Water Pathway Targets

The active surface water intakes utilized by the Wilmington Water Department and the Leland Sanitary District are located more than 15 miles upstream of the site (Refs. 30; 31). A 10 year average flow rate for the Cape Fear River was calculated at 5,247 cubic feet per year (Ref. 33). Approximately 10 acres (including 4,000 feet of frontage) of wetland exist on the southeastern portion of the site (Refs. 1; 34; 35). Approximately 56 miles of wetland frontage exist along the 15 miles of the surface water pathway, both upstream and downstream (Ref. 34). The North Carolina and U.S. threatened species, the American alligator (*Alligator mississippiensis*), has been identified at 16 locations on the Cape Fear River system (Ref 36; 37; 38). The U.S. and North Carolina endangered mammal, West Indian manatee (*Trichechus manatus*), have been reported in the Cape Fear estuary approximately 12 miles downstream of the site (Ref. 36). The federally-designated endangered shortnose sturgeon (*Acipenser brevirostrum*) has been observed in the Lower Cape Fear River (Ref. 36). There are seven commercial fisheries located along the Cape Fear River between Eagle Island and the Atlantic Ocean (Ref. 39). In addition, the Cape Fear is used extensively by recreational fishers and boaters (Ref. 40). Species of greatest commercial value include fluke flounder, hard clam, blue crabs (hard shell), and shrimp (Ref. 41). Fishing tackle, floats, and bait containers were observed lying on the ground along the southern site boundary creek bank of Greenfield Creek (Ref. 42).

## 6.3 Surface Water Pathway Sample Locations

In order to characterize potential contamination in the surface water pathway, one background surface water and one background sediment sample were collected. Surface water and sediment samples SP-SW-01 and SP-SD-01 were collected immediately offsite and upgradient of the site, approximately 250 feet east of the site entrance on Greenfield Street. Biological fish tissue samples were collected in the Cape Fear River and Greenfield Lake. The sample taken in Greenfield Lake serves as a control sample. The complete set of analytical data is presented in Appendix A. Sample locations are shown in Figure 2 and are described in Table 1.

## 6.4 Surface Water Pathway Analytical Results

### *6.4.1 Surface Water/Sediment Organic Analytical Results*

Elevated concentrations of extractable organics were detected in analytical results of sediment samples SP-SD-06, SP-SD-07, SP-SD-08, SP-SD-09, SP-SD-11, and SP-SD-14. Extractable organic constituents detected at elevated levels in sediment samples include: naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo (b and/or k) fluoranthene, and benzo(a)pyrene. Elevated concentrations of pesticides were detected in analytical results of sediment samples SP-SD-03, SP-SD-06, SP-SD-14, and SP-SD-19. The pesticide constituents 4,4'-DDD (P,P'-DDD), methoxychlor, and gamma chlordane/2 were detected at elevated levels in sediment samples SP-SD-14, SP-SD-06 and SP-SD-19, and SP-SD-03, respectively. Elevated concentrations of purgeable organics were detected in analytical results of sediment samples SP-SD-06 and SP-SD-07. The purgeable organic compounds methyl ethyl ketone, ethyl benzene, and total xylenes were detected at elevated levels in sediment samples SP-SD-06 and SP-SD-07. The sample SP-SD-01, which contained polynuclear aromatic hydrocarbons (PAHs) and other extractable compunds, is considered a control sample. A summary of sediment organic and pesticide/PCB analytical results are presented in Tables 18 and 19. Sample locations are illustrated on Figure 2. The complete set of analytical data is presented in Appendix A.

# Table 18
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-02 | SP-SD-03 | SP-SD-04 | SP-SD-05 | SP-SD-06 |
| **Extractable Organic Compounds** | | | | | | |
| Bis(2-ethylhexyl)Phthalate | 1,900 | - | - | - | - | - |
| Di-n-butylphthalate | 1,400 | - | - | - | - | - |
| Pentachlorophenol | 1900 U | - | - | - | - | - |
| (3- and/or 4-) Methylphenol | 760 U | - | - | - | - | - |
| Naphthalane | 760 U | - | - | - | - | 3,200 J |
| 2-Methylnaphthalene | 760 U | - | - | - | - | 38,000 |
| Acenaphthylene | 760 U | - | 70 J | - | - | - |
| Acenaphthene | 130 J | - | 140 J | - | - | 31,000 |
| Dibenzofuran | 82 J | - | - | - | - | 21,000 |
| Fluorene | 110 J | - | - | - | - | 41,000 |
| Phenanthrene | 1200 | - | 200 J | - | 260 J | 94,000 |
| Anthracene | 170 J | - | 340 J | - | 140 J | 61,000 |
| Carbazole | 200 J | - | 59 J | - | 64 J | 20,000 |
| Fluoranthene | 2200 | - | 1000 | - | 580 | 130,000 |
| Pyrene | 1700 | - | 750 | - | 630 | 91,000 |
| Benzo(a)anthracene | 860 | - | - | - | 260 J | 33,000 |
| Chrysene | 1200 | - | 520 J | - | 320 J | 42,000 |
| Benzo(b and/or k)fluoranthene | 1400 J | - | 920 J | - | 350 J | 27,000 J |
| Benzo(a)pyrene | 780 | - | 440 J | - | 250 J | 10,000 J |
| Dibenzo(a,h)anthracene | 760 U | - | - | - | - | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Benzonaphthothiophene | 500 JN | | | | | |
| Octahydrodimethyl (Methylethenyl) Azulene | | | | | | |
| Methylchrysene | 1,000 JN | | | | | |
| 1- Methylnaphthalene | | | | | | 20,000 JN |
| Hexachlorobiphenyl | | | | | | |
| Perylene | | | | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | | | |
| Methylfluorene (2 isomers) | | | | | | |
| Methyldibenzofuran | | | | | | |
| Methylfluorene | | | | | | |

## Table 18 (continued)
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-02 | SP-SD-03 | SP-SD-04 | SP-SD-05 | SP-SD-06 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Dibenzothiophene | | | | | | 7,000 JN |
| Methylphenanthrene (2 isomers) | | | | | | |
| Methylanthracene | | | | | | 10,000 JN |
| Methylanthracene (2 isomers) | | | | | | |
| Tetramethylphenanthrene | | | | | | |
| Methylphenanthrene (3 isomers) | | | | | | 30,000 JN |
| Phenylnaphthalene | | | | | | 10,000 JN |
| Cyclopentaphenanthrenone | | | | | | |
| Benzofluorene | | | | | | |
| Benzofluorene (2 isomers) | | | | | | |
| Benzofluorene (3 isomers) | | | | | | 30,000 JN |
| Methylpyrene | | | | | | |
| Cyclopentapyrene | | | | | | |
| Benzopyrene (not A) | | | | | | |
| Aminofluorenone | | | | | | 5,000 JN |
| Anthracenecarbonitrile | | | | | | |
| Benzoanthracenone | | | | | | |
| Benzonaphthothiophene | | | | | | |
| Benzonaphthothiophene (2 isomers) | | | | | | 10,000 JN |
| Benzofluoranthene (not B or K) | | | | | | 8,000 JN |
| Benzofluoranthene (not B or K) (2 isomers) | | | | | | |
| Pentachlorobiphenyl (2 isomers) | | | | | | |
| Hexahydrohydroxytrimethyl (Methylethyl) Phenanthrenone | | | | | | |
| Unidentified Compounds / # | 10,000 J / 8 | | 10,000J/15 | | 1,000 J / 2 | 30,000 J/1 |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SD Sediment
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL)
\- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 18 (continued)
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-07 | SP-SD-08 | SP-SD-09 | SP-SD-10 | SP-SD-11 |
| **Extractable Organic Compounds** | | | | | | |
| Bis(2-ethylhexyl)Phthalate | 1,900 | - | - | - | - | - |
| Di-n-butylphthalate | 1,400 | - | - | - | - | - |
| Pentachlorophenol | 1900 U | - | - | - | - | - |
| (3- and/or 4-)Methylphenol | 760 U | - | - | - | - | - |
| Naphthalene | 760 U | 13,000 J | - | 3,600 J | - | - |
| 2-Methylnaphthalene | 760 U | 21,000 J | 340 J | 4,000 J | - | - |
| Acenaphthylene | 760 U | - | - | - | - | - |
| Acenaphthene | 130 J | 63,000 | 590 J | 6,700 | - | - |
| Dibenzofuran | 82 J | 37,000 | 860 J | 6,400 | - | - |
| Fluorene | 110 J | 89,000 | 2,200 | 9,600 | - | - |
| Phenanthrene | 1200 | 230,000 | 7,000 | 22,000 | - | 140 J |
| Anthracene | 170 J | 88,000 | 7,800 | 33,000 | 110 J | 740 J |
| Carbazole | 200 J | 9,800 J | 1,400 J | 4,800 | - | 170 J |
| Fluoranthene | 2200 | 190,000 | 5,500 | 13,000 | 100 J | 1,200 J |
| Pyrene | 1700 | 140,000 | - | 9,200 | 100 J | 810 J |
| Benzo(a)anthracene | 860 | 38,000 | - | - | - | - |
| Chrysene | 1200 | 46,000 | 2,200 | 3,100 J | 130 J | 450 J |
| Benzo(b and/or k)fluoranthene | 1400 J | 26,000 J | 2,200 J | 1,100 J | 380 J | 690 J |
| Benzo(a)pyrene | 780 | 11,000 J | 630 J | 750 J | 180 J | 280 J |
| Dibenzo(a,h)anthracene | 760 U | - | - | - | - | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Benzonaphthothiophene | 500 JN | | | | | |
| Octahydrodimethyl (Methylethenyl) Azulene | | | | | | |
| Methylchrysene | 1,000 JN | | | | | |
| 1- Methylnaphthalene | | 20,000 JN | | 2,000 JN | | |
| Hexachlorobiphenyl | | | | | | |
| Perylene | | | | | | |
| Dimethylnaphthalene (2 isomers) | | 20,000 JN | | | | |
| Dimethylnaphthalene (3 isomers) | | | | 4,000 JN | | |
| Methylfluorene (2 isomers) | | 30,000 JN | | | | |
| Methyldibenzofuran | | 10,000 JN | | 1,000 JN | | |
| Methylfluorene | | | | 1,000 JN | | |

# Table 18 (continued)
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-07 | SP-SD-08 | SP-SD-09 | SP-SD-10 | SP-SD-11 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Dibenzothiophene | | 20,000 JN | | 2,000 JN | | |
| Methylphenanthrene (2 isomers) | | 30,000 JN | | 4,000 JN | | |
| Methylanthracene | | 40,000 JN | 1,000 JN | | | |
| Methylanthracene (2 isomers) | | | | 4,000 JN | | |
| Tetramethylphenanthrene | | | 3,000 JN | | | |
| Methylphenanthrene (3 isomers) | | | | | | |
| Phenylnaphthalene | | 20,000 JN | | 1,000 JN | | |
| Cyclopentaphenanthrenone | | | | | | |
| Benzofluorene | | | 800 JN | | 90 JN | |
| Benzofluorene (2 isomers) | | | | 3,000 JN | | |
| Benzofluorene (3 isomers) | | 40,000 JN | | | | |
| Methylpyrene | | 6,000 JN | | | | |
| Cyclopentapyrene | | | | | | |
| Benzopyrene (not A) | | | | | | |
| Aminofluorenone | | | | | | |
| Anthracenecarbonitrile | | | | | | |
| Benzoanthracenone | | | | | | |
| Benzonaphthothiophene | | | | | 200 JN | |
| Benzonaphthothiophene (2 isomers) | | | | | | |
| Benzofluoranthene (not B or K) | | 9,000 JN | | | | |
| Benzofluoranthene (not B or K) (2 isomers) | | | | | | |
| Pentachlorobiphenyl (2 isomers) | | | | | | |
| Hexahydrohydroxytrimethyl (Methylethyl) Phenanthrenone | | | 4,000 JN | | | |
| Unidentified Compounds / # | 10,000 J / 8 | 200,000J/2 | 700,000 | | | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SD Sediment
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL)
- Not detected

Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 18 (continued)
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-12 | SP-SD-13 | SP-SD-14 | SP-SD-15 | SP-SD-16 |
| **Extractable Organic Compounds** | | | | | | |
| Bis(2-ethylhexyl)Phthalate | 1,900 | - | - | - | - | - |
| Di-n-butylphthalate | 1,400 | - | - | - | - | - |
| Pentachlorophenol | 1900 U | - | - | 220 J | - | - |
| (3- and/or 4-)Methylphenol | 760 U | - | - | - | - | - |
| Naphthalene | 760 U | - | - | - | - | - |
| 2-Methylnaphthalene | 760 U | - | - | - | - | - |
| Acenaphthylene | 760 U | - | - | 210 J | - | - |
| Acenaphthene | 130 J | - | - | - | - | - |
| Dibenzofuran | 82 J | - | - | - | - | - |
| Fluorene | 110 J | - | - | 69 J | - | - |
| Phenanthrene | 1200 | - | - | 130 J | - | - |
| Anthracene | 170 J | - | - | 780 | - | - |
| Carbazole | 200 J | - | - | 100 J | - | - |
| Fluoranthene | 2200 | - | 240 J | 1,000 | - | - |
| Pyrene | 1700 | - | 350 J | 1,600 | - | - |
| Benzo(a)anthracene | 860 | - | 170 J | 970 | - | - |
| Chrysene | 1200 | - | 330 J | 1,500 | - | - |
| Benzo(b and/or k)fluoranthene | 1400 J | - | 540 J | 3,800 J | - | - |
| Benzo(a)pyrene | 780 | - | 150 J | 1,400 | - | - |
| Dibenzo(a,h)antrhacene | 760 U | - | - | - | - | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Benzonaphthothiophene | 500 JN | | | | | |
| Octahydrodimethyl (Methylethenyl) Azulene | | | | | | |
| Methylchrysene | 1,000 JN | | | | | |
| 1- Methylnaphthalene | | | | | | |
| Hexachlorobiphenyl | | | 100 JN | | | |
| Perylene | | | 200 JN | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | | | |
| Methylfluorene (2 isomers) | | | | | | |
| Methyldibenzofuran | | | | | | |
| Methylfluorene | | | | | | |

# Table 18 (continued)
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-12 | SP-SD-13 | SP-SD-14 | SP-SD-15 | SP-SD-16 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Dibenzothiophene | | | | | | |
| Methylphenanthrene (2 isomers) | | | | | | |
| Methylanthracene | | | | | | |
| Methylanthracene (2 isomers) | | | | | | |
| Tetramethylphenanthrene | | | | | | |
| Methylphenanthrene (3 isomers) | | | | | | |
| Phenylnaphthalene | | | | | | |
| Cyclopentaphenanthrenone | | | | 200 JN | | |
| Benzofluorene | | | | 200 JN | | |
| Benzofluorene (2 isomers) | | | | | | |
| Benzofluorene (3 isomers) | | | | | | |
| Methylpyrene | | | | 100 JN | | |
| Cyclopentapyrene | | | | 100 JN | | |
| Benzopyrene (not A) | | | | 300 JN | | |
| Aminofluorenone | | | | | | |
| Anthracenecarbonitrile | | | | | | |
| Benzoanthracenone | | | | | | |
| Benzonaphthothiophene | | | | | | |
| Benzonaphthothiophene (2 isomers) | | | | | | |
| Benzofluoranthene (not B or K) | | | | 700 JN | | |
| Benzofluoranthene (not B or K) (2 isomers) | | | | | | |
| Phenanthrenone | | | | | | |
| Pentachlorobiphenyl (2 isomers) | | | | | | |
| Hexahydrohydroxytrimethyl (Methylethyl) Phenanthrenone | | | | | | |
| Unidentified Compounds / # | 10,000 J / 8 | | 500 J / 1 | | 700 J / 1 | 600 J / 1 |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SD Sediment
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL)
\- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 18 (continued)
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-17 | SP-SD-18 | SP-SD-19 | SP-SD-20 | SP-SD-21 |
| **Extractable Organic Compounds** | | | | | | |
| Bis(2-ethylhexyl)Phthalate | 1,900 | - | - | - | - | - |
| Di-n-butylphthalate | 1,400 | - | - | - | - | - |
| Pentachlorophenol | 1900 U | - | - | - | - | - |
| (3- and/or 4-)Methylphenol | 760 U | 260 J | - | - | - | - |
| Naphthalene | 760 U | - | - | - | - | - |
| 2-Methylnaphthalene | 760 U | - | - | - | - | - |
| Acenaphthylene | 760 U | - | - | - | - | - |
| Acenaphthene | 130 J | - | - | - | - | - |
| Dibenzofuran | 82 J | - | - | - | - | - |
| Fluorene | 110 J | - | - | - | - | - |
| Phenanthrene | 1200 | - | - | 110 J | - | - |
| Anthracene | 170 J | - | - | 240 J | - | - |
| Carbazole | 200 J | - | - | - | - | - |
| Fluoranthrene | 2200 | - | 170 J | 730 | 65 J | - |
| Pyrene | 1700 | - | 190 J | 1,600 | 77 J | - |
| Benzo(a)anthracene | 860 | - | - | 550 | - | - |
| Chrysene | 1200 | - | 160 J | 1,300 | 75 J | - |
| Benzo(b and/or k)fluoranthene | 1400 J | 51 J | 200 J | 3,800 J | 130 J | - |
| Benzo(a)pyrene | 780 | - | 140 J | 880 J | 94 J | - |
| Dibenzo(a,h)anthracene | 760 U | - | - | 200 J | - | - |
| **Miscellaneous Extractable Organic Compounds** | | | | | | |
| Benzonaphthothiophene | 500 JN | | | | | |
| Octahydrodimethyl (Methylethenyl) Azulene | | 200 JN | | | | |
| Methylchrysene | 1,000 JN | | | | | |
| 1- Methylnaphthalene | | | | | | |
| Hexachlorobiphenyl | | | | | | |
| Perylene | | | 100 JN | | | |
| Dimethylnaphthalene (2 isomers) | | | | | | |
| Dimethylnaphthalene (3 isomers) | | | | | | |
| Methylfluorene (2 isomers) | | | | | | |
| Methyldibenzofuran | | | | | | |
| Methylfluorene | | | | | | |

# Table 18 (continued)
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-17 | SP-SD-18 | SP-SD-19 | SP-SD-20 | SP-SD-21 |
| **Miscellaneous Extractable Organic** | | | | | | |
| Dibenzothiophene | | | | | | |
| Methylphenanthrene (2 isomers) | | | | | | |
| Methylanthracene | | | | | | |
| Methylanthracene (2 isomers) | | | | | | |
| Tetramethylphenanthrene | | | | | | |
| Methylphenanthrene (3 isomers) | | | | | | |
| Phenylnaphthalene | | | | | | |
| Cyclopentaphenanthrenone | | | | | | |
| Benzofluorene | | | | 200 JN | | |
| Benzofluorene (2 isomers) | | | | | | |
| Benzofluorene (3 isomers) | | | | | | |
| Cyclopentapyrene | | | | | | |
| Benzopyrene (not A) | | | | 300 JN | | |
| Methylpyrene | | | | | | |
| Aminofluorenone | | | | | | |
| Anthracenecarbonitrile | | | | 200 JN | | |
| Benzoanthracenone | | | | 100 JN | | |
| Benzonaphthothiophene | | | | | | |
| Benzonaphthothiophene (2 isomers) | | | | | | |
| Benzofluoranthene (not B or K) | | | | | | |
| Benzofluoranthene (not B or K) (2 isomers) | | | | 1,000 JN | | |
| Pentachlorobiphenyl (2 isomers) | | | | | 400 JN | |
| Hexahydrohydroxytrimethyl (Methylethyl) Phenanthrenone | | | | | | |
| Unidentified Compounds / # | 10,000 J / 8 | 700 J / 1 | | 1,000 J / 2 | 800 J / 1 | |

ug/kg micrograms per kilogram
SP Southern Wood Piedmont
SD Sediment
J Estimated Value
N Presumptive evidence of presence of material
U Material analyzed for but not detected. Number is the sample quantitation limit (SQL)
\- Not detected
Elevated levels which are greater than three times the background level or greater than the SQL.

## Table 18-continued
## Sediment Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | | | | | |
|---|---|---|---|---|---|---|
| | SP-SD-01 | SP-SD-06 | SP-SD-07 | SP-SD-09 | SP-SD-12 | SP-SD-17 |
| **Purgeable Organic Compounds** | | | | | | |
| Methyl Ethyl Ketone | 23 U | 100 | 320 | - | - | - |
| Toluene | 160 | 20 J | - | - | 2 J | 2 J |
| Ethyl Benzene | 3 J | 64 | 20 J | - | - | - |
| Total Xylenes | 23 U | 94 | 37 J | 2 J | - | - |
| **Miscellaneous Purgeable Organic Compounds** | | | | | | |
| Trimethylbenzene | | | | 10 JN | | |
| Trimethylbenzene (2 isomers) | | 400 JN | 200 JN | | | |
| Ethylmethylbenzene | | 70 JN | | 9 JN | | |
| Ethyldimethylbenzene | | | 60 JN | | | |
| Ethyldimethylbenzene (2 isomers) | | | | 10 JN | | |
| Ethyldimethylbenzene (3 isomers) | | 200 JN | | | | |
| Camphene | | 40 JN | | | | |
| Indane | | 2,000 JN | 900 JN | 50 JN | | |
| Indene | | 30 JN | | | | |
| Tetramethylbenzene | | | | 8 JN | | |
| Methylindan | | 400 JN | | | | |
| Dihydromethylindene | | | 100 JN | | | |
| Methylbenzofuran (2 isomers) | | | 400 JN | | | |
| Methylbenzofuran (3 isomers) | | 900 JN | | | | |

ug/kg micrograms per kilogram

J Estimated value.

N Presumptive evidence of presence of material.

U Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL).

\- Not detected

Elevated levels which are greater than three times background level or greater

# Table 19
## Sediment Pesticide/PCB Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/kg) | Background | Source Samples | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SP-SD -01 | SP-SD -03 | SP-SD -05 | SP-SD -06 | SP-SD -07 | SP-SD -08 | SP-SD -09 | SP-SD -10 | SP-SD -11 | SP-SD -12 | SP-SD -13 | SP-SD -14 | SP-SD -15 | SP-SD -16 | SP-SD -17 | SP-SD -18 | SP-SD -19 | SP-SD -20 |
| **Pesticides / PCB Compounds** | | | | | | | | | | | | | | | | | | |
| Delta-BHC | 3.9U | - | - | - | - | - | - | 0.42J | - | - | - | - | - | - | - | - | - | - |
| Aldrin | 1.2J | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Dieldrin | 12 | - | - | - | - | - | - | - | - | - | - | - | 1.4JN | - | - | - | - | - |
| 4,4'-DDE (P,P'-DDE) | 17 | 26 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Endosulfan II | 7.6U | 2.9J | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4,4'-DDD (P,P'-DDD) | 7.6U | - | 0.71JN | - | - | - | - | - | - | - | - | 7.8 | - | - | - | - | - | - |
| Endosulfan Sulfate | 7.6U | - | - | - | 16JN | - | - | - | - | - | - | - | 2.6J | - | - | - | - | - |
| 4,4'-DDT (P,P'-DDT) | 15 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Methoxychlor | 39U | - | - | 100 | - | - | - | - | - | - | - | - | - | - | - | - | 49 | - |
| Endrin Aldehyde | 39U | 23 | - | - | - | - | - | 1.2J | - | - | - | - | - | - | - | - | - | 0.78J |
| Gamma Chlordane /2 | 20U | 27 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0.43JN |
| PCB-1260 (Arochlor 1260) | 76U | - | - | - | - | 590N | 170N | - | - | - | | - | - | - | - | - | - | - |

NOTES:

- ug/kg Micrograms per kilogram
- SP Southern Wood Piedmont
- SD Sediment
- J Estimated value.
- N Presumptive evidence indicates the presence of material.
- U Material was analyzed for but not detected. The number is the sample quantitation limit (SQL).
- \- Not detected.
- Elevated levels which are greater than three times the background level or greater than the SQL.

Extractable organic compounds were not detected in any surface water samples. Elevated concentrations of the pesticide alpha-chlordane/2 were detected in surface water sample SP-SW-06 obtained from Greenfield Creek on the south side of the site. Toluene was detected in the background surface water sample SP-SW-01: Elevated concentrations of PCB-1260 were detected in surface water samples SP-SW-05 and SP-SW-06 obtained from Greenfield Creek, near the southeast corner of the site. Surface water samples were not analyzed for dioxins/furans. A summary of surface water pesticide/PCB and purgeable analytical results are presented on Table 20. A complete set of analytical data is presented in Appendix A.

Tissue samples SP-BIO-07, -80, and -09 were analyzed for extractable organics and pesticides/PCBs. Miscellaneous extractable organic compounds detected at estimated quantities in the fish tissue samples include hexadecanoic acid, hexadecanoic acid, oleic acid, octadecenoic acid, and tetradecanoic acid. Sample locations are illustrated on Figure 2. The complete set of analytical data is presented in Appendix A.

### *6.4.2 Surface Water/Sediment Inorganic Analytical Results*

Inorganic analytes were detected at elevated levels in sediment samples SP-SD-03, SP-SD-05, SP-SD-06, SP-SD-07, SP-SD-08, SP-SD-09, SP-SD-11, SP-SD-12, SP-SD-15, SP-SD-16, SP-SD-17, SP-SD-18, and SP-SD-19. Inorganic analytes detected at elevated levels in the sediment samples include: aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc. Inorganic analytes were detected at elevated levels in surface water samples SP-SW-04, SP-SW-07, SP-SW-08, and SP-SW-09. Inorganic analytes detected at elevated levels in the surface water samples include arsenic, magnesium, potassium, sodium, and vanadium. Sample codes and descriptions are listed in Table 1 and are shown on Figure 2. The complete set of analytical data is presented in Appendix A. A summary of the sediment and surface water inorganic analytical results are presented in Tables 21 and 22, respectively.

## 6.5 Surface Water Pathway Conclusions

Analytical results of sediment samples collected from the onsite drainage ditch along the east side of the site revealed elevated levels of the site related extractable organic contaminants naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)

anthracene, chrysene, benzo (b and/or k) fluoranthene, and benzo(a)pyrene and site related inorganic contaminants arsenic, cadmium, chromium, copper, and lead. These contaminants were also detected at elevated levels in surface and subsurface soil samples collected from the SWP site. The surface water migration pathway is of primary concern for this site. There is an increased probability that surface water flows over the contaminated surface soils at the site and discharges to the on-site drainage ditch and Greenfield Creek, providing a mechanism for contaminant migration into nearby fisheries and sensitive environments.

# Table 20
## Surface Water Organic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | SP-SW-01 | SP-SW-01D | SP-SW-03 | SP-SW-04 | SP-SW-05 | SP-SW-06 | SP-SW-07 | SP-SW-08 | SP-SW-09 |
| **Pesticides / PCB Compounds** | | | | | | | | | |
| Alpha-Chlordane/2 | 0.050 UJ | 0.050 UJ | - | - | - | 0.064 | - | - | - |
| PCB-1260 | 1.0 UJ | 1.0 J | - | 0.33 J | 1.9 | 9.4 | 0.55 J | 0.15 J | - |
| **Purgeable Organic Compounds** | | | | | | | | | |
| Toluene | 1 J | | | | | | | | |

Notes:

| | |
|---|---|
| ug/L | micrograms per Liter |
| SP | Southern Wood Piedmont |
| SW | Surface Water |
| J | Estimated value |
| U | Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL). |
| UJ | Estimated minimum quantitation limit. The analyte is not present at concentrations above the *minimum* SQL. |
| - | Not detected |

Elevated levels which are greater than three times background levels or greater than the SQL.

# Table 21
## Sediment Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (mg/kg) | Background | Source Samples | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SP-SD -01 | SP-SD -03 | SP-SD -05 | SP-SD -06 | SP-SD -07 | SP-SD -08 | SP-SD -09 | SP-SD -10 | SP-SD -11 | SP-SD -12 | SP-SD -13 | SP-SD -14 | SP-SD -15 | SP-SD -16 | SP-SD -17 | SP-SD -18 | SP-SD -19 | SP-SD -20 |
| Aluminum | 2,700 | 15,000 | 3,100 | 13,000 | 28,000 | 11,000 | 650 | 790 | 26,000 | 1,900 | 1,100 | 3,300 | 1,200 | 1,200 | 1,900 | 890 | 7,200 | 1,600 |
| Arsenic | 3.8 UJ | 33 J | 6.2 J | 30 J | 29 J | 20 J | - | 2.6 J | 17 J | - | 2.6 J | 3.5 J | 2.9 J | - | 2.6 J | 7.1 J | - | - |
| Barium | 46 | 84 | 60 | 83 | 110 | 53 | 4.4 | 2.8 | 54 | 5.8 | - | 16 | 6 | 3.7 | 6.6 | 2.9 | 16 | 5.1 |
| Cadmium | 0.58 J | 2.1 J | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Calcium | 15,000 | 5,400 | 2,000 | 7,800 | 12,000 | 6,700 | 440 | 360 | 3,300 | 480 | 330 | 890 | 460 | 340 | 830 | 340 | 920 | 550 |
| Chromium | 14 | 45 | 4.9 | 54 | 53 | 52 | 3.5 | 2.4 J | 44 | 6.1 | 2.8 | 6.4 | 71 | 9.1 | 20 | 6 | 16 | 5.2 |
| Cobalt | 1.4 J | 7.5 J | 1 J | 6.6 J | 15 J | - | 0.47 J | 0.30 J | 12 J | 1.2 J | - | 0.84 J | 1.4 J | 1.1 J | 1.1 J | 0.37 J | 1.7 J | 0.66 J |
| Copper | 29 | 100 | 1,100 | 64 | 94 | 74 | 2.6 J | 3.1 J | 24 | 4.3 J | 3.8 J | 8 J | 2.9 J | 3 J | 4.8 J | 2.5 J | 13 | 2.8 J |
| Iron | 5,900 | 25,000 | 7,000 | 39,000 | 59,000 | 20,000 | 880 | 710 | 27,000 | 2,000 | 780 | 2,800 | 1,600 | 1,300 | 1,300 | 1,600 | 5,400 | 2,000 |
| Lead | 130 | 590 | 69 | 100 | 210 | 120 | 3.8 | 13 | 28 | 3.9 | 3.5 | 11 | 4.3 | 2.1 | 9.3 | 3.2 | 28 | 6.7 |
| Magnesium | 950 | 3,200 | 220 | 1,800 | 3,800 | 1,800 | - | - | 4,900 | 400 | - | 320 | 270 | 250 | 550 | 210 | 990 | 400 |
| Manganese | 43 | 110 | 29 | 110 | 160 | 68 | 7.2 | 6.7 | 210 | 14 | 3.5 | 14 | 12 | 11 | 15 | 7.5 | 23 | 8 |
| Nickel | 9 U | - | - | - | - | - | 13 | - | - | - | - | - | 52 | 35 | 18 | - | - | - |
| Potassium | 210 | 950 | - | 800 | 1,200 | 840 | - | - | 1,900 | 260 | - | - | 160 | 170 | 310 | 170 | 470 | 270 |
| Selenium | 1.9 U | - | - | - | - | - | - | - | - | - | - | - | 1.6 | - | - | - | - | 1.2 J |
| Sodium | 220 U | 1,600 | 290 | - | 1,400 | 1,100 | - | 210 | 3,300 | 560 | - | - | - | 270 | 740 | - | - | - |
| Vanadium | 13 J | 63 J | 5 J | 49 J | 85 J | 50 J | 10 J | 2.1 J | 56 | 5 J | 2.4 J | 8 J | 3.6 J | 3.3 J | 8.7 J | 4.3 J | 21 | 6.7 J |
| Zinc | 210 | 530 | 82 | 440 | 640 | 340 | 19 | 23 | 120 | 17 | 7.8 | 54 | 12 | 11 | 18 | 7.8 | 38 | 14 |

**NOTES:**

mg/kg milligrams per kilogram.
SP Southern Wood Piedmont
SD Sediment
J Estimated value.
U Material was analyzed for but not detected. The number is the sample quantitation limit (SQL).
- Not detected.
Elevated levels which are greater than three times the background level or greater than the SQL.

# Table 22
## Surface Water Inorganic Analytical Results
### Southern Wood Piedmont Company
### Wilmington, New Hanover County, North Carolina

| Parameters (ug/L) | Background | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | SP-SW-01 | SP-SW-01D | SP-SW-03 | SP-SW-04 | SP-SW-05 | SP-SW-06 | SP-SW-07 | SP-SW-08 | SP-SW-09 |
| Aluminum | 160 U | 160 U | - | - | - | - | - | - | - |
| Arsenic | 8 U | 8 U | - | 9 J | - | - | - | - | - |
| Barium | 65 | 72 | 30 | 33 | 34 | 36 | 27 | 28 | 27 |
| Cadmium | 1 U | 1 U | - | - | - | - | - | - | - |
| Calcium | 65,000 | 70,000 | 32,000 | 35,000 | 35,000 | 38,000 | 30,000 | 28,000 | 37,000 |
| Chromium | 1 U | 3J | - | - | - | - | - | - | - |
| Copper | 20 J | 20J | 17 J | 15 J | 23 J | 15 J | 22 J | 15 J | 15 J |
| Cyanide | 10 U | 17 | - | - | - | - | - | - | - |
| Iron | 5,100 | 4,700 | 440 | 650 | 450 | 1,400 | 940 | 1,300 | 830 |
| Lead | 6 | 9 | - | - | 4 | 3 | - | - | - |
| Magnesium | 6,000 | 6,400 | 2,400 | 2,800 | 2,600 | 3,900 | 68,000 | 64,000 | 96,000 |
| Manganese | 510 | 560 | 22 | 29 | 27 | 68 | 66 | 73 | 73 |
| Nickel | 3 U | 5 U | - | - | - | - | - | - | - |
| Potassium | 3,100 | 3,600 | 2,200 | 2,400 | 2,400 | 2,900 | 43,000 | 39,000 | 57,000 |
| Sodium | 16,000 | 19,000 | 8,100 | 9,400 | 8,900 | 17,000 | 550,000 | 520,000 | 690,000 |
| Vanadium | 1 J | 1 U | - | - | 2 J | 2 J | 2 J | 3 J | - |
| Zinc | 42 | 34 | 28 | 28 | 33 | 26 | 33 | 39 | 37 |

**NOTES:**

| | |
|---|---|
| ug/L | micrograms per Liter. |
| SP | Southern Wood Piedmont |
| SW | Surface Water |
| J | Estimated value. |
| U | Material analyzed for but not detected. Number shown is the sample quantitation limit (SQL). |
| - | Not detected. |
| | Elevated levels which are greater than three times background levels or greater than the SQL. |

# 7.0 Soil Exposure and Air Pathways

## 7.1 Physical Conditions

The SWP site is located in a river front area with numerous marine and non-marine commercial operations as well as public housing nearby. The site is situated on the eastern bank of the Cape Fear River, immediately south of the Wilmington business district (Ref. 1). An elevated railroad bed, vegetation, and the onsite drainage ditch border the east side of the site (Fig. 1). The eastern portion of the site is accessible by foot on the rail bed and accessible by vehicle only at the gated site entrance (Ref. 2; Fig. 1).

## 7.2 Soil Exposure and Air Pathway Targets

The estimated population within 4 miles of the site is approximately 49,515 (Ref. 43, pp. 12, 13). The estimated population within the 4-mile radius of the site is distributed as follows: 0 - 0.25 mile, 304 persons; 0.25 - 0.5 mile, 266 persons; 0.5 - 1 mile, 5,674 persons; 1 - 2 mile, 15,062 persons; 2 - 3 miles, 13,886 persons; and 3 - 4 miles, 14,322 persons (Ref. 43, pp. 12,13). There are two schools located less than 1/2 mile from the site (Ref. 1). The school closest to the site is approximately 0.20 miles south of the site. Day care facilities are located approximately 1/4 mile east of the site (Ref. 2). A park is located less than a 1/4 mile east of site (Ref. 1). There are currently no workers on the SWP site (Ref. 25). The nearest residents are located approximately 400 feet east of the site (Ref. 2). The estimated surface water pathway extends approximately 14.4 miles upstream and 14.4 miles downstream of the site due to tidal fluctuations. The estimated wetland acreage within a 4-mile radius of the site is distributed as follows: onsite, 10 acres; 0-0.25 miles, 32.5 acres; 0.25-0.5 miles, 130 acres; 0.5-1.0 mile, 690 acres; 1-2 miles, 3,400 acres; 2-3 miles, 4,640 acres; 3-4 miles, 3,840 acres (Ref. 35).

## 7.3 Soil Exposure and Air Pathway Sample Locations

Surface soil samples were collected to determine soil exposure at the SWP site. Background surface soil samples SP-SS-01, SP-SS-02, and SP-SS-03 were collected from upgradient areas located north, east, and southeast, respectively, of the site. Six samples were taken in former wood storage and landfarming areas. Five samples were located in previously identified contamination source areas. Seven samples were

taken in areas which were not previously sampled. Sample locations are shown in Figure 2 and described in Table 1.

No formal air sampling program was conducted. Portable flame ionization detectors, or organic vapor analyzers (OVAs) were used for onsite safety monitoring during sampling activities. No atmospheric readings were noted above background levels while performing air monitoring during sampling activities.

## 7.4 Soil Exposure and Air Pathway Analytical Results

Surface soil analytical results are presented in Section 4.3. Formal analytical air sampling was not conducted during this investigation.

## 7.5 Soil Exposure and Air Pathway Conclusions

Surface soil samples collected at the site have indicated elevated levels of organic and inorganic contamination. The soil pathway concern is minimal due to the lack of onsite residential housing in areas of detected contamination. However, there concerns about the proximity of nearby residences and the future plans to perform significant excavation and construction at the site. Airborne contamination of nearby populations is of limited concern at this site due to the lack of residences onsite, the low volatility of the primary contaminants of concern, the vegetative cover throughout most of the site, and the lack of workers on site.

## 8.0 Summary and Conclusions

The ESI for the Southern Wood Piedmont Company site was performed to further determine the nature of contaminants present at the site, to determine if a release of hazardous materials to the environment has occurred or may occur, and if a release has occurred, to determine attribution of those contaminants to the site. This inspection also sought to further define the possible pathways by which contamination could migrate from the site and the populations and environments it potentially affects.

An initial site reconnaissance and walk-over was performed at the SWP site on May 20, 1996, by a representative of BVSPC, 3 representatives of the USEPA Region IV, and a representative of SWPs environmental consultant, Virogroup. Proposed boring locations were observed and discussed, photographs were taken, and general observations of site conditions were made. Field work for the ESI conducted by BVSPC commenced on October 3, 1996 and continued through October 9, 1996, at which time Tropical Storm Josephine and flooding of the Cape Fear River caused a demobilization of personnel and equipment. Field work resumed on November 4, 1996 and continued through December 23, 1996. Surveying of the groundwater monitoring wells occurred from January 27, 1997 to January 29, 1997.

A total of 103 environmental samples were collected during the field investigation conducted between October 3, 1996 and October 9, 1996 and November 4, 1996 to December 20, 1996. This ESI confirms information that has been provided about the site through numerous other past investigations and serves to fill data gaps which existed from previous site investigations. Analytical results from the ESI environmental samples indicate that surface soil, subsurface soil, groundwater, and sediment at and adjacent to the site have been impacted by releases of contaminants which are associated with previous activities at the site.

Groundwater samples indicate that several contaminants have migrated into the shallow, intermediate and deep monitoring wells beneath the SWP site. However, most of the people in the vicinity of the site use treated surface water in their homes

and businesses. Therefore, the groundwater pathway is of moderate concern for this site due to the minimal poulation in the area which utilize potable groundwater.

The surface water migration pathway has been affected by contamination at the site. Analytical results of sediment samples collected from the onsite drainage ditch along the east side of the site revealed elevated levels of the site-related extractable organic contaminants naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo (a) anthracene, chrysene, benzo(b and/or k)fluoranthene, and benzo(a)pyrene and site related inorganic contaminants arsenic, cadmium, chromium, copper, and lead. The Cape Fear River and Greenfield are known fisheries and potential habitats for several federally-endangered species. Based on the proximity of the site to the Cape Fear River and Greenfield Creek, there is an increased probability that contaminant migration has occurred into the Cape Fear River. The surface water migration pathway is of primary concern for the site.

The results of surface and subsurface soils collected from the central two-thirds of the site suggest that significant contamination is present in the surface soil. However, there are concerns about the proximity of nearby residences and the future plans to perform significant excavation and construction at the site. The soil pathway is of minimal concern based upon the lack of onsite residential housing in areas of detected contamination.

Airborne contamination of nearby populations is of limited concern at this site due to the lack of residences onsite, the low volatility of the primary contaminants of concern, the vegetative cover throughout most of the site, and the lack of workers on site.

Further action under CERCLA is recommended at the Southern Wood Piedmont site.

## References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