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U.S. ENVIRONMENTAL PROTECTION AGENCY,
REGION IV, WASTE MANAGEMENT DIVISION.

SOUTHERN WOOD PIEDMONT COMPANY - WILMINGTON SITE
NCD 058 517 467
EXPANDED SITE INSPECTION

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(2-13)
JULY 1997

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State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

Reference 2

DEHNR

January 31, 1995

Ms. Cynthia Gurley
NC CERCLA Project Officer
EPA Region IV Waste Division
345 Courtland Street, NE
Atlanta, Georgia 30365

FEB 07 1995

Subject: Site Inspection Prioritization
Southern Wood Piedmont Co.
Wilmington, New Hanover County, NC
NCD 058 517 467

Dear Ms. Gurley:

The enclosed document summarizes the results of a Site Inspection Prioritization (SIP) of the Southern Wood Piedmont Co. site in Wilmington, NC. This site, owned by the City of Wilmington and the NC State Ports Authority, was formerly used to treat and store wood products. Wood treating materials historically used at the site included creosote and, more recently, pentachlorophenol (PCP) and chromated copper arsenate (CCA). During the mid-to-late 1980s, SWP excavated and landfarmed creosote-contaminated soils from various on-site locations. CCA-contaminated soil either was stabilized onsite or was shipped to a hazardous waste landfill. The landfarming operation concluded in April 1990.

Results of previous investigations at the site indicate detectable soil and groundwater contamination throughout much of the site. The principal contaminants are semi-volatile organic compounds (SVOCs), with traces of volatile aromatic compounds, both of which are associated with creosote. Localized PCP and CCA contamination has also been detected. The areas of contamination include former creosote and CCA storage and treatment areas, outdoor wood storage areas, and a former drainage ditch. The visibly creosote-contaminated soils in these areas were landfarmed in the northern half of the site, where they currently remain as an additional contaminant source.

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Two sand units directly beneath the site are known to be contaminated by organic and (locally) inorganic wood preserving residuals. These overburden units not used as a drinking water source. The underlying sandy limestone bedrock is a principal confined aquifer in the area, and a second, semi-confined bedrock aquifer to the southeast has been used historically for drinking water, however, most groundwater use in the study area occurs more than 2 miles from the site.

SVOCs attributable to the site have contaminated sediment in an existing drainage ditch and in Greenfield Creek, which connects the ditch to the Cape Fear River. The contaminated sediment samples were located downstream of wetland frontage along the ditch. Surface water has not been sampled in the ditch or Greenfield Creek. To date, no surface water contaminants have been detected in Cape Fear River water, but semi-volatile contaminants were detected adjacent to the site when river sediment was last sampled in 1985. Two other possible sources of semi-volatile contaminants have been identified over 0.5 mile upstream of the site. The Greenfield Creek contaminants, however, are at least partially attributable to the site.

Because of extensive tidal flow reversal in the Cape Fear River and its tributaries, the surface water pathway theoretically extends 15 miles both upstream and downstream from the site. The potential for contaminant transport upstream from the site may be limited, however, by the net seaward transport of sediment in the estuary.

No drinking-water-supply intakes reportedly operate in the pathway, but the Cape Fear and the Northeast Cape Fear River systems are commercial and recreational fisheries. Greenfield Creek is also fished recreationally. As defined in the SIP, the surface water pathway (including tidal tributaries) contains 170 miles of mapped wetland frontage. Wetlands adjacent to the site are within the downstream limits of detected SVOC contamination. Eleven rare animal and 9 rare plant species are identified within the pathway. Three of the animal species are listed as Endangered in NC and/or the US. One animal and 2 plant species are Threatened in NC and/or the US.

Landfarm soils contain residual creosote components, some exceeding their current health-based Cancer Risk Screening Concentrations for human soil exposure. Soil sampling in the former wood storage areas also detected organic and arsenic contamination at levels above Cancer Risk Screening Concentrations. The landfarm area soils also contained detectable polychlorinated dibenzodioxins and dibenzofurans, but soils outside the landfarming areas have not been tested for these two groups of compounds.

The site is accessible on foot or by boat, but has no residential or worker populations. The nearest residences are 400 feet east of the site. No schools or day care facilities are present within 0.2 mile of the site. A railroad grade and dense vegetation separate the site from a nearby recreational park. Surface soil at the site is currently stabilized by vegetation.

Under present circumstances, the site appears to pose a minimal health hazard via soil or by migration of contaminant through air. A Risk Assessment completed at the site concluded that contaminant levels at the site are low enough for future industrial use. Based on the Risk Assessment report, however, the NC Environmental Epidemiology Section has concluded that the site does not currently meet cleanup standards for future residential use, and may pose an increased cancer risk to future workers.

In summary, cumulative evidence indicates that creosote residuals attributable to the site have contaminated downstream wetlands, and possibly a fishery. Dioxins and halogenated dibenzofurans have been detected in the landfarmed soils, but the extent of contamination has not been determined for the remainder of the site. Based on this information, the Southern Wood Piedmont - Wilmington site is recommended as a high priority for an expanded Site Inspection under CERCLA. Additional testing of soil, surface water, and sediment for organic and inorganic wood preservative components, as well as for dioxins and halogenated dibenzofurans, is recommended to evaluate the site's likely impact on public health and the environment. If you have any questions, please contact me at (919) 733-2801

Sincerely,

Stuart F. Parker, Jr.
Hydrogeologist,
NC Superfund Section

STATE OF NORTH CAROLINA

Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
Superfund Section

SITE INSPECTION PRIORITIZATION

Southern Wood Piedmont Company
NCD 058 517 467
Wilmington, New Hanover County, North Carolina
Reference No. 02821

Stuart Parker, Hydrogeologist
Division of Solid Waste Management
Superfund Section

BLACK & VEATCH Waste Science, Inc.

Reference 3

Owner USEPA Region IV
Plant Southern Wood Piedmont Unit Wilmington,
Project No. 52014.755 File No. Checked By
Title Latitude + Longitude Calculations Date 19
Page 1 of 1

DO NOT WRITE IN THIS SPACE

Latitude Using a 1:60 scale

45.7 units from 34° 10' to 34° 12'30" fxm 2-23-96
and 2'30" = 150"

$\frac{150 \text{ seconds}}{45.7 \text{ units}}$ = 3.28 seconds/unit ~~or~~ fxm 2-23-96

Measured 8.7 units from 34° 12'30" to site tic mark (+)

8.7 units × 3.28 seconds/unit = 28.536 or 29 seconds

Latitude: 34° 12' 30" + 29" = **34° 12' 59" North Latitude**

Longitude Using a 1:60 scale

37.8 units from 77° 55' to 77° 57'30"
and 2'30" = 150"

$\frac{150 \text{ seconds}}{37.8 \text{ units}}$ = 3.97 seconds/unit

Measured 5.7 units from ~~77°~~ fxm 2-23-96 77° 57'30' to site tic mark (−)

5.7 units × 3.97 seconds/unit = 22.63 or 23 seconds

Longitude: 77° 57' 30" − 23" = **77° 57' 7" West Longitude**

REVISED, SUPERSEDED, AND VOID CALCULATIONS MUST BE CLEARLY IDENTIFIED, INITIALED, AND DATED BY THE RESPONSIBLE INDIVIDUAL.

Reference 4

H. L. Mangum, Jr.

SOIL SURVEY OF

New Hanover County, North Carolina

NEW HANOVER SWCD
NEW HANOVER ADMIN ANNEX
414 CHESTNUT ST, ROOM 305
WILMINGTON NC 28401

United States Department of Agriculture
Soil Conservation Service

In cooperation with
North Carolina Agricultural Experiment Station
and the
New Hanover County Board of Commissioners

SOIL SURVEY OF NEW HANOVER COUNTY, NORTH CAROLINA

BY ARLIN WEAVER, SOIL CONSERVATION SERVICE

Soils Surveyed by Arlin Weaver, Clarence Brandon, and W. Everette Lynn, Jr., Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in Cooperation with the North Carolina Agricultural Experiment Station and the New Hanover County Board of Commissioners

Introduction

New Hanover County is in the southeastern part of North Carolina (see opposite page). The county is 118,656 acres, or about 185 square miles, in size. According to the 1970 census, the population of the county was 82,996. Wilmington, the county seat, had a population of 46,169. It is one of the major ports along the Atlantic Coast.

New Hanover County is in the lower part of the Coastal Plain physiographic province. Elevation ranges from sea level to 60 feet. Most of the county is level to gently sloping, but short breaks separate the uplands from the flood plains and marshes.

New Hanover County is mainly industrial. There has been rapid, widespread urbanization over most of the county in recent years. Only a small percentage of the county is used for farms and pasture.

General Nature of the County

This section gives general facts about New Hanover County. It briefly discusses climate; water supply; settlement and development; transportation and industry; and community facilities.

Climate

New Hanover County is hot and humid in summer, but the coastal area of the county is frequently cooled by sea breezes. Winter is cool but has occasional brief cold spells. Rains occur throughout the year but are usually heaviest late in summer and early in fall. Annual precipitation is adequate for all crops.

Table 1 shows temperature and precipitation data for the county, as recorded at Wilmington for the period 1952 to 1974. Tables 2 and 3 show probable dates of the first and last freeze and the length of the growing season.

In winter the average temperature is about 47 degrees F, and the average daily minimum is 37 degrees. The lowest temperature on record, 10 degrees, occurred at Wilmington on December 13, 1962. In summer the average temperature is about 79 degrees F, and the average daily maximum is 88 degrees. The highest temperature on record, 104 degrees, was recorded on June 27, 1952.

Growing degree days, shown in table 1, are equivalent to "heat units." Starting in spring, growing degree days accumulate by the amount that the average temperature each day exceeds the base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 32.86 inches, or 61 percent, usually falls during the period April through September, which includes the growing season for most crops. Two years in 10, the April-September rainfall is less than 26.51 inches. The heaviest 1-day rainfall during the period of record was 7.49 inches at Wilmington on September 27, 1958. Thunderstorms number about 45 each year, 27 of which occur in summer.

Snowfall is rare. In 36 percent of the winters, there is no measureable snowfall, and in 59 percent the total snowfall is less than 2 inches. The heaviest snowfall ever observed in 1 day was more than 11 inches.

The average relative humidity in midafternoon in spring is less than 55 percent, and during the rest of the year it is about 58 percent. Humidity is higher at night in all seasons, and the average at dawn is about 83 percent. The percentage of possible sunshine is 65 percent in summer and 59 percent in winter. The prevailing direction of the wind is from the south-southwest. Average annual windspeed is 9.2 miles per hour. Average windspeed is highest, 10.9 miles per hour, in April.

Every few years a hurricane crosses the county.

Water Supply

Ground water is obtained from three geologic formations that are associated with three geologic ages. These are the Pee Dee Formation of upper Cretaceous Age, the Castle Hayne Limestone Formation of Eocene age, and the surficial sands of post-Miocene age.

main limitations in the use and management of this soil. If drained, this soil is suited to most locally grown crops. The main crops are corn, soybeans, tobacco, and peanuts. Minimum tillage and crop residue management aid in maintaining organic-matter content. This soil has good tilth and can be worked over a wide range of moisture content, but tillage is delayed during wet seasons. Drainage is needed for most uses. Capability subclass IIIe; woodland group 3w.

DO—Dorovan soils. These nearly level, very poorly drained soils are in bays and in long, broad areas of tidal and stream flood plains. All of the acreage is used for woodland and as wildlife habitat. The native vegetation is red maple, willow, tupelo, cypress, sweetgum, ash, American cyrilla, and greenbrier.

Typically the surface layer is black muck 4 inches thick. The underlying layer, to a depth of 64 inches, is black or very dark gray muck.

Included with these soils in mapping are small areas of Johnston soils and Tidal marsh. A few small areas of soils that have thin, continuous mineral layers are also included.

The organic-matter content in the surface layer is very high. Permeability is very slow, available water capacity is very high, and shrink-swell potential is low. Reaction is very strongly acid or strongly acid throughout, unless the soils are limed. The seasonal high water table is at or near the surface. These soils are frequently flooded for very long periods.

Flooding and high organic-matter content are the main limitations in the use and management of these soils. If these soils are drained and tilled, the organic matter decomposes and the soil subsides. Capability subclass VIIIw; woodland group 4w.

JO—Johnston soils. These nearly level, very poorly drained soils are on flood plains of the major streams. Areas are commonly long and narrow. Most of the acreage is forested, and some small areas have been filled and used for industrial and residential sites. The native vegetation consists of pond pine, tupelo-gum, ash, water oak, cypress, red maple, sweetgum, American cyrilla, waxmyrtle, and gallberry.

Typically, the surface layer is 42 inches thick. It is black loam in the upper part and black sandy loam in the lower part. The underlying layer, to a depth of about 64 inches, is light gray sand.

Included with these soils in mapping are small areas of Pamlico, Dorovan, and Murville soils. A few small areas of soils that are less acid than these Johnston soils are also included.

The organic-matter content of the surface layer is high. Permeability is moderately rapid, available water capacity is high, and shrink-swell potential is low. Reaction is very strongly acid or strongly acid throughout, unless these soils are limed. The seasonal high water table is at or near the surface. These soils are frequently flooded for long periods.

A seasonal high water table and flooding are the main limitations in the use and management of these soils. These soils subside if drained and tilled. Capability subclasses VIIw, where undrained, and IVw, where drained; woodland group 1w.

Ke—Kenansville fine sand, 0 to 3 percent slopes. This well drained soil is on broad smooth flats on the uplands. Areas are commonly large in size and irregular in shape. Most of the acreage is cultivated. The rest is forested or is used for residential or industrial sites. The native vegetation consists of longleaf and loblolly pines; white, red, black, turkey, water, and bluejack oaks; hickory; dogwood; holly; and sassafras.

Typically, the surface layer is grayish brown fine sand 3 inches thick. The subsurface layer is fine sand 30 inches thick. It is is pale brown in the upper part and mottled very pale brown in the lower part. The subsoil is fine sandy loam 17 inches thick. It is strong brown in the upper part and reddish yellow in the lower part. The underlying layer, to a depth of 80 inches, is yellow loamy fine sand.

Included with this soil in mapping are a few small areas of Norfolk and Lakeland soils. Some small areas of soils that are less acid throughout are also included.

The organic-matter content of the surface layer is very low. Permeability is moderately rapid, available water capacity is low, and shrink-swell potential is low. Reaction is very strongly acid or strongly acid throughout, unless this soil is limed. The seasonal high water table is at a depth of more than 6 feet.

Leaching of plant nutrients, moderately rapid permeability, droughtiness, low available water capacity, and soil blowing are the main limitations in the use and management of this soil. This soil is well suited to most locally grown crops. The main crops are corn, soybeans, peanuts, tobacco, and truck crops, such as squash, lettuce, cucumbers, cabbage, snapbeans, and corn. Winter cover crops, minimum tillage, and crop residue management aid in maintaining organic-matter content and conserving moisture. Soil blowing is a concern in the management of this soil. The blowing sand often causes damage to young plants. This soil is droughty during periods of low rainfall. Some supplemental irrigation, soil conditioners, and fertilizers are needed for lawn grasses, shrubs, and trees. Capability subclass IIs; woodland group 3s.

Kr—Kureb sand, 1 to 8 percent slopes. This excessively drained soil is on long, broad ridges on the uplands. Areas are generally broad and long. Most of the acreage is forested. The rest is used for residential and industrial sites. The sparse native vegetation on the higher elevations is turkey oak, scattered longleaf pine, a few bluejack oaks, and scattered dwarf myrtle and huckleberry. Much of the area is barren of any vegetation, except for mosses and lichens. On the lower slopes, the vegetation increases in density and includes various oaks, scattered hickory, holly, and brackenfern.

Typically, the surface layer is dark gray sand 3 inches thick. The subsurface layer is light gray sand 23 inches

areas are flooded daily by tides. Further inland the seawater is diluted with freshwater. Some areas are protected from the seawater by long expanses of sand dunes that do not have inlets from the ocean. The water table is at or above the surface most of the time. Most of the acreage is used as natural habitat for shore and water birds, and some areas are used for shellfish gardens. Many areas are being dredged, filled, and converted to summer cottage sites and recreational areas. The dominant vegetation in areas that are flooded daily by saltwater is smooth cordgrass. Further inland, in areas that are flooded by seawater that has been diluted by freshwater, the vegetation is a mixture of smooth cordgrass and black rush.

Typically, the surface layer is black clay loam about 18 inches thick. The underlying layer is very dark gray and black silty clay loam to a depth of more than 60 inches.

Included with these soils in mapping are areas along the Intracoastal Waterway that are sandy because of the deep dredging.

The organic-matter content of the surface layer is high. Reaction is neutral to mildly alkaline. In the areas flooded by saltwater, sulfur content is 80 to 130 parts per million and salt content is 1 or 2 percent. Capability subclass VIIIw; woodland group not assigned.

To—Torhunta loamy fine sand. This nearly level, very poorly drained soil is on broad smooth flats and in slight depressions on the uplands. Areas are small to large in size and irregular in shape. Most of the acreage is forested. The rest is used for residential and industrial sites. The native vegetation consists of loblolly pine, pond pine, bay trees, red maple, water oak, gum, waxmyrtle, and gallberry.

Typically, the surface layer is 20 inches thick. It is black loamy fine sand in the upper part and very dark gray loamy fine sand in the lower part. The subsoil is mottled light gray fine sandy loam 26 inches thick. The underlying layer, to a depth of 64 inches, is mottled light gray fine sand.

Included with this soil in mapping are small areas of Stallings, Murville, and Pantego soils.

The organic-matter content of the surface layer is medium. Permeability is moderately rapid, available water capacity is medium, and shrink-swell potential is low. Reaction is extremely acid to strongly acid throughout where this soil has not been limed. The seasonal high water table is at or near the surface. This soil is frequently flooded for long periods.

A seasonal high water table and flooding are the main limitations in the use and management of this soil. Most lawn grasses, shrubs, and trees are generally easily established and maintained. Some shrubs and trees may be unsuited to this soil because of wetness. Capability subclasses Vw, where undrained, and IIIw, where drained; woodland group 2w.

Ur—Urban land. Urban land consists of areas where the original soil has been cut, filled, graded, or paved so that most soil properties have been altered to the extent that a soil series is not recognized. These areas are now used for shopping centers, factories, municipal buildings, apartment complexes, or parking lots, or for other purposes where buildings are closely spaced or soil is covered with pavement.

Included in mapping are a few small areas between buildings where the soil has not been altered. Also included are parks and other areas within the city of Wilmington. Some of the areas between buildings are used for small lawns, gardens, and shrubbery. Capability subclass and woodland group not assigned.

Wa—Wakulla sand, 1 to 8 percent slopes. This somewhat excessively drained soil is on broad smooth flats on the uplands. Areas are small to large in size and irregular in shape. Most of the acreage is forested. The rest is used for residential and industrial sites. The native vegetation on the higher elevations consists of longleaf pine, loblolly pine, post oak, bluejack oak, turkey oak, dwarf huckleberry, and myrtle. On the lower elevations, the vegetation increases in density and includes hickory, holly, water oak, blackjack oak, and a few dogwood trees.

Typically, the surface layer is grayish brown sand 2 inches thick. The subsurface layer is light yellowish brown sand 28 inches thick. The subsoil is strong brown loamy sand 18 inches thick. The underlying layer, to a depth of 64 inches, is strong brown sand.

Included with this soil in mapping are a few small areas of Kureb, Baymeade, Kenansville, Lakeland, and Rimini soils.

The organic-matter content of the surface layer is very low. Permeability is rapid, available water capacity is very low, and shrink-swell potential is low. Reaction is strongly acid or medium acid throughout where this soil has not been limed. The seasonal high water table is below a depth of 6 feet.

Droughtiness, slope, and rapid permeability are the main limitations in the use and management of this soil. Supplemental irrigation and fertilizers are generally needed to establish and maintain lawn grasses, shrubs, and trees. Capability subclass IIIs; woodland group 3s.

Wo—Woodington fine sandy loam. This nearly level, poorly drained soil is on broad smooth flats on the uplands. Areas are small in size and irregular in shape. Most of the acreage is forested or is used for residential and industrial sites. The native vegetation consists of loblolly pine, longleaf pine, pond pine, sweetgum, water oak, willow oak, poplar, waxmyrtle, eastern baccharis, American holly, gallberry, and sweet pepperbush.

Typically, the surface layer is very dark gray fine sandy loam 7 inches thick. The subsoil, to a depth of 65 inches, is mottled light brownish gray fine sandy loam in the upper part. The middle part is mottled gray fine sandy loam, and the lower part is mottled very pale brown fine sandy loam.

Included with this soil in mapping are small areas of Wrightsboro, Lynchburg, Seagate, and Stallings soils.

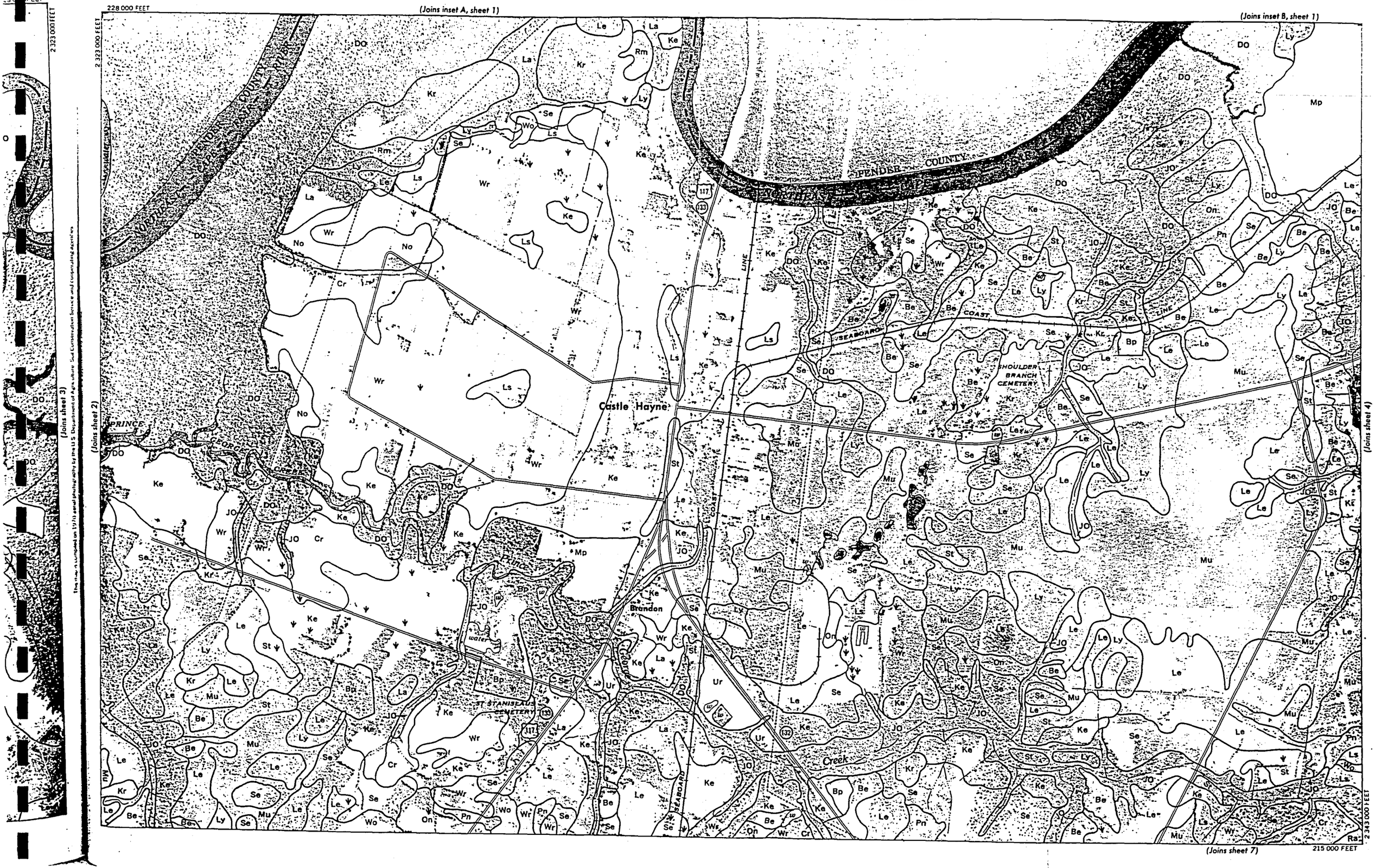
The organic-matter content of the surface layer is low. Permeability is moderately rapid, available water capacity

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	F	F	F	F	F		In	In	In		In
January----	55.9	35.3	45.6	77	17	57	3.41	1.94	4.61	7	.4
February---	58.3	37.1	47.7	79	19	69	3.66	2.40	4.80	7	1.0
March------	64.3	43.0	53.7	84	26	180	4.09	2.25	5.58	8	.3
April------	73.7	51.6	62.7	91	34	381	3.07	1.36	4.46	5	.0
May--------	80.8	60.1	70.5	95	43	636	4.09	2.27	5.57	6	.0
June-------	86.2	67.2	76.7	99	53	801	5.63	2.84	7.89	8	.0
July-------	89.0	71.2	80.1	98	61	933	7.72	4.47	10.36	10	.0
August-----	88.3	70.5	79.4	98	60	911	6.80	4.10	9.21	9	.0
September--	83.7	65.2	74.5	94	50	735	5.55	2.66	7.90	6	.0
October----	75.5	54.6	65.0	89	33	465	3.16	1.07	4.84	5	.0
November---	66.5	43.7	55.1	82	25	162	3.19	1.28	4.73	5	.0
December---	59.1	37.4	48.3	78	18	115	3.17	1.59	4.44	6	.4
Year-----	73.4	53.1	63.3	99	15	5,445	53.54	47.28	59.60	82	2.1

[1]Recorded in the period 1952-74 at Wilmington, N.C.

[2]A growing degree day is an index of the amount of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).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PRINCE GEORGE CREEK
Castle Hayne
Brandon
Prince Creek
SHOULDER BRANCH CEMETERY
ST STANISLAUS CEMETERY
SEABOARD COAST LINE
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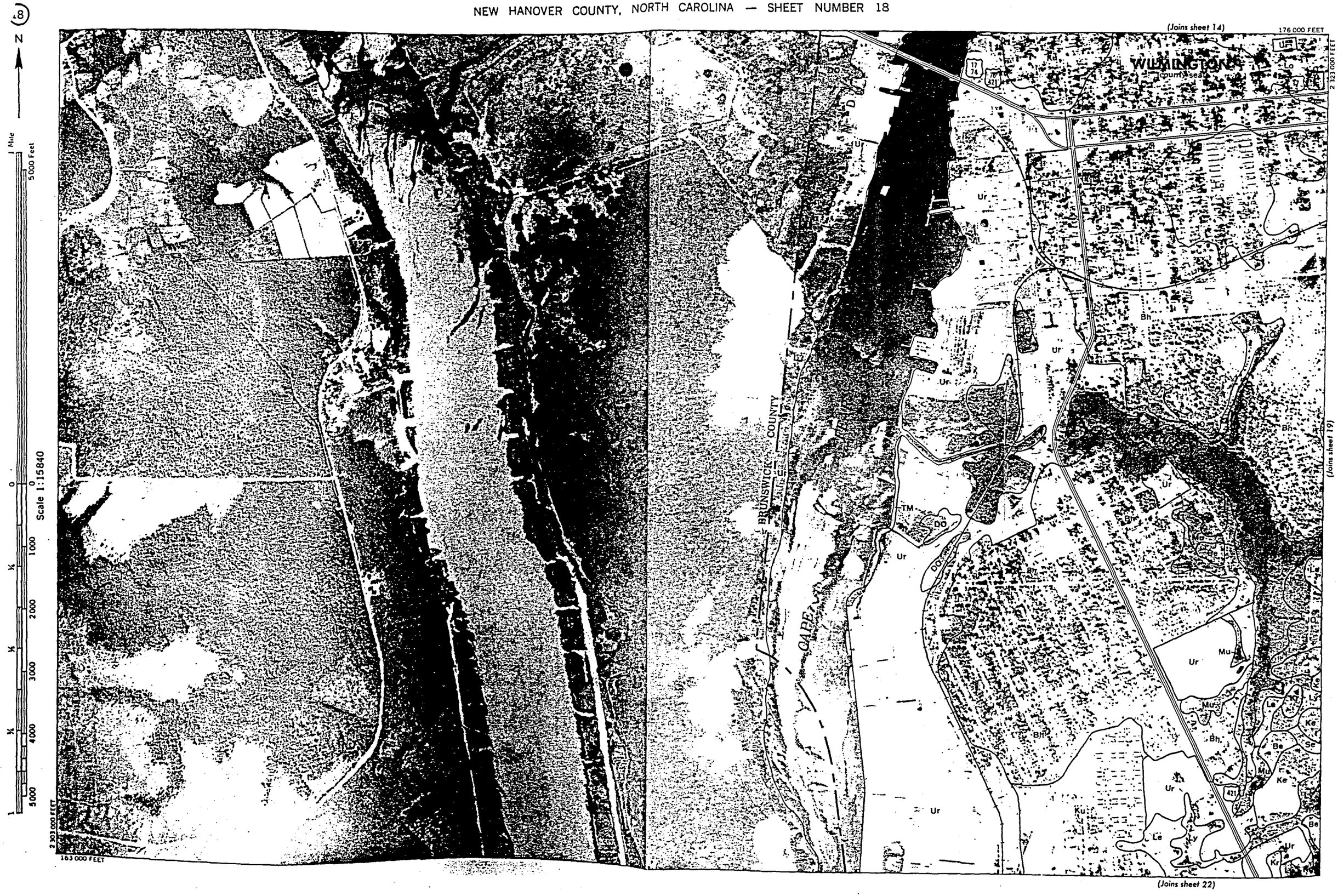
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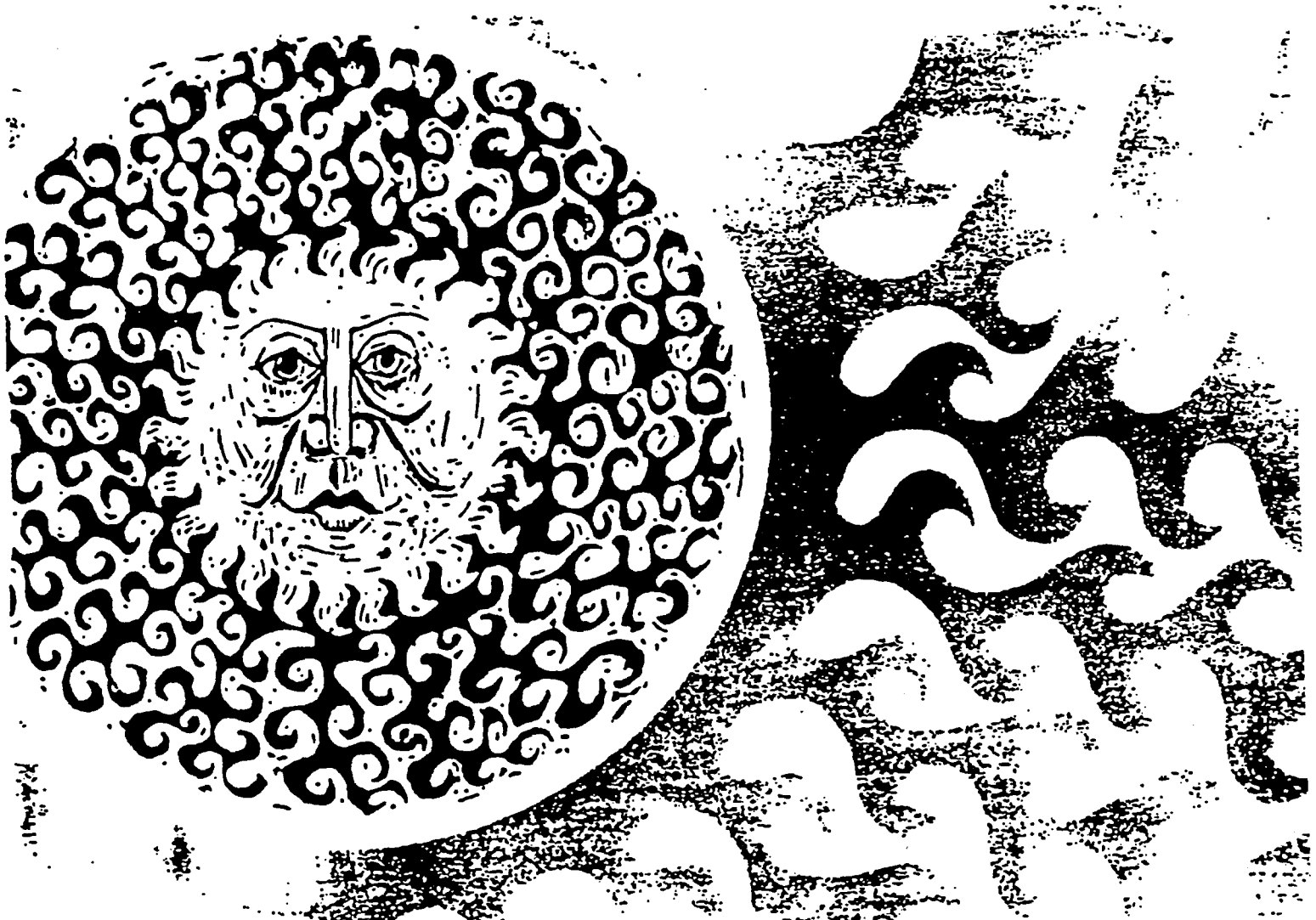
Reference 5



LIMATIC ATLAS OF THE UNITED STATES

U.S. DEPARTMENT OF COMMI
C. R. Smith, Secretary

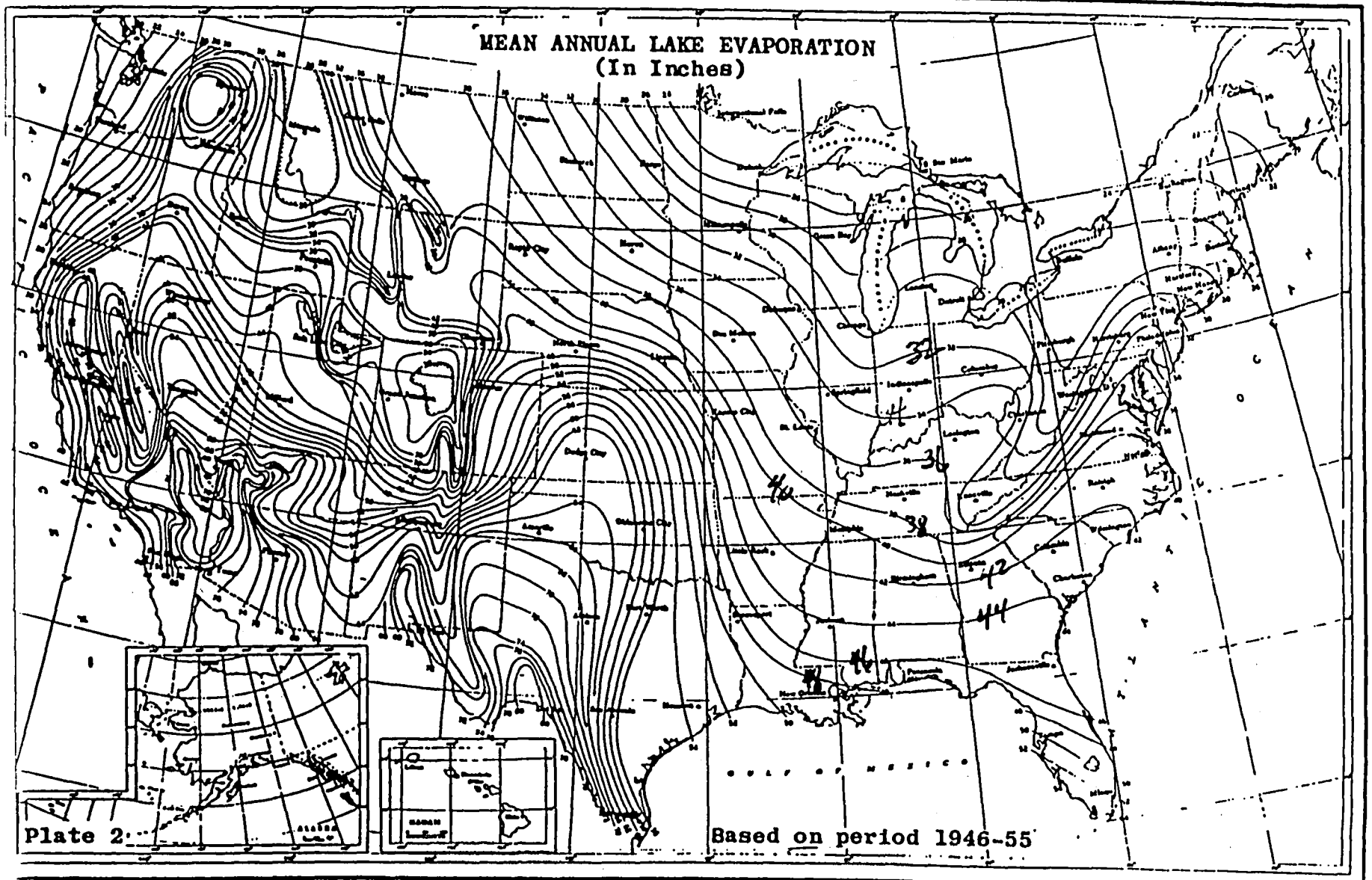
ENVIRONMENTAL SCIENCE SERVICES ADMIT
Robert M. White, Administrator

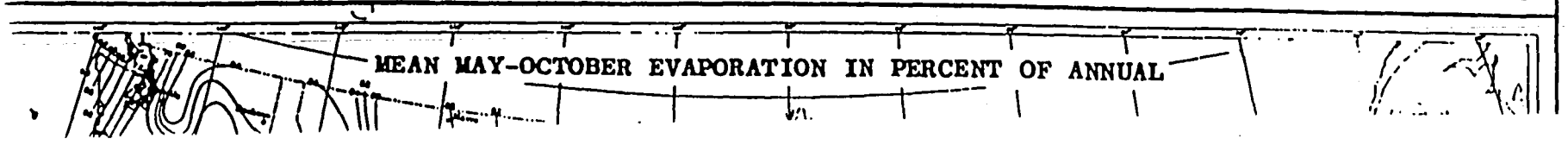
ENVIRONMENTAL DATA SERVICE
Woodrow C. Jacobs, Director

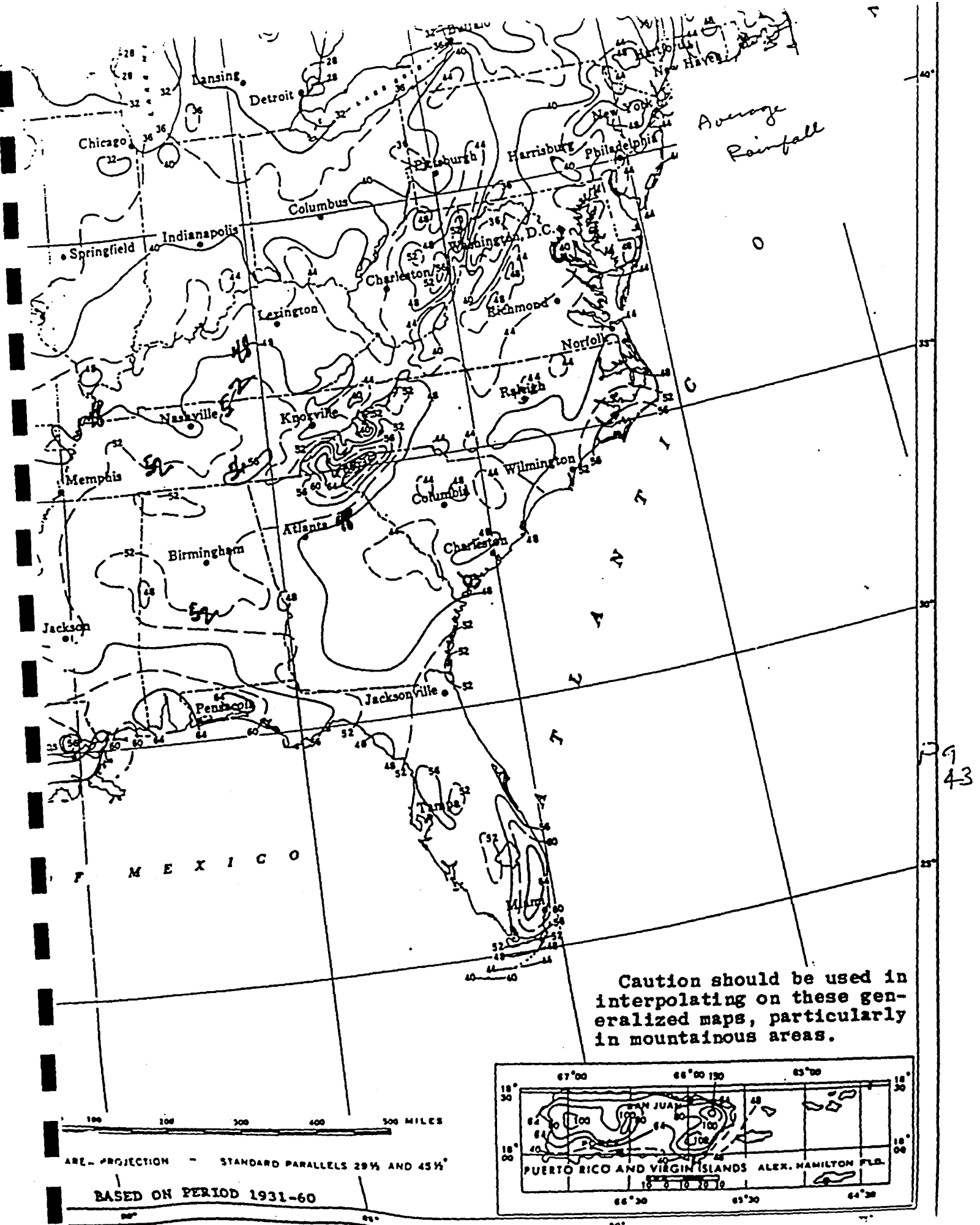
JUNE 1968

REPRINTED BY THE
NATIONAL OCEANIC AND ATMOSPHERIC ADM
1983

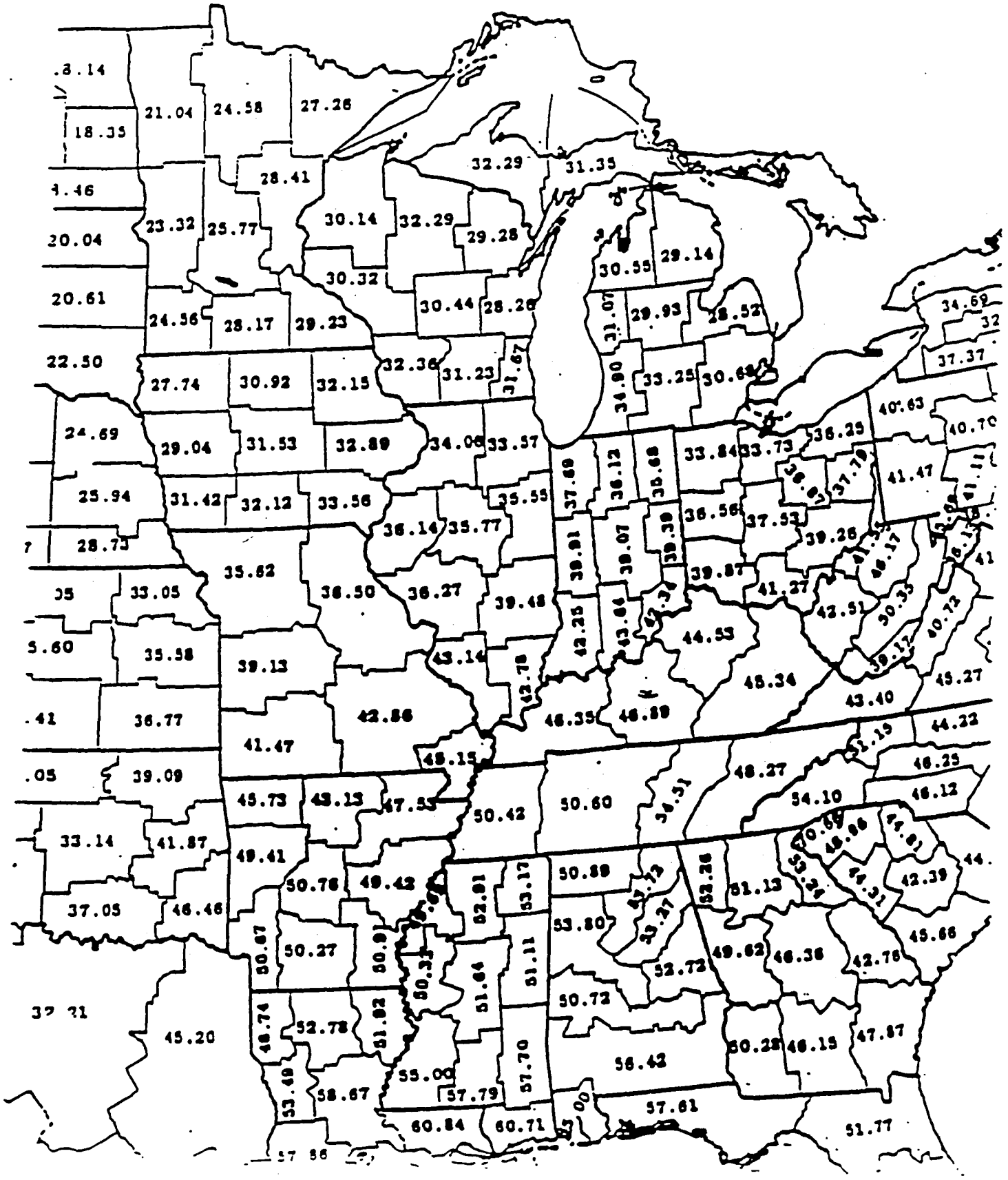
AKE EVAPORATION







Caution should be used in interpolating on these generalized maps, particularly in mountainous areas.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ENT OF COMMERCE
Secretary

WEATHER BUREAU
F. W. Reichelderfer, Ch.

Reference 6

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

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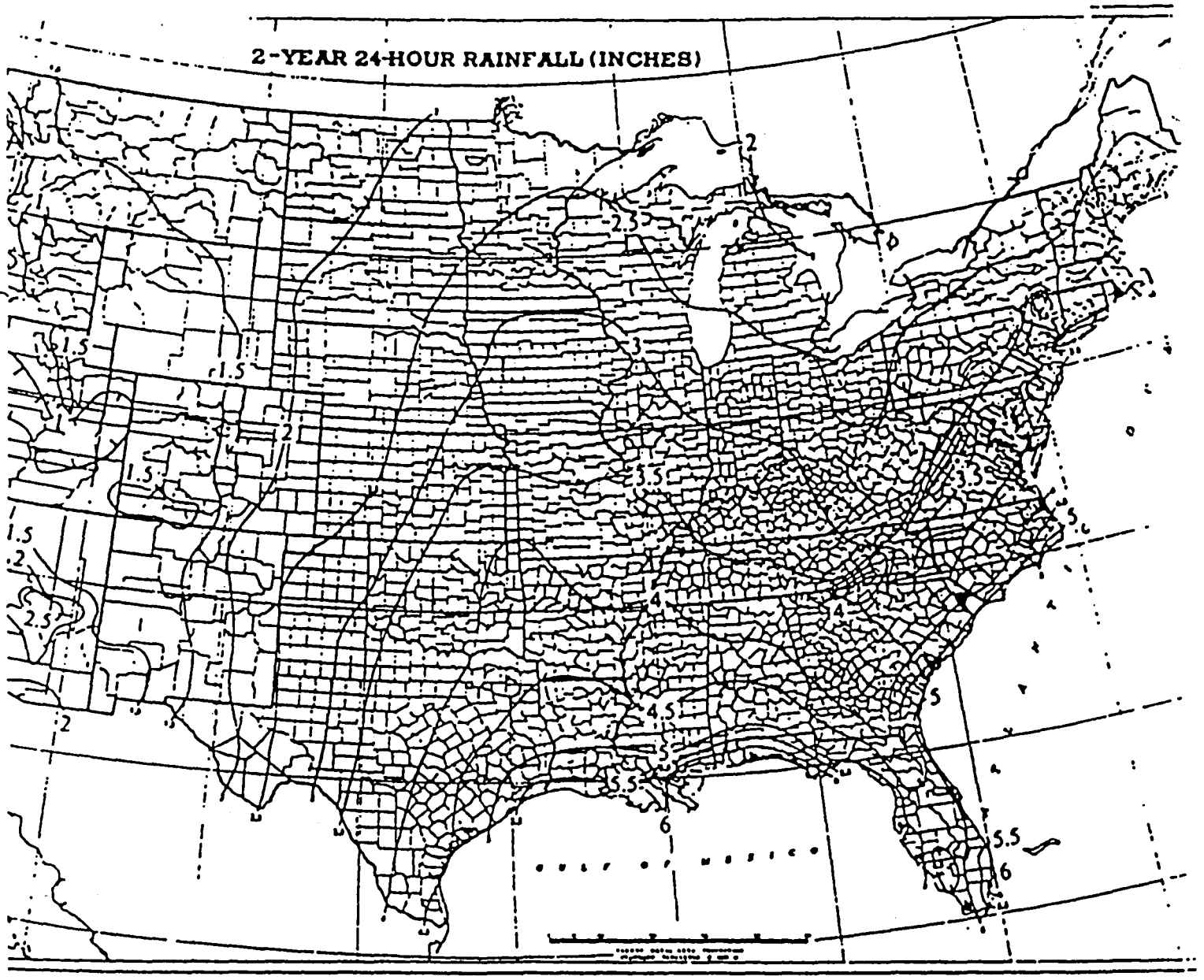
FIT IV


2-YEAR 24-HOUR RAINFALL (INCHES)
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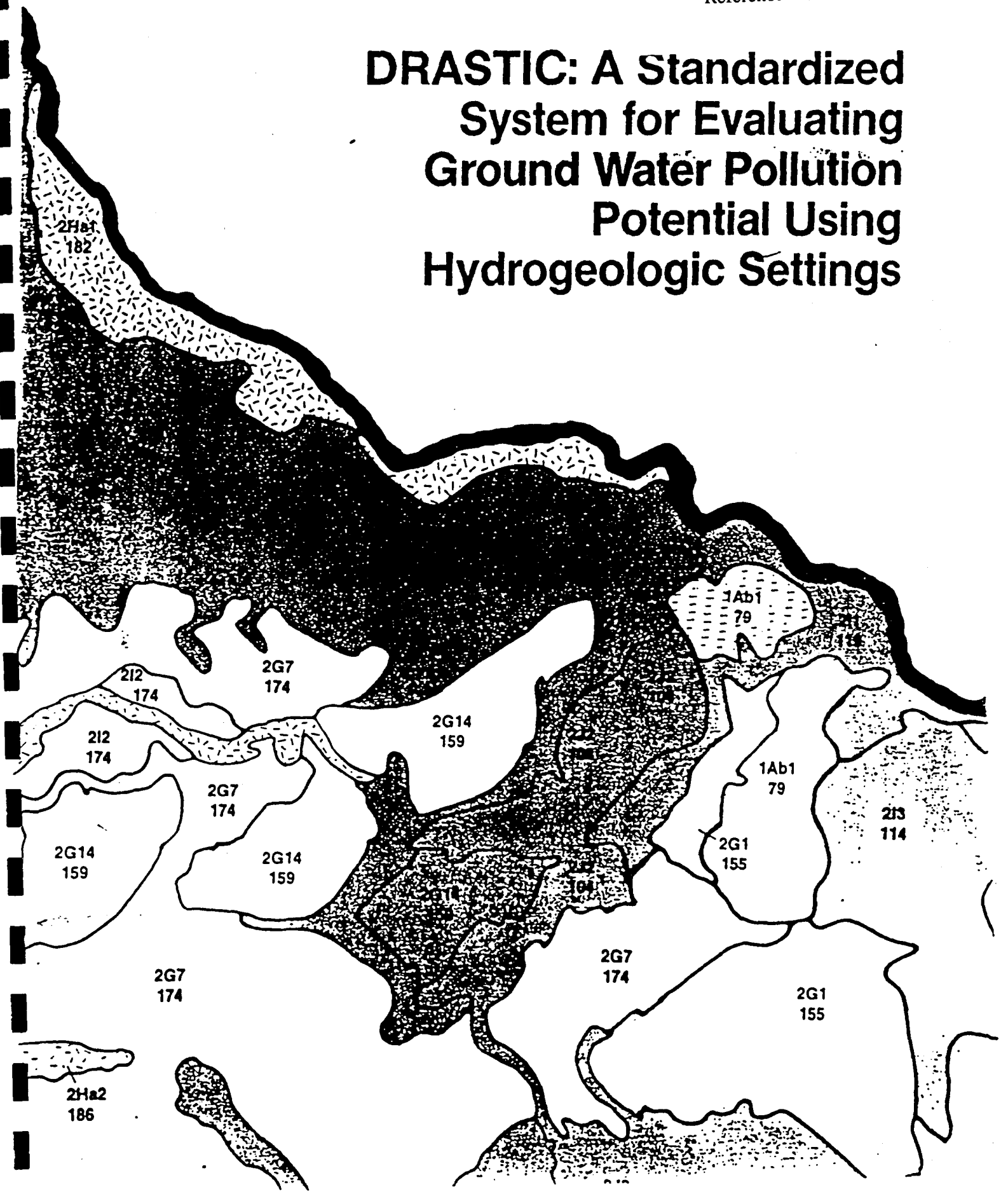
Reference 7

DRASTIC: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings



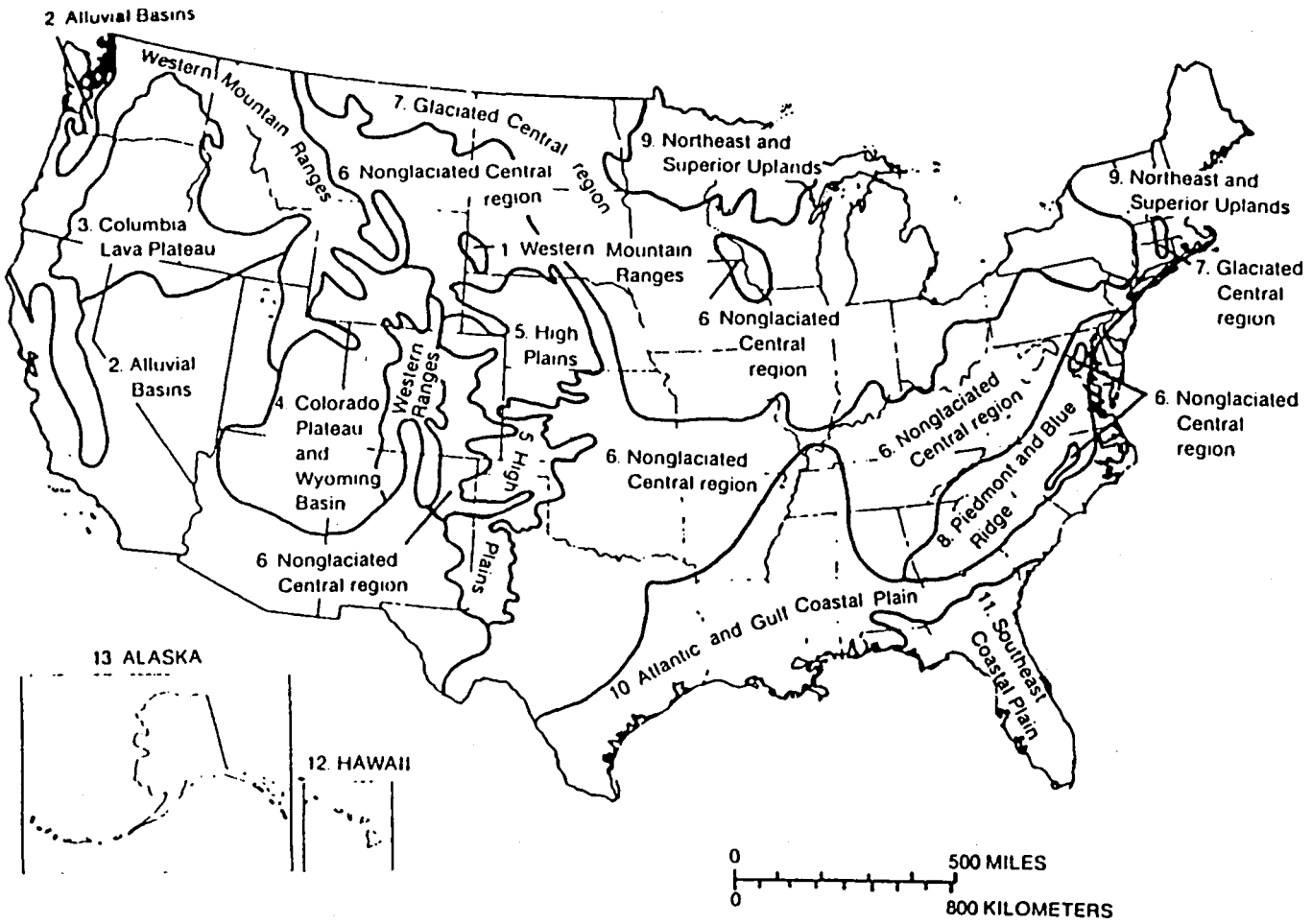
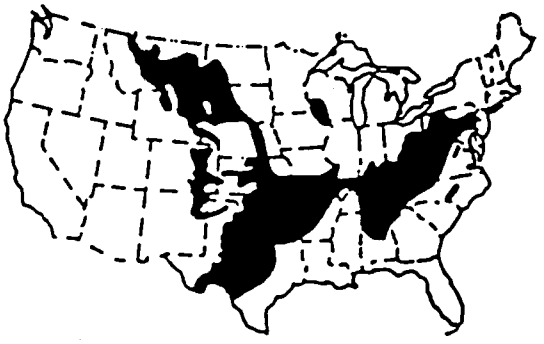
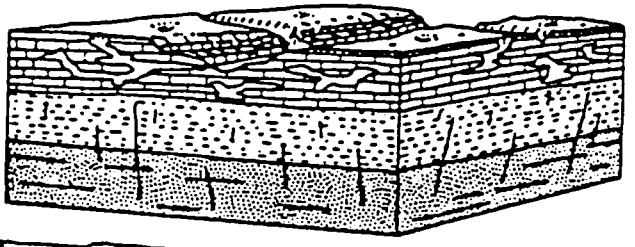
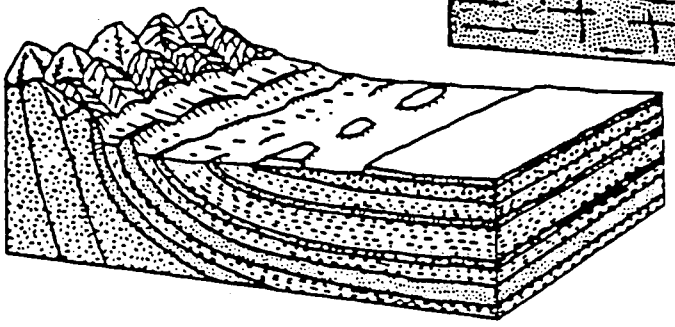


Figure 1. Ground-water regions of the United States (After Heath, 1984).

6. NONGLACIATED CENTRAL GROUND-WATER REGION







6A	Mountain Slopes
6B	Alluvial Mountain Valleys
6C	Mountain Flanks
6Da	Alternating Sandstone, Limestone and Shale - Thin Soil
6Db	Alternating Sandstone, Limestone and Shale - Deep Regolith
6E	Solution Limestone
6Fa	River Alluvium With Overbank Deposits
6Fb	River Alluvium Without Overbank Deposits
6G	Braided River Deposits
6H	Triassic Basins
6I	Swamp/Marsh
6J	Metamorphic/Igneous Domes and Fault Blocks
6K	Unconsolidated and Semi-consolidated Aquifers

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6. NONGLACIATED CENTRAL REGION

(Thin regolith over fractured sedimentary rocks)

The nonglaciated Central region is an area of about 1,737,000 km^2 extending from the Appalachian Mountains on the east to the Rocky Mountains on the west. The part of the region in eastern Colorado and northeastern New Mexico is separated from the remainder of the region by the High Plains region. The Nonglaciated Central region also includes the Triassic Basins in Virginia and North Carolina and the "driftless" area in Wisconsin, Minnesota, Iowa, and Illinois where glacial deposits, if present, are thin and of no hydrologic importance. The region is a topographically complex area that ranges from the Valley and Ridge section of the Appalachian Mountains on the east westward across the Great Plains to the foot of the Rocky Mountains. It includes, among other hilly and mountainous areas, the Ozark Plateaus in Missouri and Arkansas. Altitudes range from 150 m above sea level in central Tennessee and Kentucky to 1,500 m along the western boundary of the region.

The region is also geologically complex. Most of it is underlain by consolidated sedimentary rocks that range in age from Paleozoic to Tertiary and consist largely of sandstone, shale, carbonate rocks (limestone and dolomite), and conglomerate. A small area in Texas and western Oklahoma is underlain by gypsum. Throughout most of the region the rock layers are horizontal or gently dipping. Principal exceptions are the Valley and Ridge section of the Wichita and Arbuckle Mountains in Oklahoma, and the Ouachita Mountains in Oklahoma and Arkansas, in all of which the rocks have been folded and extensively faulted. Around the Black Hills and along the eastern side of the Rocky Mountains the rock layers have been bent up sharply toward the mountains and truncated by erosion. The Triassic Basins in Virginia and North Carolina are underlain by moderate to gently dipping beds of shale and sandstone that have been extensively faulted and invaded by narrow bodies of igneous rock. These basins were formed in Triassic time when major faults in the crystalline rocks of the Piedmont resulted in the formation of structural depressions up to several thousand meters deep and more than 25 km wide and 140 km long.

The land surface in most of the region is underlain by regolith formed by chemical and mechanical breakdown of the bedrock. In the western part of the Great Plains the residual soils are overlain by or intermixed with eolian (wind-laid) deposits. The thickness and composition of the regolith depend on the composition and structure of the parent rock and on the climate, land cover, and topography. In areas underlain by relatively pure limestone, the regolith consists mostly of clay and is generally only a few meters thick. Where the limestones contain chert and in areas underlain by shale and sandstone, the regolith is thicker, up to 30 m or more in some areas. The

chert and sand form moderately permeable soils, whereas the soils developed on shale are finer grained and less permeable.

The principal water-bearing openings in the bedrock are fractures along which the rocks have been broken by stresses imposed on the Earth's crust at different times since the rocks were consolidated. The fractures generally occur in three sets. The first set, and the one that is probably of greatest importance from the standpoint of ground water and well yields, consists of fractures developed along the contact between different rock layers, in other words, along bedding planes. Where the sedimentary layers making up the bedrock are essentially horizontal, the bedding-plane fractures are more or less parallel to the land surface. The two remaining sets of fractures are essentially vertical and thus cross the bedding planes at a steep angle. The primary difference between the sets of vertical fractures is in the orientation of the fractures in each set. For example, in parts of the region one set of vertical fractures is oriented in a northwest-southeast direction and the other set in a northeast-southwest direction. The vertical fractures facilitate movement of water across the rock layers and thus serve as the principal hydraulic connection between the bedding-plane fractures.

In the parts of the region in which the bedrock has been folded or bent, the occurrence and orientation of fractures are more complex. In these areas the dip of the rock layers and the associated bedding-plane fractures range from horizontal to vertical. Fractures parallel to the land surface, where present, are probably less numerous and of more limited extent than in areas of flat-lying rocks.

The openings developed along most fractures are less than a millimeter wide. The principal exception occurs in limestones and dolomites, which are more soluble in water than most other rocks. Water moving through these rocks gradually enlarges the fractures to form, in time, extensive cavernous openings or cave systems. Many large springs emerge from these openings; one in this region is Big Spring, in Missouri, which has an average discharge of 36.8 m^3sec^{-1}.

Recharge of the ground-water system in this region occurs primarily in the outcrop areas of the bedrock aquifers in the uplands between streams. Precipitation in the region ranges from about 400 mm per year in the western part to more than 1,200 mm in the eastern part. This wide difference in precipitation is reflected in recharge rates, which range from about 5 mm per year in west Texas and New Mexico to as much as 500 mm per year in Pennsylvania and eastern Tennessee. Discharge from the ground-water system is by springs and seepage into streams and by evaporation and transpiration in areas where the water table is within a few meters of land surface.

The yield of wells depends on (1) the number and size of fractures that are penetrated and the extent to which they have been enlarged by solution, (2) the rate of recharge, and (3) the storage capacity of the bedrock and regolith. Yields of wells in most of the region are small, in the range of 0.01 to 1 m^3min^{-1} (about 2.5 to about 250 gallons per minute), making the Nonglaciated Central region one of the least favorable ground-water regions in the

country. Even in parts of the areas underlain by cavernous limestone, yields are moderately low because of both the absence of a thick regolith and the large water-transmitting capacity of the cavernous openings which quickly discharge the water that reaches them during periods of recharge.

The exceptions to the small well yields are the cavernous limestones of the Edwards Plateau, the Ozark Plateaus, and the Ridge and Valley section. The Edwards Plateau in Texas is bounded on the south by the Balcones Fault Zone, in which limestone and dolomite up to 150 m in thickness has been extensively faulted. The faulting has facilitated the development of solution openings which makes this zone one of the most productive aquifers in the country. Wells of the City of San Antonio are located in this zone; individually, they have yields of more than 60 $m^3 min^{-1}$.

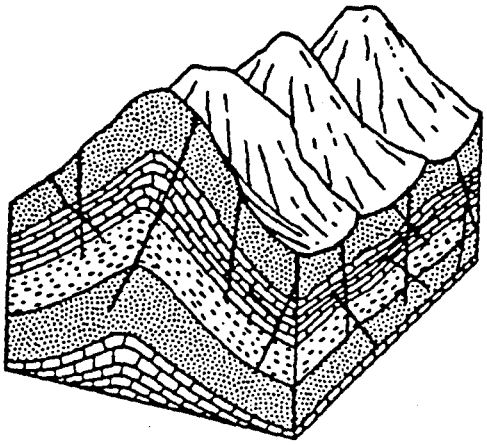
Another feature that makes much of this region unfavorable for ground-water development is the occurrence of salty water at relatively shallow depths. In most of the Nonglaciated Central region, except the Ozark Plateaus, the Ouachita and Arbuckle Mountains, and the Ridge and Valley section, the water in the bedrock contains more than 1,000 mg/l of dissolved solids at depths less than 150 m. Most of the salty water is believed to be connate--that is, it was trapped in the rocks when they emerged from the sea in which they were deposited. Other possible sources include: (1) seawater that entered the rocks during a later time when the land again was beneath the sea and (2) salty water derived from solution of salt beds that underlie parts of the region.

The presence of connate water at relatively shallow depths is doubtless due to several factors, including, in the western part of the area, a semiarid climate and, consequently, a small rate of recharge. Other factors probably include an extremely slow rate of ground-water circulation at depths greater than a few hundred meters.

NON-GLACIATED CENTRAL

(6A) Mountain Slopes

This hydrogeologic setting is characterized by relatively steep slopes on the side of mountains or hills, a thin soil cover and fractured bedrock. Ground water is obtained primarily from the fractures in the bedrock which may be of sedimentary, metamorphic or igneous origin but which are commonly alternating sedimentary layers, and also from bedding planes between the sedimentary layers. The fractures provide only localized sources of ground water and well yields are typically limited. Although precipitation may be significant in some areas, due to the steep slopes, thin soil cover and small storage capacity of the fractures, runoff is significant and ground- water recharge is low. Water levels are extremely variable but are commonly moderately deep. Perched ground-water zones are common. These sedimentary rocks may range in attitude from nearly horizontal, as in parts of the western Appalachian Plateau, to steeply dipping, as seen in the Valley and Ridge province, the Wichita, Arbuckle and Ouachita Mountains, the Black Hills, and on the eastern slopes of the Rockies.



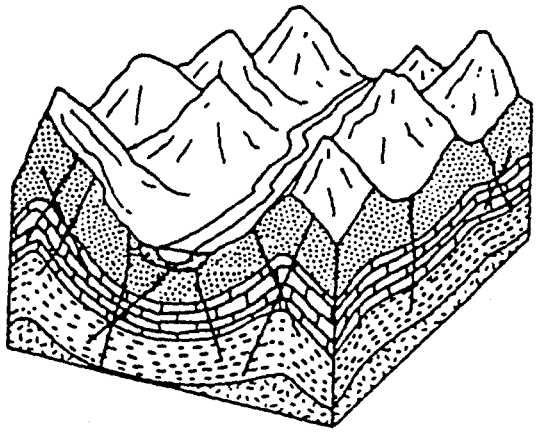
SETTING 6 A Mountain Slopes		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	0-2	4	1	4
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Thin or Absent	2	10	20
Topography	12-18%	1	3	3
Impact Vadose Zone	Bedded LS, SS, SH	5	6	30
Hydraulic Conductivity	1-100	3	1	3
			Drastic Index	103

SETTING 6 A Mountain Slopes		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	0-2	4	1	4
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Thin or Absent	5	10	50
Topography	12-18%	3	3	9
Impact Vadose Zone	Bedded LS, SS, SH	4	6	24
Hydraulic Conductivity	1-100	2	1	2
			Pesticide Drastic Index	132

NON-GLACIATED CENTRAL

(6B) Alluvial Mountain Valleys

This hydrogeologic setting is characterized by thin boulder alluvium which overlies fractured bedrock of sedimentary, metamorphic or igneous origin but which is commonly comprised of alternating sedimentary layers. The alluvium, which is derived from the surrounding slopes serves as a localized source of water. Water is obtained from sand and gravel layers which are interspersed between finer-grained deposits. Surficial deposits have typically weathered to a sandy loam. Water levels are relatively shallow but may be extremely variable. Ground water may also be obtained from the fractures in the underlying bedrock which are typically in direct hydraulic connection with the overlying alluvium.



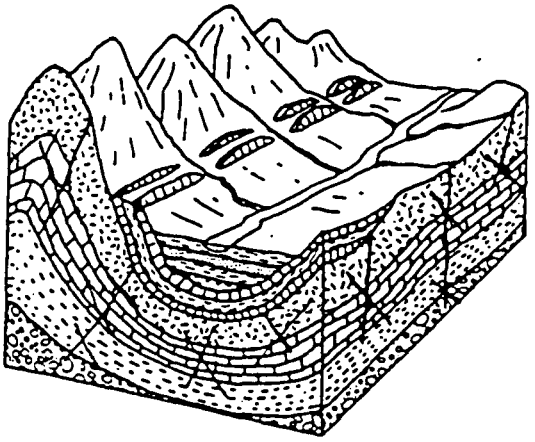
SETTING 6 B Alluvial Mountain Valleys		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact Vadose Zone	S & G w/ sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
			Drastic Index	152

SETTING 6 B Alluvial Mountain Valleys		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	5	6	30
Topography	2-6%	3	9	27
Impact Vadose Zone	S & G w/ sig. Silt and Clay	4	6	24
Hydraulic Conductivity	700-1000	2	6	12
			Pesticide Drastic Index	176

NON-GLACIATED CENTRAL

(6C) Mountain Flanks

This hydrogeologic setting is characterized by moderate topographic relief and moderately-dipping, fractured, consolidated, sedimentary rocks. Soil cover is usually thicker than on the mountain slopes and typically has weathered to a sandy loam. Although precipitation can be significant, ground-water recharge is only moderate due to the slope. Water levels are typically moderately deep although they are extremely variable. The mountain flanks serve as the recharge area for aquifers which are confined in adjacent areas. Ground water is obtained from the permeable sedimentary rocks or from fractures in the sedimentary rocks. The sedimentary rocks may be underlain by fractured bedrock of igneous, metamorphic or sedimentary origin which yield little water. Sedimentary beds may be either horizontal or dipping, as indicated for the higher mountain slopes (6A), and have a similar geographic distribution.



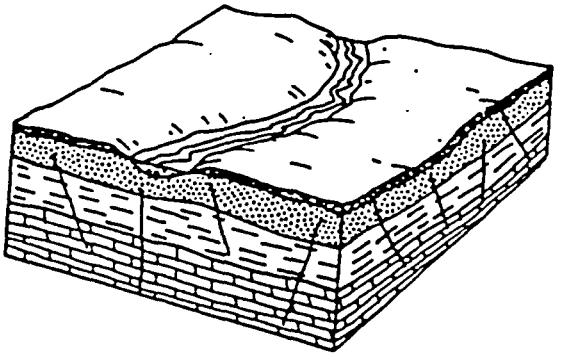
SETTING 6 C Mountain Flanks		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact Vadose Zone	Bedded LS, SS, SH	5	6	30
Hydraulic Conductivity	1-100	3	1	3
			Drastic Index	105

SETTING 6 C Mountain Flanks		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Sandy Loam	5	6	30
Topography	6-12%	3	5	15
Impact Vadose Zone	Bedded LS, SS, SH	4	6	24
Hydraulic Conductivity	1-100	2	1	2
			Pesticide Drastic Index	126

NON-GLACIATED CENTRAL

(6Da) Alternating Sandstone, Limestone and Shale - Thin Soil

This hydrogeologic setting is characterized by low to moderate topographic relief, relatively thin loamy soils overlying horizontal or slightly dipping alternating layers of fractured consolidated sedimentary rocks. Ground water is obtained primarily from fractures along bedding planes or intersecting vertical fractures. Precipitation varies widely in the region, but recharge is moderate where precipitation is adequate. Water levels are extremely variable but on the average moderately shallow. Shale or clayey layers often form aquitards, and where sufficient relief is present, perched ground water zones of local domestic importance are often developed.



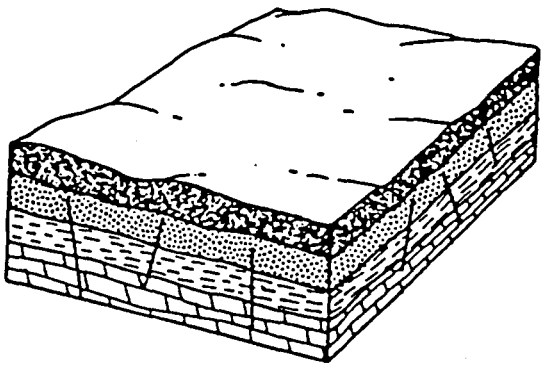
SETTING 6 Da Alternating Sandstone, Limestone, Shale - Thin Soil		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Thin or Absent	2	10	20
Topography	2-6%	1	9	9
Impact Vadose Zone	Bedded LS, SS, SH	5	6	30
Hydraulic Conductivity	1-100	3	1	3
			Drastic Index	139

SETTING 6 Da Alternating Sandstone, Limestone, Shale - Thin Soil		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Thin or Absent	5	10	50
Topography	2-6%	3	9	27
Impact Vadose Zone	Bedded LS, SS, SH	4	6	24
Hydraulic Conductivity	1-100	2	1	2
			Pesticide Drastic Index	180

NON-GLACIATED CENTRAL

(6Db) Alternating Sandstone, Limestone and Shale - Deep Regolith

This setting is identical to (6Da) Alternating Sandstone, Limestone and Shale - Thin Soil except that the surficial deposits typically have been weathered to form clay loams which grade into weathered bedrock. This weathered zone helps retard the movement of pollutants through the ground to the water table. These thick soil deposits are usually in direct, hydraulic connection with the underlying fractured sedimentary deposits.



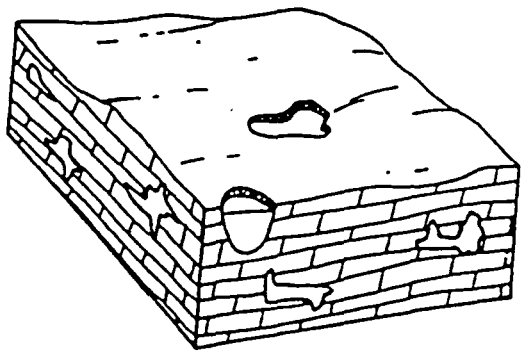
SETTING 6 Db Alternating Sandstone, Limestone, Shale - Deep Regolith		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact Vadose Zone	Bedded LS, SS, SH	5	6	30
Hydraulic Conductivity	1-100	3	1	3
		Drastic Index		125

SETTING 6 Db Alternating Sandstone, Limestone, Shale - Deep Regolith		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Clay Loam	5	3	15
Topography	2-6%	3	9	27
Impact Vadose Zone	Bedded LS, SS, SH	4	6	24
Hydraulic Conductivity	1-100	2	1	2
		Pesticide Drastic Index		145

NON-GLACIATED CENTRAL

(6E) Solution Limestone

This hydrogeologic setting is characterized by moderate, but variable, topographic relief and deposits of limestone which have been partially dissolved along bedding and fracture planes to form a network of solution cavities and caves. Soil is usually thin or absent, but where present is commonly a clayey loam. Recharge is usually greater than 10 inches per year because the region receives significant amounts of rainfall which is easily recharged through the solution channels. Runoff return through solution channels into surface watercourses is sometimes very high. Water levels are typically moderately deep. The limestone serves as a significant source of ground water because of the high hydraulic conductivity of the solution channels. Caves related to this setting are widespread, but their greatest concentration occurs in a band 200-400 miles wide extending from central Missouri through western Virginia.



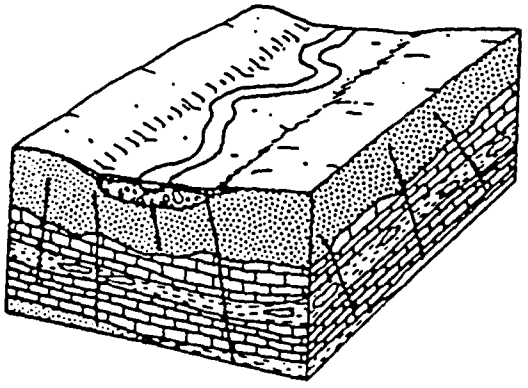
SETTING 6 E Solution Limestone		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	10+	4	9	36
Aquifer Media	Karst Limestone	3	10	30
Soil Media	Thin or Absent	2	10	20
Topography	6-12%	1	5	5
Impact Vadose Zone	Karst Limestone	5	10	50
Hydraulic Conductivity	2000+	3	10	30
		Drastic Index		196

SETTING 6 E Solution Limestone		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	10+	4	9	36
Aquifer Media	Karst Limestone	3	10	30
Soil Media	Thin or Absent	5	10	50
Topography	6-12%	3	5	15
Impact Vadose Zone	Karst Limestone	4	10	40
Hydraulic Conductivity	2000+	2	10	20
		Pesticide Drastic Index		216

NON-GLACIATED CENTRAL

(6Fa) River Alluvium with Overbank Deposits

This hydrogeologic setting is characterized by low topography and deposits of alluvium along parts of stream valleys. Water is obtained from sand and gravel layers which are interbedded with finer-grained alluvial deposits. The floodplain is covered by varying thicknesses of fine-grained silt and clay called overbank deposits. The overbank thickness is usually thicker along major streams (usually as much as 40 feet), and thinner along minor streams. Precipitation varies widely over the region, but recharge is somewhat reduced because of the impermeable nature of the overbank deposits and subsequent clayey loam soils which typically cover the surface. There is usually substantial recharge, however, due to infiltration from the associated stream, water levels are typically moderately shallow. The alluvium is commonly in direct hydraulic connection with the underlying sedimentary rocks.



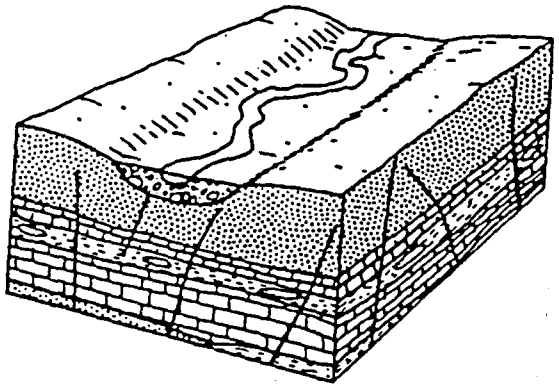
SETTING 6 Fa River Alluvium with Overbank Deposits		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact Vadose Zone	Silt/Clay	5	3	15
Hydraulic Conductivity	1000-2000	3	8	24
			Drastic Index	146

SETTING 6 Fa River Alluvium with Overbank Deposits		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	5	3	15
Topography	0-2%	3	10	30
Impact Vadose Zone	Silt/Clay	4	3	12
Hydraulic Conductivity	1000-2000	2	8	16
			Pesticide Drastic Index	164

NON-GLACIATED CENTRAL

(6Fb) River Alluvium without Overbank Deposits

This setting is identical to (6Fa) River Alluvium with Overbank Deposits except that no significant fine-grained floodplain deposits occupy the stream valley. This results in significantly higher recharge where precipitation is adequate and sandy loam soils occur at the surface. Water levels are typically closer to the surface because the fine-grained overbank deposits are not present.



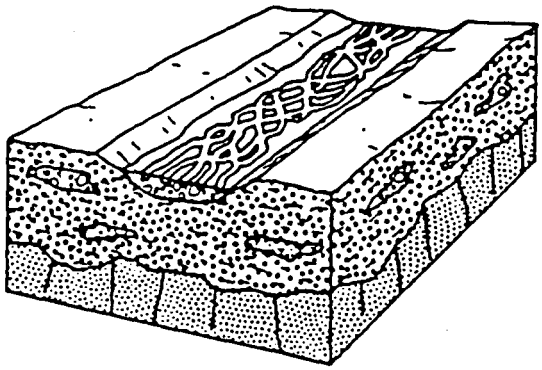
SETTING 6 Fb River Alluvium without Overbank Deposits		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	1000-2000	3	8	24
			Drastic Index	187

SETTING 6 Fb River Alluvium without Overbank Deposits		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	5	6	30
Topography	0-2%	3	10	30
Impact Vadose Zone	Sand and Gravel	4	8	32
Hydraulic Conductivity	1000-2000	2	8	16
			Pesticide Drastic Index	209

NON-GLACIATED CENTRAL

(6G) Braided River Deposits

This hydrogeologic setting is characterized by deposits of alluvium which occur within the flood plain of streams and rivers. The stream is characterized by a low gradient, wide channel and series of interconnected shallow channels which form a braided pattern. Water levels are typically shallow. This setting is found only in the western portion of this ground- water region. The river alluvium does not serve as a significant source of ground water where it overlies more productive semi-consolidated deposits. However, recharge from the river is substantial and the underlying deposits are in direct hydraulic connection with the overlying alluvium; therefore the potential for pollution of the aquifer is high. Although precipitation commonly averages less than 20 inches per year, recharge is relatively high due to the flat topography and sandy surficial deposits.



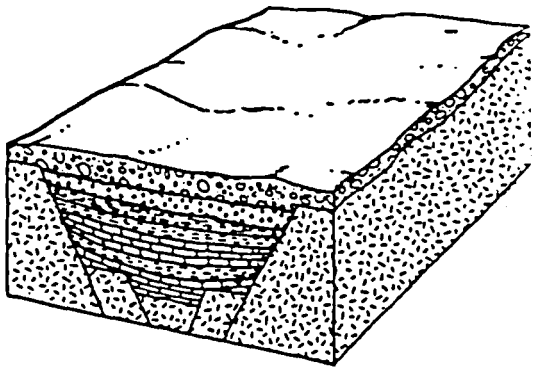
SETTING 6 G Braided River Deposits		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	1000-2000	3	8	24
			Drastic Index	190

SETTING 6 G Braided River Deposits		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	5	9	45
Topography	0-2%	3	10	30
Impact Vadose Zone	Sand and Gravel	4	8	32
Hydraulic Conductivity	1000-2000	2	8	16
			Pesticide Drastic Index	221

NON-GLACIATED CENTRAL

(6H) Triassic Basins

This hydrogeologic setting is characterized by modera dipping, highly faulted beds of sandstone, shale and limestone. Conglomeritic deposits occur in some areas These basins tend to be bounded by high angle faults, the basins being elongate in the NE-SW directions. Th sedimentary beds may be cut by narrow igneous intrusi (dikes, etc.), and are sometimes indurated by the intr activity. The Triassic formations are often red in co due to high iron concentrations, but green colors are common. These deposits may serve as a localized source water and water levels are variable.



SETTING 6 H Triassic Basins		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	[illegible]
Depth to Water	75-100	5	2	[illegible]
Net Recharge	4-7	4	6	[illegible]
Aquifer Media	Massive Sandstone	3	6	[illegible]
Soil Media	Sandy Loam	2	6	[illegible]
Topography	2-6%	1	9	[illegible]
Impact Vadose Zone	Bedded LS. SS. SH	5	6	[illegible]
Hydraulic Conductivity	1-100	3	1	[illegible]
			Drastic Index	[illegible]

SETTING 6 H Triassic Basins		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	[illegible]
Depth to Water	75-100	5	2	[illegible]
Net Recharge	4-7	4	6	[illegible]
Aquifer Media	Massive Sandstone	3	6	[illegible]
Soil Media	Sandy Loam	5	6	[illegible]
Topography	2-6%	3	9	[illegible]
Impact Vadose Zone	Bedded LS. SS. SH	4	6	24
Hydraulic Conductivity	1-100	2	1	[illegible]
			Pesticide Drastic Index	[illegible]

NON-GLACIATED CENTRAL

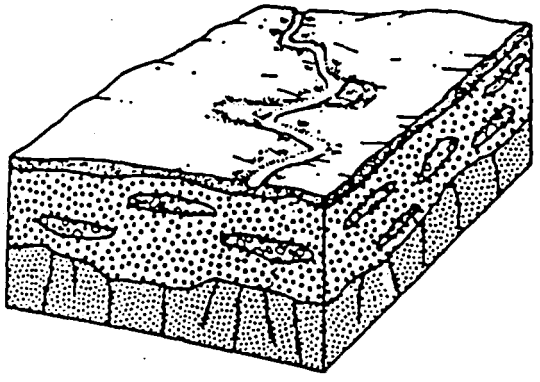
(6I) Swamp/Marsh

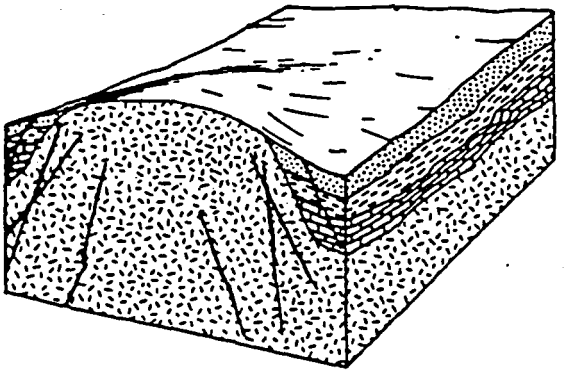
This hydrogeologic setting is characterized by low topographic relief and high water levels with high organic content in the sandy clay deposits. The high water tables are a result of either restricted vertical conductivity or restricted drainage patterns. Recharge is highly variable but is typically moderate to high where precipitation and/or streamflow permit. These deposits may serve as aquifers or may serve as recharge to the underlying aquifer.

NON-GLACIATED CENTRAL

(6J) Metamorphic/Igneous Domes and Fault Blocks

This hydrogeologic setting is characterized by metamorphic and igneous rocks exposed at the surface. The rocks are typically more highly fractured and faulted along the flanks of the domes. The domes are flanked by gently dipping deposits of sedimentary rocks which may also be faulted adjacent to the dome. Soil is typically thin or absent and water levels are extremely variable. Recharge rates are typically low because of excessive surface runoff and low permeabilities. Water yields are extremely variable depending on the degree of folding and faulting but typically are higher along the more fractured flank zones. Where few fractures exist, water yields are very low or non-existent.





SETTING 6 I Swamp/Marsh		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	6-7	4	6	24
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2	1	10	10
Impact Vadose Zone	S & G w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	100-300	3	2	6
			Drastic Index	144

SETTING 6 J Metamorphic/Igneous Domes and Fault Blocks		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	75-100	5	2	10
Net Recharge	0-2	4	1	4
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Thin or Absent	2	10	20
Topography	6-12	1	5	5
Impact Vadose Zone	Metamorphic/Igneous	5	4	20
Hydraulic Conductivity	1-100	3	1	3
			Drastic Index	[illegible]

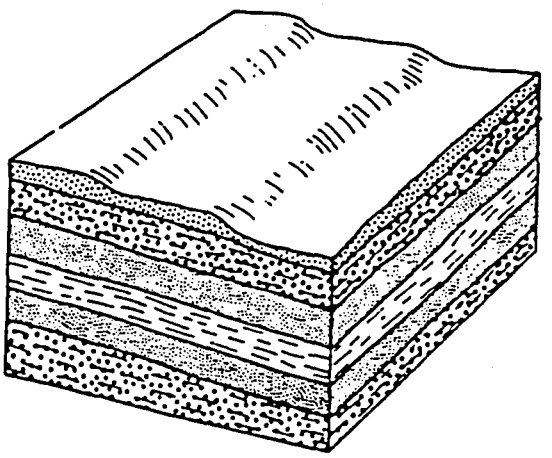
SETTING 6 I Swamp/Marsh		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	6-7	4	6	24
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Clay Loam	5	3	15
Topography	0-2	3	10	30
Impact Vadose Zone	S & G w/sig. Silt and Clay	6	4	24
Hydraulic Conductivity	100-300	2	2	4
			Pesticide Drastic Index	165

SETTING 6 J Metamorphic/Igneous Domes and Fault Blocks		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water Table	75-100	5	2	10
Net Recharge	0-2	4	1	4
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Thin or Absent	5	10	50
Topography	6-12	1	5	5
Impact Vadose Zone	Metamorphic/Igneous	4	4	16
Hydraulic Conductivity	1-100	2	1	2
			Pesticide Drastic Index	96

NON-GLACIATED CENTRAL

(6K) Unconsolidated and Semi-Consolidated Aquifers

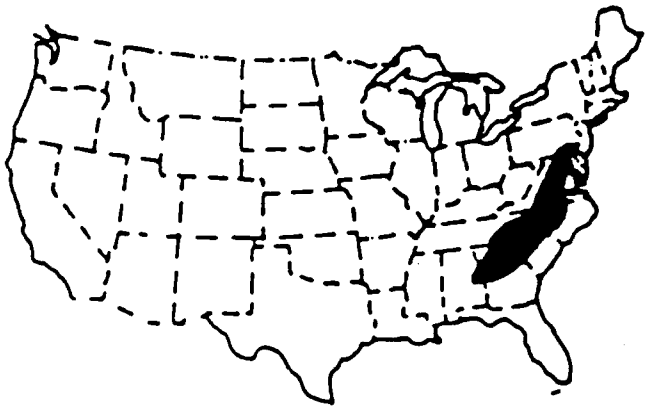
This hydrogeologic setting is characterized by moderately low topographic relief and interbedded deposits which consist primarily of sand, silt and clay. Although soils are typically loamy or sandy, recharge is limited because of only moderate precipitation and high evapotranspiration. Water levels are extremely variable but are typically not less than 50 feet. Hydraulic conductivities are also extremely variable also depending on the amount of fine materials which are interbedded with the sands.

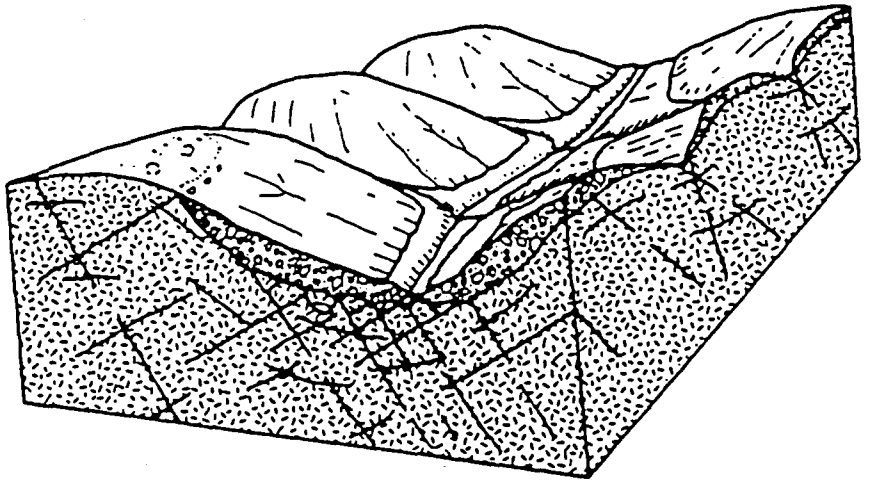


SETTING 6 K Unconsolidated and Semi-Consolidated Aquifers		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	75-100	5	2	10
Net Recharge	0-2	4	1	4
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact Vadose Zone	S&G w/sig. Silt & Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		Drastic Index		101

SETTING 6 K Unconsolidated and Semi-Consolidated Aquifers		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water Table	75-100	5	2	10
Net Recharge	0-2	4	1	4
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	5	6	30
Topography	2-6%	1	9	9
Impact Vadose Zone	S&G w/sig. Silt & Clay	4	6	24
Hydraulic Conductivity	300-700	2	4	8
		Pesticide Drastic Index		109

8. PIEDMONT BLUE RIDGE GROUND-WATER REGION





8A	Mountain Slopes
8B	Alluvial Mountain Valleys
8C	Mountain Flanks
8D	Regolith
8E	River Alluvium
8F	Mountain Crests
8G	Swamp/Marsh

8. PIEDMONT BLUE RIDGE REGION

(Thick regolith over fractured crystalline and metamorphosed sedimentary rocks)

The Piedmont and Blue Ridge region is an area of about 247,000 km2 extending from Alabama on the south to Pennsylvania on the north. The Piec part of the region consists of low, rounded hills and long, rolling, northeast-southwest trending ridges whose summits range from about a hundre meters above sea level along its eastern boundary with the Coastal Plain to to 600 m along its boundary with the Blue Ridge area to the west. The Blue Ridge is mountainous and includes the highest peaks east of the Mississippi The mountains, some of which reach altitudes of more than 2,000 m, have smooth-rounded outlines and are bordered by well-graded streams flowing in relatively narrow valleys.

The Piedmont and Blue Ridge region is underlain by bedrock of Precambr: and Paleozoic age consisting of igneous and metamorphosed igneous and sedimentary rocks. These include granite, gneiss, schist, quartzite, slate, marble, and phyllite. The land surface in the Piedmont and Blue Ridge is underlain by clay-rich, unconsolidated material derived from in situ weather of the underlying bedrock. This material, which averages about 10 to 20 m i thickness and may be as much as 100 m thick on some ridges, is referred to a saprolite. In many valleys, especially those of larger streams, flood plain are underlain by thin, moderately well-sorted alluvium deposited by the streams. When the distinction between saprolite and alluvium is not importa the term regolith is used to refer to the layer of unconsolidated deposits.

The regolith contains water in pore spaces between rock particles. The bedrock, on the other hand, does not have any significant intergranular porosity. It contains water, instead, in sheetlike openings formed along fractures (that is, breaks in the otherwise "solid" rock). The hydraulic conductivities of the regolith and the bedrock are similar and range from ab: 0.001 to 1 m day^{-1}. The major difference in their water-bearing characteristics is their porosities, that of regolith being about 20 to 30 percent and that of the bedrock about 0.01 to 2 percent. Small supplies of water adequate for domestic needs can be obtained from the regolith through large-diameter bored or dug wells. However, most wells, especially those whe moderate supplies of water are needed, are relatively small in diameter and a cased through the regolith and finished with open holes in the bedrock. Although, as noted, the hydraulic conductivity of the bedrock is similar to that of the regolith, bedrock wells generally have much larger yields than regolith wells because, being deeper, they have a much larger availble drawdown.

All ground-water systems function both as reservoirs that store water and as pipelines (or conduits) that transmit water from recharge areas to discharge areas. The yield of bedrock wells in the Piedmont and Blue Ridge region depends on the number and size of fractures penetrated by the open hole and on the replenishment of the fractures by seepage into them from the overlying regolith. Thus, the ground-water system in this region can be viewed, from the standpoint of ground-water development, as a terrane in which the reservoir and pipeline functions are effectively separated. Because of its larger porosity, the regolith functions as a reservoir which slowly feeds water downward into the fractures in the bedrock. The fractures serve as an intricate interconnected network of pipelines that transmit water either to springs or streams or to wells.

Recharge of the ground-water system occurs on the areas above the flood plains of streams, and natural discharge occurs as seepage springs that are common near the bases of slopes and as seepage into streams. With respect to recharge conditions, it is important to note that forested areas, which include most of the Blue Ridge and much of the Piedmont, have thick and very permeable soils overlain by a thick layer of forest litter. In these areas, even on steep slopes, most of the precipitation seeps into the soil zone, and most of this moves laterally through the soil in a thin, temporary, saturated zone to surface depressions or streams to discharge. The remainder seeps into the regolith below the soil zone, and much of this ultimately seeps into the underlying bedrock.

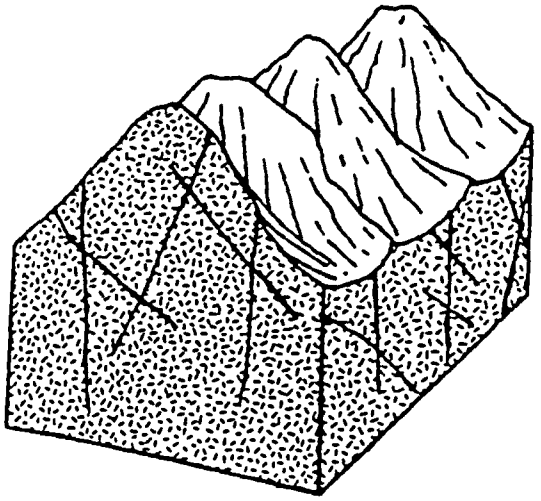
Because the yield of bedrock wells depends on the number of fractures penetrated by the well, the key element in selecting well sites is recognizing the relation between the present surface topography and the location of fractures in the bedrock. Most of the valleys, draws, and other surface depressions indicate the presence of more intensely fractured zones in the bedrock which are more susceptible to weathering and erosion than are the intervening areas. Because fractures in the bedrock are the principal avenues along which ground water moves, the best well sites appear to be in draws on the sides of the valleys of perennial streams where the bordering ridges are underlain by substantial thicknesses of regolith. Wells located at such sites seem to be most effective in penetrating open water-bearing fractures and in intercepting ground water draining from the regolith. Chances of success seem to be somewhat less for wells on the flood plains of perennial streams, possibly because the alluvium obscures the topographic expression of bedrock fractures. The poorest sites for wells are on the tops of ridges and mountains where the regolith cover is thin or absent and the bedrock is sparsely fractured.

As a general rule, fractures near the bedrock surface are most numerous and have the largest openings, so that the yield of most wells is not increased by drilling to depths greater than about 100 m. Exceptions to this occur in Georgia, South Carolina and North Carolina and some other areas where water-bearing, low-angle faults or fractured zones are present at depths as great as 200 to 300 m.

The Piedmont and Blue Ridge region has long been known as an area generally unfavorable for ground water development. This reputation seems t have resulted both from the small reported yields of the numerous domestic wells in use in the region that were, generally, sited as a matter of convenience and from a failure to apply existing technology to the careful selection of well sites where moderate yields are needed. As water needs in the region increase and as reservoir sites on streams become increasingly mo difficult to obtain, it will be necessary to make more intensive use of grou water.

(8A) Mountain Slopes

This hydrogeologic setting is characterized by steep slopes on the side of mountains, a thin soil cover and fractured bedrock. Ground water is obtained primarily from the fractures in the bedrock which may be of sedimentary, metamorphic or igneous origin, but which is commonly metamorphic or igneous. The fractures provide localized sources of ground water and well yields are typically limited. Although precipitation is abundant, due to the steep slopes, thin soil cover and small storage capacity of the fractures, runoff is significant and ground-water recharge is only moderate. Water levels are extremely variable but are commonly deep.

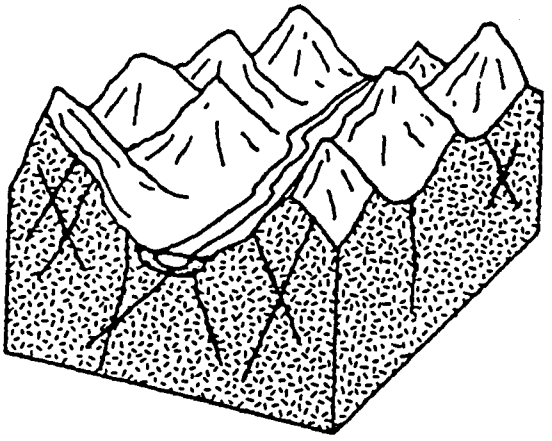


SETTING 8 A Mountain Slopes		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Thin or Absent	2	10	20
Topography	18+	1	1	1
Impact Vadose Zone	Metamorphic/Igneous	5	4	20
Hydraulic Conductivity	1-100	3	1	3
		Drastic Index		75

SETTING 8 A Mountain Slopes		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Thin or Absent	5	10	50
Topography	18+	3	1	3
Impact Vadose Zone	Metamorphic/Igneous	4	4	16
Hydraulic Conductivity	1-100	2	1	2
		Pesticide Drastic Index		102

(8B) Alluvial Mountain Valleys

This hydrogeologic setting is characterized by thin, bouldery alluvium which overlies fractured bedrock of sedimentary, metamorphic or igneous origin. The alluvium, which includes both mass-wastage and water-sorted debris, is derived from the surrounding slopes, and serves as a localized source of water. Water is obtained from sand and gravel layers which are interspersed between finer-grained deposits. Surficial deposits have typically weathered to a loam. Water levels are usually relatively shallow but are extremely variable. Ground water is also obtained from the fractures in the underlying bedrock, which are typically in direct hydraulic connection with the overlying alluvium.



SETTING 8 B Alluvial Mountain Valleys		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	2-6%	1	9	9
Impact Vadose Zone	S & G w/ sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		Drastic Index		162

SETTING 8 B Alluvial Mountain Valleys		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	5	5	25
Topography	2-6%	3	9	27
Impact Vadose Zone	S & G w/ sig. Silt and Clay	4	6	24
Hydraulic Conductivity	300-700	2	4	8
		Pesticide Drastic Index		185

PIEDMONT AND BLUE RIDGE

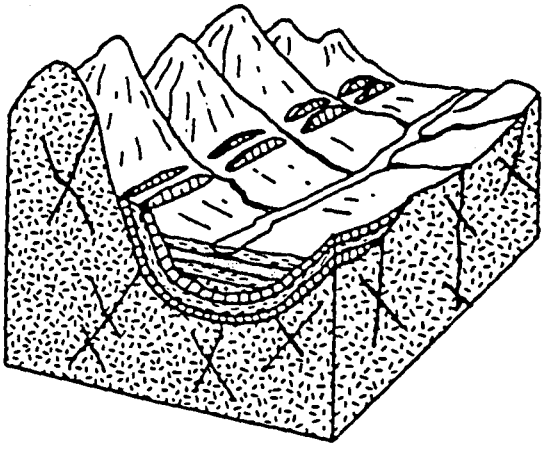
(8C) Mountain Flanks

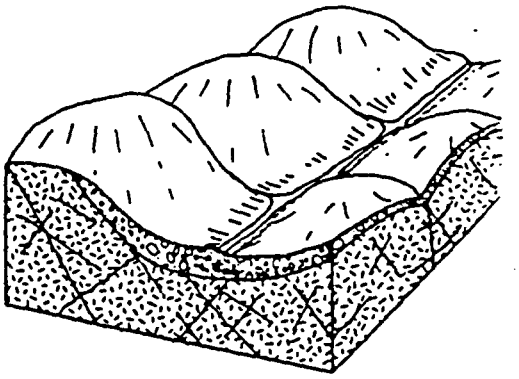
This hydrogeologic setting is characterized by moderate topographic relief and moderately-dipping, fractured, consolidated sedimentary rocks. Soil cover is usually thicker than on the mountain slopes and typically has weathered to a sandy loam or loam. Although precipitation is abundant, ground-water recharge is moderate due to the soil cover and slope. Water levels are typically moderately-deep although they are extremely variable. The mountain flanks serve as the recharge area for aquifers which are typically confined in adjacent valley areas.

PIEDMONT AND BLUE RIDGE

(8D) Regolith

This hydrogeologic setting is characterized by mode: low slopes covered by regolith and underlain by fra: bedrock of igneous, sedimentary or metamorphic orig: regolith is typically clay-rich but may also serve a source of ground water for low-yield wells. The reg functions as a reservoir for ground-water recharge t bedrock which is in direct hydraulic connection with overlying regolith. The bedrock typically yields la amounts of ground water than the regolith when the w intersects fractures in the bedrock.





SETTING 8 C Mountain Flanks		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Loam	2	5	10
Topography	6-12%	1	5	5
Impact Vadose Zone	Bedded LS, SS, SH	5	6	30
Hydraulic Conductivity	100-300	3	2	6
			Drastic Index	106

SETTING 8 D Regolith		GENERAL	
FEATURE	RANGE	WEIGHT	RATING
Depth to Water	5-15	5	9
Net Recharge	4-7	4	6
Aquifer Media	Weathered Meta./Ig	3	4
Soil Media	Clay Loam	2	3
Topography	6-12%	1	5
Impact Vadose Zone	Silt/Clay	5	1
Hydraulic Conductivity	1-100	3	1
			Drastic Index

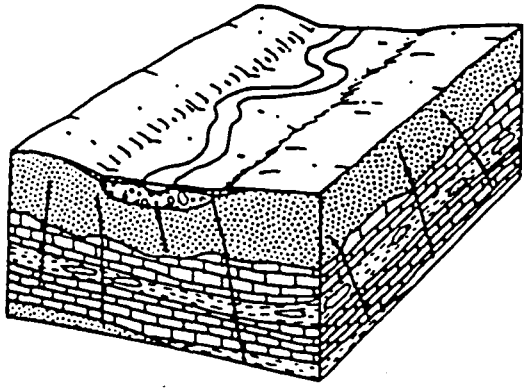
SETTING 8 C Mountain Flanks		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Bedded SS, LS, SH Sequences	3	6	18
Soil Media	Loam	5	5	25
Topography	6-12%	3	5	15
Impact Vadose Zone	Bedded LS, SS, SH	4	6	24
Hydraulic Conductivity	100-300	2	2	4
			Pesticide Drastic Index	123

SETTING 8 D Regolith		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	N
Depth to Water	5-15	5	9	
Net Recharge	4-7	4	6	
Aquifer Media	Weathered Meta./Ig	3	4	
Soil Media	Clay Loam	5	3	
Topography	6-12%	3	5	
Impact Vadose Zone	Silt/Clay	4	1	
Hydraulic Conductivity	1-100	2	1	
			Pesticide Drastic Index	

PIEDMONT AND BLUE RIDGE

(8E) River Alluvium

This hydrogeologic setting is characterized by low topography and deposits of varying thickness of alluvium along parts of stream valleys. The alluvium is underlain by fractured igneous, metamorphic or consolidated sedimentary rocks. Water is obtained from sand and gravel which is overlain and interbedded with finer-grained alluvial deposits. Surficial deposits usually weather to a sandy loam. The sand and gravel within the alluvium serves as the principal aquifer, but the alluvium also serves as the source of ground-water recharge for the underlying aquifer. Precipitation is abundant and recharge is moderately high, limited only by the loamy surficial deposits. Water levels are extremely variable, but are typically moderately shallow.



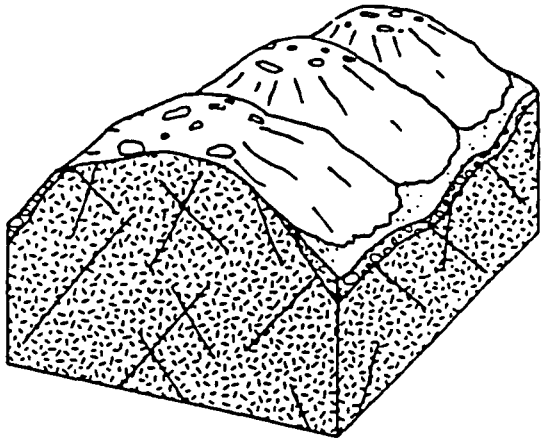
SETTING 8 E River Alluvium		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact Vadose Zone	S & G w/ sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		Drastic Index		176

SETTING 8 E River Alluvium		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	5	6	30
Topography	2-6%	3	9	27
Impact Vadose Zone	S & G w/ sig. Silt and Clay	4	6	24
Hydraulic Conductivity	1000-2000	2	8	16
		Pesticide Drastic Index		198

PIEDMONT AND BLUE RIDGE

(8F) Mountain Crests

This hydrogeologic setting is characterized by moderate to steep topography on the crests of mountains with thin soil cover and exposed fractured bedrock. Ground water is obtained primarily from the fractures in the bedrock which may be of sedimentary, metamorphic or igneous origin but which is commonly metamorphic or igneous. The fractures provide localized sources of ground water and well yields are typically limited. Although precipitation is abundant, due to the slopes, thin soil cover and small storage capacity of the fractures, runoff is significant and ground-water recharge is low. Water levels are extremely variable but commonly deep.



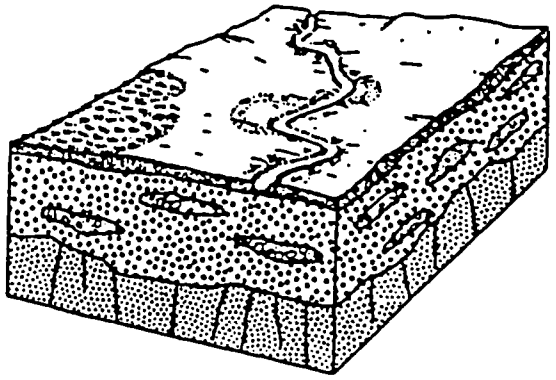
SETTING 8 F Mountain Crests		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	100+	5	1	5
Net Recharge	0-2	4	1	4
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Thin or Absent	2	10	20
Topography	2-6%	1	9	9
Impact Vadose Zone	Metamorphic/Igneous	5	4	20
Hydraulic Conductivity	1-100	3	1	3
		Drastic Index		70

SETTING 8 F Mountain Crests		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	100+	5	1	5
Net Recharge	0-2	4	1	4
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Thin or Absent	5	10	50
Topography	2-6%	3	9	27
Impact Vadose Zone	Metamorphic/Igneous	4	4	16
Hydraulic Conductivity	1-100	2	1	2
		Pesticide Drastic Index		113

PIEDMONT AND BLUE RIDGE

(8G) Swamp/Marsh

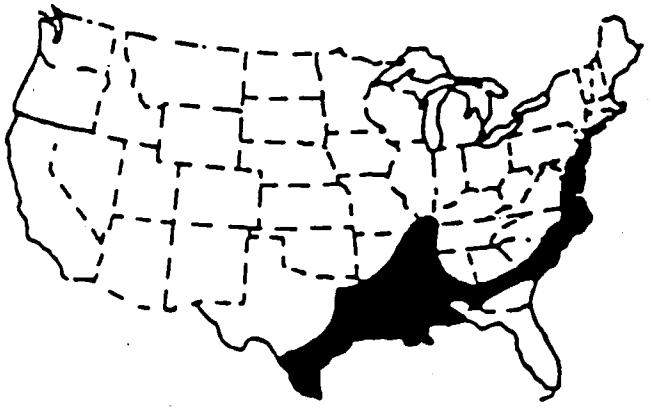
This hydrogeologic setting is characterized by low topographic relief, high water levels and high organic silt and clay deposits. These wetlands occur along the courses of floodplains and in upland areas as a result of vertically restricted drainage. Recharge is commonly low to moderate as a result of low topography and low conductivities even though rainfall is high. These areas may be discharge zones or may alternate as recharge and discharge zones as seasons change.

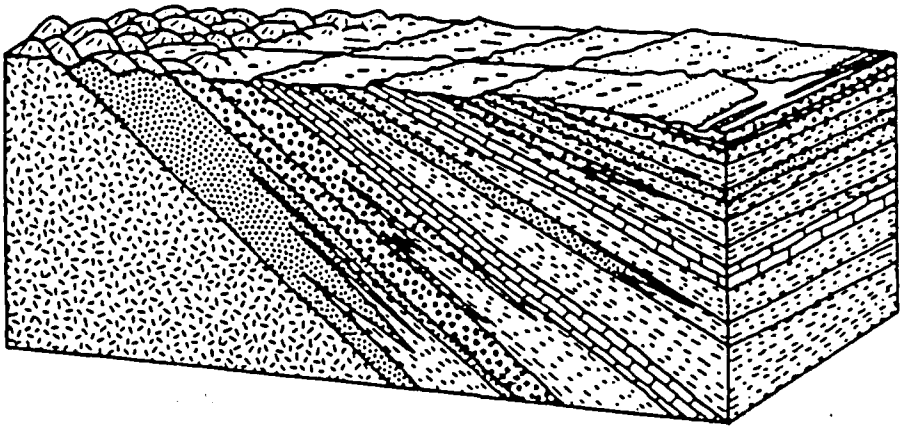


SETTING 8 G Swamp/Marsh		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	4-7	4	6	24
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Muck	2	2	4
Topography	0-2	1	10	10
Impact Vadose Zone	Metamorphic/Igneous	5	4	20
Hydraulic Conductivity	1-100	3	1	3
			Drastic Index	120

SETTING 8 G Swamp/Marsh		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	4-7	4	6	24
Aquifer Media	Metamorphic/Igneous	3	3	9
Soil Media	Muck	5	2	10
Topography	0-2	3	10	30
Impact Vadose Zone	Metamorphic/Igneous	4	4	16
Hydraulic Conductivity	1-100	2	1	2
			Pesticide Drastic Index	141

10. ATLANTIC AND GULF COASTAL PLAIN GROUND-WATER REGION





10Aa	Regional Aquifers
10Ab	Unconsolidated & Semi-Consolidated Shallow Surficial Aquifer
10Ba	River Alluvium With Overbank Deposits
10Bb	River Alluvium Without Overbank Deposits
10C	Swamp

10. ATLANTIC AND GULF COASTAL PLAIN

(Complexly interbedded sand, silt, and clay)

The Atlantic and Gulf Coastal Plain region is an area of about 844,000 km^2 extending from Cape Cod, Massachusetts, on the north to the Rio Grande in Texas on the south. This Region does not include Florida and parts of the adjacent States; although those areas are a part of the Atlantic and Gulf Coastal Plain physiographic province, they together form a separate ground-water region. (See region 11, "Southeast Coastal Plain").

The Atlantic and Gulf Coastal Plain region ranges in width from a few kilometers near its northern end to nearly a thousand kilometers in the vicinity of the Mississippi River. The great width near the Mississippi reflects the effect of a major downwarped zone in the Earth's crust that extends from the Gulf of Mexico to about the confluence of the Mississippi and Ohio Rivers. This area is referred to as the Mississippi embayment.

The topography of the region ranges from extensive, flat, coastal swamps and marshes 1 to 2 m above sea level to rolling uplands, 100 to 250 m above sea level, along the inner margin of the region.

The region is underlain by unconsolidated sediments that consist principally of sand, silt, and clay transported by streams from the adjoining uplands. These sediments, which range in age from Jurassic to the present, range in thickness from less than a meter near the inner edge of the region to more than 12,000 m in southern Louisiana. The greatest thicknesses are along the seaward edge of the region and along the axis of the Mississippi embayment. The sediments were deposited on floodplains and as deltas where streams reached the coast and, during different invasions of the region by the sea, were reworked by waves and ocean currents. Thus, the sediments are complexly interbedded to the extent that most of the named geologic units into which they have been divided contain layers of the different types of sediment that underlie the region. These named geologic units (or formations) dip toward the coast or toward the axis of the Mississippi embayment, with the result that those that crop out at the surface form a series of bands roughly parallel to the coast or to the axis of the embayment. The oldest formations crop out along the inner margin of the region, and the youngest crop out in the coastal area.

Within any formation the coarsest grained materials (sand, at places interbedded with thin gravel layers) tend to be most abundant near source areas. Clay and silt layers become thicker and more numerous downdip.

Although sand, silt, and clay, as noted above, are the principal types material underlying the Atlantic and Gulf Coastal Plain, there are also a sa amount of gravel interbedded with the sand, a few beds composed of mollusk shells, and a small amount of limestone present in the region. The most important limestone is the semi-consolidated Castle Hayne Limestone of Eocen age which underlies an area of about 26,000 km^2 in eastern North Carolina, i more than 200 m thick in much of the area, and is the most productive aquife in North Carolina. A soft, clayey limestone (the chalk of the Selma Group) of Late Cretaceous age underlies parts of eastern Mississippi and western Alaba but instead of being an aquifer it is an important confining bed.

From the standpoint of well yields and ground-water use, the Atlantic an Gulf Coastal Plain is one of the most important regions in the country. Recharge to the ground-water system occurs in the interstream areas, both whe sand layers crop out and by percolation downward across the interbedded clay and silt layers. Discharge from the system occurs by seepage to streams, estuaries, and the ocean. Movement of water from recharge areas to discharge areas is controlled, as in all ground-water systems, by hydraulic gradients, but in this region the pattern of movement is complicated by down-dip thickening of clay which hampers upward discharge. As a result, movement dow the dip of the permeable layers becomes increasingly slow with increasing distance from the outcrop areas. This causes many flow lines to converge on th discharge areas located on major streams near the downdip part of outcrop areas. These areas of concentrated ground-water discharge are referred to as "artesian-water gaps" by LeGrand and Pettyjohn (1981).

Wells that yield moderate to large quantities of water can be constructed almost anywhere in the region. Because most of the aquifers consist of unconsolidated sand, wells require screens; where the sand is fine-grained and well sorted, the common practice is to surround the screens with a coarse sand or gravel envelope.

Withdrawals near the outcrop areas of aquifers are rather quickly balance by increases in recharge and (or) reductions in natural discharge. Withdrawal at significant distances downdip do not appreciably affect conditions in the outcrop area and thus must be partly or largely supplied from water in storage in the aquifers and confining beds.

The reduction of storage in an aquifer in the vicinity of a pumping well is reflected in a decline in ground-water levels and is necessary in order to establish a hydraulic gradient toward the well. If withdrawals are continued for long periods in areas underlain by thick sequences of unconsolidated deposits, such as the Atlantic and Gulf Coastal Plain, the lowered ground-water levels in the aquifer may result in drainage of water from layers of silt and clay. The depletion of storage in fine-grained beds results in subsidence of the land surface. Subsidence in parts of the Houston area totaled about 9 m as of 1978. Subsidence near pumping centers in the Atlantic Coastal Plain has not yet been confirmed but is believed to be occurring, though at a slower rate than along the Texas Gulf Coast.

The depletion of storage in confining beds is permanent, and subsidence of the land surface that results from such depletion is also permanent. On the other hand, depletion of storage in aquifers may not be fully permanent, depending on the availability of recharge. In arid and semiarid regions, recharge rates are extremely small, and depletion of aquifer storage is, for practical purposes, permanent. Depletion of storage in aquifers in these regions is referred to as mining. In humid regions, recharge is sufficient to replace aquifer storage rather quickly, once withdrawals are stopped, so that depletion of aquifer storage in these areas is not considered to be mining. The important point is that depletion of storage in the confining layers of silt and clay in both arid and humid regions is permanent but is not normally considered to be ground-water mining. The term "mining" is applied by most ground-water hydrologists only to areas in which aquifer storage is being permanently depleted.

Depletion of storage in the aquifers underlying large areas of the Atlantic and Gulf Coastal Plain is reflected in long-term declines in ground-water levels. These declines suggest that withdrawals in these areas are exceeding the long-term yield of the aquifers.

This is a water-management problem that will become more important as rates of withdrawal and the lowering of water levels increase. Solutions to this problem include (1) concentrating withdrawals as close as possible to outcrop (recharge) areas, (2) dispersing withdrawals in regions remote from the outcrop areas over the widest possible area, and (3) increasing withdrawals from surficial aquifers to the maximum possible extent.

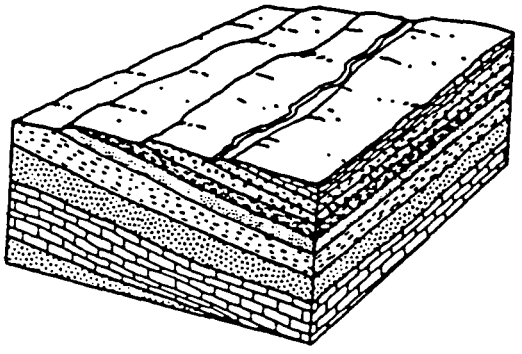
Another problem that affects ground-water development in the region concerns the presence of saline water in the deeper parts of most aquifers. The occurrence of saline water is controlled by the circulation of freshwater which, as noted previously, becomes increasingly slow down the dip of the aquifers. Thus, in some of the deeper aquifers, the interface between freshwater and saltwater is inshore, but in parts of the region, including parts of Long Island, New Jersey, and Mississippi, the interface in the most intensively developed aquifers is a significant distance offshore. Pumping near the interfaces has resulted in problems of saltwater encroachment locally.

Another significant feature of the ground-water system in this region is the presence of "geopressured" zones at depths of 1,800 to 6,100 m in Texas and Louisiana which contain water at a temperature of 80°C to more than 273°C. Water in these zones contains significant concentrations of natural gas, and the water in some zones is under pressures sufficient to support a column of water more than 4,000 m above land surface. Because the elevated temperature, natural gas, and high pressures are all potential energy sources, these zones are under intensive investigation.

ATLANTIC AND GULF COASTAL PLAIN

(10Aa) Regional Aquifer

This hydrogeologic setting is characterized by moderately low topographic relief and gently dipping, complexly interbedded unconsolidated and semi-consolidated deposits which consist primarily of sand, silt and clay. Outcrops of these deposits form a series of bands roughly parallel to the coast or to the axis of the Mississippi Embayment. The outcrop areas and overlying semi-permeable beds are the principal sources of recharge to the formations which serve as regional aquifers. Precipitation is abundant and recharge is moderately high in the outcrop areas but low regionally to deep zones. Surficial deposits typically weather to a sandy loam. Large quantities of water are obtained from the sand and gravel and sand deposits within the aquifer. Water levels are extremely variable and typically are shallower toward the shoreline. When ground water is heavily pumped near the shoreline, these aquifers are very susceptible to salt-water intrusion. Since the shallow aquifers are very vulnerable to pollution due to their permeable nature, and the deeper aquifers are recharged from the shallow ones, the entire system is somewhat susceptible to ground-water pollution. The degree of vulnerability varies according to the nature of the deposits and the amount of recharge.



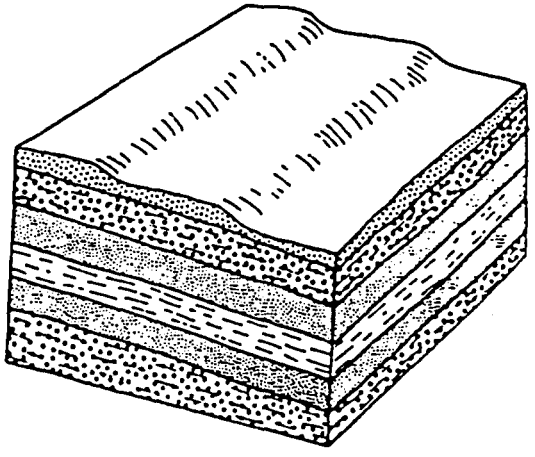
SETTING 10 Aa Confined Regional Aquifers		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	100+	5	1	5
Net Recharge	0-2	4	1	4
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact Vadose Zone	Silt and Clay	5	3	15
Hydraulic Conductivity	300-700	3	4	12
			Drastic Index	82

SETTING 10 Aa Confined Regional Aquifers		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	100+	5	1	5
Net Recharge	0-2	4	1	4
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	5	6	30
Topography	0-2%	3	10	30
Impact Vadose Zone	Silt and Clay	4	3	12
Hydraulic Conductivity	300-700	2	4	8
			Pesticide Drastic Index	113

ATLANTIC AND GULF COASTAL PLAIN

(10Ab) Unconsolidated & Semi-Consolidated Shallow Surficial Aquifer

This setting is very similar to (10Aa) Confined Regional Aquifers except that the principal aquifer is the shallow surficial deposits which serve as a local source of water and typically provide recharge for the regional aquifer. Water is obtained from the surficial sand and gravel which may be separated from the underlying regional aquifer by a confining layer. This confining layer typically "leaks" providing recharge to the deeper zones. Surficial deposits are sandy loams. Water levels tend to be quite shallow, especially near the coast. Precipitation is abundant and recharge to the ground water is high. These deposits are very vulnerable to ground-water pollution due to their permeable nature.



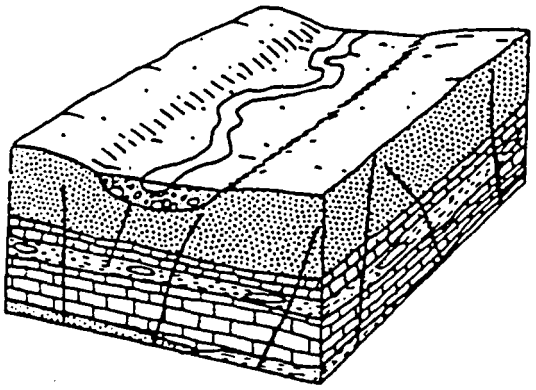
SETTING 10 Ab Unconsolidated & Semi-Consolidated Shallow Surficial Aquifer		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	4[illegible]
Net Recharge	10+	4	9	3[illegible]
Aquifer Media	Sand and Gravel	3	8	[illegible]
Soil Media	Sandy Loam	2	6	[illegible]
Topography	2-6%	1	9	[illegible]
Impact Vadose Zone	Sand and Gravel	5	8	4[illegible]
Hydraulic Conductivity	700-1000	3	6	[illegible]
			Drastic Index	18[illegible]

SETTING 10 Ab Unconsolidated & Semi-Consolidated Shallow Surficial Aquifer		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	4[illegible]
Net Recharge	10+	4	9	3[illegible]
Aquifer Media	Sand and Gravel	3	8	[illegible]
Soil Media	Sandy Loam	5	6	3[illegible]
Topography	2-6%	3	9	2[illegible]
Impact Vadose Zone	Sand and Gravel	4	8	3[illegible]
Hydraulic Conductivity	700-1000	2	6	1[illegible]
			Pesticide Drastic Index	204

ATLANTIC AND GULF COASTAL PLAIN

(108a) River Alluvium with Overbank Deposits

This hydrogeologic setting is characterized by low topography and thin to moderately thick deposits of alluvium along parts of river valleys. The alluvium is underlain by unconsolidated and semi-consolidated sedimentary rocks. Water is obtained from sand and gravel layers which are interbedded with finer-grained alluvial deposits. The floodplain is covered by varying thicknesses of fine-grained, silty deposits called overbank deposits. The overbank thickness is usually greater along major streams (as much as 40 feet) and thinner along minor streams. Precipitation in the region is abundant, but recharge is somewhat reduced because of the silty overbank deposits and subsequent silty soils which typically cover the surface. Water levels are typically moderately shallow. The alluvium may serve as a significant source of water and may be in direct hydraulic connection with the underlying sedimentary rocks. The alluvium may also serve as a source of recharge to the underlying bedrock.



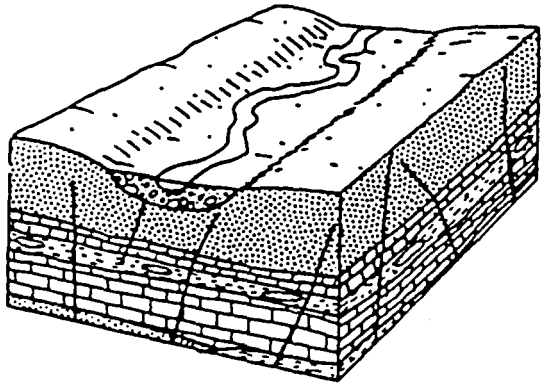
SETTING 10 Ba River Alluvium With Overbank Deposits		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact Vadose Zone	Silt/Clay	5	3	15
Hydraulic Conductivity	700-1000	3	6	18
			Drastic Index	142

SETTING 10 Ba River Alluvium With Overbank Deposits		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silty Loam	5	4	20
Topography	0-2%	3	10	30
Impact Vadose Zone	Silt/Clay	4	3	12
Hydraulic Conductivity	700-1000	2	6	12
			Pesticide Drastic Index	165

ATLANTIC AND GULF COASTAL PLAIN

(108b) River Alluvium without Overbank Deposits

This setting is identical to (108a) River Alluvium with Overbank Deposits except that no significant fine-grained floodplain deposits occupy the stream valley. This results in significantly higher recharge and sandy soils at the surface. Water levels are typically shallow in depth and throughout much of this region there is an abundance of coarse-grained material. Hydraulic connection with the surface stream is usually excellent, with alternating recharge/discharge relationships varying with stream stage. These deposits provide a good source of recharge to the underlying consolidated and semi-consolidated bedrock.



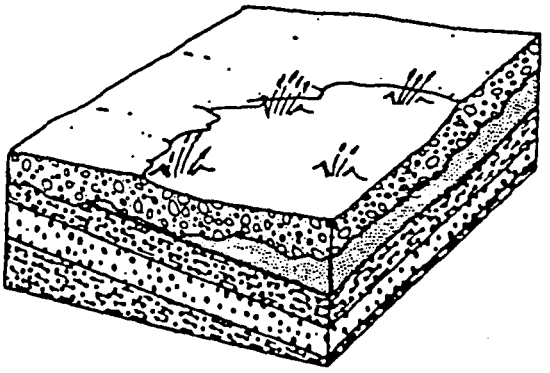
SETTING 10 Bb River Alluvium Without Overbank Deposits		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact Vadose Zone	S & G w/ sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
			Drastic Index	187

SETTING 10 Bb River Alluvium Without Overbank Deposits		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	5	9	45
Topography	0-2%	3	10	30
Impact Vadose Zone	S & G w/ sig. Silt and Clay	4	6	24
Hydraulic Conductivity	1000-2000	2	8	16
			Pesticide Drastic Index	220

ATLANTIC AND GULF COASTAL PLAIN

(10C) Swamp

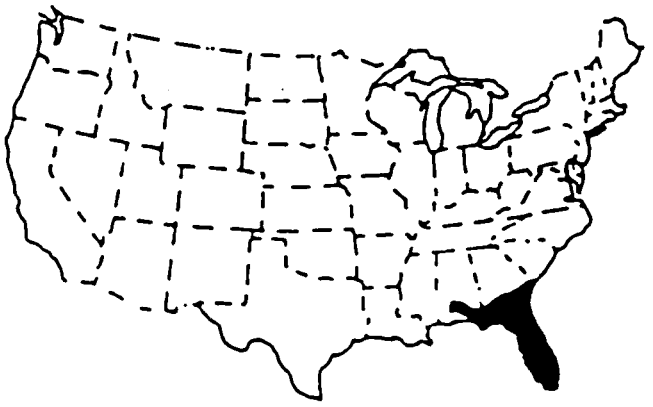
This hydrogeologic setting is characterized by low topographic relief and deposits of sand, and sand and gravel, which overlie consolidated and semi-consolidated sedimentary rocks. Precipitation is abundant and potential recharge is high. Water levels are typically at or near the surface during the majority of the year. Surficial deposits are typically sand mixed with organic material. The surficial sands are usually in hydraulic connection with the underlying aquifers and may serve as a source of recharge. However, a swamp is frequently a ground-water discharge zone and in this case would not be especially vulnerable to pollution. It should also be noted that a slight reversal in gradient would easily convert the swamp into a ground-water recharge zone. Thus, it is potentially highly vulnerable to ground-water pollution.

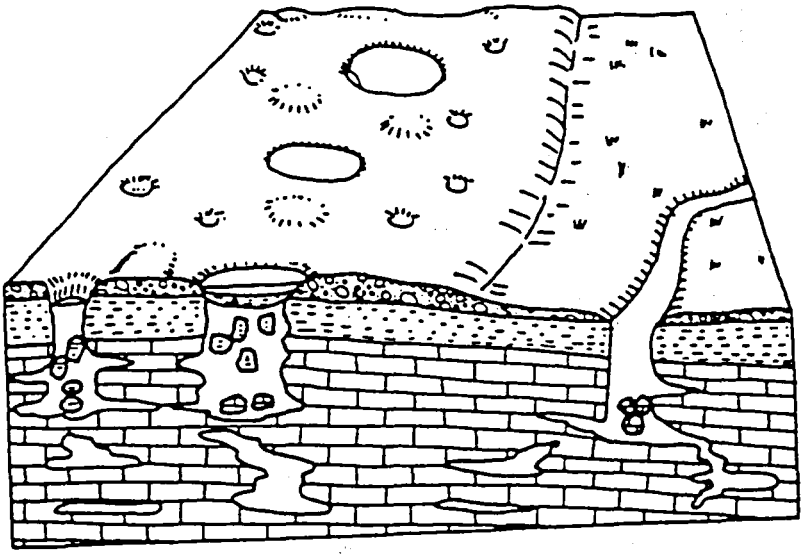


SETTING 10 C Swamp		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	1000-2000	3	8	24
			Drastic Index	202

SETTING 10 C Swamp		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	5	9	45
Topography	0-2%	3	10	30
Impact Vadose Zone	Sand and Gravel	4	8	32
Hydraulic Conductivity	1000-2000	2	8	16
			Pesticide Drastic Index	233

11. SOUTHEAST COASTAL PLAIN GROUND-WATER REGION





11A	Solution Limestone and Shallow Surficial Aquifers
11B	Coastal Deposits
11C	Swamp
11D	Beaches & Bars

11. SOUTHEAST COASTAL PLAIN

(Thick layers of sand and clay over semi-consolidated carbonate rock

The Southeast Coastal Plain is an area of about 212,000 km^2 in Alaba: Florida, Georgia, and South Carolina. It is a relatively flat, low-lying in which altitudes range from sea level at the coast to about 100 m down : center of the Florida peninsula and as much as 200 m on hills in Georgia : the interior boundary of the region. Much of the area, including the Everglades in southern Florida, is a nearly flat plain less than 10 m abo: level.

The land surface of the Southeast Coastal Plain is underlain by unconsolidated deposits of Pleistocene age consisting of sand, gravel, cla and shell beds and, in southeastern Florida, by semiconsolidated limestone From the coast up to altitudes of nearly 100 m, the surficial deposits are associated with marine terraces formed when the Coastal Plain was inundate different times by the sea. In most of the region the surficial deposits on formations, primarily of middle to late Miocene age, composed of interb clay, sand, and limestone. The most extensive Miocene deposit is the Hawt Formation. The formations of middle to late Miocene age and, where those formations are absent, the surficial deposits overlie semiconsolidated limestones and dolomites that are as much as 1,500 m thick. These carbona rocks range in age from early Miocene to Paleocene and are generally refer to collectively as Tertiary limestones.

The Tertiary limestone that underlies the Southeast Coastal Plain constitutes one of the most productive aquifers in the United States and is feature that justifies treatment of the region separately from the remainde the Atlantic and Gulf Coastal Plain. The aquifer, which is known as the Floridan aquifer, underlies all of Florida and southeast Georgia and small areas in Alabama and South Carolina. The Floridan aquifer consists of laye several meters thick composed largely of loose aggregations of shells of foraminifers and fragments of echinoids and other marine organisms interbed with much thinner layers of cemented and cherty limestone. The Floridan, o of the most productive aquifers in the world, is the principal source of ground-water supplies in the southeast Coastal Plain region.

In southern Florida, south of Lake Okeechobee, and in a belt about 30 : wide northward along the east coast of Florida to the vicinity of St. Augustine, the water in the Floridan aquifer contains more than 100 mg/l of chloride. In this area, most water supplies are obtained from surficial aquifers, the most notable of which underlies the southeastern part of Flor: and which in the Miami area consists of 30 to 100 m of cavernous limestone a

sand referred to as the Biscayne aquifer. The Biscayne is an unconfined aquifer which is recharged by local precipitation and by infiltration of water from canals that drain water from impoundments (conservation areas) developed in the Everglades. It is the principal source of water for municipal, industrial, and irrigation uses and can yield as much as $5 m^3 min^{-1}$ (1,300 gal min^{-1}) to small-diameter wells less than 25 m deep finished with open holes only 1 to 2 m in length.

The surficial aquifers in the remainder of the region are composed primarily of sand, except in the coastal zones of Florida where the sand is interbedded with shells and thin limestones. These surficial aquifers serve a sources of small ground-water supplies throughout the region and are the primary sources of ground water where the water in the Floridan aquifer contains more than about 259 mg/l of chloride.

The Floridan aquifer, as noted above, is the principal source of ground water in the region. Ground water in the upper part of the aquifer is unconfined in the principal recharge areas in Georgia and in west-central Florida. In the remainder of the region, water in the aquifer is confined by clay in the Hawthorn Formation and in other beds that overlie the aquifer. Recharge occurs where the potentiometric surface of the Floridan aquifer is lower than the water table in the overlying surficial aquifer. The principal recharge areas include a broad area along the west side of Florida extending from the central part of the peninsula to south-central Georgia and an area extending from west-central Florida through southeast Alabama into southwest Georgia. In these areas, recharge rates are estimated to exceed 120 mm yr^{-1} (5 in. yr^{-1}). Recharge occurs by infiltration of precipitation directly into the limestone, where it is exposed at the land surface, and by seepage through the permeable soils that partly mantle the limestone in the outcrop areas. Considerable recharge also occurs in the higher parts of the recharge areas through permeable openings in the confining beds, where these beds have been breached by the collapse of caverns in the limestone during the process of sinkhole formation. Thus, the land surface in most of Florida north of Lake Okeechobee is marked by thousands of closed depressions ranging in diameter from a few meters to several kilometers. The larger depressions, which represent a more advanced stage of solution of the limestone and collapse of the overlying material, are occupied by lakes generally referred to as sinkhole lakes.

Discharge from the Floridan aquifer occurs through springs and by seepage to streams. Considerable discharge also occurs by diffuse seepage across the overlying confining beds in areas where the potentiometric surface of the aquifer stands at a higher altitude than the water table. In most of these areas, which include the southern third of the Florida peninsula, the east coast area and major stream valleys of Florida, and the coastal zone and major stream valleys of Georgia and South Carolina, wells open to the aquifer will flow at the land surface. Such wells are called "flowing artesian wells." The most spectacular discharge from the Floridan aquifer is through sinkholes exposed along streams and offshore. Florida has 27 springs of the first magnitude at which the average discharge exceeds 2.83 $m^3 sec^{-1}$ (100 $ft^3 sec^{-1}$). The largest is Silver Springs, which has an average discharge

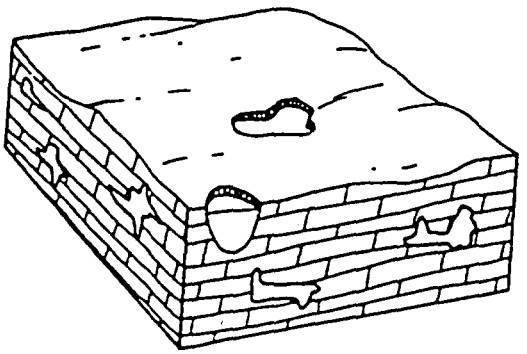
of 23.2 m^3sec^{-1} (530 million gallons per day) and reached a maximum discharge of 36.5 m^3sec^{-1} on September 28, 1960. Heath and Conover (1981) estimate that the combined discharge from Florida's springs is 357 m^3sec^{-1} (8 billion gallons per day).

The marked difference in ground-water conditions between the Southeast Coastal Plain and the Atlantic and Gulf Coastal Plain and the Atlantic and Coastal Plain regions is apparent in the response of ground-water levels withdrawals. In the Atlantic and Gulf region most large withdrawals are accompanied by a pronounced continuing decline in ground-water levels. In Southeast Coastal Plain, on the other hand, large withdrawals have significantly lowered ground-water levels in only a few areas.

SOUTHEAST COASTAL PLAIN

(11A) Solution Limestone and Shallow Surficial Aquifers

This hydrogeologic setting is characterized by low to moderate topographic relief and deposits of limestone which have been partially dissolved to form a network of solution cavities and caves. Surficial deposits typically consist of sands which may serve as localized aquifers. The underlying limestone typically serves as the principal aquifer due to the high yields. The shallow surficial aquifer may not be present in all areas. Precipitation is abundant and recharge is high. Water levels are variable but are usually moderate in the limestone and shallow in the overlying surficial sands. These sands also serve as an important source of recharge for the limestones. Due to the presence of a shallow water table and direct recharge to the limestone these surficial sands are very vulnerable to pollution. Near the coast, these aquifers are very susceptible to salt water intrusion.



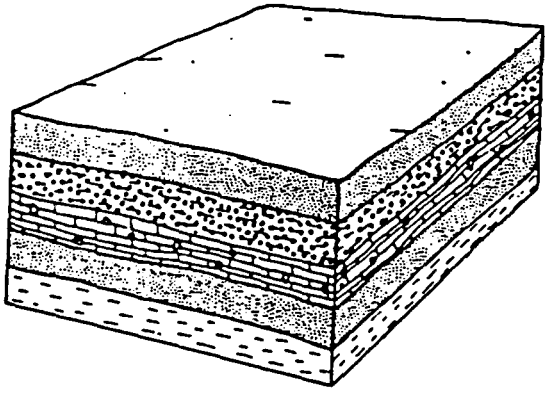
SETTING 11 A Solution Limestone		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Karst Limestone	3	10	30
Soil Media	Sand	2	9	18
Topography	2-6%	1	9	9
Impact Vadose Zone	Karst Limestone	5	10	50
Hydraulic Conductivity	2000+	3	10	30
			Drastic Index	218

SETTING 11 A Solution Limestone		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Karst Limestone	3	10	30
Soil Media	Sand	5	9	45
Topography	2-6%	3	9	27
Impact Vadose Zone	Karst Limestone	4	10	40
Hydraulic Conductivity	2000+	2	10	20
			Pesticide Drastic Index	243

SOUTHEAST COASTAL PLAIN

(11B) Coastal Deposits

This hydrogeologic setting is characterized by flat topography and unconsolidated deposits of carbonate, sand, gravel, clay and shell beds which overlie semi-consolidated carbonate rocks. The surficial deposits serve as direct sources of ground water and also serve as recharge for the underlying carbonate rocks where the gradient is downward toward the carbonates. The carbonates serve as a source of ground water but may contain saline water in some areas. Precipitation is abundant and recharge is high. Water levels may vary, but are typically close to the surface.



SETTING 11 B Coastal Deposits		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9+	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	700-1000	3	6	18
			Drastic Index	191

SETTING 11 B Coastal Deposits		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	5	9	45
Topography	0-2%	3	10	30
Impact Vadose Zone	Sand and Gravel	4	8	32
Hydraulic Conductivity	700-1000	2	6	12
			Pesticide Drastic Index	224

SOUTHEAST COASTAL PLAIN

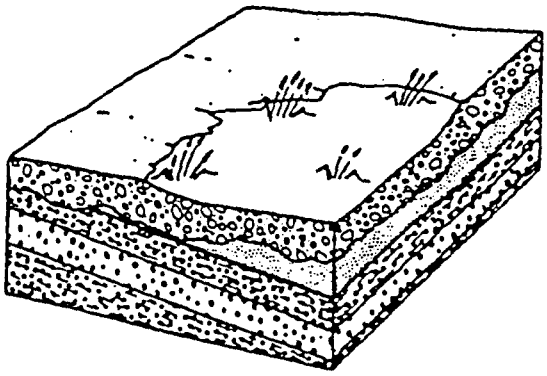
(11C) Swamp

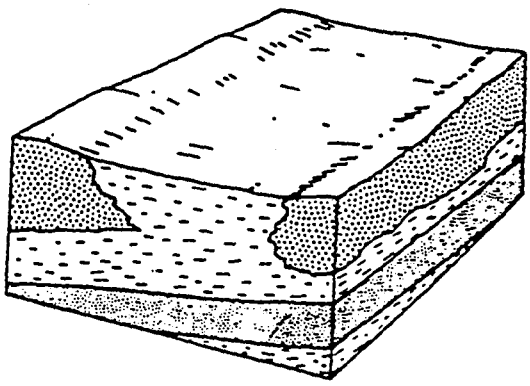
This hydrogeologic setting is characterized by flat topographic relief, very high water levels and deposits of limestone which have partially been dissolved to form a network of solution cavities and caves. Soils are typically sand and recharge may be high due to the abundant precipitation. The limestone typically serves as the major regional aquifer. These swamps also serve as discharge areas, but due to their environmental vulnerability, and possible gradient reversal, they should be regarded as areas of maximum (potential) recharge. Water levels are typically at or above the surface during the majority of the year.

SOUTHEAST COASTAL PLAIN

(11D) Beaches and Bars

This hydrogeologic setting is characterized by moderate to flat topographic relief and unconsolidated deposits of water-washed sands. These sands are well-sorted and very permeable, and may serve as localized sources of ground water. These deposits also serve as a source of recharge to the underlying unconsolidated coastal deposits. Precipitation is abundant and recharge is high. Water levels may vary, but are typically shallow. These areas are highly susceptible to pollution due to their high permeabilities.





SETTING 11 C Swamp		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	10+	4	9	36
Aquifer Media	Karst Limestone	3	10	30
Soil Media	Sand	2	9	18
Topography	0-2%	1	10	10
Impact Vadose Zone	Karst Limestone	5	10	50
Hydraulic Conductivity	2000+	3	10	30
			Drastic Index	224

SETTING 11 D Beaches and Bars		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	2	9	18
Topography	2-6%	1	9	9
Impact Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	700-1000	3	6	18
			Drastic Index	190

SETTING 11 C Swamp		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	0-5	5	10	50
Net Recharge	10+	4	9	36
Aquifer Media	Karst Limestone	3	10	30
Soil Media	Sand	5	9	45
Topography	0-2%	3	10	30
Impact Vadose Zone	Karst Limestone	4	10	40
Hydraulic Conductivity	2000+	2	10	20
			Pesticide Drastic Index	251

SETTING 11 D Beaches and Bars		PESTICIDE		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sand	5	9	45
Topography	2-6%	3	9	27
Impact Vadose Zone	Sand and Gravel	4	8	36
Hydraulic Conductivity	700-1000	2	6	12
			Pesticide Drastic Index	225

Reference 8

Southern Wood Piedmont Company

RECEIVED
JUN 18 1984
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

11-M-1.10.7
June 8, 1984

Mr. William Paige
Solid and Hazardous Waste Management Branch
N. C. Department of Human Resources
Box 2091
Raleigh, N. C. 27602

Dear Mr. Paige:

Enclosed please find the detailed procedure we plan to follow in cleaning up our former Wilmington, N. C. plant site. As you know, aerobic breakdown of the wood preservatives is accelerated as temperature increases. In order to take advantage of the summer temperatures and the remainder of our lease term we plan to implement the enclosed procedure at once.

The wood preservative wastes we are subjecting to bacterial degradation are not classified as a hazardous waste under the Resource Conservation Recovery Act or North Carolina's solid waste management regulations. Therefore, we are not asking your office to approve this practice or to issue any form of permit. What we do ask, is that you inform us at once if you believe this procedure will violate any laws or regulations. In the absence of such notice we plan to proceed, as we believe this is the best way to clean the site of residual wood preservatives.

You asked Mr. Ned Button about the stage of the tide corresponding to the November 1982 groundwater samples. We did not record the time these samples were taken so we cannot tie them into the tide stage. We did not observe a significant change of water level in the wells as tide level changed. We do not believe that the groundwater is affected by tide change in this area.

In answer to your question regarding the direction of groundwater flow, our groundwater consultant, Law Engineering and Testing Company, believes that it is flowing somewhat parallel but towards the shoreline. This would mean it is flowing from the city parcel towards the port parcel towards the mouth of the creek south of the plant site.

I did meet again with Mr. Farris of the City and explained in more detail our plans.

We have changed the scope of the procedures to be used and modified the methodology to accommodate the suggestions you made with respect to our initial suggestion submitted on February 13, 1984. If you have further suggestions with respect to monitoring of methodology we would be pleased to discuss them with you, but again we need to know about them in the immediate future.

Very truly yours,

SOUTHERN WOOD PIEDMONT COMPANY

Charles A. Burdell

Charles A. Burdell
Director, Technical Services

CAB:bsb

attachments

cc: E. F. Button - Stamford
E. L. Gibbs

0832T

The following is a list of attachments referenced in the attached proposal. Attachments 1 thru 7 were included in the package mailed to you February 13. Please refer to them.

Attachment 1	-	Map with Locations of Various Deposits
Attachment 2	-	Summary of Groundwater Data
Attachment 3	-	Copy of Law Engineering Testing Company's Findings
Attachment 4	-	Map showing Cape Fear Water Locations
Attachment 5	-	Summary Memo Regarding the Monitoring of the NPDES Discharge
Attachment 6	-	University of Florida Study
Attachment 7	-	EPA Submittal by MSU Illustrating the Breakdown of PCP in the Soil

The below listed Attachments 8 thru 10 are included in this package:

Attachment 8	-	Landfarming Areas Diagram
Attachment 9	-	Landfarming Lysimeter Locations
Attachment 10	-	Extraction and Analytical Procedure/Methods

PROPOSED CLEANUP PROGRAM FOR SOUTHERN WOOD PIEDMONT
WILMINGTON, N. C. PLANT SITE

I. Site Description

The plant is located in Wilmington, New Hanover County, N. C. at the end of Greenfield Street on the Cape Fear River (map attached). There are approximately 39 acres leased from the city and about 7 acres leased from the State Port Authority (SPA). The soil is classified as gray clay and sand to a 3.5' depth by Froehling and Robertson, Inc. There was a 24-hour water table of 19" in the treatment room area when sampled in May of 1971.

II. Site History

The site was originally developed during World War I as a plant to construct concrete barges and ships. Northstate Creosote Company constructed a wood treating plant on the site about 1932. This plant was purchased by the Taylor-Colquitt Company in 1935. In 1964, Southern Wood Preserving Company (now SWP) purchased the Taylor-Colquitt Company and has operated it since then. Through 1971, creosote coal tar was the only preservative used. In 1972, a separate treating system was installed to use the water salt preservatives: copper, chromium, and arsenic (known as CCA). In 1980, penta-petroleum preservative treatment was added using an existing creosote treating cylinder.

In 1975, a large area of cull and broken poles along the city/Port District property line was cleaned up. At this time, a permit was obtained to close a surface drainage ditch on the Port District property which contained settled creosote sludge. This buried material was reported under Superfund (see Section A).

There has never been any aeration water treatment at the Wilmington plant. Original waste water treatment was simple settling and discharge. In recent years, process waste water was given thorough settling and discharged to the Wilmington sewage treatment plant (POTW). More recently, since 1980, the settled effluent was further clarified using a Wemco flotation clarification system prior to discharge to the POTW. Oil and float separated in the settling tanks and in WEMCO have been recycled to the process or burned for fuel value in the plant waste wood boiler. No K001 sludge was ever generated by this treatment approach.

III. Current Status of Site

The plant ceased production in May of 1983. Removal of physical inventory and plant equipment started at that time. At present, all material except three rail tracks have been removed from the State Port Authority property. The ditch area covered in 1975 has grass growing on it. SPA personnel have inspected the site and stated it was acceptable for their use. About one-half of the area nearest the river was used for storage of treated poles and piling.

All the wood inventory has been removed from the city's acreage and raked reasonably clean. The CCA treating tanks and cylinder have been removed. The oil preservative tanks have been removed. The pole machine and maintenance equipment have been removed. All of the tanks and equipment used in handling the process waste water have been removed. The tracks in front of the oil preservative cylinder have been removed back to the road crossing (about 200 feet). We are in the process of having the creosote sludge removed from the large storage tanks.

IV. Description of Treating Chemical Deposits

Please see attached map showing location of various deposits (Attachment 1).

A. Deposits Reported Under Superfund

A Superfund report was filed in June of 1982. A copy of this report is attached, listing four deposits. When this report was filed, we were not clear as to what K001 sludge was. We have since learned that it is sludge resulting from the aerobic stabilization of wood preservative waste waters. As mentioned in section II, no such sludge was ever created at the Wilmington plant.

1. Superfund Area I, Covered Sludge Ditch

This area was described in section II above. Creosote sludges from early plant operations were buried when this ditch was filled.

2. Superfund Area II, Trash Dump Area

This area is a general waste landfill used by the plant for many years. It consists almost exclusively of wood waste, dirt, and metal waste. Small amounts of creosote cleanup material were deposited here from time to time. It was listed under Superfund because of the suspected presence of creosote material.

3. Superfund Area III, Dike Area

Old, hard and solid creosote residuals similar to road tar were used to seal some of the earthfilled dike near the south slip.

4. Superfund Area IV, Trash Fill Area

Part of the north slip was filled with trash a number of years ago. This mill waste consisted of mainly wood waste and metal bands. Some creosote sludge was deposited on the top of part of this area.

B. Operating Area Deposits

1. Track Area

The track area in front of the cylinder was inspected in 1982 by your office and Mr. Ray Church. Two soil samplings were made which showed residuals to a depth of 18" about 10 feet in front of the cylinder and to 6" deep about 200 feet out in front of the cylinder.

2. Treating Areas

The soil areas around both oil treating room buildings have treating chemical residuals. Soil around the working tanks is noticeably contaminated with oil to about two feet deep. The soil area around the waste water-oil recovered tank system is noticeably discolored to about a one-foot depth.

3. Large Storage Tank Containment Area

The soil in this area contains creosote residuals to about a foot in depth.

4. Treated Product Storage Areas

Relatively large areas on both Port District and city property have a small degree of creosote residuals in the soil as evidenced by some discoloration. These are areas where the treated poles were stored prior to shipment.

5. CCA Storage Tank Area

Soil around the CCA storage tanks is discolored and has some CCA chemical content.

6. Storage Tank Sludges

Varying amounts of sludge is present in the bottom of the various treating tanks.

V. Proposed General Approach to Cleanup of Chemical Residuals

A. Landfarming of Contaminated Soils

We propose to utilize the landfarming method to reduce the oil preservative residuals in non-hazardous contaminated soils. This landfarming approach has already been recognized by the North Carolina Solid and Hazardous Waste Management Branch for other wood preserving plant locations. We propose to conduct the landfarming on treated pole storage areas at the Wilmington plant where there are already low levels of preservative residuals in the soil. NO

Monitoring wells have been in place at the Wilmington site since 1981. The effect on groundwater from years of plant operation is therefore known. Preservative chemicals have been detected at low levels in some of the groundwater samples. A summary of groundwater data is attached (Attachment 2). Our groundwater consultant, Law Engineering, is convinced that this groundwater discharges to the Cape Fear River. Further, there are no groundwater uses that would be impacted. A copy of Law Engineering's findings is also attached (Attachment 3). The Cape Fear River has been tested upstream and downstream at the plant. Treating chemicals were not detected indicating no impact by the site (Attachment 4). The surface drainage at the NPDES discharge to ditch drainage to Greenfield Creek has been monitored and reported for several years. This data is on file at your department, a summary memo is attached (Attachment 5).

We realize that some of our contaminated soils contain traces of pentachlorophenol (PCP). For this reason, an acceptable residual concentration for PCP needs to be established. The University of Florida, Gainesville has established 0.475 ppm as such a concentration. We have attached their study used to develop this proposed standard (Attachment 6). We propose to use 0.475 ppm PCP as an acceptable residual level for soil requiring landfarming, and to consider landfarmed soil having less than this concentration to be acceptable (with respect to PCP). We have also attached information submitted to EPA by Mississippi State University illustrating the breakdown of PCP in the soil (Attachment 7).

We propose to landfarm the contaminated soilds from the following areas:

1. Track area.
2. Treating areas.
3. Treated product storage areas.

These areas have been contaminated with treating chemical residues from working solutions and/or treated product drippage. These deposits occurred slowly over many, many years and tended to "weather" as they were deposited. We are convinced that these contaminated soils are not classified as hazardous waste under RCRA definitions. We are, therefore, not proposing to landfarm RCRA hazardous material.

It is our understanding that standards for creosote residuals in landfarmed soil have not been established as yet. As this is somewhat a site specific question, we propose to discuss this with the Agency after the six-month testing program is completed. We have been in contact with Dr. Gary McGinnis of Mississippi State University regarding possible standards. We will be submitting information that he has developed separately.

B. Disposition of Other Contaminated Material

Following is an outline of our planned disposition of other contaminated material present on the site.

1. Superfund Area I, Filled Ditch

We are currently doing further sampling of this area. We will discuss proposed disposition with the owner, the State Port District, prior to finalizing our disposition plans.

2. Superfund Area II, Trash Dump Area

We propose to leave this area as it is since there is very little creosote material here and it is dispersed in large amounts of wood waste.

3. Superfund Area III, Dike Area

We propose to remove the large chunks of creosote contaminated soil; and landfarm in a treated pole storage area.

4. Superfund Area IV, Trashfill Area

We propose to remove the creosote sludge piled on top of the area and send to a permitted hazardous waste landfill.

Plant Operating Areas

1. Track Area

We propose to remove the visually contaminated soil and to landfarm in a treated pole storage area. After removal of the contaminated soil, we would till the underlying soil in place, soil moisture conditions permitting, to obtain the maximum breakdown of any remaining chemicals. We would not follow the full landfarm procedure, but would fertilize, till and retill one to three times.

2. Oil Treating Areas

We propose to handle as described in Section 1 above.

3. Large Storage Tank Containment Area

The visually contaminated soil will be removed and sent to a hazardous waste landfill. If dry enough, we will till the underlying soil as outlined in section 1 above.

4. Treated Product Storage Area

Those treated pole storage areas not used for landfarming of heavily contaminated soil would be tilled in place as outlined in section 1 for the underlying soil.

5. CCA Storage Tank Area

We propose to remove soil containing CCA salts, as determined by the EPA EP toxicity tests. Some soil has been removed and will be sent to a permitted hazardous waste landfill. Further tests will be made to determine if more soil needs to be removed. If we elect to encapsulate some contaminated soil, we will submit a separate proposal.

6. Storage Tank Sludges

The CCA sludge has already been removed and sent to a hazardous waste landfill.

We are in the process of removing the sludges from the bottom of the various oil tanks. These sludges are being burned in one of our pulp mill waste wood boilers (the State of Georgia has approved) to recover heat value. Any sludge that cannot be burned will be sent to a permitted hazardous waste landfill.

VI. Proposed Landfarming Procedure

1. The landfarming will be done in either the Area LF1 or Area LF2, or both, if needed, outlined on the plant layout diagram (Attachment 8). These areas are already lightly contaminated with treating chemical residues from many years use as treated pole storage.

2. The designated landfarm areas will be bermed and ditched to prevent rain runoff or runon.

3. Three to six suction vacuum lysimeters will be installed at one, two, and three foot depths to monitor soil water quality. The proposed lysimeter cluster locations are indicated on the landfarm layout diagram (Attachment 9). These lysimeter clusters will be protected by barricades to prevent damage by tilling equipment. We will install two monitoring wells immediately downgradient of the landfarm areas. We propose to utilize the existing upgradient well. A proposal showing well design and location will be submitted shortly. We are convinced that these samples will demonstrate that the wood treating chemicals are breaking down, not leaching into the groundwater.

4. Contaminated soil from the areas outlined in Section V A above; the treating cylinder track area and treating area; will be spread in a maximum two inch layer over the landfarm area. This will be at a maximum additional rate of 20% of the underlying soil when tilled to a depth of ten to twelve inches. From previous analysis these soils contain less than 5% creosote.

5. Nutrients will be added at an application rate of 200 lbs. per acre as commercial fertilizer (10/10/10 or 10/5/5).

6. The initial application of contaminated soil and fertilizer will be thoroughly tilled into the underlying soil to a depth of ten to twelve inches.

7. The soil will be tilled weekly, weather permitting, to promote biological and photochemical breakdown of treating chemical residuals.

8. Sampling and Testing Schedules

Extraction and analytical procedures are outlined in Attachment 10.

a. Lysimeters will be sampled for soil water just prior to application of contaminated soil to the landfarm areas, and every two months thereafter. Soil water will be analyzed for total phenol content using the Standard Methods Test 222 Method and for PCP and the creosote compounds using the gas chromatograph method (G/C), EPA SW8040 through 8100.

b. Soil will be sampled immediately after the initial tilling is completed. It will be resampled after one, two, four, and six months. Soil samples will be sampled at the points indicated on the landfarm diagram (Attachment 8). Samples will be obtained at 0-3", 9-12", and 21-24" depths. The soil samples from each of the two landfarm areas will be composited for equal depths for analysis.

c. All samples will be analyzed for total extractable phenol. The initial samples and the four and six-month samples will be analyzed by G/C for other organics.

9. After the six month sample analyses results are available, all results will be reviewed with the North Carolina agency.

VII. Outline of Tilling Procedure

All lightly contaminated treated product storage areas and the soil underlying areas not utilized for landfarming where heavily contaminated soil is removed will be tilled to encourage breakdown of any residual treating chemicals that might be present. Some of the areas where soil is removed may be too wet to till due to soil moisture conditions.

1. The overlying soil will be removed for landfarming; or for offsite disposal in the case of the soil around the creosote storage tanks. No soil will be removed from the treated pole storage areas.

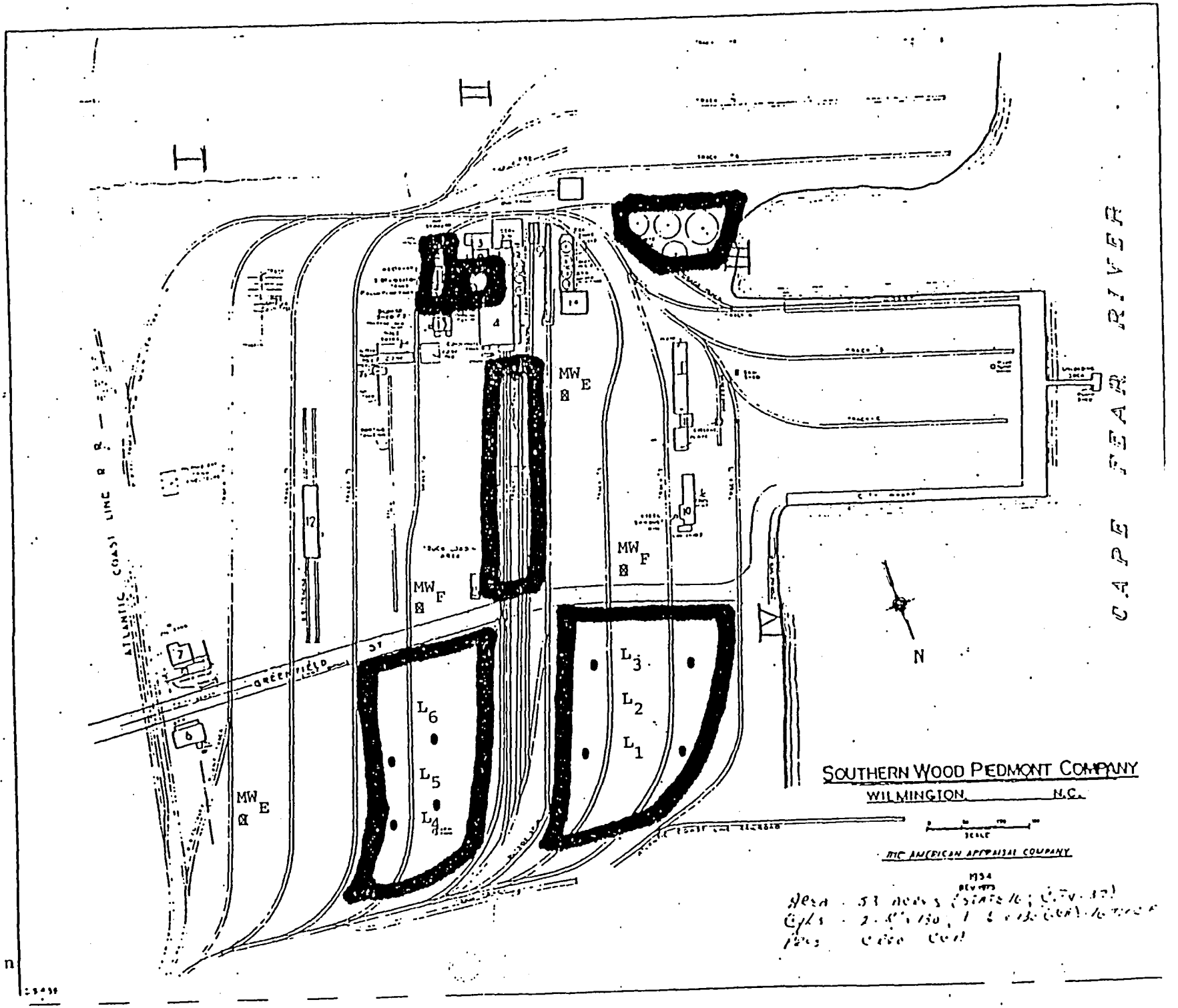
2. Immediately after soil removal, fertilizer will be added at the rate of 200 lbs. per acre and the underlying soil will be tilled, soil moisture content permitting.

3. Tilling will be repeated weekly for the first 12 to 16 weeks, weather permitting, and will be done once per month until the six months.

4. After six months of tilling, soil samples will be obtained at 0-3", 9-12", and 21-24" depths.

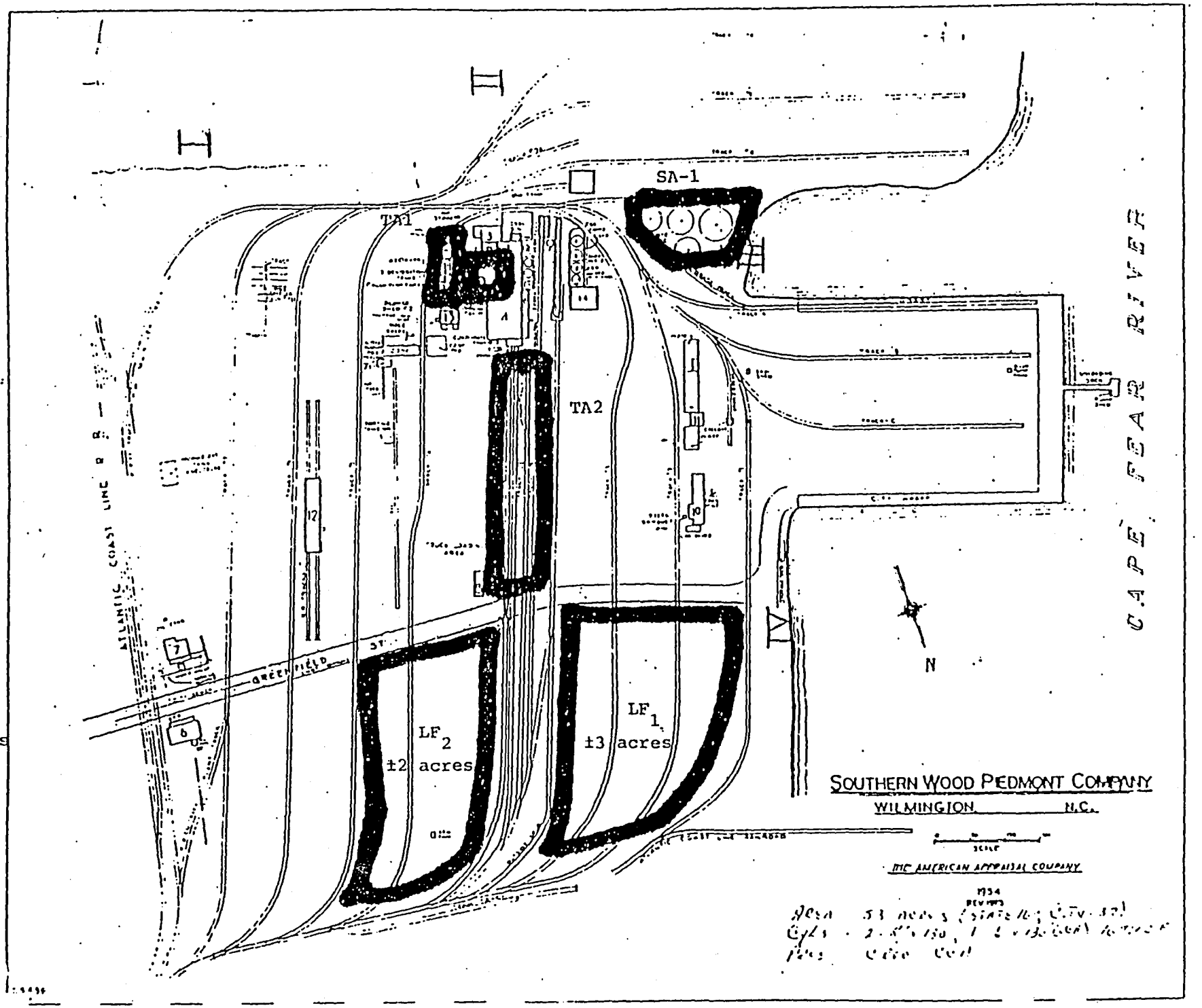
5. Soil samples will be composited by depth for each major area and analyzed for organics by G/C.

6. Analytical results will be reviewed with the agency.



ES:

6=Lysimeters
=Soil Sampling Points
1 =Monitoring Wells
=Existing
=To be added by Law Eng.
Recomm la n



tg. Tank Area
reating Areas
andfarming Areas
±3 acres

±2 acres

METHODS OF ANALYSIS

Phenol - EPA SW846, 261 or Standard Method for Water and Wastes, Method 222

O & G - Standard Method for Water and Wastes, 209A

Organic - Test Methods for Evaluating Solid Waste, SW846, 8040-8100

CCA - Standard Methods for Water and Wastes, 307B (Cu)
104A (As)
308C (Cu)

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

Reference 9

August 10, 1984

PA File

Mr. Walton Jones
EPA 3012 Regional Project Officer
Air and Hazardous Materials Division
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RE: Preliminary Assessment Reports/
Transmittal Letter

Dear Mr. Jones:

Submitted under this cover are the Preliminary Assessment Reports for the following ERRIS List Sites in North Carolina:

North State Chemicals, Inc. — NCD991278839
3301 Spring Garden Street — Guilford County
Greensboro, N. C. 27407

The location noted here is where the facility began operations sometime in 1978 as a processor and reclaimer of industrial chemical wastes. The company had problems with the property owner and moved to another location. The State forced a cleanup of the second location when the company went out of business in 1983. Both sites are "clean" and are not CERCLA hazardous waste disposal sites.

Based on the review of available information we recommend that no further action is required at this site. It is therefore requested that North State Chemicals be placed on the inactive ERRIS List.

Rohm & Haas, Inc. — NCD039047485
Cedar Creek Road — Cumberland County
Fayetteville, N. C. 28302

This listing is an ERRIS List Duplication and therefore request that it be removed from ERRIS. The correct site identification is: Rohm & Haas Co. - Corodel Plant NCD990714479, Cedar Creek Rd, Fayetteville. The correct listing is already on the ERRIS List and a PA is being completed for the site. The RCRA ID number is also NCD990714479.

Note, past disposal activities of Westinghouse may lead to other disposal locations, off-site.

Southern Wood Piedmont Company — NCD058517467
Greenfield Street — New Hanover County
Wilmington, N. C. 28401

This site was the location of a wood treating facility from 1933 to 1983. They used, spilled and disposed on-site creosote residues, pentachlorophenol residues as well as CCA mixtures. The company is trying to address some of the areas of concern under their closure with RCRA. The other areas will not be cleaned-up. The major CERCLA area reported is where creosote sludges and residues were disposed in a lagoon and later buried. The site is on the edge of the Cape Fear River and G-W is reported to be only 18" below the surface. Significant creosote contamination was visible during a site visit on 7-23-84. (Soil & Water)

Based on the review of available information, we recommend a medium priority for site inspection at this site. Therefore it is requested that Southern Wood Piedmont remain on the active ERRIS List as a hazardous waste disposal site.
Note: Site referred to EPA for FIT evaluation and SI.

Southern Wood Piedmont Company — NCD053488557
SR #2139 — Chatham County
Gulf, N. C. 27256

This site was reported by the company under a CERCLA 103(c) notification for disposal of creosote, PCP and CCA wood treating residues and sludges on site. The site was recommended for a medium priority for site inspection and referred to EPA for FIT evaluation. It was later learned that a FIT SI had been done in 1983. (Attached)

Based on the review of available information and the FIT SI a low priority for follow-up is recommended. This is based primarily on the conclusion that the FIT SI detected no off-site impact from past disposals. However, it is requested that this site remain on the active ERRIS List.

Note: The company is reportedly planning to do additional site clean-up in the future.

Please find attached the site summary sheet for the above sites.

If you have any questions or comments regarding the contents of this report, please call me.

Sincerely,

Frank E. Moore

Frank E. Moore, Geologist

Solid & Hazardous Waste Management Branch
Environmental Health Section

FEM:jj

PRELIMINARY ASSESSMENTS SUBMITTED TO EPA

Date August 13, 1984

EPA ID NUMBER	SITE NAME	DISPOSITION			
		PRIORITY-INSPECTION			NO FURTHE ACTION
		HIGH	MEDIUM	LOW	
NCD991278839	N. State Chemicals, Inc.				X
NCD039047485	Rohm & Haas, Inc.		(Duplication)		X
NCD990715625	Hoover Universal, Inc.				X
NCD980839757	Indian Grave Gap Drum Disposal		X		
NCD000831065	Photo Chem Systems, Inc.				X
NCD991277807	Woolfolk Chemical Wks.				X
NCD980557920	DuPont/Brevard		(Duplication)		X
NCD003152329	DuPont		X to	X	
NCD080894645	Chloride Automotive Batt.				X
NCD003195963	Westinghouse		X		
NCD058517467	Southern Wood Piedmont		X		
NCD053488557	Southern Wood Piedmont		X to	X	

NCD058517467 NEW HANOVER
SOUTHERN WOOD PIEDMONT CO#
PO BOX 450 GREENFIELD ST
WILMINGTON NC 28401

...HAZARDOUS WASTE SITE
...ASSESSMENT
...ION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D058517467

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER

04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CO DI
		New Hanover	065	07

09 COORDINATES LATITUDE	LONGITUDE
34 12 45.0	077 57 15.0

10 DIRECTIONS TO SITE (Starting from nearest public road)

Map attached -

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)
City of Wilmington - N.C. Ports Authority	

03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Wilmington	NC	28401	( )

07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)
Southern Wood Piedmont Company	P. O. Box 5447

09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
Spartanburg	SC	29304	(803) 576-7660

13 TYPE OF OWNERSHIP (Check one)

☒ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☒ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

ON SITE INSPECTION

☒ YES DATE 7 / 23 / 84 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)

CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)

☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION

1933 (BEGINNING YEAR) | 1983 (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Creosote, pentachlorophenol (PCP), and CCA wood preserving residues. Severa disposal areas on site, with spills, leaks and drippings in production areas (52 ac. tract)

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Surface and G-W contamination known as well as several acres of soil contamination. Part of the area is being addressed under RCRA - Most will not be. This site is adjacent to Cape Fear River. Referred to FIT Team for SI.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBE
William Paige	Engr. S& HW Mgt. Br., N. C.	919) 733-21

PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
O. W. Strickland	DHR	S&HW Mgt. Br.	(919) 733-2178	7 / 24 / 84 (MONTH DAY YEAR)

FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

01 STATE	02 SITE NUMBER
NC	D058517467

WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] A. SOLID
- [ ] B. POWDER, FINES
- [ ] C. SLUDGE
- [ ] D. OTHER _____ (Specify)
- [ ] E. SLURRY
- [X] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS Unknown
NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [X] D. PERSISTENT
- [X] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [X] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	Yes		Several on-site disposal areas
OLW	OILY WASTE	500,000	gallons	estimate of ditch 500' x 25'x'
SOL	SOLVENTS			
PSD	PESTICIDES			
CCC	OTHER ORGANIC CHEMICALS	yes		
ICC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	Yes		Chromium from CCA

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SLU	Creosote		Landfill & OD		
OLW	Creosote		Landfill		
	Pentachlorophenol	87-86-5			
CCC	PCP (penta)	87-86-5	OD LF		
MES	CCA Chromated,		OD LF		
	Copper Arsenate				

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

CRA Files
Site Visit 7-23-84

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D058517467

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION — 02 [ ] OBSERVED (DATE: 7-23-84) — [X] POTENTIAL — [X] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ---- — 04 NARRATIVE DESCRIPTION

G-W is contaminated - oil sheen visable on water. Water table reported 18" below surface - discharge to Cape Fear River and Greenfield Creek.

01 [X] B. SURFACE WATER CONTAMINATION — 02 [ ] OBSERVED (DATE: 7-23-84) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: --- — 04 NARRATIVE DESCRIPTION

Observed oily sheen on water in several areas on site.

01 [X] C. CONTAMINATION OF AIR — 02 [ ] OBSERVED (DATE: 7-23-84) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

Votatiles coming off "tars" in large storage tanks

01 [X] D. FIRE/EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE:) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

In tank storage area - large tanks were cut open to clean out the bottoms. Very high BTU & votatile.

01 [ ] E. DIRECT CONTACT — 02 [ ] OBSERVED (DATE:) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

N/A

01 [X] F. CONTAMINATION OF SOIL — 02 [ ] OBSERVED (DATE: 7-23-84) — [ ] POTENTIAL — [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: 50 ac. (Acres) — 04 NARRATIVE DESCRIPTION

Contamination is greater in tank storage and production areas - less in finished product storage areas - plus disposal sites. (see maps)

01 [ ] G. DRINKING WATER CONTAMINATION — 02 [ ] OBSERVED (DATE:) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

None reported

01 [ ] H. WORKER EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE:) — [ ] POTENTIAL — [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

None reported

01 [ ] I. POPULATION EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE:) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

N/A

EPA

TENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D058517467

II. ARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☒ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: 7-23-84) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Some stressed vegatation in disposal areas.

01 ☒ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) XX POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION (Include name(s) of species)

Unknown

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) XX POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Unknown

01 XX M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE: 7-23-84) XX POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Disposal in land filled areas and a ditch area as well as in production areas

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Unknown

XX O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL XX ALLEGED

NARRATIVE DESCRIPTION

Unknown - materials were discharged to sewer WWTP

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Unknown

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

Although RCRA is trying to address this site many areas of concern will remai untouched.

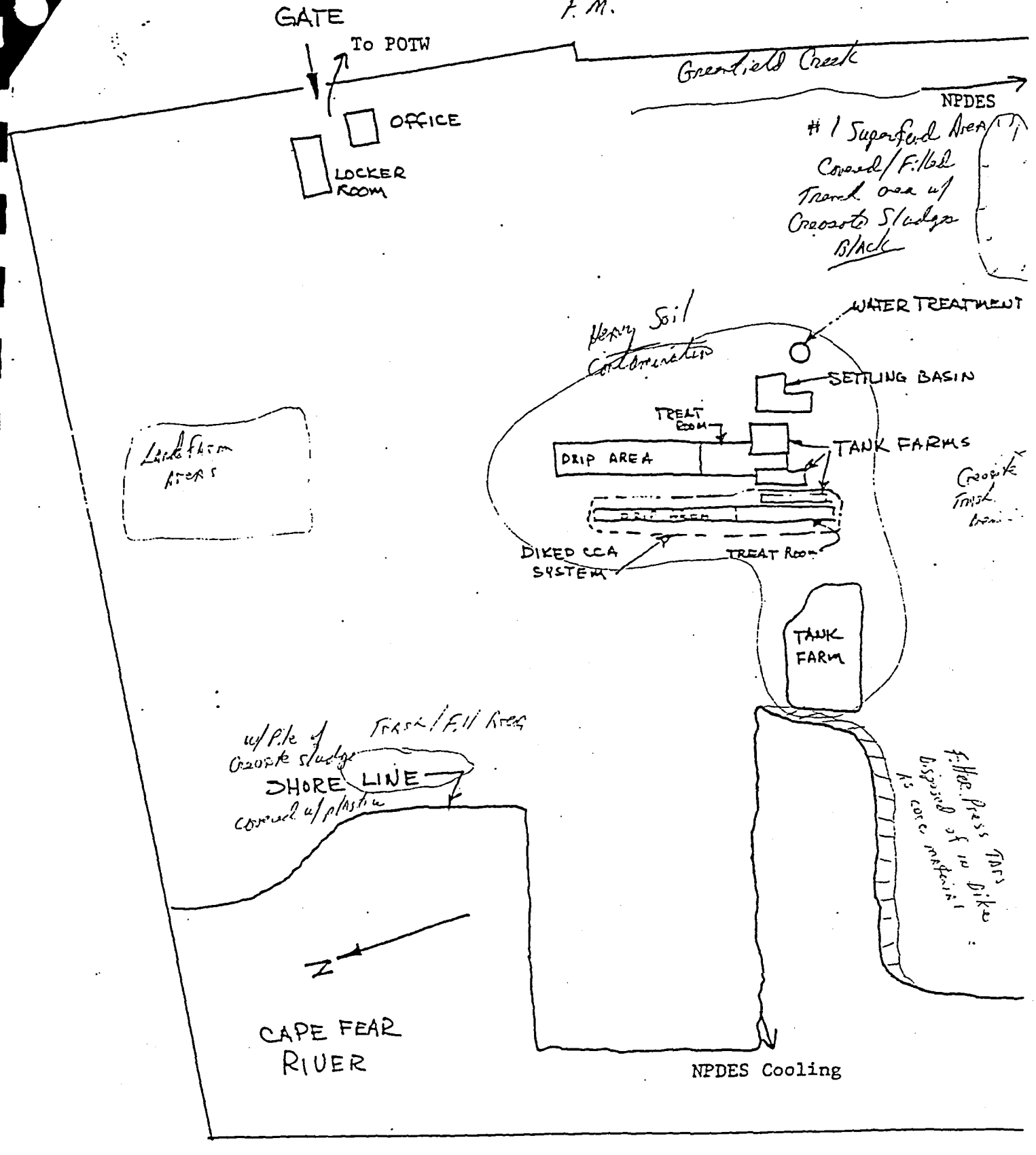
V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Site visit 7-23-84
RCRA Files

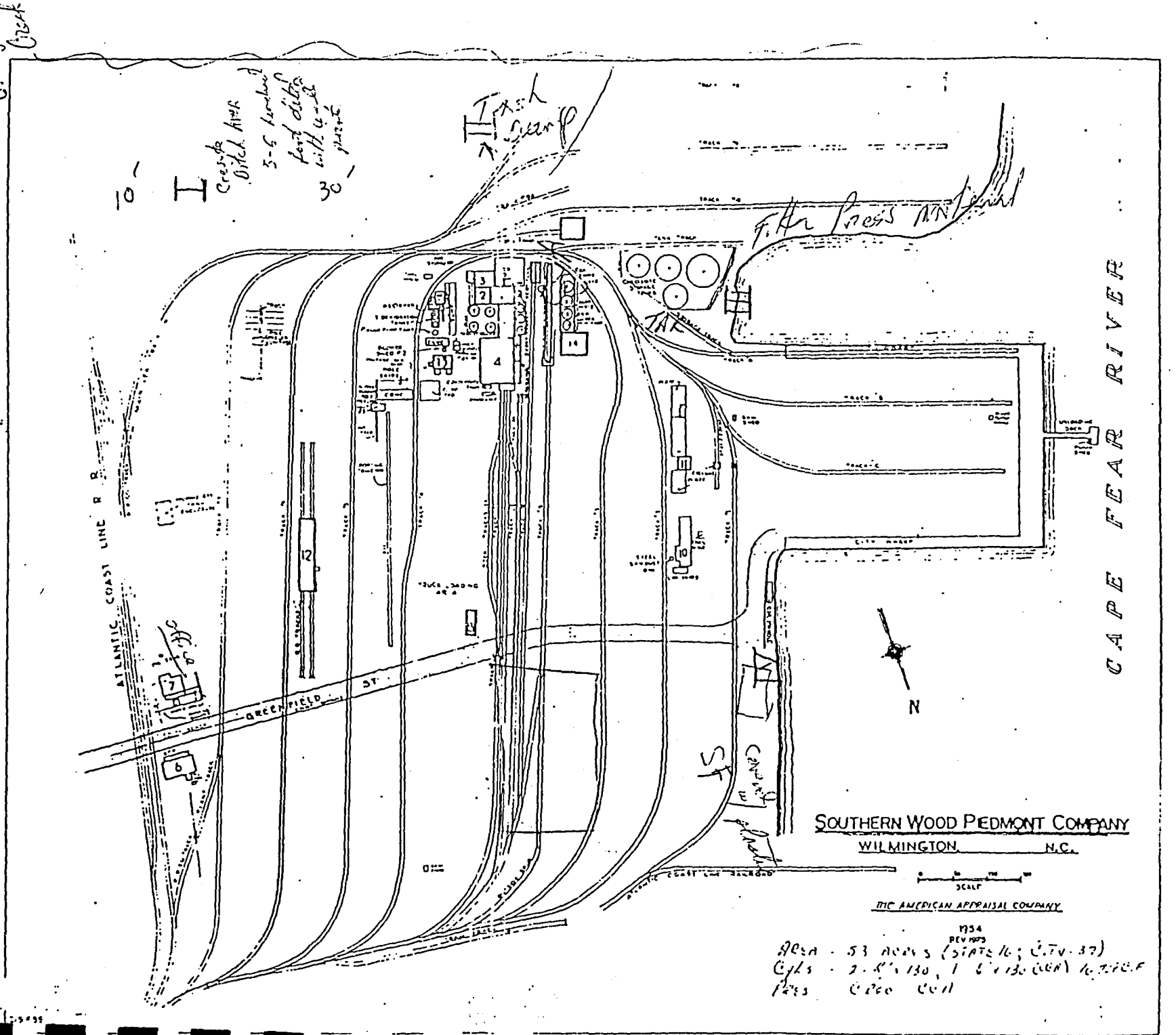
NG (see page 4)

WILMINGTON

Sketch & Notes
Site Visit 7-23-84
F.M.



ATTACHMENT 1



Reference 10

FIT R-586-4-6-17

SITE SCREENING INVESTIGATION
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

Prepared Under
TDD NO. F4-8411-0#
CONTRACT NO. 68-01-6699

Revision 0

FOR THE

AIR AND WASTE MANAGEMENT DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

APRIL 18, 1986

NUS CORPORATION
SUPERFUND DIVISION

CERCLA

Prepared By	Reviewed By	Approved By
B. Hansen Benoy	Philip Blackwell	Murray Warner, P.E.
Chemist	Assistant Regional Project Manager	Regional Project Manager

R-586-4-6-17

SITE SCREENING INVESTIGATION
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

Prepared Under
TDD NO. F4-8411-0#
CONTRACT NO. 68-01-6699

Revision 0

FOR THE

AIR AND WASTE MANAGEMENT DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

APRIL 18, 1986

NUS CORPORATION
SUPERFUND DIVISION

Prepared By	Reviewed By	Approved By
B. Hansen Benoy Chemist	Philip Blackwell Assistant Regional Project Manager	Murray Warner, P.E. Regional Project Manager

1.0 INTRODUCTION

A site screening sampling investigation was conducted at the Southern Wood Piedmont Site, Wilmington, North Carolina on January 7, 1985. The investigation was conducted by Barbara Hansen Benoy, Bob Donaghue, Bob Rose, and Maurice Rowan, Jr., NUS Corporation, Region IV, Field Investigation Team (FIT) at the request of the U. S. Environmental Protection Agency, Air and Waste Management Division in accordance with Technical Directive Document (TDD) No. F4-8411-03. The investigation was conducted under the authority of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA).

The purpose of this investigation was to identify contaminants which may be present at the site, if any, and to determine whether these materials may be migrating offsite.

2.0 SITE CHARACTERIZATION

2.1 Site Description

The Southern Wood Piedmont site is located on Greenfield Street in Wilmington, North Carolina (New Hanover County). The site occupies approximately 52 acres adjacent to the Cape Fear River. Shown in Figure 1, the Southern Wood Piedmont site is specifically located at coordinates 34° 13' N Latitude and 77° 57' W Longitude, and is shown on the Wilmington Quadrangle, United States Geologic Survey Topographic Map, dated 1979.

2.2 Site History

During World War I the site was developed to construct concrete barges and ships. A wood treating facility was constructed at the site about 1932. The Taylor-Colquitt Company purchased this plant in 1935, and Southern Wood Piedmont purchased the Taylor-Colquitt Company in 1964 and operated the plant until it closed in 1983. A 35 acre parcel of the site is owned by the City of Wilmington and the remaining acreage is owned by the State of North Carolina Ports Authority (1). Creosote coal tar was the only preservative used in the wood preserving process

The limestone aquifer is capable of yielding 10 to 1000 gpm of good quality water. Zones of high transmissivity occur in areas where permeability has been enhanced by fossil replacement.

Ground water beneath the site appears to flow almost parallel to, but slightly towards the Cape Fear River (south, southwest). Law Engineering has determined that the groundwater originating at the site discharges into the Cape Fear River (10).

3.0 OBJECTIVE

The purpose of this site screening was to collect soil and water samples from the Southern Wood Piedmont site and to obtain the analytical data needed to determine the identity of contaminants if any, which do not normally occur in the area.

4.0 SCOPE

It was withing the scope of this investigation to collect ground and surface water samples and soil samples from the site area. The sampling locations were chosen to target the most likely contaminated areas. Subsurface soil samples were not collected, nor did this study include a geophysical evaluation of the site.

5.0 FIELD INVESTIGATION

5.1 Description of Sample Collection Stations

A total of 13 samples, two surface water samples, five groundwater samples, and six soil/sediment samples, were collected during this investigation. A background sediment and surface water sample were collected from areas offsite. One groundwater sample was collected from an artesian well which is used for public supply. Four groundwater samples were collected from existing monitoring wells installed at the site. Monitoring well No. 3 was inoperable and could not be sampled. One composite soil sample was collected from each of the landfarming areas. One composite soil sample was collected from the jetty area. A sediment and surface water sample were collected from the Cape Fear River immediately

adjacent to the site. Figure 2 shows the sampling locations and Table 1 lists all the sampling codes and descriptions. Figure 1 shows the sampling location for the background soil and water samples.

5.2 Field Measurements

Data collected in the field, i.e., pH and temperature of water samples, are shown in Table 7.

5.3 Sample Duplicates

CERCLA regulations dictate that duplicate samples be offered to the current owners of the site. Duplicate samples were collected and reliquished to Southern Wood Piedmont's on-site representative.

5.4 Analytical Laboratories

Analyses of samples collected during this investigation were conducted by laboratories under contract with the U. S. Environmental Protection Agency (EPA) in their Contract Laboratory Program (CLP). Organic water and soil analyses were conducted by UBTL, Salt Lake City, Utah. Inorganic water and soil analyses were conducted by Wilson Laboratories, Salina, Kansas. The results are given in Appendix A.

5.5 Analytical Data Quality

The data used in this report have not been subjected to a Quality Control (QC) review. Use of the data should be restricted to site screening purposes only.

6.0 DISCUSSION OF ANALYTICAL RESULTS

6.1 Groundwater Samples

Results of laboratory analyses of groundwater sample GW-1, collected from monitoring well No. 1 located in the southeast portion of the site, indicate the

presence of ten inorganic constituents. Two of these constituents, lead (14 ug/l) and zinc (40 ug/l), are priority pollutants. These results are shown in Table 2. Organic analyses indicate the presence of nine identified and nine unidentified organic compounds. Benzene (0.3 ug/l, estimated quantity) and ethyl benzene (3 ug/l, estimated quantity) were the only organic constituents detected in this sample which are priority pollutants. These results are shown in Table 3. Pesticides and PCB's were not detected in this sample.

Results of analyses of ground water samples GW-2, collected from monitoring well No. 2 located near the center of the site indicate the presence of nine inorganic constituents. Four of these constituents, arsenic (22 ug/l), chromium (20 ug/l), lead (12 ug/l), and zinc (60 ug/l), are priority pollutants. Table 2 shows these results. Laboratory analyses indicate the presence of fifteen identified and three unidentified organic compounds. Seven of the identified compounds are priority pollutants. These compounds are benzene (0.3 ug/l, estimated quantity), toluene (5 ug/l, estimated quantity), ethyl benzene (5.1 ug/l), naphthalene (290 ug/l), acenaphthene (40 ug/l), fluorene (15 ug/l), and phenanthrene (7.8 ug/l). These results are shown in Table 3. No pesticides and PCB's were detected in this sample.

Results of inorganic analyses of groundwater sample GW-4, collected from monitoring well No. 4 located in the northwest portion of the site, indicate the presence of eight inorganic constituents. Three of these constituents, arsenic (44 ug/l), lead (16 ug/l), and zinc (40 ug/l), are priority pollutants. These results are shown in Table 2.

Laboratory analyses indicate the presence of eleven identified and one unidentified organic compounds. Eight of the identified organic constituents are priority pollutants. These pollutants are toluene (16 ug/l), acenaphthene (3.2 ug/l), fluorene (0.7 ug/l, estimated quantity), phenanthrene (0.5 ug/l), acenaphthylene (0.9 ug/l, estimated quantity), anthracene (2 ug/l, estimated quantity), fluoranthene (7.8 ug/l), and pyrene (10 ug/l, estimated quantity). Table 3 shows these results. Pesticides and PCB's were not detected in this sample.

Results of laboratory analyses of sample GW-5, collected from monitoring well No. 5 located in the northeast portion of the site, indicate the presence of five inorganic constituents, one of which, chromium (20 ug/l), is a priority pollutant. These results are shown in Table 2. Analyses indicate the presence of two identified and two unidentified organic compounds. None of the organic compounds detected in this sample are priority pollutants. Table 3 shows these results. No pesticides or PCB's were detected in this sample.

Results of analyses of groundwater sample AW-01, collected from the artesian well located approximately one-half mile southeast of the site, indicate the presence of one metal, which is not listed as a priority pollutant. These results are shown in Table 2.

Analyses indicate the presence of thirteen identified and two unidentified organic compounds. Ten of the organic constituents are priority pollutants. These organic pollutants are methylene chloride (37 ug/l), 1,1-dichloroethene (1,1-dichloroethylene) (6.6 ug/l), chloroform (63 ug/l), 1,2-dichloroethane (55 ug/l), 1,1,1-trichloroethane (14 ug/l), carbon tetrachloride (38 ug/l), trichloroethene (trichloroethylene) (15 ug/l), bromoform (14 ug/l), tetrachloroethene (tetrachloroethylene) (81 ug/l), and toluene (26 ug/l). These results are shown in Table 3. No pesticides or PCB's were detected in this sample.

6.2 Surface Water Samples

Laboratory analyses of background surface water sample BK-W 1, collected from the overflow stream from Greenfield Lake located south of the site, indicate the presence of five inorganic constituents. Cyanide (40 ug/l) is the only inorganic priority pollutant which was detected in this sample. These results are shown in Table 2. Laboratory analyses also indicate that five unidentified organic compounds are present in the sample. No pesticides or PCB's were detected in the sample.

Results of laboratory analyses of surface water sample RB-W, collected from the Cape Fear River from the end of the jetty, indicate the presence of five inorganic constituents; none of which are priority pollutants. Organic analyses indicate the

presence of three unidentified organic compounds. No pesticides or PCB's were detected by analyses of the sample.

6.3 Soil/Sediment Samples

Results of laboratory analyses of background sediment sample BK-S1, collected from the bed of the overflow stream out of Greenfield Lake south of the site, indicate the presence of four inorganic constituents. Two of the constituents, lead (6000 ug/kg) and cyanide (430 ug/kg), are priority pollutants. The results of the inorganic analyses are shown in Table 4. Analyses indicate the presence of eight identified organic compounds, eleven unidentified organic compounds and one unidentified brominated compound. Four of the identified compounds are priority pollutants. These compounds are isophorone (80 ug/kg, estimated quantity), 2-chloronaphthalene (24 ug/kg), flouranthene (300 ug/kg, estimated quantity), and pyrene (500 ug/kg, estimated quantity). These results are shown in Table 5. Pesticide and PCB analyses detected the priority pollutants 4,4'-DDE (P,P'-DDE) (7.4 ug/kg) and 4,4'-DDD (P,P'-DDD) (5.9 ug/kg). These results are shown in Table 6.

Results of laboratory analyses of sediment sample RB-S, collected from the bed of the Cape Fear River at the end of the jetty on site, indicate the presence of five inorganic constituents. Two of these constituents, lead (15,000 ug/kg) and cyanide (225 ug/kg), are priority pollutants. These results are shown in Table 4. Analytical analyses indicate the presence of fourteen identified organic compounds, one unidentified brominated compound, and three unidentified hydrocarbons. These results are shown in Table 5. Analyses did not detect pesticides or PCB's in this sample.

Laboratory analyses of composite soil sample JA-C1, collected from the jetty area, indicate the presence of eight inorganic constituents. Four of these constituents, arsenic (10,000 ug/kg), copper (40,000 ug/kg), lead (12000 ug/kg), and cyanide (880 ug/kg) are priority pollutants. The results of the inorganic analyses are shown in Table 4. Twelve organic constituents were detected by laboratory analyses; nine of these compounds are priority pollutants, two of which are different isomers of the same compound. The organic pollutants are 2-chloronaphthalene (400 ug/kg,

estimated quantity), phenanthrene (4,400 ug/kg), anthracene (2000 ug/kg), estimated quantity), fluoranthene (15,000 ug/kg), pyrene (12,000 ug/kg), benzo(A)anthracene (2,700 ug/kg), benzo(B and/or K)fluoranthene (5,600 ug/kg), and benzo-A-pyrene (4,600 ug/kg). These results are shown in Table 5. Pesticides or PCB's were not detected in this sample.

Analyses of composite soil sample LA-C2, collected from landfarm area A, indicate the presence of twelve inorganic constituents. Seven of these constituents are priority pollutants. These constituents are arsenic (610,000 ug/kg), copper (620,000 ug/kg), chromium (390,000 ug/kg), lead (150,000 ug/kg), zinc (75,000 ug/kg), mercury (480 ug/kg), and cyanide (410 ug/kg). The results of the inorganic analysis are shown in Table 4. Results of laboratory analyses indicate the presence of seventeen identified organic compounds and 2 unidentified polynuclear aromatics. Twelve of the identified compounds are priority pollutants. These organic pollutants are naphthalene (1200 ug/kg), 2-chloronaphthalene (500 ug/kg, estiamted quantity), acenaphthylene (1500 ug/kg), phenanthrene (5400 ug/kg), anthracene (5200 ug/kg), fluoranthene (25000 ug/kg), pyrene (22,000 ug/kg), benzo-A-anthracene (11,000 ug/kg), benzo (B and/or K) fluoranthene (14,000 and 12,000 ug/kg listed for the different isomers), benzo-A-pyrene (11,000 ug/kg), and pentachlorophenol (4000 ug/kg, estimated quantity). These results are shown in Table 5. Pesticides or PCB's were not detected in this sample.

Results of laboratory analyses of composite soil sample LB-C3, collected from landfarm area B, indicate the presence of nine inorganic constituents. Five of these inorganic constituents, arsenic (10,000 ug/kg), copper (30,000 ug/kg), lead (33,000 ug/kg), zinc (20,000 ug/kg), and cyanide (110 ug/kg), are priority pollutants. Table 4 shows these results. Fourteen organic constituents were also detected in this sample. Eleven of the organic compounds are priority pollutants. These compounds are 2-chloronaphthalene (400 ug/kg, estimated quantity), acenaphthylene (1000 ug/kg, estimated quantity), phenanthrene (1400 ug/kg), anthracene (2000 ug/kg, estimated value), fluoranthene (10,000 ug/kg), pyrene (10,000 ug/kg, estimated quantity), benzo(A)anthracene (3,900 ug/kg), chrysene (7100 ug/kg), benzo (B and/or K) fluoranthene (7,300 and 6,600 ug/kg for the different isomers), and benzo-a-pyrene (5,800 ug/kg). These results are shown in Table 5. Pesticides or PCB's were not detected in this sample.

Results of laboratory analyses of composite soil sample LC-C4, collected from landfarm area C, indicate the presence of ten inorganic constituents. Six of the ten inorganic constituents are priority pollutants. These constituents are arsenic (20,000 ug/kg), copper (60,000 ug/kg), chromium (10,000 ug/kg), lead (61,000 ug/kg), zinc (87,000 ug/kg) and mercury (450 ug/kg). These results are shown in Table 4. Analytical analyses detected 29 identified organic compounds, 2 unidentified methylphenanthrenes, 2 unidentified benzofluorenes, and three unidentified methylpyrenes. Sixteen of the identified compounds are priority pollutants. These compounds are acenaphthylene (6,300 ug/kg), acenaphthene (170,000 ug/kg), fluorene (170,000 ug/kg), phenanthrene (390,000 ug/kg), anthracene (170,000 ug/kg), di-N-butylphthalate (6500 ug/kg), fluoranthene (29,000 ug/kg), pyrene (220,000 ug/kg), benzo(A)anthracene (130,000 ug/kg), chrysene (120,000 ug/kg), benzo (B and/or K)fluoranthene (48,000 and 4,500 ug/kg for the different isomers), benzo-A-pyrene (37,000 ug/kg), indeno(1,2,3-CD)pyrene (10,000 ug/kg, estimated quantity), benzo(GHI)perylene (9000 ug/kg) and pentachlorophenol (150,000 ug/kg). These results are shown in Table 5. Analyses did not detected pesticides or PCB's.

7.0 SUMMARY OF ANALYTICAL RESULTS

Constituents which are related to the presence of creosote (11) were detected in soil samples collected both on and off the Southern Wood Piedmont site. Fluoranthene and pyrene, both constituents of creosote, were detected in all of the soil samples collected during this investigation. Anthracene and phenathrene, also creosote components, were found in all of the soil samples collected from the Southern Wood Piedmont site. Chrysene was present in landfarm areas B and C, and in the sediment sample collected from the Cape Fear River. Concentrations of the creosote components fluorene, acenaphthene, and 2-methylnaphthalene were detected in landfarm area C. Naphthalene was found only in landfarm area A.

Monitoring well No. 2, located in the center of the site, contained concentrations of naphthalene, acenaphthene, fluorene, and phenathrene; all these compounds are components of creosote. Monitoring well No. 4, located in the northwest portion of the site, contained concentrations of acenaphthene, fluorene, anthracene, fluoranthene, phenanthrene, and pyrene.

Pentachlorophenol (PCP), used as a wood preserving agent, was detected in landfarm areas A and C. No pentachlorophenol was detected in the water samples.

Concentrations of chromium, copper, and arsenic, a result of the chromated copper arsenate (CCA) wood preserving process, was detected in both soil and water samples. Chromium was detected in landfarm areas A and C and in groundwater samples collected from monitoring wells No. 2 and No. 5. Concentrations of copper and arsenic were detected in the composite soil samples collected from the jetty and the three landfill areas. Groundwater samples collected from monitoring wells No. 2 and No. 4 also contained concentrations of arsenic.

Concentrations of constituents detected in composite soil samples collected from landfarm area C are generally higher than concentrations found at other locations in the site. Landfarm area C was a region of the site where wood treatment was performed. Spillage and leakage of preserving agents during wood treatment probably resulted in the higher concentrations observed.

The artesian well located southeast of the site contained a suite of organic compounds which were not found in samples collected from the site. These constituents include 1,1-dichlorethane, 1,1,1-trichloroethane, chloroform, carbon tetrachloride, and trichloroethane. The direction of ground water flow and the compounds identified make if unlikely that the contaminants in this well originated from the Southern Wood Piedmont. The well supplies water to a fountain which is open to public use.

The background sediment sample, collected from the bed of the stream flowing form Greenfield Lake, contained concentration of the pesticides 4,4'-DDE (P,P'-DDE) and 4,4'-DDD (P,P'-DDD). These were the only pesticides detected during this investigation. Analyses also indicate the presence of pyrene and fluorene in this sample.

The progress of the landfarming technique for reducing concentrations of the wood preserving agents should be monitored. In this manner the effectiveness of the procedure can be determined and alternatives can be implemented if required. Care should be taken to prevent soil runoff into the Cape Fear River during tillage

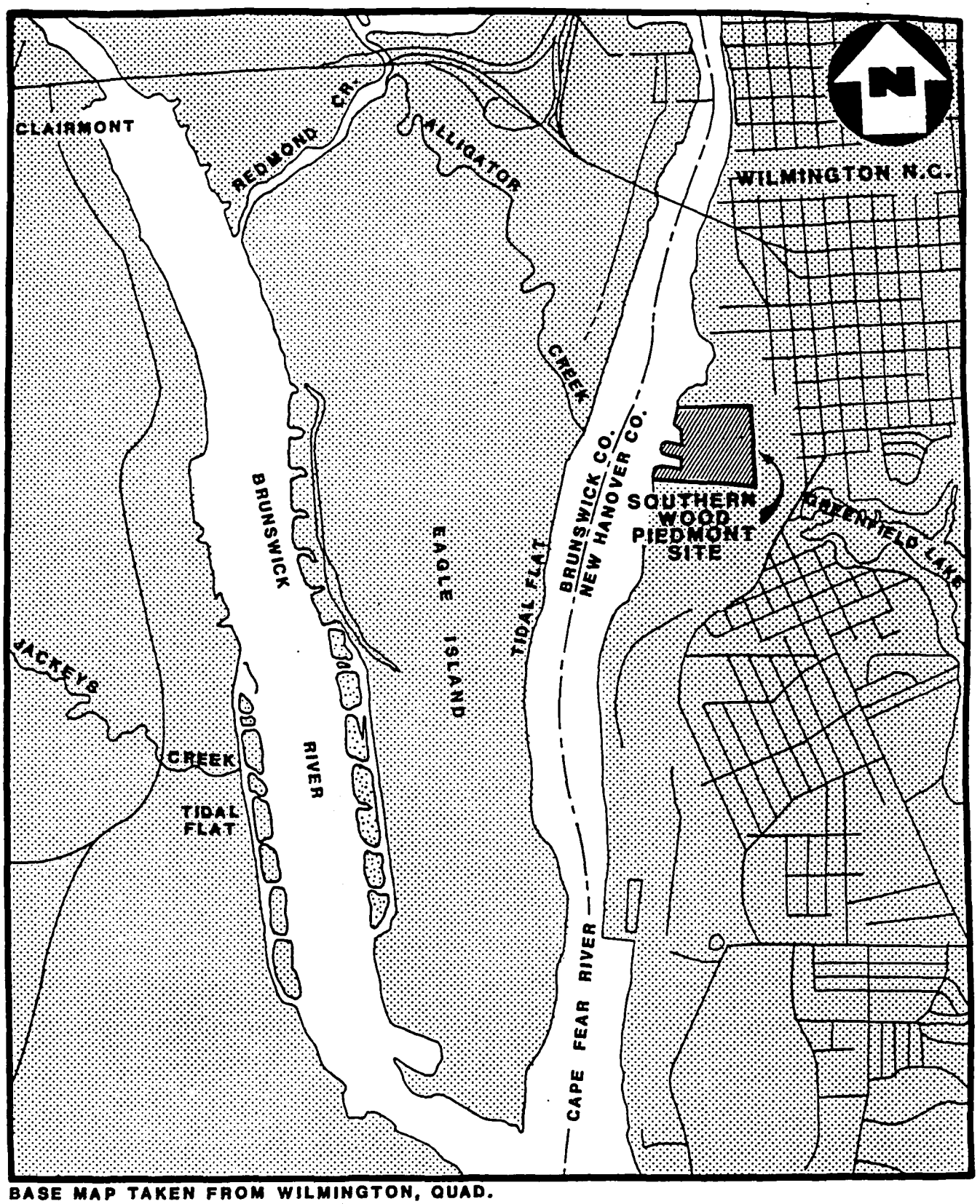
of the landfarm areas Berms or other erosion barriers are possible solutions for preventing contaminated soil from migrating into the Cape Fear River. Landfarming should allow the degradation of the contaminants and not promote contaminant migration.

8.0 METHODOLOGY

All sample collection, sample preservation, and chain-of-custody procedures used during this investigation were in accordance with the standard operating procedures as specified in Sections 3, 4, and 6 of the Water Surveillance Branch Standard Operating Procedures and Quality Assurance Manual (Draft); United States Environmental Protection Agency, Region IV, Environmental Services Division, August 1980 and all revisions to the SOP addressed in the following correspondences:

Blackwell, P. (October 21, 1983) Changes in Sampling Procedures.
Lair, D. (September 10, 1984) Solvents Used to Clean Sampling Equipment.
Wilson, C. (December 14, 1983) Region IV Sampling SOP Revisions. (ESD, 1980).

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 Operations and Quality Assurance Manual; United States Environmental Protection Agency, Region IV, Environmental Services Division; April 1982, or as specified by the existing United States Environmental Protection Agency Standard procedures and protocols for the contract analytical laboratory program (ESD, 1982).

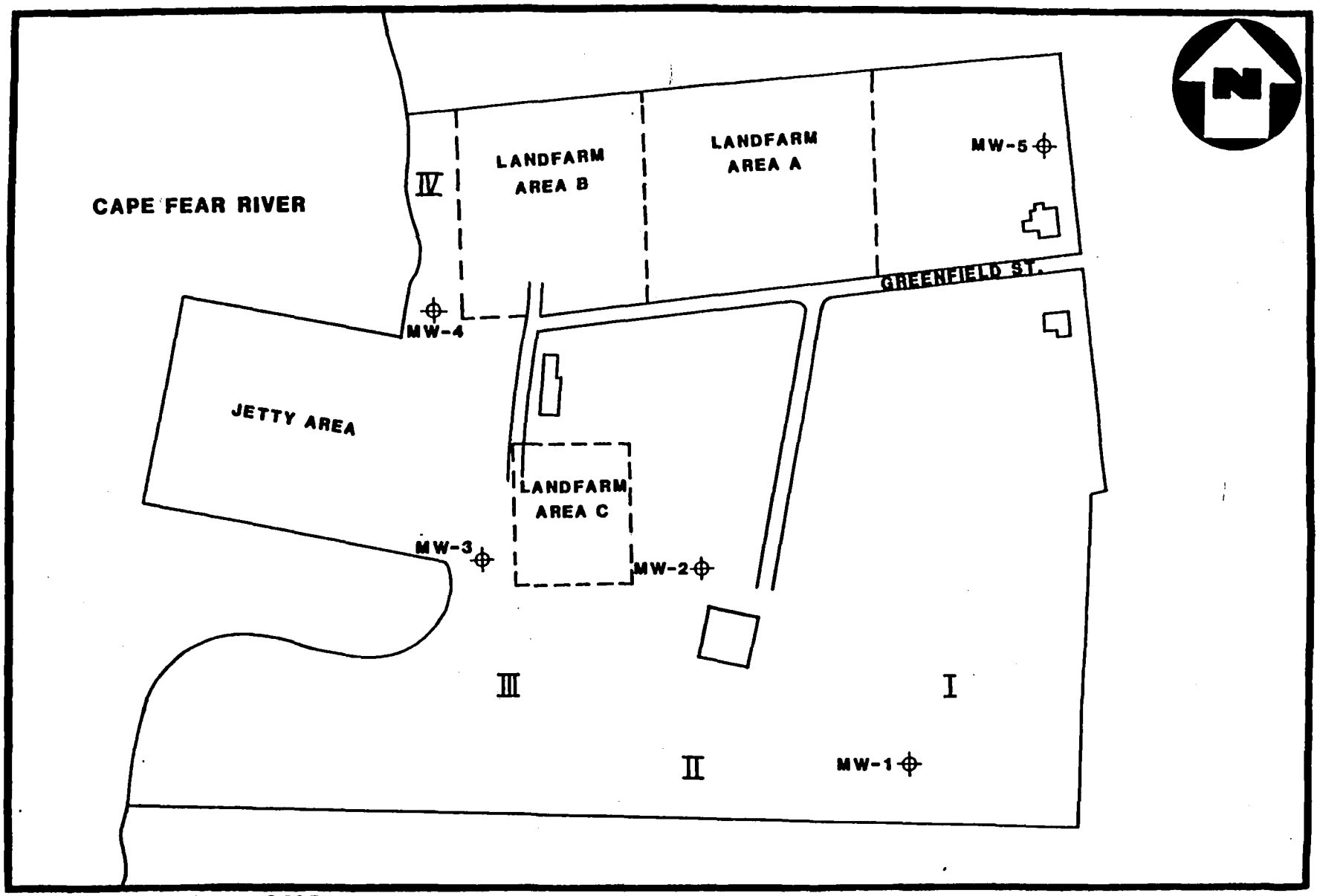


BASE MAP TAKEN FROM WILMINGTON, QUAD.

SITE LOCATION MAP
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA

FIGURE 1

NUS CORPORATION
A Halliburton Company



SAMPLE LOCATIONS
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA

LEGEND

⌖ MONITORING WELL

I II III IV ROMAN NUMERALS INDICATE CONTAMINANT DISPOSAL AREAS (SEE TEXT)

FIGURE 2

NUS CORPORATION
A Halliburton Company

TABLE 1
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
SAMPLE CODES AND DESCRIPTIONS

SWP*-BK-W1	Surface Water sample collected from overflow stream from Greenfield Lake south of the site.
SWP-BK-51	Sediment sample collected from above location.
SWP-GW-1	Groundwater sample collected from onsite monitoring well #1.
SWP-GW-2	Groundwater sample collected from onsite monitoring well #2.
SWP-GW-4	Groundwater sample collected from onsite monitoring well #4.
SWP-GW-5	Groundwater sample collected from onsite monitoring well #5.
SWP-RB-W	Surface water sample collected at end of jetty from Cape Fear River.
SWP-RB-S	Sediment sample collected from above location.
SWP-JA-C1	Composite soil sample collected from jetty area.
SWP-LA-CZ	Composite soil sample collected form landfarm area A.
SWP-LB-C3	Composite soil sample collected from landfarm area B.
SWP-LC-C4	Composite soil sample collected from landfarm area C.
SWP-AW-01	Groundwater sample collected from artesian well, (public supply).

* SWP: Code short for Southern Wood Preserving. This designation will not be used in the narrative report.

TABLE 2
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
INORGANIC ANALYSES
WATER SAMPLES
in ug/l

	SWP-BK-W1	SWP-GW-1	SWP-GW-2	SWP-GW-4	SWP-GW-5	SWP-RB-W	SWP-AW-01
Arsenic*	-	-	22	44	-	-	-
Chromium*	-	-	20	-	20	-	-
Lead*	-	14	12	16	-	-	-
Zinc*	-	40	60	40	-	-	-
Aluminum	500	4,800	7,100	3,500	5,700	1,000	-
Manganese	20	2,000	1,100	300	150	130	-
Iron	680	91,000	46,000	17,000	5,300	2,400	-
Sodium	10,000	2,300,000	9,000	1,400,000	15,000	930,000	6,000
Potassium	-	14,000	6,000	49,000	-	36,000	-
Cyanide*	40	-	-	-	-	-	-

* Priority pollutant.
\- Material analyzed for but not detected.

TABLE 3
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
ORGANIC ANALYSES
WATER SAMPLES
in ug/l

	SWP-BK-W1	SWP-GW-1	SWP-GW-2	SWP-GW-4	SWP GW-5	SWP-RB-W	SWP-AW-01
Methylene Chloride*	-	-	-	-	-	-	37
1,1-Dichloroethene(1,1-Dichloroethylene)*	-	-	-	-	-	-	6.6
Chloroform*	-	-	-	-	-	-	63
1,2-Dichloroethane*	-	-	-	-	-	-	55
1,1,1-Trichloroethane*	-	-	-	-	-	-	14
Carbon Tetrachloride*	-	-	-	-	-	-	38
Bromodichloromethane	-	-	-	-	-	-	60
Trichloroethene(Trichloroethylene)*	-	-	-	-	-	-	15
Benzene*	-	0.3J	0.3J	-	-	-	-
Dibromochloromethane	-	-	-	-	-	-	38
Bromoform*	-	-	-	-	-	-	14
Tetrachloroethene(Tetrachloroethylene)*	-	-	-	-	-	-	81
Toluene*	-	-	5J	16	-	-	26
Chlorobenzene*							
Ethyl Benzene*	-	3J	5.1	-	-	-	-
Methyl Butyl Ketone	-	7J	7J	-	23	-	-
Propene	-	5J	-	-	26	-	-
Acetone	-	-	500	1,000	-	-	-
Chloromethylpropane	-	-	3JN	-	-	-	-
Methyl Ethyl Ketone	-	-	-	30	-	-	-
1 Unidentified Compound	-	4J	-	30JN	-	-	-
Naphthalene*	-	-	290	-	-	-	-
Acenaphthene*	-	-	40	3.2	-	-	-
Fluorene*	-	-	15	0.7J	-	-	-

TABLE 3
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
ORGANIC ANALYSES
WATER SAMPLES
in ug/l
PAGE 2

	SWP-BK-W1	SWP-GW-1	SWP-GW-2	SWP-GW-4	SWP GW-5	SWP-RB-W	SWP-AW-01
Phenanthrene*	-	-	7.8	0.5	-	-	-
Acenaphthylene*	-	-	-	0.9J	-	-	-
Anthracene*	-	-	-	2J	-	-	-
Fluoranthene*	-	-	-	7.8	-	-	-
Pyrene*	-	-	-	10J	-	-	-
Protect	-	8JN	-	-	-	-	-
Prometon	-	50JN	-	-	-	-	-
Tetrahydrodimethylpyranone	-	20JN	-	-	-	-	-
methylheptanol	-	10JN	-	-	-	-	-
C5 Alkyl Benzene	-	7JN	-	-	-	-	-
Dibenzafuran	-	-	14	8	-	-	-
2-Methyl Naphthalene	-	-	18	-	-	-	-
C3 Alkylbenzene	-	-	100JN	-	-	-	-
Benzothiophene	-	-	20JN	-	-	-	-
Nitrocarbazole	-	-	10JN	-	-	-	-
Tribromophenol	-	-	-	-	-	-	10JN
8 Unidentified Compounds	-	100J	-	-	-	-	-
3 Unidentified Compounds	-	-	30J	-	-	30J	-
2 Unidentified Compounds	-	-	-	-	10JN	-	20J
5 Unidentified Compounds	100J	-	-	-	-	-	-

* Priority pollutant.
\- Material analyzed for but not detected.
J Estimated quantity.
N Presumtive evidence of material.

TABLE 4
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
INORGANIC ANALYSES
SOIL/SEDIMENT SAMPLES
in ug/kg

	SWP-BK-S1	SWP-RB-S	SWP-JA-C1	SWP-LA-C2	SWP-LB-C3	SWP-LC-C4
Arsenic*	-	-	10,000	610,000	10,000	20,000
Copper*	-	-	40,000	620,000	30,000	60,000
Chromium*	-	-	-	390,000	-	10,000
Lead*	6,000	15,000	12,000	150,000	33,000	61,000
Vanadium	-	-	-	20,000	-	-
Zinc*	-	-	-	75,000	20,000	87,000
Mercury*	-	-	-	480	-	450
Aluminum	1,700,000	750,000	2,600,000	4,300,000	2,100,000	1,700,000
Manganese	-	20,000	40,000	100,000	52,000	50,000
Calcium	-	-	4,000,000	12,000,000	6,300,000	2,000,000
Iron	930,000	1,400,000	4,800,000	12,000,000	5,800,000	6,600,000
Cyanide*	430	225	880	410	110	-

* Priority pollutant.
\- Material analyzed for but not detected.

TABLE 5
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
ORGANIC ANALYSES
SOIL/SEDIMENT SAMPLES
in ug/kg

	SWP-BK-S1	SWP-RB-S	SWP-JA-C1	SWP-LA-C2	SWP-LB-C3	SWP-LC-C4
Naphthalene*	-	-	-	1,200	-	-
Isophorone*	80J	60J	-	-	-	-
2-Chloronaphthalene*	24	19	400J	500J	400J	-
Acenaphthylene*	-	30J	-	1,500	1,000J	6,300
Acenaphthene*	-	-	-	-	-	170,000
Fluorene*	-	-	-	-	-	170,000
Phenanthrene*	-	70	4,400	5,400	1,400	390,000
Anthracene*	-	70J	2,000J	5,200	2,000J	170,000
Di-N-Butylphthalate*	-	-	-	-	-	6,500
Fluoranthene*	300J	350	15,000	25,000	10,000	29,000
Pyrene*	500J	300J	12,000	22,000	10,000J	220,000
Benzo(A)Anthracene*	-	78	2,700	11,000	3,900	130,000
Chrysene*	-	160	-	-	7,100	120,000
Benzo(B and/or K)Fluoranthene* (1)	-	110	5,600	14,000	7,300	48,000
Benzo(B and/or K)Fluoranthene* (1)	-	100J	5,600	12,000	6,600	4,500
Benzo-A-Pyrene*	-	90J	4,600	11,000	5,800	37,000
Indeno(1,2,3-CD)Pyrene*	-	-	-	-	-	10,000J
Benzo(GHI)Perylene*	-	-	-	-	-	9,000
Pentachlorophenol*	-	-	-	4,000J	-	150,000
Dimethyheptanone	10,000JN					
Hexadecanoic Acid	20JN					
Acetyloxyhexanone	2,000JN	2,000JN				
Dimethylfuranone	8,000JN	5,000JN				

(1) For Benzol(B and/or K)Fluoranthene, there is no distinction on laboratory data sheets between the two isomers, the above data could represent total concentrations for the two isomers or replicate concentrations of one isomer.

TABLE 5
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
ORGANIC ANALYSES
SOIL/SEDIMENT SAMPLES
in ug/kg
PAGE 2

	SWP-BK-S1	SWP-RB-S	SWP-JA-C1	SWP-LA-C2	SWP-LB-C3	SWP-LC-C4
Dibenzofuran	-	-	300J	900J	300J	110,000
Tetrahydrodimethylpyranone	-	-	7,000JN	-	-	-
Benzo(J)Fluoranthene	-	-	3,000JN	6,000JN	4,000JN	40,000JN
Dimethyltetrahydropyran-2-one	-	-	-	8,000JN	-	-
Benzo(GHI)Fluoranthene	-	-	-	4,000JN	-	-
2-Methyl Naphthalene	-	-	-	-	-	16,000
Ethylideneindene	-	-	-	-	-	10,000JN
Dimethylnaphthalenes	-	-	-	-	-	20,000JN
Xanthene	-	-	-	-	-	20,000JN
Methyldibenzofuran	-	-	-	-	-	40,000JN
Methylfluorene	-	-	-	-	-	20,000JN
Dihydronapthafuran	-	-	-	-	-	8,000JN
Cyclopentaphenathrene	-	-	-	-	-	70,000JN
Benzo(B)Napthothiophene	-	-	-	-	-	40,000JN
11 Unidentified Compounds	200,000J	-	-	-	-	-
1 Unidentified Brominated Compound	5,000J	30,000JN	-	-	-	-
3 Unidentified Hydrocarbons	-	10,000J	-	-	-	-
2 Unidentified Polynuclear Aromatics	-	-	-	5,000J	-	-
2 Unidentified Methylphenanthrenes	-	-	-	-	-	70,000J
2 Unidentified Benzofluorene Compounds	-	-	-	-	-	100,000J
3 Unidentified Methylpyrenes	-	-	-	-	-	60,000J
Fluoratrichloromethane	-	-	-	10JN	10JN	-
Pinene	-	-	-	-	-	7JN
Trimethylcyclohexanone	-	-	-	-	-	6JN

* Priority pollutants.
\- Material analyzed for but not detected.
J Estimated quantity.
N Presumptive evidence of material.

TABLE 6
SOUTHERN WOOD PIEDMONT SITE
WILMINGTON, NORTH CAROLINA
PESTICIDES AND PCB ANALYSES
SOIL/SEDIMENT SAMPLES
in ug/kg

	SWP-BK-S1	SWP-RB-S	SWP-JA-C1	SWP-LA-C2	SWP-LB-C3	SWP-LC-C4
4,4'-DDE (P,P'-DDE)*	7.4	-	-	-	-	-
4,4'-DDD (P,P'-DDD)*	5.9	-	-	-	-	-

* Priority pollutant.
\- Material analyzed for but not detected.

TABLE 7
FIELD MEASUREMENTS
SOUTHERN WOOD PIEDMONT
WILMINGTON, NORTH CAROLINA

Sample Code	Time*	pH (S.U.)	Temp. °C
BK-W1	0950	7.5	10
GW-1	1045	5.85	16
GW-2	1335	6.4	17
GW-4	1440	6.85	16
GW-5	0940	5.85	14
AW-01	1645	7.8	13

* All measurements taken on January 7, 1985.

APPENDIX A

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
WATER

SAMPLE NO.: H5C6276 SAMPLE TYPE: MONWL

PROJECT NO.: H5-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: S-P-GW-4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: H HAESEC RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4648 INORG SAMPLE NO.: MDA417
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLM DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.010	MG/L	CYANIDE	00720

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.010	MG/L	CYANIDE	00720

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6273 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-5
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: R HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4645 INORG SAMPLE NO.: MDA414
CONTRACT LABORATORY(ORGANIC): UNTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLR DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6270 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-AW-01
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA657 INORG SAMPLE NO.: MDA419
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.01U	MG/L	CYANIDE	00720

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6269 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-KB-W
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA656 INORG SAMPLE NO.: MDA418
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.010	MG/L	CYANIDE	00720

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6268 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-W1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/08/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA494 INORG SAMPLE NO.: MDA420
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.04	MG/L	CYANIDE	00720

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
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*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6274 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4646 INORG SAMPLE NO.: MDA415
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
10U	UG/L	SILVER
20U	UG/L	ARSENIC
NA	UG/L	BORON
200U	UG/L	BARIUM
3U	UG/L	BERYLLIUM
2U	UG/L	CADMIUM
30U	UG/L	COBALT
10U	UG/L	CHROMIUM
10U	UG/L	COPPER
NA	UG/L	MOLYBDENUM
20U	UG/L	NICKEL
14	UG/L	LEAD
60U	UG/L	ANTIMONY
6U	UG/L	SELENIUM
40U	UG/L	TIN
NA	UG/L	STRONTIUM
NA	UG/L	TELLURIUM
NA	UG/L	TITANIUM
70U	UG/L	THALLIUM
10U	UG/L	VANADIUM
NA	UG/L	YTTRIUM
40	UG/L	ZINC
NA	UG/L	ZIRCONIUM
0.2U	UG/L	MERCURY
4800	UG/L	ALUMINUM
2000	UG/L	MANGANESE
80	MG/L	CALCIUM
48	MG/L	MAGNESIUM
91	MG/L	IRON
230	MG/L	SODIUM
14	MG/L	POTASSIUM

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6275 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4647 INORG SAMPLE NO.: MDA416
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
10U	UG/L	SILVER
22	UG/L	ARSENIC
NA	UG/L	BORON
200U	UG/L	BARIUM
3U	UG/L	BERYLLIUM
2U	UG/L	CADMIUM
30U	UG/L	COBALT
20	UG/L	CHROMIUM
10U	UG/L	COPPER
NA	UG/L	MOLYBDENUM
20U	UG/L	NICKEL
12	UG/L	LEAD
60U	UG/L	ANTIMONY
6U	UG/L	SELENIUM
40U	UG/L	TIN
NA	UG/L	STRONTIUM
NA	UG/L	TELLURIUM
NA	UG/L	TITANIUM
70U	UG/L	THALLIUM
10U	UG/L	VANADIUM
NA	UG/L	YTTRIUM
60	UG/L	ZINC
NA	UG/L	ZIRCONIUM
0.2U	UG/L	MERCURY
7100	UG/L	ALUMINUM
1100	UG/L	MANGANESE
35	MG/L	CALCIUM
8	MG/L	MAGNESIUM
46	MG/L	IRON
9	MG/L	SODIUM
6	MG/L	POTASSIUM

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6276 SAMPLE TYPE: MONWL

PROJECT NO.: 85-046 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: S-P-GW-4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4648 INORG SAMPLE NO.: MDA417
CONTRACT LABORATORY(ORGANIC): UATL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
10U	UG/L	SILVER
44	UG/L	ARSENIC
NA	UG/L	BORON
200U	UG/L	BARIUM
3U	UG/L	BERYLLIUM
2U	UG/L	CADMIUM
30U	UG/L	COBALT
10U	UG/L	CHROMIUM
10U	UG/L	COPPER
NA	UG/L	MOLYBDENUM
20U	UG/L	NICKEL
16	UG/L	LEAD
60U	UG/L	ANTIMONY
6U	UG/L	SELENIUM
40U	UG/L	TIN
NA	UG/L	STRONTIUM
NA	UG/L	TELLURIUM
NA	UG/L	TITANIUM
70U	UG/L	THALLIUM
10U	UG/L	VANADIUM
NA	UG/L	YTTRIUM
40	UG/L	ZINC
NA	UG/L	ZIRCONIUM
0.2U	UG/L	MERCURY
3500	UG/L	ALUMINUM
300	UG/L	MANGANESE
66	MG/L	CALCIUM
160	MG/L	MAGNESIUM
17	MG/L	IRON
1400	MG/L	SODIUM
49	MG/L	POTASSIUM

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
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*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
WATER

SAMPLE NO.: B5C6273 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-5
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4645 INORG SAMPLE NO.: MDA414
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLR SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
10U	UG/L	SILVER
20U	UG/L	ARSENIC
NA	UG/L	BORON
200U	UG/L	BARIUM
3U	UG/L	BERYLLIUM
2U	UG/L	CADMIUM
30U	UG/L	COBALT
20	UG/L	CHROMIUM
10U	UG/L	COPPER
NA	UG/L	MOLYBDENUM
20U	UG/L	NICKEL
4U	UG/L	LEAD
60U	UG/L	ANTIMONY
6U	UG/L	SELENIUM
40U	UG/L	TIN
NA	UG/L	STRONTIUM
NA	UG/L	TELLURIUM
NA	UG/L	TITANIUM
70U	UG/L	THALLIUM
10U	UG/L	VANADIUM
NA	UG/L	YTTRIUM
20U	UG/L	ZINC
NA	UG/L	ZIRCONIUM
0.2U	UG/L	MERCURY
5700	UG/L	ALUMINUM
15U	UG/L	MANGANESE
42	MG/L	CALCIUM
2U	MG/L	MAGNESIUM
5.3	MG/L	IRON
15	MG/L	SODIUM
2U	MG/L	POTASSIUM

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NA1=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6270 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-AW-01
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA657 INORG SAMPLE NO.: ADA419
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
10U	UG/L	SILVER
20U	UG/L	ARSENIC
NA	UG/L	BORON
200U	UG/L	BARIUM
3U	UG/L	BERYLLIUM
2U	UG/L	CADMIUM
30U	UG/L	COBALT
10U	UG/L	CHROMIUM
10U	UG/L	COPPER
NA	UG/L	MOLYBDENUM
20U	UG/L	NICKEL
4U	UG/L	LEAD
60U	UG/L	ANTIMONY
6U	UG/L	SELENIUM
40U	UG/L	TIN
NA	UG/L	STRONTIUM
NA	UG/L	TELLURIUM
NA	UG/L	TITANIUM
70U	UG/L	THALLIUM
10U	UG/L	VANADIUM
NA	UG/L	YTTRIUM
20U	UG/L	ZINC
NA	UG/L	ZIRCONIUM
0.2U	UG/L	MERCURY
200U	UG/L	ALUMINUM
15U	UG/L	MANGANESE
43	MG/L	CALCIUM
2U	MG/L	MAGNESIUM
0.1U	MG/L	IRON
6.0	MG/L	SODIUM
2U	MG/L	POTASSIUM

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
WATER

SAMPLE NO.: H5C6769 SAMPLE TYPE: GOOWL

PROJECT NO.: H5-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SMP-RH-W
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: H HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA656 INORG SAMPLE NO.: MDA418
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
10U	UG/L	SILVER
20U	UG/L	ARSENIC
NA	UG/L	BORON
200U	UG/L	BARIUM
3U	UG/L	BERYLLIUM
2U	UG/L	CADMIUM
30U	UG/L	COBALT
10U	UG/L	CHROMIUM
10U	UG/L	COPPER
NA	UG/L	MOLYBDENUM
20U	UG/L	NICKEL
4U	UG/L	LEAD
60U	UG/L	ANTIMONY
6U	UG/L	SELENIUM
40U	UG/L	TIN
NA	UG/L	STRONTIUM
NA	UG/L	TELLURIUM
NA	UG/L	TITANIUM
14U	UG/L	THALLIUM
10U	UG/L	VANADIUM
NA	UG/L	YTTRIUM
20U	UG/L	ZINC
NA	UG/L	ZIRCONIUM
0.2U	UG/L	MERCURY
1000	UG/L	ALUMINUM
130	UG/L	MANGANESE
41	MG/L	CALCIUM
100	MG/L	MAGNESIUM
2.4	MG/L	IRON
930	MG/L	SODIUM
36	MG/L	POTASSIUM

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
WATER

SAMPLE NO.: 85C6268 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-W1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/08/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA494 INORG SAMPLE NO.: MDA420
CONTRACT LABORATORY(ORGANIC): ORTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
10U	UG/L	SILVER
20U	UG/L	ARSENIC
NA	UG/L	BORON
200U	UG/L	BARIUM
3U	UG/L	BERYLLIUM
2U	UG/L	CADMIUM
30U	UG/L	COBALT
10U	UG/L	CHROMIUM
10U	UG/L	COPPER
NA	UG/L	MOLYBDENUM
20U	UG/L	NICKEL
4U	UG/L	LEAD
60U	UG/L	ANTIMONY
6U	UG/L	SELENIUM
40U	UG/L	TIN
NA	UG/L	STRONTIUM
NA	UG/L	TELLURIUM
NA	UG/L	TITANIUM
70U	UG/L	THALLIUM
10U	UG/L	VANADIUM
NA	UG/L	YTTRIUM
20U	UG/L	ZINC
NA	UG/L	ZIRCONIUM
0.2U	UG/L	MERCURY
50U	UG/L	ALUMINUM
20	UG/L	MANGANESE
23	MG/L	CALCIUM
2U	MG/L	MAGNESIUM
0.68	MG/L	IRON
1U	MG/L	SODIUM
2U	MG/L	POTASSIUM

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
WATER

SAMPLE NO.: 85C6274 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-1
STORET STATION NO: 370230C

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4646 INORG SAMPLE NO.: MDA415
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/L	ACROLEIN
NA	UG/L	ACRYLONITRILE
5U	UG/L	CHLOROMETHANE
5U	UG/L	BROMOMETHANE
5U	UG/L	VINYL CHLORIDE
5U	UG/L	CHLOROETHANE
5U	UG/L	METHYLENE CHLORIDE
5U	UG/L	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/L	1,1-DICHLOROETHANE
5U	UG/L	TRANS-1,2-DICHLOROETHENE
5U	UG/L	CHLOROFORM
5U	UG/L	1,2-DICHLOROETHANE
5U	UG/L	1,1,1-TRICHLOROETHANE
5U	UG/L	CARBON TETRACHLORIDE
5U	UG/L	BROMODICHLOROMETHANE
5U	UG/L	1,2-DICHLOROPROPANE
5U	UG/L	TRANS-1,3-DICHLOROPROPENE
5U	UG/L	TRICHLOROETHENE(TRICHLOROETHYLENE)
0.3J	UG/L	BENZENE
10U	UG/L	DIBROMOCHLOROMETHANE
5U	UG/L	1,1,2-TRICHLOROETHANE
5U	UG/L	CIS-1,3-DICHLOROPROPENE
10U	UG/L	2-CHLOROETHYLVINYL ETHER
5U	UG/L	BROMOFORM
5U	UG/L	1,1,2,2-TETRACHLOROETHANE
10U	UG/L	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/L	TOLUENE
10U	UG/L	CHLOROBENZENE
3J	UG/L	ETHYL BENZENE
5U	UG/L	M-XYLENE
5U	UG/L	O&P-XYLENE(MIXED)

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
FPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
WATER

SAMPLE NO.: 85C6275 SAMPLE TYPE: NONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-2
STORET STATION NO: 3702300

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4647 INORG SAMPLE NO.: MDA416
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/L	ACROLEIN
NA	UG/L	ACRYLONITRILE
5U	UG/L	CHLOROMETHANE
5U	UG/L	BROMOMETHANE
5U	UG/L	VINYL CHLORIDE
5U	UG/L	CHLOROETHANE
5U	UG/L	METHYLENE CHLORIDE
5U	UG/L	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/L	1,1-DICHLOROETHANE
5U	UG/L	TRANS-1,2-DICHLOROETHENE
5U	UG/L	CHLOROFORM
5U	UG/L	1,2-DICHLOROETHANE
5U	UG/L	1,1,1-TRICHLOROETHANE
5U	UG/L	CARBON TETRACHLORIDE
5U	UG/L	BROMODICHLOROMETHANE
5U	UG/L	1,2-DICHLOROPROPANE
5U	UG/L	TRANS-1,3-DICHLOROPROPENE
5U	UG/L	TRICHLOROETHENE(TRICHLOROETHYLENE)
0.3J	UG/L	BENZENE
10U	UG/L	DIBROMOCHLOROMETHANE
5U	UG/L	1,1,2-TRICHLOROETHANE
5U	UG/L	CIS-1,3-DICHLOROPROPENE
10U	UG/L	2-CHLOROETHYLVINYL ETHER
5U	UG/L	BROMOFORM
5U	UG/L	1,1,2,2-TETRACHLOROETHANE
10U	UG/L	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5.1	UG/L	TOLUENE
10U	UG/L	CHLOROBENZENE
5.1	UG/L	ETHYL BENZENE
5U	UG/L	M-XYLENE
5U	UG/L	O&P-XYLENE(MIXED)

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
WATER

SAMPLE NO.: 85C6276 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-4
STORET STATION NO: 370230F

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4648 INORG SAMPLE NO.: MDA417
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/L	ACROLEIN
NA	UG/L	ACRYLONITRILE
5U	UG/L	CHLOROMETHANE
5U	UG/L	BROMOMETHANE
5U	UG/L	VINYL CHLORIDE
5U	UG/L	CHLOROETHANE
5U	UG/L	METHYLENE CHLORIDE
5U	UG/L	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/L	1,1-DICHLOROETHANE
5U	UG/L	TRANS-1,2-DICHLOROETHENE
5U	UG/L	CHLOROFORM
5U	UG/L	1,2-DICHLOROETHANE
5U	UG/L	1,1,1-TRICHLOROETHANE
5U	UG/L	CARBON TETRACHLORIDE
5U	UG/L	BROMODICHLOROMETHANE
5U	UG/L	1,2-DICHLOROPROPANE
5U	UG/L	TRANS-1,3-DICHLOROPROPENE
5U	UG/L	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/L	BENZENE
10U	UG/L	DIBROMOCHLOROMETHANE
5U	UG/L	1,1,2-TRICHLOROETHANE
5U	UG/L	CIS-1,3-DICHLOROPROPENE
10U	UG/L	2-CHLOROETHYLVINYL ETHER
5U	UG/L	BROMOFORM
5U	UG/L	1,1,2,2-TETRACHLOROETHANE
10U	UG/L	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
16	UG/L	TOLUENE
10U	UG/L	CHLOROBENZENE
5U	UG/L	ETHYL BENZENE
5U	UG/L	M-XYLENE
5U	UG/L	O&P-XYLENE(MIXED)

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
WATER

SAMPLE NO.: 85C6273 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: 800TH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-5
STORET STATION NO: 370230F

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4645 INORG SAMPLE NO.: MDA414
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/L	ACROLEIN
NA	UG/L	ACRYLONITRILE
5U	UG/L	CHLOROMETHANE
5U	UG/L	BROMOMETHANE
5U	UG/L	VINYL CHLORIDE
5U	UG/L	CHLOROETHANE
5U	UG/L	METHYLENE CHLORIDE
10U	UG/L	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	UG/L	1,1-DICHLOROETHANE
5U	UG/L	TRANS-1,2-DICHLOROETHENE
5U	UG/L	CHLOROFORM
5U	UG/L	1,2-DICHLOROETHANE
5U	UG/L	1,1,1-TRICHLOROETHANE
5U	UG/L	CARBON TETRACHLORIDE
5U	UG/L	BROMODICHLOROMETHANE
5U	UG/L	1,2-DICHLOROPROPANE
5U	UG/L	TRANS-1,3-DICHLOROPROPENE
5U	UG/L	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/L	BENZENE
10U	UG/L	DIBROMOCHLOROMETHANE
5U	UG/L	1,1,2-TRICHLOROETHANE
5U	UG/L	CIS-1,3-DICHLOROPROPENE
10U	UG/L	2-CHLOROETHYLVINYL ETHER
5U	UG/L	BROMOFORM
5U	UG/L	1,1,2,2-TETRACHLOROETHANE
10U	UG/L	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/L	TOLUENE
10U	UG/L	CHLOROBENZENE
5U	UG/L	ETHYL BENZENE
5U	UG/L	M-XYLENE
5U	UG/L	O&P-XYLENE(MIXED)

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
WATER

SAMPLE NO.: 85C6270 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-AW-01
STORET STATION NO: 370230A

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA657 INORG SAMPLE NO.: MDA419
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT.

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/L	ACROLEIN
NA	UG/L	ACRYLONITRILE
5U	UG/L	CHLOROMETHANE
5U	UG/L	BROMOMETHANE
5U	UG/L	VINYL CHLORIDE
5U	UG/L	CHLOROETHANE
37	UG/L	METHYLENE CHLORIDE
6.6	UG/L	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/L	1,1-DICHLOROETHANE
5U	UG/L	TRANS-1,2-DICHLOROETHENE
63	UG/L	CHLOROFORM
55	UG/L	1,2-DICHLOROETHANE
14	UG/L	1,1,1-TRICHLOROETHANE
3A	UG/L	CARBON TETRACHLORIDE
60	UG/L	BROMODICHLOROMETHANE
5U	UG/L	1,2-DICHLOKOPROPANE
5U	UG/L	TRANS-1,3-DICHLOKOPROPENE
15	UG/L	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/L	BENZENE
3A	UG/L	DIBROMOCHLOROMETHANE
5U	UG/L	1,1,2-TRICHLOROETHANE
5U	UG/L	CIS-1,3-DICHLOROPROPENE
10U	UG/L	2-CHLOROETHYLVINYL ETHER
14	UG/L	BROMOFORM
5U	UG/L	1,1,2,2-TETRACHLOROETHANE
81	UG/L	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/L	TOLUENE
26	UG/L	CHLOROBENZENE
5U	UG/L	ETHYL BENZENE
5U	UG/L	M-XYLENE
5U	UG/L	O&P-XYLENE(MIXED)

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
WATER

SAMPLE NO.: 85C6269 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-W
STORET STATION NO: 370230G

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA656 INORG SAMPLE NO.: MDA418
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/L	ACROLEIN
NA	UG/L	ACRYLONITRILE
5U	UG/L	CHLOROMETHANE
5U	UG/L	BROMOMETHANE
5U	UG/L	VINYL CHLORIDE
5U	UG/L	CHLOROETHANE
5U	UG/L	METHYLENE CHLORIDE
5U	UG/L	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/L	1,1-DICHLOROETHANE
5U	UG/L	TRANS-1,2-DICHLOROETHENE
5U	UG/L	CHLOROFORM
5U	UG/L	1,2-DICHLOROETHANE
5U	UG/L	1,1,1-TRICHLOROETHANE
5U	UG/L	CARBON TETRACHLORIDE
10U	UG/L	BROMODICHLOROMETHANE
5U	UG/L	1,2-DICHLOROPROPANE
5U	UG/L	TRANS-1,3-DICHLOROPROPENE
5U	UG/L	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/L	BENZENE
5U	UG/L	DIBROMOCHLOROMETHANE
5U	UG/L	1,1,2-TRICHLOROETHANE
5U	UG/L	CIS-1,3-DICHLOROPROPENE
10U	UG/L	2-CHLOROETHYLVINYL ETHER
5U	UG/L	BROMOFORM
5U	UG/L	1,1,2,2-TETRACHLOROETHANE
10U	UG/L	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/L	TOLUENE
10U	UG/L	CHLOROBENZENE
5U	UG/L	ETHYL BENZENE
5U	UG/L	M-XYLENE
5U	UG/L	O&P-XYLENE(MIXED)

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
WATER

SAMPLE NO.: 85C6268 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: 600TH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-W1
STORET STATION NO: 370230R

SAMPLE COLLECTION: START DATE/TIME 01/08/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA494 INORG SAMPLE NO.: MDA420
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/L	ACROLEIN
NA	UG/L	ACRYLONITRILE
5U	UG/L	CHLOROMETHANE
5U	UG/L	BROMOMETHANE
5U	UG/L	VINYL CHLORIDE
5U	UG/L	CHLOROETHANE
5U	UG/L	METHYLENE CHLORIDE
5U	UG/L	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	UG/L	1,1-DICHLOROETHANE
5U	UG/L	TRANS-1,2-DICHLOROETHENE
5U	UG/L	CHLOROFORM
5U	UG/L	1,2-DICHLOROETHANE
5U	UG/L	1,1,1-TRICHLOROETHANE
5U	UG/L	CARBON TETRACHLORIDE
10U	UG/L	BROMODICHLOROMETHANE
5U	UG/L	1,2-DICHLOROPROPANE
5U	UG/L	TRANS-1,3-DICHLOROPROPENE
5U	UG/L	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/L	BENZENE
5U	UG/L	DIBROMOCHLOROMETHANE
5U	UG/L	1,1,2-TRICHLOROETHANE
5U	UG/L	CIS-1,3-DICHLOROPROPENE
10U	UG/L	2-CHLOROETHYLVINYL ETHER
5U	UG/L	BROMOFORM
5U	UG/L	1,1,2,2-TETRACHLOROETHANE
10U	UG/L	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5U	UG/L	TOLUENE
10U	UG/L	CHLOROBENZENE
5U	UG/L	ETHYL BENZENE
5U	UG/L	M-XYLENE
5U	UG/L	O&P-XYLENE(MIXED)

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6274 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-1
STORET STATION NO: 370230C

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4646 INORG SAMPLE NO.: MDA415
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
15U	ACETONE
5U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
7J	METHYL BUTYL KETONE
5J	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE
800JN	PROPENE
4J	1 UNIDENTIFIED COMPOUND

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6275 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-2
STORET STATION NO: 370230D

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4647 INORG SAMPLE NO.: MDA416
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
500	ACETONE
5U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
7J	METHYL BUTYL KETONE
5U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE
3JN	CHLOROMETHYLPROPANE
100JN	PROPENE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6276 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-4
STORET STATION NO: 370230F

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4648 INORG SAMPLE NO.: MDA417
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
1000	ACETONE
30	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE
90JN	PROPENE
30JN	1 UNIDENTIFIED AROMATIC COMPOUND

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6273 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-5
STORET STATION NO: 370230F

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4645 INORG SAMPLE NO.: MDA414
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
15U	ACETONE
5U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
23	METHYL BUTYL KETONE
26	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6270 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-AW-01
STORET STATION NO: 370230A

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA657 INORG SAMPLE NO.: MDA419
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
15U	ACETONE
5U	METHYL ETHYL KETONE
10U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
5U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6269 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-W
STORET STATION NO: 370230G

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA656 INORG SAMPLE NO.: MDA418
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
15U	ACETONE
5U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
WATER

SAMPLE NO.: 85C626B SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-W1
STORET STATION NO: 370230B

SAMPLE COLLECTION: START DATE/TIME 01/08/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA494 INORG SAMPLE NO.: MDA420
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
15U	ACETONE
10U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
WATER

SAMPLE NO.: 85C6274 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-1
STORET STATION NO: 370230C

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN. RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4646 INORG SAMPLE NO.: MDA415
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10U	UG/L	N-NITROSODIMETHYLAMINE
NA	UG/L	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
11U	UG/L	BENZIDINE
5U	UG/L	1,3-DICHLOROBENZENE
5U	UG/L	1,4-DICHLOROBENZENE
5U	UG/L	1,2-DICHLOROBENZENE
5U	UG/L	BIS(2-CHLOROETHYL) ETHER
5U	UG/L	HEXACHLOROETHANE
10U	UG/L	BIS(2-CHLOROISOPROPYL) ETHER
10U	UG/L	N-NITROSODI-N-PROPYLAMINE
5U	UG/L	NITROBENZENE
5U	UG/L	HEXACHLOROBUTADIENE
5U	UG/L	1,2,4-TRICHLOROBENZENE
5U	UG/L	NAPHTHALENE
5U	UG/L	BIS(2-CHLOROETHOXY) METHANE
5U	UG/L	ISOPHORONE
10U	UG/L	HEXACHLOROCYCLOPENTADIENE (HCCP)
5U	UG/L	2-CHLORONAPHTHALENE
5U	UG/L	ACENAPHTHYLENE
5U	UG/L	ACENAPHTHENE
5U	UG/L	DIMETHYL PHTHALATE
5U	UG/L	2,4-DINITROTOLUENE
5U	UG/L	2,6-DINITROTOLUENE
5U	UG/L	4-CHLOROPHENYL PHENYL ETHER
5U	UG/L	FLUORENE
5U	UG/L	DIETHYL PHTHALATE
5U	UG/L	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
5U	UG/L	HEXACHLOROBENZENE (HCB)
5U	UG/L	4-BROMOPHENYL PHENYL ETHER
5U	UG/L	PHENANTHRENE
5U	UG/L	ANTHRACENE
10U	UG/L	DI-N-BUTYLPHTHALATE
10U	UG/L	FLUORANTHENE
10U	UG/L	PYRENE
10U	UG/L	BENZYL BUTYL PHTHALATE
10U	UG/L	BIS(2-ETHYLHEXYL) PHTHALATE
5U	UG/L	BENZO(A)ANTHRACENE
5U	UG/L	CHRYSENE
10U	UG/L	3,3'-DICHLOROBENZIDINE
10U	UG/L	DI-N-OCTYLPHTHALATE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO-A-PYRENE
10U	UG/L	INDENO (1,2,3-CD) PYRENE
10U	UG/L	DIBENZO(A,H)ANTHRACENE
10U	UG/L	BENZO(GHI)PERYLENE
5U	UG/L	2-CHLOROPHENOL
5U	UG/L	2-NITROPHENOL
5U	UG/L	PHENOL
5U	UG/L	2,4-DIMETHYLPHENOL
5U	UG/L	2,4-DICHLOROPHENOL
5U	UG/L	2,4,6-TRICHLOROPHENOL
5U	UG/L	4-CHLORO-3-METHYLPHENOL
10U	UG/L	2,4-DINITROPHENOL
5U	UG/L	2-METHYL-4,6-DINITROPHENOL
5U	UG/L	PENTACHLOROPHENOL
11U	UG/L	4-NITROPHENOL

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
WATER

SAMPLE NO.: 85C6275 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-2
STORET STATION NO: 370230D

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4647 INORG SAMPLE NO.: MDA416
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10U	UG/L	N-NITROSODIMETHYLAMINE
NA	UG/L	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
11U	UG/L	BENZIDINE
5U	UG/L	1,3-DICHLOROBENZENE
5U	UG/L	1,4-DICHLOROBENZENE
5U	UG/L	1,2-DICHLOROBENZENE
5U	UG/L	BIS(2-CHLOROETHYL) ETHER
5U	UG/L	HEXACHLOROETHANE
10U	UG/L	BIS(2-CHLOROISOPROPYL) ETHER
10U	UG/L	N-NITROSODI-N-PROPYLAMINE
5U	UG/L	NITROBENZENE
5U	UG/L	HEXACHLOROBUTADIENE
5U	UG/L	1,2,4-TRICHLOROBENZENE
290	UG/L	NAPHTHALENE
5U	UG/L	BIS(2-CHLOROETHOXY) METHANE
5U	UG/L	ISOPHORONE
10U	UG/L	HEXACHLOROCYCLOPENTADIENE (HCCP)
5U	UG/L	2-CHLORONAPHTHALENE
5U	UG/L	ACENAPHTHYLENE
4U	UG/L	ACENAPHTHENE
5U	UG/L	DIMETHYL PHTHALATE
5U	UG/L	2,4-DINITROTOLUENE
5U	UG/L	2,6-DINITROTOLUENE
5U	UG/L	4-CHLOROPHENYL PHENYL ETHER
1J	UG/L	FLUORENE
5U	UG/L	DIETHYL PHTHALATE
5U	UG/L	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
5U	UG/L	HEXACHLOROBENZENE (HCB)
5U	UG/L	4-BROMOPHENYL PHENYL ETHER
7.8	UG/L	PHENANTHRENE
5U	UG/L	ANTHRACENE
10U	UG/L	DI-N-BUTYLPHTHALATE
10U	UG/L	FLUORANTHENE
10U	UG/L	PYRENE
10U	UG/L	BENZYL BUTYL PHTHALATE
10U	UG/L	BIS(2-ETHYLHEXYL) PHTHALATE
5U	UG/L	BENZO(A)ANTHRACENE
5U	UG/L	CHRYSENE
18U	UG/L	3,3'-DICHLOROBENZIDINE
10U	UG/L	DI-N-OCTYLPHTHALATE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO-A-PYRENE
10U	UG/L	INDENO (1,2,3-CD) PYRENE
10U	UG/L	DIBENZO(A,H)ANTHRACENE
10U	UG/L	BENZO(GHI)PERYLENE
5U	UG/L	2-CHLOROPHENOL
5U	UG/L	2-NITROPHENOL
5U	UG/L	PHENOL
5U	UG/L	2,4-DIMETHYLPHENOL
5U	UG/L	2,4-DICHLOROPHENOL
5U	UG/L	2,4,6-TRICHLOROPHENOL
5U	UG/L	4-CHLORO-3-METHYLPHENOL
10U	UG/L	2,4-DINITROPHENOL
5U	UG/L	2-METHYL-4,6-DINITROPHENOL
5U	UG/L	PENTACHLOROPHENOL
11U	UG/L	4-NITROPHENOL

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
WATER

SAMPLE NO.: 85C6276 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-4
STORET STATION NO: 370230E

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4648 INORG SAMPLE NO.: MDA417
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10U	UG/L	N-NITROSODIMETHYLAMINE
NA	UG/L	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
11U	UG/L	BENZIDINE
5U	UG/L	1,3-DICHLOROBENZENE
5U	UG/L	1,4-DICHLOROBENZENE
5U	UG/L	1,2-DICHLOROBENZENE
5U	UG/L	BIS(2-CHLOROETHYL) ETHER
5U	UG/L	HEXACHLOROETHANE
10U	UG/L	BIS(2-CHLOROISOPROPYL) ETHER
10U	UG/L	N-NITROSODI-N-PROPYLAMINE
5U	UG/L	NITROBENZENE
5U	UG/L	HEXACHLOROBUTADIENE
5U	UG/L	1,2,4-TRICHLOROBENZENE
5U	UG/L	NAPHTHALENE
5U	UG/L	BIS(2-CHLOROETHOXY) METHANE
5U	UG/L	ISOPHORONE
10U	UG/L	HEXACHLOROCYCLOPENTADIENE (HCCP)
5U	UG/L	2-CHLORONAPHTHALENE
0.9J	UG/L	ACENAPHTHYLENE
32	UG/L	ACENAPHTHENE
5U	UG/L	DIMETHYL PHTHALATE
5U	UG/L	2,4-DINITROTOLUENE
5U	UG/L	2,6-DINITROTOLUENE
5U	UG/L	4-CHLOROPHENYL PHENYL ETHER
0.7J	UG/L	FLUORENE
5U	UG/L	DIETHYL PHTHALATE
5U	UG/L	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
5U	UG/L	HEXACHLOROBENZENE (HCB)
5U	UG/L	4-BROMOPHENYL PHENYL ETHER
0.5	UG/L	PHENANTHRENE
2J	UG/L	ANTHRACENE
10U	UG/L	DI-N-BUTYLPHTHALATE
7.8	UG/L	FLUORANTHENE
10J	UG/L	PYRENE
10U	UG/L	BENZYL BUTYL PHTHALATE
10U	UG/L	BIS(2-ETHYLHEXYL) PHTHALATE
5U	UG/L	BENZO(A)ANTHRACENE
5U	UG/L	CHRYSENE
18U	UG/L	3,3'-DICHLOROBENZIDINE
10U	UG/L	DI-N-OCTYLPHTHALATE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO-A-PYRENE
10U	UG/L	INDENO (1,2,3-CD) PYRENE
10U	UG/L	DIBENZO(A,H)ANTHRACENE
10U	UG/L	BENZO(GHI)PERYLENE
5U	UG/L	2-CHLOROPHENOL
5U	UG/L	2-NITROPHENOL
5U	UG/L	PHENOL
5U	UG/L	2,4-DIMETHYLPHENOL
5U	UG/L	2,4-DICHLOROPHENOL
5U	UG/L	2,4,6-TRICHLOROPHENOL
5U	UG/L	4-CHLORO-3-METHYLPHENOL
10U	UG/L	2,4-DINITROPHENOL
5U	UG/L	2-METHYL-4,6-DINITROPHENOL
5U	UG/L	PENTACHLOROPHENOL
11U	UG/L	4-NITROPHENOL

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
WATER

SAMPLE NO.: 85C6273 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-5
STORET STATION NO: 370230F

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4645 INORG SAMPLE NO.: MDA414
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
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*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10U	UG/L	N-NITROSODIMETHYLAMINE
NA	UG/L	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
11U	UG/L	BENZIDINE
5U	UG/L	1,3-DICHLOROBENZENE
5U	UG/L	1,4-DICHLOROBENZENE
5U	UG/L	1,2-DICHLOROBENZENE
5U	UG/L	BIS(2-CHLOROETHYL) ETHER
5U	UG/L	HEXACHLOROETHANE
10U	UG/L	BIS(2-CHLOROISOPROPYL) ETHER
10U	UG/L	N-NITROSODI-N-PROPYLAMINE
5U	UG/L	NITROBENZENE
5U	UG/L	HEXACHLOROBUTADIENE
5U	UG/L	1,2,4-TRICHLOROBENZENE
5U	UG/L	NAPHTHALENE
5U	UG/L	BIS(2-CHLOROETHOXY) METHANE
5U	UG/L	ISOPHORONE
10U	UG/L	HEXACHLOROCYCLOPENTADIENE (HCCP)
5U	UG/L	2-CHLORONAPHTHALENE
5U	UG/L	ACENAPHTHYLENE
5U	UG/L	ACENAPHTHENE
5U	UG/L	DIMETHYL PHTHALATE
5U	UG/L	2,4-DINITROTOLUENE
5U	UG/L	2,6-DINITROTOLUENE
5U	UG/L	4-CHLOROPHENYL PHENYL ETHER
5U	UG/L	FLUORENE
5U	UG/L	DIETHYL PHTHALATE
5U	UG/L	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
5U	UG/L	HEXACHLOROBENZENE (HCB)
5U	UG/L	4-BROMOPHENYL PHENYL ETHER
5U	UG/L	PHENANTHRENE
5U	UG/L	ANTHRACENE
5U	UG/L	DI-N-BUTYLPHTHALATE
10U	UG/L	FLUORANTHENE
10U	UG/L	PYRENE
10U	UG/L	BENZYL BUTYL PHTHALATE
10U	UG/L	BIS(2-ETHYLHEXYL) PHTHALATE
5U	UG/L	BENZO(A)ANTHRACENE
5U	UG/L	CHRYSENE
18U	UG/L	3,3'-DICHLOROBENZIDINE
10U	UG/L	DI-N-OCTYLPHTHALATE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO-A-PYRENE
10U	UG/L	INDENO (1,2,3-CD) PYRENE
10U	UG/L	DIBENZO(A,H)ANTHRACENE
10U	UG/L	BENZO(GHI)PERYLENE
5U	UG/L	2-CHLOROPHENOL
5U	UG/L	2-NITROPHENOL
5U	UG/L	PHENOL
5U	UG/L	2,4-DIMETHYLPHENOL
5U	UG/L	2,4-DICHLOROPHENOL
5U	UG/L	2,4,6-TRICHLOROPHENOL
5U	UG/L	4-CHLORO-3-METHYLPHENOL
10U	UG/L	2,4-DINITROPHENOL
5U	UG/L	2-METHYL-4,6-DINITROPHENOL
5U	UG/L	PENTACHLOROPHENOL
11U	UG/L	4-NITROPHENOL

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
WATER

SAMPLE NO.: 85C6270 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-AW-01
STORET STATION NO: 370230A

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA657 INORG SAMPLE NO.: MDA419
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
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*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10U	UG/L	N-NITROSODIMETHYLAMINE
NA	UG/L	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
11U	UG/L	BENZIDINE
5U	UG/L	1,3-DICHLOROBENZENE
5U	UG/L	1,4-DICHLOROBENZENE
5U	UG/L	1,2-DICHLOROBENZENE
5U	UG/L	BIS(2-CHLOROETHYL) ETHER
5U	UG/L	HEXACHLOROETHANE
10U	UG/L	BIS(2-CHLOROISOPROPYL) ETHER
10U	UG/L	N-NITROSODI-N-PROPYLAMINE
5U	UG/L	NITROBENZENE
5U	UG/L	HEXACHLOROBUTADIENE
5U	UG/L	1,2,4-TRICHLOROBENZENE
5U	UG/L	NAPHTHALENE
5U	UG/L	BIS(2-CHLOROETHOXY) METHANE
5U	UG/L	ISOPHORONE
10U	UG/L	HEXACHLOROCYCLOPENTADIENE (HCCP)
5U	UG/L	2-CHLORONAPHTHALENE
5U	UG/L	ACENAPHTHYLENE
5U	UG/L	ACENAPHTHENE
5U	UG/L	DIMETHYL PHTHALATE
5U	UG/L	2,4-DINITROTOLUENE
5U	UG/L	2,6-DINITROTOLUENE
5U	UG/L	4-CHLOROPHENYL PHENYL ETHER
5U	UG/L	FLUORENE
5U	UG/L	DIETHYL PHTHALATE
5U	UG/L	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
5U	UG/L	HEXACHLOROBENZENE (HCB)
5U	UG/L	4-BROMOPHENYL PHENYL ETHER
5U	UG/L	PHENANTHRENE
5U	UG/L	ANTHRACENE
10U	UG/L	DI-N-BUTYLPHTHALATE
10U	UG/L	FLUORANTHENE
10U	UG/L	PYRENE
10U	UG/L	BENZYL BUTYL PHTHALATE
10U	UG/L	BIS(2-ETHYLHEXYL) PHTHALATE
5U	UG/L	BENZO(A)ANTHRACENE
5U	UG/L	CHRYSENE
18U	UG/L	3,3'-DICHLOROBENZIDINE
5U	UG/L	DI-N-OCTYLPHTHALATE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO-A-PYRENE
10U	UG/L	INDENO (1,2,3-CD) PYRENE
10U	UG/L	DIBENZO(A,H)ANTHRACENE
10U	UG/L	BENZO(GHI)PERYLENE
5U	UG/L	2-CHLOROPHENOL
5U	UG/L	2-NITROPHENOL
5U	UG/L	PHENOL
5U	UG/L	2,4-DIMETHYLPHENOL
5U	UG/L	2,4-DICHLOROPHENOL
5U	UG/L	2,4,6-TRICHLOROPHENOL
5U	UG/L	4-CHLORO-3-METHYLPHENOL
10U	UG/L	2,4-DINITROPHENOL
5U	UG/L	2-METHYL-4,6-DINITROPHENOL
5U	UG/L	PENTACHLOROPHENOL
11U	UG/L	4-NITROPHENOL

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
WATER

SAMPLE NO.: 85C6269 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RR-W
STORET STATION NO: 370230G

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA656 INORG SAMPLE NO.: MDA418
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
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*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10U	UG/L	N-NITROSODIMETHYLAMINE
NA	UG/L	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
11U	UG/L	BENZIDINE
10U	UG/L	1,3-DICHLOROBENZENE
10U	UG/L	1,4-DICHLOROBENZENE
10U	UG/L	1,2-DICHLOROBENZENE
10U	UG/L	BIS(2-CHLOROETHYL) ETHER
10U	UG/L	HEXACHLOROETHANE
10U	UG/L	BIS(2-CHLOROISOPROPYL) ETHER
10U	UG/L	N-NITROSODI-N-PROPYLAMINE
10U	UG/L	NITROBENZENE
10U	UG/L	HEXACHLOROBUTADIENE
10U	UG/L	1,2,4-TRICHLOROBENZENE
10U	UG/L	NAPHTHALENE
10U	UG/L	BIS(2-CHLOROETHOXY) METHANE
10U	UG/L	ISOPHORONE
10U	UG/L	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	UG/L	2-CHLORONAPHTHALENE
10U	UG/L	ACENAPHTHYLENE
10U	UG/L	ACENAPHTHENE
10U	UG/L	DIMETHYL PHTHALATE
10U	UG/L	2,4-DINITROTOLUENE
10U	UG/L	2,6-DINITROTOLUENE
10U	UG/L	4-CHLOROPHENYL PHENYL ETHER
10U	UG/L	FLUORENE
10U	UG/L	DIETHYL PHTHALATE
10U	UG/L	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
10U	UG/L	HEXACHLOROBENZENE (HCB)
10U	UG/L	4-BROMOPHENYL PHENYL ETHER
10U	UG/L	PHENANTHRENE
10U	UG/L	ANTHRACENE
10U	UG/L	DI-N-BUTYLPHTHALATE
10U	UG/L	FLUORANTHENE
10U	UG/L	PYRENE
10U	UG/L	BENZYL BUTYL PHTHALATE
10U	UG/L	BIS(2-ETHYLHEXYL) PHTHALATE
10U	UG/L	BENZO(A)ANTHRACENE
10U	UG/L	CHRYSENE
10U	UG/L	3,3'-DICHLOROBENZIDINE
10U	UG/L	DI-N-OCTYLPHTHALATE
10U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
10U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
10U	UG/L	BENZO-A-PYRENE
10U	UG/L	INDENO (1,2,3-CD) PYRENE
10U	UG/L	DIBENZO(A,H)ANTHRACENE
10U	UG/L	BENZO(GHI)PERYLENE
10U	UG/L	2-CHLOROPHENOL
10U	UG/L	2-NITROPHENOL
10U	UG/L	PHENOL
10U	UG/L	2,4-DIMETHYLPHENOL
10U	UG/L	2,4-DICHLOROPHENOL
10U	UG/L	2,4,6-TRICHLOROPHENOL
10U	UG/L	4-CHLORO-3-METHYLPHENOL
10U	UG/L	2,4-DINITROPHENOL
10U	UG/L	2-METHYL-4,6-DINITROPHENOL
10U	UG/L	PENTACHLOROPHENOL
11U	UG/L	4-NITROPHENOL

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
WATER

SAMPLE NO.: 85C6268 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-W1
STORET STATION NO: 370230B

SAMPLE COLLECTION: START DATE/TIME 01/08/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA494 INORG SAMPLE NO.: MDA420
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
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****

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*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10U	UG/L	N-NITROSODIMETHYLAMINE
NA	UG/L	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
11U	UG/L	BENZIDINE
5U	UG/L	1,3-DICHLOROBENZENE
5U	UG/L	1,4-DICHLOROBENZENE
5U	UG/L	1,2-DICHLOROBENZENE
10U	UG/L	BIS(2-CHLOROETHYL) ETHER
5U	UG/L	HEXACHLOROETHANE
5U	UG/L	BIS(2-CHLOROISOPROPYL) ETHER
5U	UG/L	N-NITROSODI-N-PROPYLAMINE
5U	UG/L	NITROBENZENE
5U	UG/L	HEXACHLOROBUTADIENE
5U	UG/L	1,2,4-TRICHLOROBENZENE
5U	UG/L	NAPHTHALENE
5U	UG/L	BIS(2-CHLOROETHOXY) METHANE
5U	UG/L	ISOPHORONE
10U	UG/L	HEXACHLOROCYCLOPENTADIENE (HCCP)
5U	UG/L	2-CHLORONAPHTHALENE
5U	UG/L	ACENAPHTHYLENE
5U	UG/L	ACENAPHTHENE
5U	UG/L	DIMETHYL PHTHALATE
5U	UG/L	2,4-DINITROTOLUENE
5U	UG/L	2,6-DINITROTOLUENE
5U	UG/L	4-CHLOROPHENYL PHENYL ETHER
5U	UG/L	FLUORENE
5U	UG/L	DIETHYL PHTHALATE
5U	UG/L	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
5U	UG/L	HEXACHLOROBENZENE (HCB)
5U	UG/L	4-BROMOPHENYL PHENYL ETHER
5U	UG/L	PHENANTHRENE
5U	UG/L	ANTHRACENE
10U	UG/L	DI-N-BUTYLPHTHALATE
10U	UG/L	FLUORANTHENE
10U	UG/L	PYRENE
10U	UG/L	BENZYL BUTYL PHTHALATE
10U	UG/L	BIS(2-ETHYLHEXYL) PHTHALATE
5U	UG/L	BENZO(A)ANTHRACENE
5U	UG/L	CHRYSENE
20U	UG/L	3,3'-DICHLOROBENZIDINE
5U	UG/L	DI-N-OCTYLPHTHALATE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO(B AND/OR K)FLUORANTHENE
5U	UG/L	BENZO-A-PYRENE
10U	UG/L	INDENO (1,2,3-CD) PYRENE
10U	UG/L	DIBENZO(A,H)ANTHRACENE
10U	UG/L	BENZO(GHI)PERYLENE
5U	UG/L	2-CHLOROPHENOL
5U	UG/L	2-NITROPHENOL
5U	UG/L	PHENOL
5U	UG/L	2,4-DIMETHYLPHENOL
5U	UG/L	2,4-DICHLOROPHENOL
5U	UG/L	2,4,6-TRICHLOROPHENOL
5U	UG/L	4-CHLORO-3-METHYLPHENOL
10U	UG/L	2,4-DINITROPHENOL
5U	UG/L	2-METHYL-4,6-DINITROPHENOL
5U	UG/L	PENTACHLOROPHENOL
11U	UG/L	4-NITROPHENOL

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6274 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-1
STORET STATION NO: 370230C

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4646 INORG SAMPLE NO.: MDA415
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
10U	BENZOIC ACID
10U	2-METHYLPHENOL
10U	4-METHYLPHENOL
5U	2,4,5-TRICHLOROPHENOL
10U	ANILINE
5U	BENZYL ALCOHOL
10U	4-CHLOROANILINE
5U	DIBENZOFURAN
10U	2-METHYL NAPHTHALENE
5U	2-NITROANILINE
21U	3-NITROANILINE
5U	4-NITROANILINE
8JN	PROTECT
50JN	PROMETON
20JN	TETRAHYDRODIMETHYLPYRANONE
10JN	METHYLHEPTANOL
7JN	C5 ALKYL-BENZENE
100J	8 UNIDENTIFIED COMPOUNDS

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6275 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-2
STORET STATION NO: 370230D

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4647 INORG SAMPLE NO.: MDA416
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
5U	BENZOIC ACID
10U	2-METHYLPHENOL
10U	4-METHYLPHENOL
5U	2,4,5-TRICHLOROPHENOL
10U	ANILINE
5U	BENZYL ALCOHOL
10U	4-CHLOROANILINE
14	DIBENZOFURAN
18	2-METHYL NAPHTHALENE
5U	2-NITROANILINE
21U	3-NITROANILINE
5U	4-NITROANILINE
100JN	C3 ALKYLBENZENE
20JN	BENZOTHIOPHENE
10JN	NITROCARBAZOLE
30J	3 UNIDENTIFIED COMPOUNDS

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6276 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-4
STORET STATION NO: 370230E

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4648 INORG SAMPLE NO.: MDA417
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
5U	BENZOIC ACID
10U	2-METHYLPHENOL
10U	4-METHYLPHENOL
10U	2,4,5-TRICHLOROPHENOL
10U	ANILINE
5U	BENZYL ALCOHOL
10U	4-CHLOROANILINE
8.0	DIBENZOFURAN
10U	2-METHYL NAPHTHALENE
5U	2-NITROANILINE
21U	3-NITROANILINE
5U	4-NITROANILINE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
FPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6273 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-5
STORET STATION NO: 370230F

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4645 INORG SAMPLE NO.: MDA414
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
5U	BENZOIC ACID
10U	2-METHYLPHENOL
10U	4-METHYLPHENOL
5U	2,4,5-TRICHLOROPHENOL
10U	ANILINE
5U	BENZYL ALCOHOL
10U	4-CHLOROANILINE
5U	DIBENZOFURAN
10U	2-METHYL NAPHTHALENE
5U	2-NITROANILINE
21U	3-NITROANILINE
5U	4-NITROANILINE
10J	2 UNIDENTIFIED COMPOUNDS

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6270 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-AW-01
STORET STATION NO: 370230A

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA657 INORG SAMPLE NO.: MDA419
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
5U	BENZOIC ACID
10U	2-METHYLPHENOL
10U	4-METHYLPHENOL
5U	2,4,5-TRICHLOROPHENOL
10U	ANILINE
5U	BENZYL ALCOHOL
10U	4-CHLOROANILINE
5U	DIBENZOFURAN
10U	2-METHYL NAPHTHALENE
5U	2-NITROANILINE
21U	3-NITROANILINE
5U	4-NITROANILINE
10JN	TRIBROMOPHENOL
20J	2 UNIDENTIFIED COMPOUNDS

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6269 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-W
STORET STATION NO: 370230G

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA656 INORG SAMPLE NO.: MDA418
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
5U	BENZOIC ACID
10U	2-METHYLPHENOL
10U	4-METHYLPHENOL
5U	2,4,5-TRICHLOROPHENOL
10U	ANILINE
5U	BENZYL ALCOHOL
10U	4-CHLOROANILINE
5U	DIBENZOFURAN
10U	2-METHYL NAPHTHALENE
5U	2-NITROANILINE
21U	3-NITROANILINE
5U	4-NITROANILINE
30J	3 UNIDENTIFIED COMPOUNDS

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
WATER

SAMPLE NO.: 85C6268 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: 800TH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-W1
STORET STATION NO: 3702308

SAMPLE COLLECTION: START DATE/TIME 01/08/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA494 INORG SAMPLE NO.: MDA420
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/L	COMPOUND NAME
5U	BENZOIC ACID
10U	2-METHYLPHENOL
10U	4-METHYLPHENOL
5U	2,4,5-TRICHLOROPHENOL
10U	ANILINE
5U	BENZYL ALCOHOL
10U	4-CHLOROANILINE
5U	DIBENZOFURAN
5U	2-METHYL NAPHTHALENE
5U	2-NITROANILINE
30U	3-NITROANILINE
5U	4-NITROANILINE
100J	5 UNIDENTIFIED COMPOUNDS

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
WATER

SAMPLE NO.: 85C6274 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-1
STORET STATION NO: 370230C

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4646 INORG SAMPLE NO.: MDA415
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.01U	UG/L	ALDRIN
0.01U	UG/L	HEPTACHLOR
0.01U	UG/L	HEPTACHLOR EPOXIDE
0.01U	UG/L	ALPHA-BHC
0.01U	UG/L	BETA-BHC
0.01U	UG/L	GAMMA-BHC (LINDANE)
0.01U	UG/L	DELTA-BHC
0.01U	UG/L	ENDOSULFAN I (ALPHA)
0.01U	UG/L	DIELDRIN
0.1U	UG/L	4,4'-DDT (P,P'-DDT)
0.01U	UG/L	4,4'-DDE (P,P'-DDE)
0.01U	UG/L	4,4'-DDD (P,P'-DDD)
0.01U	UG/L	ENDRIN
0.01U	UG/L	ENDOSULFAN II (BETA)
0.3U	UG/L	ENDOSULFAN SULFATE
0.1U	UG/L	CHLORDANE (TECH. MIXTURE) /1
0.3U	UG/L	PCB-1242 (AROCLOR 1242)
0.3U	UG/L	PCB-1254 (AROCLOR 1254)
0.3U	UG/L	PCB-1221 (AROCLOR 1221)
0.3U	UG/L	PCB-1232 (AROCLOR 1232)
0.3U	UG/L	PCB-1248 (AROCLOR 1248)
0.3U	UG/L	PCB-1260 (AROCLOR 1260)
0.3U	UG/L	PCB-1016 (AROCLOR 1016)
0.1U	UG/L	TOXAPHENE
0.1U	UG/L	ENDRIN ALDEHYDE
NA	UG/L	2,3,7,8 TCDD(DIOXIN)
--	UG/L	CHLORDENE /2
--	UG/L	ALPHA-CHLORDENE /2
--	UG/L	GAMMA-CHLORDENE /2
--	UG/L	1-HYDROXYCHLORDENE /2
--	UG/L	GAMMA-CHLORDANE /2
--	UG/L	TRANS-NONACHLOR /2
--	UG/L	ALPHA-CHLORDANE /2
--	UG/L	CIS-NONACHLOR /2
0.1U	UG/L	METHOXYCHLOR
0.1U	UG/L	ENDRIN KETONE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
WATER

SAMPLE NO.: B5C6275 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-2
STORET STATION NO: 370230D

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4647 INORG SAMPLE NO.: MDA416
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.01U	UG/L	ALDRIN
0.01U	UG/L	HEPTACHLOR
0.01U	UG/L	HEPTACHLOR EPOXIDE
0.01U	UG/L	ALPHA-BHC
0.01U	UG/L	BETA-BHC
0.01U	UG/L	GAMMA-BHC (LINDANE)
0.01U	UG/L	DELTA-BHC
0.01U	UG/L	ENDOSULFAN I (ALPHA)
0.01U	UG/L	DIELDRIN
0.1U	UG/L	4,4'-DDT (P,P'-DDT)
0.01U	UG/L	4,4'-DDE (P,P'-DDE)
0.01U	UG/L	4,4'-DDD (P,P'-DDD)
0.01U	UG/L	ENDRIN
0.01U	UG/L	ENDOSULFAN II (BETA)
0.3U	UG/L	ENDOSULFAN SULFATE
0.1U	UG/L	CHLORDANE (TECH. MIXTURE) /1
0.3U	UG/L	PCB-1242 (AROCLOR 1242)
0.3U	UG/L	PCB-1254 (AROCLOR 1254)
0.3U	UG/L	PCB-1221 (AROCLOR 1221)
0.3U	UG/L	PCB-1232 (AROCLOR 1232)
0.3U	UG/L	PCB-1248 (AROCLOR 1248)
0.3U	UG/L	PCB-1260 (AROCLOR 1260)
0.3U	UG/L	PCB-1016 (AROCLOR 1016)
0.3U	UG/L	TOXAPHENE
0.02U	UG/L	ENDRIN ALDEHYDE
NA	UG/L	2,3,7,8 TCDD(DIOXIN)
--	UG/L	CHLORDENE /2
--	UG/L	ALPHA-CHLORDENE /2
--	UG/L	GAMMA-CHLORDENE /2
--	UG/L	1-HYDROXYCHLORDENE /2
--	UG/L	GAMMA-CHLORDANE /2
--	UG/L	TRANS-NONACHLOR /2
--	UG/L	ALPHA-CHLORDANE /2
--	UG/L	CIS-NONACHLOR /2
0.1U	UG/L	METHOXYCHLOR
0.1U	UG/L	ENDRIN KETONE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
WATER

SAMPLE NO.: 85C6276 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-4
STORET STATION NO: 370230E

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4648 INORG SAMPLE NO.: MDA417
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.01U	UG/L	ALDRIN
0.01U	UG/L	HEPTACHLOR
0.01U	UG/L	HEPTACHLOR EPOXIDE
0.01U	UG/L	ALPHA-BHC
0.01U	UG/L	BETA-BHC
0.01U	UG/L	GAMMA-BHC (LINDANE)
0.01U	UG/L	DELTA-BHC
0.01U	UG/L	ENDOSULFAN I (ALPHA)
0.01U	UG/L	DIELDRIN
0.1U	UG/L	4,4'-DDT (P,P'-DDT)
0.01U	UG/L	4,4'-DDE (P,P'-DDE)
0.01U	UG/L	4,4'-DDD (P,P'-DDD)
0.01U	UG/L	ENDRIN
0.01U	UG/L	ENDOSULFAN II (BETA)
0.3U	UG/L	ENDOSULFAN SULFATE
0.1U	UG/L	CHLORDANE (TECH. MIXTURE) /1
0.3U	UG/L	PCB-1242 (AROCLOR 1242)
0.3U	UG/L	PCB-1254 (AROCLOR 1254)
0.3U	UG/L	PCB-1221 (AROCLOR 1221)
0.3U	UG/L	PCB-1232 (AROCLOR 1232)
0.3U	UG/L	PCB-1248 (AROCLOR 1248)
0.3U	UG/L	PCB-1260 (AROCLOR 1260)
0.3U	UG/L	PCB-1016 (AROCLOR 1016)
0.3U	UG/L	TOXAPHENE
0.1U	UG/L	ENDRIN ALDEHYDE
NA	UG/L	2,3,7,8 TCDD(DIOXIN)
--	UG/L	CHLORDENE /2
--	UG/L	ALPHA-CHLORDENE /2
--	UG/L	GAMMA-CHLORDENE /2
--	UG/L	1-HYDROXYCHLORDENE /2
--	UG/L	GAMMA-CHLORDANE /2
--	UG/L	TRANS-NONACHLOR /2
--	UG/L	ALPHA-CHLORDANE /2
--	UG/L	CIS-NONACHLOR /2
0.1U	UG/L	METHOXYCHLOR
0.1U	UG/L	ENDRIN KETONE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
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2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
FPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
WATER

SAMPLE NO.: 85C6273 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-GW-5
STORET STATION NO: 370230F

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4645 INORG SAMPLE NO.: MDA414
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND	
0.01U	UG/L	ALDRIN	
0.01U	UG/L	HEPTACHLOR	
0.01U	UG/L	HEPTACHLOR EPOXIDE	
0.01U	UG/L	ALPHA-BHC	
0.01U	UG/L	BETA-BHC	
0.01U	UG/L	GAMMA-BHC (LINDANE)	
0.01U	UG/L	DELTA-BHC	
0.01U	UG/L	ENDOSULFAN I (ALPHA)	
0.01U	UG/L	DIELDRIN	
0.1U	UG/L	4,4'-DDT (P,P'-DDT)	
0.01U	UG/L	4,4'-DDE (P,P'-DDE)	
0.01U	UG/L	4,4'-DDD (P,P'-DDD)	
0.01U	UG/L	ENDRIN	
0.01U	UG/L	ENDOSULFAN II (BETA)	
0.3U	UG/L	ENDOSULFAN SULFATE	
0.1U	UG/L	CHLORDANE (TECH. MIXTURE)	/1
0.1U	UG/L	PCB-1242 (AROCLOR 1242)	
0.3U	UG/L	PCB-1254 (AROCLOR 1254)	
0.3U	UG/L	PCB-1221 (AROCLOR 1221)	
0.1U	UG/L	PCB-1232 (AROCLOR 1232)	
0.1U	UG/L	PCB-1248 (AROCLOR 1248)	
0.1U	UG/L	PCB-1260 (AROCLOR 1260)	
0.3U	UG/L	PCB-1016 (AROCLOR 1016)	
0.1U	UG/L	TOXAPHENE	
0.1U	UG/L	ENDRIN ALDEHYDE	
NA	UG/L	2,3,7,8 TCDD(DIOXIN)	
--	UG/L	CHLORDENE	/2
--	UG/L	ALPHA-CHLORDENE	/2
--	UG/L	GAMMA-CHLORDENE	/2
--	UG/L	1-HYDROXYCHLORDENE	/2
--	UG/L	GAMMA-CHLORDANE	/2
--	UG/L	TRANS-NONACHLOR	/2
--	UG/L	ALPHA-CHLORDANE	/2
--	UG/L	CIS-NONACHLOR	/2
0.1U	UG/L	METHOXYCHLOR	
0.1U	UG/L	ENDRIN KETONE	

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
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2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
WATER

SAMPLE NO.: 85C6270 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-AW-01
STORET STATION NO: 370230A

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA657 INORG SAMPLE NO.: MDA419
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND	
0.01U	UG/L	ALDRIN	
0.01U	UG/L	HEPTACHLOR	
0.01U	UG/L	HEPTACHLOR EPOXIDE	
0.01U	UG/L	ALPHA-BHC	
0.01U	UG/L	BETA-BHC	
0.01U	UG/L	GAMMA-BHC (LINDANE)	
0.01U	UG/L	DELTA-BHC	
0.01U	UG/L	ENDOSULFAN I (ALPHA)	
0.01U	UG/L	DIELDRIN	
0.1U	UG/L	4,4'-DDT (P,P'-DDT)	
0.01U	UG/L	4,4'-DDE (P,P'-DDE)	
0.01U	UG/L	4,4'-DDD (P,P'-DDD)	
0.01U	UG/L	ENDRIN	
0.01U	UG/L	ENDOSULFAN II (BETA)	
0.3U	UG/L	ENDOSULFAN SULFATE	
0.1U	UG/L	CHLORDANE (TECH. MIXTURE)	/1
0.1U	UG/L	PCB-1242 (AROCLOR 1242)	
0.3U	UG/L	PCB-1254 (AROCLOR 1254)	
0.3U	UG/L	PCB-1221 (AROCLOR 1221)	
0.1U	UG/L	PCB-1232 (AROCLOR 1232)	
0.1U	UG/L	PCB-1248 (AROCLOR 1248)	
0.1U	UG/L	PCB-1260 (AROCLOR 1260)	
0.3U	UG/L	PCB-1016 (AROCLOR 1016)	
0.1U	UG/L	TOXAPHENE	
0.1U	UG/L	ENDRIN ALDEHYDE	
NA	UG/L	2,3,7,8 TCDD(DIOXIN)	
--	UG/L	CHLORDENE	/2
--	UG/L	ALPHA-CHLORDENE	/2
--	UG/L	GAMMA-CHLORDENE	/2
--	UG/L	1-HYDROXYCHLORDENE	/2
--	UG/L	GAMMA-CHLORDANE	/2
--	UG/L	TRANS-NONACHLOR	/2
--	UG/L	ALPHA-CHLORDANE	/2
--	UG/L	CIS-NONACHLOR	/2
0.1U	UG/L	METHOXYCHLOR	
0.1U	UG/L	ENDRIN KETONE	

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
WATER

SAMPLE NO.: 85C6269 SAMPLE TYPE: MONWL

PROJECT NO.: 85-049 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-W
STORET STATION NO: 370230G

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA656 INORG SAMPLE NO.: MDA418
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.01U	UG/L	ALDRIN
0.01U	UG/L	HEPTACHLOR
0.01U	UG/L	HEPTACHLOR EPOXIDE
0.01U	UG/L	ALPHA-BHC
0.01U	UG/L	BETA-BHC
0.01U	UG/L	GAMMA-BHC (LINDANE)
0.01U	UG/L	DELTA-BHC
0.01U	UG/L	ENDOSULFAN I (ALPHA)
0.01U	UG/L	DIELDRIN
0.01U	UG/L	4,4'-DDT (P,P'-DDT)
0.01U	UG/L	4,4'-DDE (P,P'-DDE)
0.01U	UG/L	4,4'-DDD (P,P'-DDD)
0.01U	UG/L	ENDRIN
0.01U	UG/L	ENDOSULFAN II (BETA)
0.3U	UG/L	ENDOSULFAN SULFATE
0.1U	UG/L	CHLORDANE (TECH. MIXTURE) /1
0.3U	UG/L	PCB-1242 (AROCLOR 1242)
0.3U	UG/L	PCB-1254 (AROCLOR 1254)
0.3U	UG/L	PCB-1221 (AROCLOR 1221)
0.3U	UG/L	PCB-1232 (AROCLOR 1232)
0.3U	UG/L	PCB-1248 (AROCLOR 1248)
0.3U	UG/L	PCB-1260 (AROCLOR 1260)
0.3U	UG/L	PCB-1016 (AROCLOR 1016)
0.1U	UG/L	TOXAPHENE
0.06U	UG/L	ENDRIN ALDEHYDE
NA	UG/L	2,3,7,8 TCDD(DIOXIN)
--	UG/L	CHLORDENE /2
--	UG/L	ALPHA-CHLORDENE /2
--	UG/L	GAMMA-CHLORDENE /2
--	UG/L	1-HYDROXYCHLORDENE /2
--	UG/L	GAMMA-CHLORDANE /2
--	UG/L	TRANS-NONACHLOR /2
--	UG/L	ALPHA-CHLORDANE /2
--	UG/L	CIS-NONACHLOR /2
0.06U	UG/L	METHOXYCHLOR
0.06U	UG/L	ENDRIN KETONE

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
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2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
WATER

SAMPLE NO.: 85C6268 SAMPLE TYPE: MONWL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-W1
STORET STATION NO: 3702308

SAMPLE COLLECTION: START DATE/TIME 01/08/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA494 INORG SAMPLE NO.: MDA420
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.01U	UG/L	ALDRIN
0.01U	UG/L	HEPTACHLOR
0.01U	UG/L	HEPTACHLOR EPOXIDE
0.01U	UG/L	ALPHA-BHC
0.01U	UG/L	BETA-BHC
0.01U	UG/L	GAMMA-BHC (LINDANE)
0.01U	UG/L	DELTA-BHC
0.01U	UG/L	ENDOSULFAN I (ALPHA)
0.01U	UG/L	DIELDRIN
0.03U	UG/L	4,4'-DDT (P,P'-DDT)
0.01U	UG/L	4,4'-DDE (P,P'-DDE)
0.01U	UG/L	4,4'-DDD (P,P'-DDD)
0.01U	UG/L	ENDRIN
0.01U	UG/L	ENDOSULFAN II (BETA)
0.3U	UG/L	ENDOSULFAN SULFATE
0.1U	UG/L	CHLORDANE (TECH. MIXTURE) /1
0.3U	UG/L	PCB-1242 (AROCLOR 1242)
0.3U	UG/L	PCB-1254 (AROCLOR 1254)
0.3U	UG/L	PCB-1221 (AROCLOR 1221)
0.3U	UG/L	PCB-1232 (AROCLOR 1232)
0.3U	UG/L	PCB-1248 (AROCLOR 1248)
0.3U	UG/L	PCB-1260 (AROCLOR 1260)
0.3U	UG/L	PCB-1016 (AROCLOR 1016)
0.1U	UG/L	TOXAPHENE
0.1U	UG/L	ENDRIN ALDEHYDE
NA	UG/L	2,3,7,8 TCDD(DIOXIN)
--	UG/L	CHLORDENE /2
--	UG/L	ALPHA-CHLORDENE /2
--	UG/L	GAMMA-CHLORDENE /2
--	UG/L	1-HYDROXYCHLORDENE /2
--	UG/L	GAMMA-CHLORDANE /2
--	UG/L	TRANS-NONACHLOR /2
--	UG/L	ALPHA-CHLORDANE /2
--	UG/L	CIS-NONACHLOR /2
0.1U	UG/L	METHOXYCHLOR
0.1U	UG/L	ENDRIN KETONE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
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SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6279 SAMPLE TYPE: SOIL

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.88	MG/KG	CYANIDE	00721

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-JA-C1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA497 INORG SAMPLE NO.: MDA423
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.41	MG/KG	CYANIDE	00721

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6280 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LA-C2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA498 INORG SAMPLE NO.: MDA474
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.11	MG/KG	CYANIDE	00721

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6281 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LB-C3
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: H HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA499 INORG SAMPLE NO.: MDA425
CONTRACT LABORATORY(ORGANIC): UNTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6284 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SMP-LC-C4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4644 INORG SAMPLE NO.: MDA413
CONTRACT LABORATORY(ORGANIC): UATL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.130	MG/KG	CYANIDE	00721

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
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*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
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THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.22	MG/KG	CYANIDE	00721

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C627H SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RH-S
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN. RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA496 INORG SAMPLE NO.: MDA472
CONTRACT LABORATORY(ORGANIC): OBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

03/26/85

SPECIFIED ANALYSIS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6277 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-51
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA495 INORG SAMPLE NO.: MDA421
CONTRACT LABORATORY(ORGANIC): UNTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	PARAMETER	STORET
0.43	MG/KG	CYANIDE	00721

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6279 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-JA-C1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA497 INORG SAMPLE NO.: MDA423
CONTRACT LABORATORY(ORGANIC): UNTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
6U	MG/KG	SILVER
10	MG/KG	ARSENIC
NA	MG/KG	BORON
100U	MG/KG	BARIUM
2U	MG/KG	BERYLLIUM
1U	MG/KG	CADMIUM
20U	MG/KG	COBALT
6U	MG/KG	CHROMIUM
40	MG/KG	COPPER
NA	MG/KG	MOLYBDENUM
10U	MG/KG	NICKEL
12	MG/KG	LEAD
40U	MG/KG	ANTIMONY
4U	MG/KG	SELENIUM
20U	MG/KG	TIN
NA	MG/KG	STRONTIUM
NA	MG/KG	TELLURIUM
NA	MG/KG	TITANIUM
9U	MG/KG	THALLIUM
6U	MG/KG	VANADIUM
NA	MG/KG	YTTRIUM
10U	MG/KG	ZINC
NA	MG/KG	ZIRCONIUM
0.06U	MG/KG	MERCURY
2600	MG/KG	ALUMINUM
40	MG/KG	MANGANESE
4000	MG/KG	CALCIUM
1000U	MG/KG	MAGNESIUM
4800	MG/KG	IRON
3000U	MG/KG	SODIUM
1000U	MG/KG	POTASSIUM
20	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6280 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LA-C2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: H HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA498 INORG SAMPLE NO.: MDA424
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLH SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
7U	MG/KG	SILVER
610	MG/KG	ARSENIC
NA	MG/KG	BORON
1000	MG/KG	BARIUM
2U	MG/KG	BERYLLIUM
1U	MG/KG	CADMIUM
20U	MG/KG	COBALT
390	MG/KG	CHROMIUM
670	MG/KG	COPPER
NA	MG/KG	MOLYBDENUM
10U	MG/KG	NICKEL
150	MG/KG	LEAD
40U	MG/KG	ANTIMONY
4U	MG/KG	SELENIUM
30U	MG/KG	TIN
NA	MG/KG	STRONTIUM
NA	MG/KG	TELLURIUM
NA	MG/KG	TITANIUM
9U	MG/KG	THALLIUM
20	MG/KG	VANADIUM
NA	MG/KG	YTTRIUM
75	MG/KG	ZINC
NA	MG/KG	ZIRCONIUM
0.48	MG/KG	MERCURY
4100	MG/KG	ALUMINUM
100	MG/KG	MANGANESE
12000	MG/KG	CALCIUM
1000U	MG/KG	MAGNESIUM
12000	MG/KG	IRON
3000U	MG/KG	SODIUM
1000U	MG/KG	POTASSIUM
27	%	MOISTURE

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NA1=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6281 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LB-C3
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA499 INORG SAMPLE NO.: MDA425
CONTRACT LABORATORY(ORGANIC): DATL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
5U	MG/KG	SILVER
10	MG/KG	ARSENIC
NA	MG/KG	BORON
100U	MG/KG	BARIUM
2U	MG/KG	BERYLLIUM
1U	MG/KG	CADMIUM
20U	MG/KG	COBALT
5U	MG/KG	CHROMIUM
30	MG/KG	COPPER
NA	MG/KG	MOLYBDENUM
10U	MG/KG	NICKEL
33	MG/KG	LEAD
30U	MG/KG	ANTIMONY
3U	MG/KG	SELENIUM
20U	MG/KG	TIN
NA	MG/KG	STRONTIUM
NA	MG/KG	TELLURIUM
NA	MG/KG	TITANIUM
7U	MG/KG	THALLIUM
5U	MG/KG	VANADIUM
NA	MG/KG	YTTRIUM
20	MG/KG	ZINC
NA	MG/KG	ZIRCONIUM
0.05U	MG/KG	MERCURY
2100	MG/KG	ALUMINUM
52	MG/KG	MANGANESE
6300	MG/KG	CALCIUM
1000U	MG/KG	MAGNESIUM
5800	MG/KG	IRON
3000U	MG/KG	SODIUM
1000U	MG/KG	POTASSIUM
5	%	MOISTURE

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*R=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6284 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LC-C4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN. RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4644 INORG SAMPLE NO.: NDA413
CONTRACT LABORATORY(ORGANIC): UBIL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
6U	MG/KG	SILVER
20	MG/KG	ARSENIC
NA	MG/KG	BORON
100U	MG/KG	BARIUM
2U	MG/KG	BERYLLIUM
1U	MG/KG	CADMIUM
20U	MG/KG	COBALT
10	MG/KG	CHROMIUM
60	MG/KG	COPPER
NA	MG/KG	MOLYBDENUM
10U	MG/KG	NICKEL
61	MG/KG	LEAD
40U	MG/KG	ANTIMONY
4U	MG/KG	SELENIUM
20U	MG/KG	TIN
NA	MG/KG	STRONTIUM
NA	MG/KG	TELLURIUM
NA	MG/KG	TITANIUM
9U	MG/KG	THALLIUM
6U	MG/KG	VANADIUM
NA	MG/KG	YTTRIUM
87	MG/KG	ZINC
NA	MG/KG	ZIRCONIUM
0.45	MG/KG	MERCURY
1700	MG/KG	ALUMINUM
50	MG/KG	MANGANESE
2000	MG/KG	CALCIUM
1000U	MG/KG	MAGNESIUM
6600	MG/KG	IRON
3000U	MG/KG	SODIUM
1000U	MG/KG	POTASSIUM
20	%	MOISTURE

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: H5C6278 SAMPLE TYPE: SOIL

PROJECT NO.: H5-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-S
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: H HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA496 INORG SAMPLE NO.: MDA422
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
5U	MG/KG	SILVER
10U	MG/KG	ARSENIC
NA	MG/KG	BORON
1000	MG/KG	BARIUM
2U	MG/KG	BERYLLIUM
1U	MG/KG	CADMIUM
20U	MG/KG	COBALT
5U	MG/KG	CHROMIUM
5U	MG/KG	COPPER
NA	MG/KG	MOLYBDENUM
10U	MG/KG	NICKEL
15	MG/KG	LEAD
30U	MG/KG	ANTIMONY
3U	MG/KG	SELENIUM
20U	MG/KG	TIN
NA	MG/KG	STRONTIUM
NA	MG/KG	TELLURIUM
NA	MG/KG	TITANIUM
7U	MG/KG	THALLIUM
5U	MG/KG	VANADIUM
NA	MG/KG	YTTRIUM
10U	MG/KG	ZINC
NA	MG/KG	ZIRCONIUM
0.05U	MG/KG	MERCURY
75U	MG/KG	ALUMINUM
20	MG/KG	MANGANESE
5000	MG/KG	CALCIUM
10000	MG/KG	MAGNESIUM
1400	MG/KG	IRON
3000U	MG/KG	SODIUM
1000U	MG/KG	POTASSIUM
7	%	MOISTURE

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

03/26/85

METALS
DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6277 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, AOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-S1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MAW
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA495 INORG SAMPLE NO.: MDA421
CONTRACT LABORATORY(ORGANIC): UNTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLH SAMPLE DATA VERIFIED BY: MAW

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	ELEMENT
7U	MG/KG	SILVER
10U	MG/KG	ARSENIC
NA	MG/KG	BORON
100U	MG/KG	BARIUM
2U	MG/KG	BERYLLIUM
1U	MG/KG	CADMIUM
20U	MG/KG	COBALT
7U	MG/KG	CHROMIUM
7U	MG/KG	COPPER
NA	MG/KG	MOLYBDENUM
10U	MG/KG	NICKEL
6	MG/KG	LEAD
40U	MG/KG	ANTIMONY
4U	MG/KG	SELENIUM
30U	MG/KG	TIN
NA	MG/KG	STRONTIUM
NA	MG/KG	TELLURIUM
NA	MG/KG	TITANIUM
10U	MG/KG	THALLIUM
7U	MG/KG	VANADIUM
NA	MG/KG	YTTRIUM
10U	MG/KG	ZINC
NA	MG/KG	ZIRCONIUM
0.07U	MG/KG	MERCURY
1700	MG/KG	ALUMINUM
10U	MG/KG	MANGANESE
700U	MG/KG	CALCIUM
1000U	MG/KG	MAGNESIUM
930	MG/KG	IRON
4000U	MG/KG	SODIUM
1000U	MG/KG	POTASSIUM
31	%	MOISTURE

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6279 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-JA-C1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA497 INORG SAMPLE NO.: MDA423
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/KG	ACROLEIN
NA	UG/KG	ACRYLONITRILE
5U	UG/KG	CHLOROMETHANE
5U	UG/KG	BROMOMETHANE
10U	UG/KG	VINYL CHLORIDE
5U	UG/KG	CHLOROETHANE
5U	UG/KG	METHYLENE CHLORIDE
5U	UG/KG	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/KG	1,1-DICHLOROETHANE
5U	UG/KG	TRANS-1,2-DICHLOROETHENE
5U	UG/KG	CHLOROFORM
5U	UG/KG	1,2-DICHLOROETHANE
5U	UG/KG	1,1,1-TRICHLOROETHANE
5U	UG/KG	CARBON TETRACHLORIDE
5U	UG/KG	BROMODICHLOROMETHANE
5U	UG/KG	1,2-DICHLOROPROPANE
5U	UG/KG	TRANS-1,3-DICHLOROPROPENE
5U	UG/KG	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/KG	BENZENE
10U	UG/KG	DIBROMOCHLOROMETHANE
5U	UG/KG	1,1,2-TRICHLOROETHANE
5U	UG/KG	CIS-1,3-DICHLOROPROPENE
10U	UG/KG	2-CHLOROETHYLVINYL ETHER
5U	UG/KG	BROMOFORM
5U	UG/KG	1,1,2,2-TETRACHLOROETHANE
11U	UG/KG	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/KG	TOLUENE
10U	UG/KG	CHLOROBENZENE
5U	UG/KG	ETHYL BENZENE
5U	UG/KG	M-XYLENE
5U	UG/KG	O&P-XYLENE(MIXED)
7.7	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6280 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LA-C2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA498 INORG SAMPLE NO.: MDA424
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/KG	ACROLEIN
NA	UG/KG	ACRYLONITRILE
5U	UG/KG	CHLOROMETHANE
5U	UG/KG	BROMOMETHANE
10U	UG/KG	VINYL CHLORIDE
5U	UG/KG	CHLOROETHANE
5U	UG/KG	METHYLENE CHLORIDE
5U	UG/KG	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/KG	1,1-DICHLOROETHANE
5U	UG/KG	TRANS-1,2-DICHLOROETHENE
5U	UG/KG	CHLOROFORM
5U	UG/KG	1,2-DICHLOROETHANE
5U	UG/KG	1,1,1-TRICHLOROETHANE
5U	UG/KG	CARBON TETRACHLORIDE
5U	UG/KG	BROMODICHLOROMETHANE
10U	UG/KG	1,2-DICHLOROPROPANE
5U	UG/KG	TRANS-1,3-DICHLOROPROPENE
5U	UG/KG	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/KG	BENZENE
10U	UG/KG	DIBROMOCHLOROMETHANE
5U	UG/KG	1,1,2-TRICHLOROETHANE
5U	UG/KG	CIS-1,3-DICHLOROPROPENE
10U	UG/KG	2-CHLOROETHYLVINYL ETHER
5U	UG/KG	BROMOFORM
12U	UG/KG	1,1,2,2-TETRACHLOROETHANE
5U	UG/KG	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/KG	TOLUENE
10U	UG/KG	CHLOROBENZENE
5U	UG/KG	ETHYL BENZENE
10U	UG/KG	M-XYLENE
10U	UG/KG	O&P-XYLENE(MIXED)
16	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85

PURGEABLE ORGANICS ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6281 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LB-C3
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA499 INORG SAMPLE NO.: MDA475
CONTRACT LABORATORY(ORGANIC): UATL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/KG	ACROLEIN
NA	UG/KG	ACRYLONITRILE
5U	UG/KG	CHLOROMETHANE
5U	UG/KG	BROMOMETHANE
10U	UG/KG	VINYL CHLORIDE
5U	UG/KG	CHLOROETHANE
5U	UG/KG	METHYLENE CHLORIDE
5U	UG/KG	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/KG	1,1-DICHLOROETHANE
5U	UG/KG	TRANS-1,2-DICHLOROETHENE
5U	UG/KG	CHLOROFORM
5U	UG/KG	1,2-DICHLOROETHANE
5U	UG/KG	1,1,1-TRICHLOROETHANE
5U	UG/KG	CARBON TETRACHLORIDE
5U	UG/KG	BROMODICHLOROMETHANE
5U	UG/KG	1,2-DICHLOROPROPANE
5U	UG/KG	TRANS-1,3-DICHLOROPROPENE
5U	UG/KG	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/KG	BENZENE
10U	UG/KG	DIBROMOCHLOROMETHANE
5U	UG/KG	1,1,2-TRICHLOROETHANE
5U	UG/KG	CIS-1,3-DICHLOROPROPENE
10U	UG/KG	2-CHLOROETHYLVINYL ETHER
5U	UG/KG	BROMOFORM
5U	UG/KG	1,1,2,2-TETRACHLOROETHANE
11U	UG/KG	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/KG	TOLUENE
10U	UG/KG	CHLOROBENZENE
5U	UG/KG	ETHYL BENZENE
5U	UG/KG	M-XYLENE
5U	UG/KG	O&P-XYLENE(MIXED)
5.8	%	MOISTURE

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85

PURGEABLE ORGANICS ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6284 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LC-C4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4644 INORG SAMPLE NO.: MDA413
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/KG	ACROLEIN
NA	UG/KG	ACRYLONITRILE
5U	UG/KG	CHLOROMETHANE
5U	UG/KG	BROMOMETHANE
10U	UG/KG	VINYL CHLORIDE
5U	UG/KG	CHLOROETHANE
5U	UG/KG	METHYLENE CHLORIDE
10U	UG/KG	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
5U	UG/KG	1,1-DICHLOROETHANE
5U	UG/KG	TRANS-1,2-DICHLOROETHENE
5U	UG/KG	CHLOROFORM
5U	UG/KG	1,2-DICHLOROETHANE
5U	UG/KG	1,1,1-TRICHLOROETHANE
5U	UG/KG	CARBON TETRACHLORIDE
10U	UG/KG	BROMODICHLOROMETHANE
5U	UG/KG	1,2-DICHLOROPROPANE
5U	UG/KG	TRANS-1,3-DICHLOROPROPENE
5U	UG/KG	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/KG	BENZENE
5U	UG/KG	DIBROMOCHLOROMETHANE
5U	UG/KG	1,1,2-TRICHLOROETHANE
5U	UG/KG	CIS-1,3-DICHLOROPROPENE
10U	UG/KG	2-CHLOROETHYLVINYL ETHER
5U	UG/KG	BROMOFORM
5U	UG/KG	1,1,2,2-TETRACHLOROETHANE
11U	UG/KG	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5U	UG/KG	TOLUENE
5U	UG/KG	CHLOROBENZENE
5U	UG/KG	ETHYL BENZENE
5U	UG/KG	M-XYLENE
5U	UG/KG	O&P-XYLENE(MIXED)
8.3	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85

PURGEABLE ORGANICS ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6278 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RR-S
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA496 INORG SAMPLE NO.: MDA422
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/KG	ACROLEIN
NA	UG/KG	ACRYLONITRILE
5U	UG/KG	CHLOROMETHANE
5U	UG/KG	BROMOMETHANE
10U	UG/KG	VINYL CHLORIDE
5U	UG/KG	CHLOROETHANE
5U	UG/KG	METHYLENE CHLORIDE
5U	UG/KG	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/KG	1,1-DICHLOROETHANE
5U	UG/KG	TRANS-1,2-DICHLOROETHENE
5U	UG/KG	CHLOROFORM
5U	UG/KG	1,2-DICHLOROETHANE
5U	UG/KG	1,1,1-TRICHLOROETHANE
5U	UG/KG	CARBON TETRACHLORIDE
5U	UG/KG	BROMODICHLOROMETHANE
10U	UG/KG	1,2-DICHLOROPROPANE
5U	UG/KG	TRANS-1,3-DICHLOROPROPENE
5U	UG/KG	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/KG	BENZENE
10U	UG/KG	DIBROMOCHLOROMETHANE
5U	UG/KG	1,1,2-TRICHLOROETHANE
5U	UG/KG	CIS-1,3-DICHLOROPROPENE
10U	UG/KG	2-CHLOROETHYLVINYL ETHER
5U	UG/KG	BROMOFORM
5U	UG/KG	1,1,2,2-TETRACHLOROETHANE
11U	UG/KG	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/KG	TOLUENE
10U	UG/KG	CHLOROBENZENE
10U	UG/KG	ETHYL BENZENE
5U	UG/KG	M-XYLENE
5U	UG/KG	O&P-XYLENE(MIXED)
12	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85

PURGEABLE ORGANICS ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6277 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-S1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA495 INORG SAMPLE NO.: MDA421
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB SAMPLE DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
NA	UG/KG	ACROLEIN
NA	UG/KG	ACRYLONITRILE
5U	UG/KG	CHLOROMETHANE
5U	UG/KG	BROMOMETHANE
5U	UG/KG	VINYL CHLORIDE
5U	UG/KG	CHLOROETHANE
5U	UG/KG	METHYLENE CHLORIDE
5U	UG/KG	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
10U	UG/KG	1,1-DICHLOROETHANE
5U	UG/KG	TRANS-1,2-DICHLOROETHENE
5U	UG/KG	CHLOROFORM
5U	UG/KG	1,2-DICHLOROETHANE
10U	UG/KG	1,1,1-TRICHLOROETHANE
5U	UG/KG	CARBON TETRACHLORIDE
5U	UG/KG	BROMODICHLOROMETHANE
10U	UG/KG	1,2-DICHLOROPROPANE
5U	UG/KG	TRANS-1,3-DICHLOROPROPENE
5U	UG/KG	TRICHLOROETHENE(TRICHLOROETHYLENE)
5U	UG/KG	BENZENE
10U	UG/KG	DIBROMOCHLOROMETHANE
5U	UG/KG	1,1,2-TRICHLOROETHANE
5U	UG/KG	CIS-1,3-DICHLOROPROPENE
11U	UG/KG	2-CHLOROETHYLVINYL ETHER
5U	UG/KG	BROMOFORM
5U	UG/KG	1,1,2,2-TETRACHLOROETHANE
25U	UG/KG	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
10U	UG/KG	TOLUENE
10U	UG/KG	CHLOROBENZENE
5U	UG/KG	ETHYL BENZENE
10U	UG/KG	M-XYLENE
10U	UG/KG	O&P-XYLENE(MIXED)
32	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6279 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-JA-C1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA497 INORG SAMPLE NO.: MDA423
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
16U	ACETONE
10U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6280 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LA-C2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA498 INORG SAMPLE NO.: MDA424
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLH DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
20UJ	ACETONE
10U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
10U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
10JN	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6281 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LB-C3
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA499 INORG SAMPLE NO.: MDA425
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
16U	ACETONE
10U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
10JN	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6284 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LC-C4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4644 INORG SAMPLE NO.: MDA413
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
16U	ACETONE
10U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
5U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE
7JN	PINENE
6JN	TRIMETHYLCYCLOHEXANONE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6278 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-S
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA496 INORG SAMPLE NO.: MDA422
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
20U	ACETONE
10U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
10U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PURGEABLE ORGANICS ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6277 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-S1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA495 INORG SAMPLE NO.: MDA471
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
25U	ACETONE
10U	METHYL ETHYL KETONE
5U	CARBON DISULFIDE
10U	METHYL BUTYL KETONE
10U	METHYL ISOBUTYL KETONE
10U	STYRENE
5U	VINYL ACETATE
NA	DICHLORODIFLUOROMETHANE
NA	FLUOROTRICHLOROMETHANE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6279 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-JA-C1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA497 INORG SAMPLE NO.: MDA423
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SURJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10000U	UG/KG	N-NITROSODIMETHYLAMINE
NA	UG/KG	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
20000U	UG/KG	BENZIDINE
1000U	UG/KG	1,3-DICHLOROBENZENE
1000U	UG/KG	1,4-DICHLOROBENZENE
1000U	UG/KG	1,2-DICHLOROBENZENE
5000U	UG/KG	BIS(2-CHLOROETHYL) ETHER
5000U	UG/KG	HEXACHLOROETHANE
10000U	UG/KG	BIS(2-CHLOROISOPROPYL) ETHER
10000U	UG/KG	N-NITROSODI-N-PROPYLAMINE
2000U	UG/KG	NITROBENZENE
2000U	UG/KG	HEXACHLOROBUTADIENE
2000U	UG/KG	1,2,4-TRICHLOROBENZENE
1000U	UG/KG	NAPHTHALENE
5000U	UG/KG	BIS(2-CHLOROETHOXY) METHANE
2000U	UG/KG	ISOPHORONE
11000U	UG/KG	HEXACHLOROCYCLOPENTADIENE (HCCP)
400J	UG/KG	2-CHLORONAPHTHALENE
1000U	UG/KG	ACENAPHTHYLENE
5000U	UG/KG	ACENAPHTHENE
1000U	UG/KG	DIMETHYL PHTHALATE
1000U	UG/KG	2,4-DINITROTOLUENE
3000U	UG/KG	2,6-DINITROTOLUENE
1000U	UG/KG	4-CHLOROPHENYL PHENYL ETHER
1000U	UG/KG	FLUORENE
3000U	UG/KG	DIETHYL PHTHALATE
2000U	UG/KG	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
3000U	UG/KG	HEXACHLOROBENZENE (HCB)
3000U	UG/KG	4-BROMOPHENYL PHENYL ETHER
4400	UG/KG	PHENANTHRENE
2000J	UG/KG	ANTHRACENE
5000U	UG/KG	DI-N-BUTYLPHTHALATE
15000	UG/KG	FLUORANTHENE
17000	UG/KG	PYRENE
4000U	UG/KG	BENZYL BUTYL PHTHALATE
3000U	UG/KG	BIS(2-ETHYLHEXYL) PHTHALATE
2700	UG/KG	BENZO(A)ANTHRACENE
3000U	UG/KG	CHRYSENE
20000U	UG/KG	3,3'-DICHLOROBENZIDINE
10000U	UG/KG	DI-N-OCTYLPHTHALATE
5600	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
5600	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
4600	UG/KG	BENZO-A-PYRENE
11000U	UG/KG	INDENO (1,2,3-CD) PYRENE
11000U	UG/KG	DIBENZO(A,H)ANTHRACENE
10000U	UG/KG	BENZO(GHI)PERYLENE
1000U	UG/KG	2-CHLOROPHENOL
2000U	UG/KG	2-NITROPHENOL
5000U	UG/KG	PHENOL
4000U	UG/KG	2,4-DIMETHYLPHENOL
2000U	UG/KG	2,4-DICHLOROPHENOL
1000U	UG/KG	2,4,6-TRICHLOROPHENOL
3000U	UG/KG	4-CHLORO-3-METHYLPHENOL
11000U	UG/KG	2,4-DINITROPHENOL
4000U	UG/KG	2-METHYL-4,6-DINITROPHENOL
4000U	UG/KG	PENTACHLOROPHENOL
12000U	UG/KG	4-NITROPHENOL
7.7	%	MOISTURE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85

EXTRACTABLE ORGANIC ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6280 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LA-C2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA498 INORG SAMPLE NO.: MDA424
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
8000U	UG/KG	N-NITROSODIMETHYLAMINE
NA	UG/KG	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
13000U	UG/KG	BENZIDINE
1000U	UG/KG	1,3-DICHLOROBENZENE
1000U	UG/KG	1,4-DICHLOROBENZENE
1000U	UG/KG	1,2-DICHLOROBENZENE
5000U	UG/KG	BIS(2-CHLOROETHYL) ETHER
4000U	UG/KG	HEXACHLOROETHANE
8000U	UG/KG	BIS(2-CHLOROISOPROPYL) ETHER
8000U	UG/KG	N-NITROSODI-N-PROPYLAMINE
2000U	UG/KG	NITROBENZENE
4000U	UG/KG	HEXACHLOROBUTADIENE
2000U	UG/KG	1,2,4-TRICHLOROBENZENE
1200	UG/KG	NAPHTHALENE
2000U	UG/KG	BIS(2-CHLOROETHOXY) METHANE
2000U	UG/KG	ISOPHORONE
12000U	UG/KG	HEXACHLOROCYCLOPENTADIENE (HCCP)
500J	UG/KG	2-CHLORONAPHTHALENE
1500	UG/KG	ACENAPHTHYLENE
5000U	UG/KG	ACENAPHTHENE
1000U	UG/KG	DIMETHYL PHTHALATE
2000U	UG/KG	2,4-DINITROTOLUENE
3000U	UG/KG	2,6-DINITROTOLUENE
1000U	UG/KG	4-CHLOROPHENYL PHENYL ETHER
1000U	UG/KG	FLUORENE
3000U	UG/KG	DIETHYL PHTHALATE
2000U	UG/KG	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
3000U	UG/KG	HEXACHLOROBENZENE (HCB)
3000U	UG/KG	4-BROMOPHENYL PHENYL ETHER
5400	UG/KG	PHENANTHRENE
8200	UG/KG	ANTHRACENE
8000U	UG/KG	DI-N-BUTYLPHTHALATE
25000	UG/KG	FLUORANTHENE
22000	UG/KG	PYRENE
4000U	UG/KG	BENZYL BUTYL PHTHALATE
3000U	UG/KG	BIS(2-ETHYLHEXYL) PHTHALATE
11000	UG/KG	BENZO(A)ANTHRACENE
4000U	UG/KG	CHRYSENE
21000U	UG/KG	3,3'-DICHLOROBENZIDINE
10000U	UG/KG	DI-N-OCTYLPHTHALATE
14000	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
12000	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
11000	UG/KG	BENZO-A-PYRENE
12000U	UG/KG	INDENO (1,2,3-CD) PYRENE
12000U	UG/KG	DIBENZO(A,H)ANTHRACENE
7000U	UG/KG	BENZO(GHI)PERYLENE
1000U	UG/KG	2-CHLOROPHENOL
2000U	UG/KG	2-NITROPHENOL
3000U	UG/KG	PHENOL
4000U	UG/KG	2,4-DIMETHYLPHENOL
2000U	UG/KG	2,4-DICHLOROPHENOL
1000U	UG/KG	2,4,6-TRICHLOROPHENOL
3000U	UG/KG	4-CHLORO-3-METHYLPHENOL
12000U	UG/KG	2,4-DINITROPHENOL
4000U	UG/KG	2-METHYL-4,6-DINITROPHENOL
4000J	UG/KG	PENTACHLOROPHENOL
13000U	UG/KG	4-NITROPHENOL
16	%	MOISTURE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6281 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LR-C3
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA499 INORG SAMPLE NO.: MDA425
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
7000U	UG/KG	N-NITROSODIMETHYLAMINE
NA	UG/KG	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
12000U	UG/KG	BENZIDINE
1000U	UG/KG	1,3-DICHLOROBENZENE
1000U	UG/KG	1,4-DICHLOROBENZENE
1000U	UG/KG	1,2-DICHLOROBENZENE
4000U	UG/KG	BIS(2-CHLOROETHYL) ETHER
4000U	UG/KG	HEXACHLOROETHANE
7000U	UG/KG	BIS(2-CHLOROISOPROPYL) ETHER
6000U	UG/KG	N-NITROSODI-N-PROPYLAMINE
2000U	UG/KG	NITROBENZENE
5000U	UG/KG	HEXACHLOROBUTADIENE
2000U	UG/KG	1,2,4-TRICHLOROBENZENE
1000U	UG/KG	NAPHTHALENE
3000U	UG/KG	BIS(2-CHLOROETHOXY) METHANE
2000U	UG/KG	ISOPHORONE
10000U	UG/KG	HEXACHLOROCYCLOPENTADIENE (HCCP)
400J	UG/KG	2-CHLORONAPHTHALENE
1000J	UG/KG	ACENAPHTHYLENE
5000U	UG/KG	ACENAPHTHENE
1000U	UG/KG	DIMETHYL PHTHALATE
1000U	UG/KG	2,4-DINITROTOLUENE
3000U	UG/KG	2,6-DINITROTOLUENE
1000U	UG/KG	4-CHLOROPHENYL PHENYL ETHER
1000U	UG/KG	FLUORENE
3000U	UG/KG	DIETHYL PHTHALATE
2000U	UG/KG	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
2000U	UG/KG	HEXACHLOROBENZENE (HCB)
3000U	UG/KG	4-BROMOPHENYL PHENYL ETHER
1400	UG/KG	PHENANTHRENE
2000J	UG/KG	ANTHRACENE
10000U	UG/KG	DI-N-BUTYLPHTHALATE
10000	UG/KG	FLUORANTHENE
10000J	UG/KG	PYRENE
4000U	UG/KG	BENZYL BUTYL PHTHALATE
3000U	UG/KG	BIS(2-ETHYLHEXYL) PHTHALATE
3900	UG/KG	BENZO(A)ANTHRACENE
7100	UG/KG	CHRYSENE
20000U	UG/KG	3,3'-DICHLOROBENZIDINE
10000U	UG/KG	DI-N-OCTYLPHTHALATE
7300	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
6600	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
5800	UG/KG	BENZO-A-PYRENE
20000U	UG/KG	INDENO (1,2,3-CD) PYRENE
10000U	UG/KG	DIBENZO(A,H)ANTHRACENE
10000U	UG/KG	BENZO(GHI)PERYLENE
1000U	UG/KG	2-CHLOROPHENOL
2000U	UG/KG	2-NITROPHENOL
3000U	UG/KG	PHENOL
4000U	UG/KG	2,4-DIMETHYLPHENOL
2000U	UG/KG	2,4-DICHLOROPHENOL
1000U	UG/KG	2,4,6-TRICHLOROPHENOL
3000U	UG/KG	4-CHLORO-3-METHYLPHENOL
11000U	UG/KG	2,4-DINITROPHENOL
4000U	UG/KG	2-METHYL-4,6-DINITROPHENOL
4000U	UG/KG	PENTACHLOROPHENOL
12000U	UG/KG	4-NITROPHENOL
5.8	%	MOISTURE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85

EXTRACTABLE ORGANIC ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6284 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LC-C4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4644 INORG SAMPLE NO.: MDA413
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A=AVERAGE VALUE *NA=NOT ANALYZED *NAI=INTERFERENCES
*J=ESTIMATED VALUE *N=PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K=ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L=ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U=MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
10000U	UG/KG	N-NITROSODIMETHYLAMINE
NA	UG/KG	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
12000U	UG/KG	BENZIDINE
1000U	UG/KG	1,3-DICHLOROBENZENE
1000U	UG/KG	1,4-DICHLOROBENZENE
1000U	UG/KG	1,2-DICHLOROBENZENE
4000U	UG/KG	BIS(2-CHLOROETHYL) ETHER
4000U	UG/KG	HEXACHLOROETHANE
7000U	UG/KG	BIS(2-CHLOROISOPHOPYL) ETHER
7000U	UG/KG	N-NITROSODI-N-PROPYLAMINE
2000U	UG/KG	NITROBENZENE
5000U	UG/KG	HEXACHLOROBUTADIENE
2000U	UG/KG	1,2,4-TRICHLOROBENZENE
1000U	UG/KG	NAPHTHALENE
3000U	UG/KG	BIS(2-CHLOROETHOXY) METHANE
2000U	UG/KG	ISOPHORONE
11000U	UG/KG	HEXACHLOROCYCLOPENTADIENE (HCCP)
1000U	UG/KG	2-CHLORONAPHTHALENE
6300	UG/KG	ACENAPHTHYLENE
170000	UG/KG	ACENAPHTHENE
1000U	UG/KG	DIMETHYL PHTHALATE
1000U	UG/KG	2,4-DINITROTOLUENE
3000U	UG/KG	2,6-DINITROTOLUENE
1000U	UG/KG	4-CHLOROPHENYL PHENYL ETHER
170000	UG/KG	FLUORENE
4000U	UG/KG	DIETHYL PHTHALATE
4000U	UG/KG	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
4000U	UG/KG	HEXACHLOROBENZENE (HCB)
4000U	UG/KG	4-BROMOPHENYL PHENYL ETHER
390000	UG/KG	PHENANTHRENE
170000	UG/KG	ANTHRACENE
6500	UG/KG	DI-N-BUTYLPHTHALATE
29000	UG/KG	FLUORANTHENE
220000	UG/KG	PYRENE
4000U	UG/KG	BENZYL BUTYL PHTHALATE
4000U	UG/KG	BIS(2-ETHYLHEXYL) PHTHALATE
130000	UG/KG	BENZO(A)ANTHRACENE
120000	UG/KG	CHRYSENE
20000U	UG/KG	3,3'-DICHLOROBENZIDINE
10000U	UG/KG	DI-N-OCTYLPHTHALATE
48000	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
45000	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
37000	UG/KG	BENZO-A-PYRENE
10000J	UG/KG	INDENO (1,2,3-CD) PYRENE
11000U	UG/KG	DIBENZO(A,H)ANTHRACENE
9000	UG/KG	BENZO(GHI)PERYLENE
1000U	UG/KG	2-CHLOROPHENOL
2000U	UG/KG	2-NITROPHENOL
4000U	UG/KG	PHENOL
4000U	UG/KG	2,4-DIMETHYLPHENOL
2000U	UG/KG	2,4-DICHLOROPHENOL
2000U	UG/KG	2,4,6-TRICHLOROPHENOL
4000U	UG/KG	4-CHLORO-3-METHYLPHENOL
11000U	UG/KG	2,4-DINITROPHENOL
4000U	UG/KG	2-METHYL-4,6-DINITROPHENOL
150000	UG/KG	PENTACHLOROPHENOL
12000U	UG/KG	4-NITROPHENOL
8.3	%	MOISTURE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6278 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-S
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA496 INORG SAMPLE NO.: MDA422
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
400U	UG/KG	N-NITROSODIMETHYLAMINE
NA	UG/KG	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
500U	UG/KG	BENZIDINE
100U	UG/KG	1,3-DICHLOROBENZENE
100U	UG/KG	1,4-DICHLOROBENZENE
100U	UG/KG	1,2-DICHLOROBENZENE
400U	UG/KG	BIS(2-CHLOROETHYL) ETHER
200U	UG/KG	HEXACHLOROETHANE
400U	UG/KG	BIS(2-CHLOROISOPROPYL) ETHER
400U	UG/KG	N-NITROSODI-N-PROPYLAMINE
100U	UG/KG	NITROBENZENE
200U	UG/KG	HEXACHLOROBUTADIENE
100U	UG/KG	1,2,4-TRICHLOROBENZENE
100U	UG/KG	NAPHTHALENE
100U	UG/KG	BIS(2-CHLOROETHOXY) METHANE
60J	UG/KG	ISOPHORONE
400U	UG/KG	HEXACHLOROCYCLOPENTADIENE (HCCP)
19	UG/KG	2-CHLORONAPHTHALENE
30J	UG/KG	ACENAPHTHYLENE
200U	UG/KG	ACENAPHTHENE
100U	UG/KG	DIMETHYL PHTHALATE
100U	UG/KG	2,4-DINITROTOLUENE
100U	UG/KG	2,6-DINITROTOLUENE
100U	UG/KG	4-CHLOROPHENYL PHENYL ETHER
100U	UG/KG	FLUORENE
100U	UG/KG	DIETHYL PHTHALATE
100U	UG/KG	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
100U	UG/KG	HEXACHLOROBENZENE (HCB)
100U	UG/KG	4-BROMOPHENYL PHENYL ETHER
70	UG/KG	PHENANTHRENE
70J	UG/KG	ANTHRACENE
200U	UG/KG	DI-N-BUTYLPHTHALATE
350	UG/KG	FLUORANTHENE
300J	UG/KG	PYRENE
200U	UG/KG	BENZYL BUTYL PHTHALATE
100U	UG/KG	BIS(2-ETHYLHEXYL) PHTHALATE
78	UG/KG	BENZO(A)ANTHRACENE
160	UG/KG	CHRYSENE
700U	UG/KG	3,3'-DICHLOROBENZIDINE
400U	UG/KG	DI-N-OCTYLPHTHALATE
110	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
100J	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
90J	UG/KG	BENZO-A-PYRENE
400U	UG/KG	INDENO (1,2,3-CD) PYRENE
400U	UG/KG	DIBENZO(A,H)ANTHRACENE
400U	UG/KG	BENZO(GHI)PERYLENE
100U	UG/KG	2-CHLOROPHENOL
100U	UG/KG	2-NITROPHENOL
100U	UG/KG	PHENOL
200U	UG/KG	2,4-DIMETHYLPHENOL
100U	UG/KG	2,4-DICHLOROPHENOL
100U	UG/KG	2,4,6-TRICHLOROPHENOL
100U	UG/KG	4-CHLORO-3-METHYLPHENOL
400U	UG/KG	2,4-DINITROPHENOL
200U	UG/KG	2-METHYL-4,6-DINITROPHENOL
200U	UG/KG	PENTACHLOROPHENOL
500U	UG/KG	4-NITROPHENOL
12	%	MOISTURE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6277 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-S1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA495 INORG SAMPLE NO.: MDA421
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE ESTIMATED MINIMUM QUANTITATION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
400U	UG/KG	N-NITROSODIMETHYLAMINE
NA	UG/KG	1,2-DIPHENYLHYDRAZINE/AZOBENZENE
600U	UG/KG	BENZIDINE
100U	UG/KG	1,3-DICHLOROBENZENE
100U	UG/KG	1,4-DICHLOROBENZENE
100U	UG/KG	1,2-DICHLOROBENZENE
200U	UG/KG	BIS(2-CHLOROETHYL) ETHER
200U	UG/KG	HEXACHLOROETHANE
400U	UG/KG	BIS(2-CHLOROISOPROPYL) ETHER
400U	UG/KG	N-NITROSODI-N-PROPYLAMINE
100U	UG/KG	NITROBENZENE
400U	UG/KG	HEXACHLOROBUTADIENE
100U	UG/KG	1,2,4-TRICHLOROBENZENE
100U	UG/KG	NAPHTHALENE
200U	UG/KG	BIS(2-CHLOROETHOXY) METHANE
80J	UG/KG	ISOPHORONE
500U	UG/KG	HEXACHLOROCYCLOPENTADIENE (HCCP)
24	UG/KG	2-CHLORONAPHTHALENE
100U	UG/KG	ACENAPHTHYLENE
200U	UG/KG	ACENAPHTHENE
100U	UG/KG	DIMETHYL PHTHALATE
100U	UG/KG	2,4-DINITROTOLUENE
100U	UG/KG	2,6-DINITROTOLUENE
100U	UG/KG	4-CHLOROPHENYL PHENYL ETHER
100U	UG/KG	FLUORENE
100U	UG/KG	DIETHYL PHTHALATE
100U	UG/KG	N-NITROSODIPHENLYAMINE/DIPHENYLAMINE
100U	UG/KG	HEXACHLOROBENZENE (HCB)
200U	UG/KG	4-BROMOPHENYL PHENYL ETHER
100U	UG/KG	PHENANTHRENE
100U	UG/KG	ANTHRACENE
200U	UG/KG	DI-N-BUTYLPHTHALATE
300J	UG/KG	FLUORANTHENE
500J	UG/KG	PYRENE
200U	UG/KG	BENZYL BUTYL PHTHALATE
200U	UG/KG	BIS(2-ETHYLHEXYL) PHTHALATE
100U	UG/KG	BENZO(A)ANTHRACENE
200U	UG/KG	CHRYSENE
1000U	UG/KG	3,3'-DICHLOROBENZIDINE
500U	UG/KG	DI-N-OCTYLPHTHALATE
100U	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
200U	UG/KG	BENZO(B AND/OR K)FLUORANTHENE
200U	UG/KG	BENZO-A-PYRENE
500U	UG/KG	INDENO (1,2,3-CD) PYRENE
500U	UG/KG	DIBENZO(A,H)ANTHRACENE
500U	UG/KG	BENZO(GHI)PERYLENE
100U	UG/KG	2-CHLOROPHENOL
100U	UG/KG	2-NITROPHENOL
200U	UG/KG	PHENOL
200U	UG/KG	2,4-DIMETHYLPHENOL
100U	UG/KG	2,4-DICHLOROPHENOL
100U	UG/KG	2,4,6-TRICHLOROPHENOL
200U	UG/KG	4-CHLORO-3-METHYLPHENOL
500U	UG/KG	2,4-DINITROPHENOL
200U	UG/KG	2-METHYL-4,6-DINITROPHENOL
200U	UG/KG	PENTACHLOROPHENOL
600U	UG/KG	4-NITROPHENOL
32	%	MOISTURE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6279 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-JA-C1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA497 INORG SAMPLE NO.: MDA423
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
2000U	BENZOIC ACID
10000U	2-METHYLPHENOL
10000U	4-METHYLPHENOL
5000U	2,4,5-TRICHLOROPHENOL
10000U	ANILINE
2000U	BENZYL ALCOHOL
11000U	4-CHLOROANILINE
300J	DIBENZOFURAN
6000U	2-METHYL NAPHTHALENE
2000U	2-NITROANILINE
23000U	3-NITROANILINE
5000U	4-NITROANILINE
7000JN	TETRAHYDRODIMETHYLPYRANONE
3000JN	BENZO(J)FLUORANTHENE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6280 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LA-C2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA498 INORG SAMPLE NO.: MDA424
CONTRACT LABORATORY(ORGANIC): URTI
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
2000U	BENZOIC ACID
8000U	2-METHYLPHENOL
8000U	4-METHYLPHENOL
3000U	2,4,5-TRICHLOROPHENOL
11000U	ANILINE
2000U	BENZYL ALCOHOL
12000U	4-CHLOROANILINE
900J	DIBENZOFURAN
7000U	2-METHYL NAPHTHALENE
2000U	2-NITROANILINE
25000U	3-NITROANILINE
5000U	4-NITROANILINE
8000JN	DIMETHYLTETRAHYDROPYRAN-2-ONE
6000JN	BENZO(J)FLUORANTHENE
4000JN	BENZO(GHI)FLUORANTHENE
5000J	2 UNIDENTIFIED POLYNUCLEAR AROMATICS

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6281 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LB-C3
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA499 INORG SAMPLE NO.: MDA425
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
2000U	BENZOIC ACID
7000U	2-METHYLPHENOL
7000U	4-METHYLPHENOL
2000U	2,4,5-TRICHLOROPHENOL
10000U	ANILINE
2000U	BENZYL ALCOHOL
12000U	4-CHLOROANILINE
300J	DIBENZOFURAN
6000U	2-METHYL NAPHTHALENE
2000U	2-NITROANILINE
22000U	3-NITROANILINE
4000U	4-NITROANILINE
4000JN	BENZO(J)FLUORANTHENE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6284 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LC-C4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4644 INORG SAMPLE NO.: MDA413
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
2000U	BENZOIC ACID
10000U	2-METHYLPHENOL
10000U	4-METHYLPHENOL
3000U	2,4,5-TRICHLOROPHENOL
10000U	ANILINE
2000U	BENZYL ALCOHOL
11000U	4-CHLOROANILINE
110000	DIBENZOFURAN
16000	2-METHYL NAPHTHALENE
2000U	2-NITROANILINE
23000U	3-NITROANILINE
5000U	4-NITROANILINE
10000JN	ETHYLIDENEINDENE
50000JN	DIMETHYLNAPHTHALENE
20000JN	TRIMETHYLNAPHTHALENES
20000JN	XANTHENE
40000JN	METHYLDIBENZOFURAN
20000JN	METHYLFLUORENE
8000JN	DIHYDRONAPHTHOFURAN
70000J	2 UNIDENTIFIED METHYLPHENANTHRENES
70000JN	CYCLOPENTAPHENANTHRENE
100000J	2 UNIDENTIFIED BENZOFLUORENE COMPOUNDS
40000JN	BENZO(B)NAPHTHOTHIOPHENE
40000JN	BENZO(J)FLUORANTHENE
60000J	3 UNIDENTIFIED METHYLPYRENES

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6278 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-S
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN. RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA496 INORG SAMPLE NO.: MDA422
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
100U	BENZOIC ACID
400U	2-METHYLPHENOL
400U	4-METHYLPHENOL
100U	2,4,5-TRICHLOROPHENOL
400U	ANILINE
100U	BENZYL ALCOHOL
400U	4-CHLOROANILINE
100U	DIBENZOFURAN
200U	2-METHYL NAPHTHALENE
100U	2-NITROANILINE
800U	3-NITROANILINE
200U	4-NITROANILINE
2000JN	ACETYLOXYHEXANONE
5000JN	DIMETHYLFURANONE
10000J	3 UNIDENTIFIED HYDROCARBONS
30000JN	1 UNIDENTIFIED BROMINATED COMPOUND

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 EXTRACTABLE ORGANIC ANALYSIS, MISC
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6277 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-S1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE,/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST:
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA495 INORG SAMPLE NO.: MDA421
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE MINIMUM DETECTION LIMIT.

*****ANALYTICAL RESULTS*****

RESULTS IN: UG/KG	COMPOUND NAME
100U	BENZOIC ACID
400U	2-METHYLPHENOL
300U	4-METHYLPHENOL
100U	2,4,5-TRICHLOROPHENOL
500U	ANILINE
100U	BENZYL ALCOHOL
500U	4-CHLOROANILINE
100U	DIBENZOFURAN
300U	2-METHYL NAPHTHALENE
100U	2-NITROANILINE
1000U	3-NITROANILINE
200U	4-NITROANILINE
200000J	11 UNIDENTIFIED COMPOUNDS
5000J	1 UNIDENTIFIED BROMINATED COMPOUND
10000JN	DIMETHYLHEPTANONE
20JN	HEXADECANOIC ACID
2000JN	ACETYLOXYHEXANONE
8000JN	DIMETHYLFURANONE

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6279 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-JA-C1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHB
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA497 INORG SAMPLE NO.: MDA423
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.
DATA REPORTED ON DRY WEIGHT BASIS

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.5U	UG/KG	ALDRIN
0.5U	UG/KG	HEPTACHLOR
1.0U	UG/KG	HEPTACHLOR EPOXIDE
0.5U	UG/KG	ALPHA-BHC
1.0U	UG/KG	BETA-BHC
0.5U	UG/KG	GAMMA-BHC (LINDANE)
1.0U	UG/KG	DELTA-BHC
0.5U	UG/KG	ENDOSULFAN I (ALPHA)
1.0U	UG/KG	DIELDRIN
1.0U	UG/KG	4,4'-DDT (P,P'-DDT)
2.0U	UG/KG	4,4'-DDE (P,P'-DDE)
4.0U	UG/KG	4,4'-DDD (P,P'-DDD)
0.5U	UG/KG	ENDRIN
1.0U	UG/KG	ENDOSULFAN II (BETA)
3.0U	UG/KG	ENDOSULFAN SULFATE
10U	UG/KG	CHLORDANE (TECH. MIXTURE) /1
11U	UG/KG	PCB-1242 (AROCLOR 1242)
21U	UG/KG	PCB-1254 (AROCLOR 1254)
33U	UG/KG	PCB-1221 (AROCLOR 1221)
11U	UG/KG	PCB-1232 (AROCLOR 1232)
11U	UG/KG	PCB-1248 (AROCLOR 1248)
11U	UG/KG	PCB-1260 (AROCLOR 1260)
33U	UG/KG	PCB-1016 (AROCLOR 1016)
11U	UG/KG	TOXAPHENE
2.2U	UG/KG	ENDRIN ALDEHYDE
NA	UG/KG	2,3,7,8 TCDD(DIOXIN)
**	UG/KG	CHLORDENE /2
**	UG/KG	ALPHA-CHLORDENE /2
**	UG/KG	GAMMA-CHLORDENE /2
**	UG/KG	1-HYDROXYCHLORDENE /2
**	UG/KG	GAMMA-CHLORDANE /2
**	UG/KG	TRANS-NONACHLOR /2
**	UG/KG	ALPHA-CHLORDANE /2
**	UG/KG	CIS-NONACHLOR /2
10U	UG/KG	METHOXYCHLOR
10U	UG/KG	ENDRIN KETONE
7.7	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6280 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LA-C2
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA498 INORG SAMPLE NO.: MDA424
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW,
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND	
0.2U	UG/KG	ALDRIN	
0.7U	UG/KG	HEPTACHLOR	
0.7U	UG/KG	HEPTACHLOR EPOXIDE	
0.4U	UG/KG	ALPHA-BHC	
0.7U	UG/KG	BETA-BHC	
0.1U	UG/KG	GAMMA-BHC (LINDANE)	
0.8U	UG/KG	DELTA-BHC	
0.2U	UG/KG	ENDOSULFAN I (ALPHA)	
1.1U	UG/KG	DIELDRIN	
4U	UG/KG	4,4'-DDT (P,P'-DDT)	
0.7U	UG/KG	4,4'-DDE (P,P'-DDE)	
1.2U	UG/KG	4,4'-DDD (P,P'-DDD)	
0.2U	UG/KG	ENDRIN	
6U	UG/KG	ENDOSULFAN II (BETA)	
36U	UG/KG	ENDOSULFAN SULFATE	
12U	UG/KG	CHLORDANE (TECH. MIXTURE)	/1
12U	UG/KG	PCB-1242 (AROCLOR 1242)	
24U	UG/KG	PCB-1254 (AROCLOR 1254)	
36U	UG/KG	PCB-1221 (AROCLOR 1221)	
12U	UG/KG	PCB-1232 (AROCLOR 1232)	
12U	UG/KG	PCB-1248 (AROCLOR 1248)	
12U	UG/KG	PCB-1260 (AROCLOR 1260)	
36U	UG/KG	PCB-1016 (AROCLOR 1016)	
12U	UG/KG	TOXAPHENE	
7U	UG/KG	ENDRIN ALDEHYDE	
NA	UG/KG	2,3,7,8 TCDD(DIOXIN)	
--	UG/KG	CHLORDENE	/2
--	UG/KG	ALPHA-CHLORDENE	/2
--	UG/KG	GAMMA-CHLORDENE	/2
--	UG/KG	1-HYDROXYCHLORDENE	/2
--	UG/KG	GAMMA-CHLORDANE	/2
--	UG/KG	TRANS-NONACHLOR	/2
--	UG/KG	ALPHA-CHLORDANE	/2
--	UG/KG	CIS-NONACHLOR	/2
7U	UG/KG	METHOXYCHLOR	
7U	UG/KG	ENDRIN KETONE	
16	%	MOISTURE	

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6281 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH. WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LR-C3
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA499 INORG SAMPLE NO.: NDA425
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.5U	UG/KG	ALDRIN
0.5U	UG/KG	HEPTACHLOR
1U	UG/KG	HEPTACHLOR EPOXIDE
0.5U	UG/KG	ALPHA-BHC
1U	UG/KG	BETA-BHC
0.5U	UG/KG	GAMMA-BHC (LINDANE)
1U	UG/KG	DELTA-BHC
0.5U	UG/KG	ENDOSULFAN I (ALPHA)
1U	UG/KG	DIELDRIN
5U	UG/KG	4,4'-DDT (P,P'-DDT)
1U	UG/KG	4,4'-DDE (P,P'-DDE)
2U	UG/KG	4,4'-DDD (P,P'-DDD)
0.5U	UG/KG	ENDRIN
1U	UG/KG	ENDOSULFAN II (BETA)
37U	UG/KG	ENDOSULFAN SULFATE
10U	UG/KG	CHLORDANE (TECH. MIXTURE) /1
10U	UG/KG	PCB-1242 (AROCLOR 1242)
30U	UG/KG	PCB-1254 (AROCLOR 1254)
40U	UG/KG	PCB-1221 (AROCLOR 1221)
20U	UG/KG	PCB-1232 (AROCLOR 1232)
20U	UG/KG	PCB-1248 (AROCLOR 1248)
20U	UG/KG	PCB-1260 (AROCLOR 1260)
40U	UG/KG	PCB-1016 (AROCLOR 1016)
20U	UG/KG	TOXAPHENE
3U	UG/KG	ENDRIN ALDEHYDE
NA	UG/KG	2,3,7,8 TCDD(DIOXIN)
--	UG/KG	CHLORDENE /2
--	UG/KG	ALPHA-CHLORDENE /2
--	UG/KG	GAMMA-CHLORDENE /2
--	UG/KG	1-HYDROXYCHLORDENE /2
--	UG/KG	GAMMA-CHLORDANE /2
--	UG/KG	TRANS-NONACHLOR /2
--	UG/KG	ALPHA-CHLORDANE /2
--	UG/KG	CIS-NONACHLOR /2
10U	UG/KG	METHOXYCHLOR
10U	UG/KG	ENDRIN KETONE
5.8	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6284 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-LC-C4
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: D4644 INORG SAMPLE NO.: MDA413
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND	
0.5U	UG/KG	ALDRIN	
0.5U	UG/KG	HEPTACHLOR	
1.0U	UG/KG	HEPTACHLOR EPOXIDE	
0.5U	UG/KG	ALPHA-BHC	
1.0U	UG/KG	BETA-BHC	
0.5U	UG/KG	GAMMA-BHC (LINDANE)	
1.0U	UG/KG	DELTA-BHC	
0.5U	UG/KG	ENDOSULFAN I (ALPHA)	
1.0U	UG/KG	DIELDRIN	
5U	UG/KG	4,4'-DDT (P,P'-DDT)	
1U	UG/KG	4,4'-DDE (P,P'-DDE)	
5U	UG/KG	4,4'-DDD (P,P'-DDD)	
0.5U	UG/KG	ENDRIN	
1.0U	UG/KG	ENDOSULFAN II (BETA)	
33U	UG/KG	ENDOSULFAN SULFATE	
10U	UG/KG	CHLORDANE (TECH. MIXTURE)	/1
33U	UG/KG	PCB-1242 (AROCLOR 1242)	
33U	UG/KG	PCB-1254 (AROCLOR 1254)	
33U	UG/KG	PCB-1221 (AROCLOR 1221)	
33U	UG/KG	PCB-1232 (AROCLOR 1232)	
33U	UG/KG	PCB-1248 (AROCLOR 1248)	
33U	UG/KG	PCB-1260 (AROCLOR 1260)	
33U	UG/KG	PCB-1016 (AROCLOR 1016)	
33U	UG/KG	TOXAPHENE	
3U	UG/KG	ENDRIN ALDEHYDE	
NA	UG/KG	2,3,7,8 TCDD(DIOXIN)	
--	UG/KG	CHLORDENE	/2
--	UG/KG	ALPHA-CHLORDENE	/2
--	UG/KG	GAMMA-CHLORDENE	/2
--	UG/KG	1-HYDROXYCHLORDENE	/2
--	UG/KG	GAMMA-CHLORDANE	/2
--	UG/KG	TRANS-NONACHLOR	/2
--	UG/KG	ALPHA-CHLORDANE	/2
--	UG/KG	CIS-NONACHLOR	/2
10U	UG/KG	METHOXYCHLOR	
10U	UG/KG	ENDRIN KETONE	
8.3%	%	MOISTURE	

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
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*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-ESD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6278 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-RB-S
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA496 INORG SAMPLE NO.: MDA422
CONTRACT LABORATORY(ORGANIC): UBTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.04U	UG/KG	ALDRIN
0.08U	UG/KG	HEPTACHLOR
0.1U	UG/KG	HEPTACHLOR EPOXIDE
0.08U	UG/KG	ALPHA-BHC
0.1U	UG/KG	BETA-BHC
0.04U	UG/KG	GAMMA-BHC (LINDANE)
0.1U	UG/KG	DELTA-BHC
0.04U	UG/KG	ENDOSULFAN I (ALPHA)
0.2U	UG/KG	DIELDRIN
0.6U	UG/KG	4,4'-DDT (P,P'-DDT)
0.1U	UG/KG	4,4'-DDE (P,P'-DDE)
0.2U	UG/KG	4,4'-DDD (P,P'-DDD)
0.04U	UG/KG	ENDRIN
0.1U	UG/KG	ENDOSULFAN II (BETA)
10U	UG/KG	ENDOSULFAN SULFATE
5U	UG/KG	CHLORDANE (TECH. MIXTURE) /1
5U	UG/KG	PCB-1242 (AROCLOR 1242)
5U	UG/KG	PCB-1254 (AROCLOR 1254)
10U	UG/KG	PCB-1221 (AROCLOR 1221)
5U	UG/KG	PCB-1232 (AROCLOR 1232)
5U	UG/KG	PCB-1248 (AROCLOR 1248)
5U	UG/KG	PCB-1260 (AROCLOR 1260)
10U	UG/KG	PCB-1016 (AROCLOR 1016)
5U	UG/KG	TOXAPHENE
0.4U	UG/KG	ENDRIN ALDEHYDE
NA	UG/KG	2,3,7,8 TCDD(DIOXIN)
**	UG/KG	CHLORDENE /2
**	UG/KG	ALPHA-CHLORDENE /2
**	UG/KG	GAMMA-CHLORDENE /2
**	UG/KG	1-HYDROXYCHLORDENE /2
**	UG/KG	GAMMA-CHLORDANE /2
**	UG/KG	TRANS-NONACHLOR /2
**	UG/KG	ALPHA-CHLORDANE /2
**	UG/KG	CIS-NONACHLOR /2
2U	UG/KG	METHOXYCHLOR
2U	UG/KG	ENDRIN KETONE
12	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED, THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
FPA-FSD,REG IV
ATHENS GEORGIA

06/14/85 PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS
SEDIMENT/SOIL/SLUDGE(DRY WT)

SAMPLE NO.: 85C6277 SAMPLE TYPE: SOIL

PROJECT NO.: 85-048 PROGRAM ELEMENT: NSF
SOURCE: SOUTH, WOOD PIEDMONT
CITY: WILMINGTON STATE: NC

STATION I.D.: SWP-BK-S1
STORET STATION NO:

SAMPLE COLLECTION: START DATE/TIME 01/07/85
SAMPLE COLLECTION: STOP DATE/TIME 00/00/00

COLLECTED BY: B HANSEN RECEIVED FROM:
SAMPLE REC'D: DATE/TIME 00/00/00 REC'D BY:
SEALED:

CHEMIST: MHR
ANALYTICAL METHOD:

CASE NO.: 3454 ORG SAMPLE NO: DA495 INORG SAMPLE NO.: MDA421
CONTRACT LABORATORY(ORGANIC): URTL
CONTRACT LABORATORY(INORGANIC): WILSON

REMARK:
REMARK:

SAMPLE LOG VERIFIED BY: PLB DATA VERIFIED BY: JWT

REMARKS
THIS DATA HAS NOT BEEN SUBJECTED TO A QC REVIEW.
DATA SHOULD BE LIMITED TO SITE SCREENING.

*****ANALYTICAL RESULTS*****

RESULTS	UNITS	COMPOUND
0.05U	UG/KG	ALDRIN
0.1U	UG/KG	HEPTACHLOR
0.1U	UG/KG	HEPTACHLOR EPOXIDE
0.1U	UG/KG	ALPHA-BHC
0.1U	UG/KG	BETA-BHC
0.1U	UG/KG	GAMMA-BHC (LINDANE)
0.2U	UG/KG	DELTA-BHC
0.05U	UG/KG	ENDOSULFAN I (ALPHA)
0.2U	UG/KG	DIELDRIN
0.7U	UG/KG	4,4'-DDT (P,P'-DDT)
7.4	UG/KG	4,4'-DDE (P,P'-DDE)
5.9	UG/KG	4,4'-DDD (P,P'-DDD)
0.05U	UG/KG	ENDRIN
0.1U	UG/KG	ENDOSULFAN II (BETA)
1.0U	UG/KG	ENDOSULFAN SULFATE
2.2U	UG/KG	CHLORDANE (TECH. MIXTURE) /1
2.2U	UG/KG	PCB-1242 (AROCLOR 1242)
5.9U	UG/KG	PCB-1254 (AROCLOR 1254)
7.4U	UG/KG	PCB-1221 (AROCLOR 1221)
2.5U	UG/KG	PCB-1232 (AROCLOR 1232)
2.5U	UG/KG	PCB-1248 (AROCLOR 1248)
2.5U	UG/KG	PCB-1260 (AROCLOR 1260)
7.4U	UG/KG	PCB-1016 (AROCLOR 1016)
2.5U	UG/KG	TOXAPHENE
0.5U	UG/KG	ENDRIN ALDEHYDE
NA	UG/KG	2,3,7,8 TCDD(DIOXIN)
--	UG/KG	CHLORDENE /2
--	UG/KG	ALPHA-CHLORDENE /2
--	UG/KG	GAMMA-CHLORDENE /2
--	UG/KG	1-HYDROXYCHLORDENE /2
--	UG/KG	GAMMA-CHLORDANE /2
--	UG/KG	TRANS-NONACHLOR /2
--	UG/KG	ALPHA-CHLORDANE /2
--	UG/KG	CIS-NONACHLOR /2
1.5U	UG/KG	METHOXYCHLOR
1.5U	UG/KG	ENDRIN KETONE
37	%	MOISTURE

****

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES
*J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS
THE ESTIMATED MINIMUM QUANTITATION LIMIT.
1. WHEN NO VALUE IS REPORTED, SEE CHLORDANE CONSTITUENTS.
2. CONSTITUENTS OR METABOLITES OF TECHNICAL CHLORDANE.

APPENDIX B

Agency
Washington, DC 20460
July, 1981

EPA

Potential Hazardous Waste Site

Site Inspection Report

DRAFT

Site Inspection Report

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D058172467

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Southern Wood Piedmont	

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Wilmington	NC		New Hanover		

09 COORDINATES LATITUDE ___ LONGITUDE ___

10 TYPE OF OWNERSHIP (Check one): ☒ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION: 1 7 85 (MONTH DAY YEAR)

02 SITE STATUS: ☐ ACTIVE ☒ INACTIVE

03 YEARS OF OPERATION: 1932 / 1983 (BEGINNING YEAR / ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply): ☐ A. EPA ☒ B. EPA CONTRACTOR NUS, Region III FIT (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ___ (Name of firm) ☐ E. STATE ☐ F. STATE CONTRACTOR ___ (Name of firm) ☐ G. OTHER ___ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Barbara Hanson	Chemist	NUS	(404) 938-7710

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Maurice Lowan	Field Technician	"	( ) "
Bob Donaghue		"	( ) "
Bob Rose	Environmental Sci.	"	( ) "
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
Henry Phillips	Manager	Southern Wood Piedmont	( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	0910	Windy, Clear, Cold (≈ 36°F)

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Charles Burdell	Southern Wood Piedmont	(803) 576-7460

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Barbara Hanson		NUS	(404) 938-7710	1 23 85 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D058517467

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☒ C. SLUDGE
- ☐ D. OTHER _____ (Specify)
- ☐ E. SLURRY
- ☐ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- ☐ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ C CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None observed

01 ☐ D FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None observed

01 ☐ E DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☒ F CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED _____ (Acres)
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ G DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ H WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None observed

01 ☐ I POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED _____
02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None observed

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D058517467

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
None observed

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)
None observed

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
None observed

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills, Runoff, Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION
None observed

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
None observed

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Unknown

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Unknown

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
Unknown

III. TOTAL POPULATION POTENTIALLY AFFECTED: Unknown

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)
Site investigation 1/7/85

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D058517467

II. PERMIT INFORMATION Unknown - To be updated

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A NPDES				
☐ B UIC				
☐ C AIR				
☐ D RCRA				
☐ E RCRA INTERIM STATUS				
☐ F SPCC PLAN				
☐ G STATE (Specify)				
☐ H LOCAL (Specify)				
☐ I OTHER (Specify)				
☐ J NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A SURFACE IMPOUNDMENT		
☐ B PILES		
☐ C DRUMS, ABOVE GROUND		
☐ D TANK, ABOVE GROUND		
☐ E TANK, BELOW GROUND		
☐ F LANDFILL		
☒ G LANDFARM		
☐ H OPEN DUMP		
☐ I OTHER _____ (Specify)		

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER _____ (Specify)

05 OTHER

- ☐ A. BUILDINGS ON SITE

06 AREA OF SITE

_____ (Acres)

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☒ B. MODERATE ☐ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ☐ YES ☐ NO

02 COMMENTS

Contaminated ~~waste~~ Soils landfarmed in 3 areas on site

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

Site inspection 1/~~23~~ 7/85

BJ

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D058517467

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☒
NON-COMMUNITY	C. ☐	D. ☐

02 STATUS Unknown

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☐
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE
A. 0.75 (mi)
B. _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A ONLY SOURCE FOR DRINKING ☒ B DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER Unknown

03 DISTANCE TO NEAREST DRINKING WATER WELL 0.75 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
Unknown (ft)	Unknown	Unknown (ft)	Unknown (gpd)	☐ YES ☒ NO Unknown

09 DESCRIPTION OF WELLS (including usage, depth, and location relative to population and buildings)

Artesian well located less than a mile south-southeast of the site. This well is open for public use.

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☐ NO	COMMENTS Unknown	☐ YES ☐ NO	COMMENTS Unknown

IV. SURFACE WATER

01 SURFACE WATER USE (Check one) Unknown

☐ A RESERVOIR, RECREATION DRINKING WATER SOURCE ☐ B IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
Cape Fear River	☐	0 (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN Unknown

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. _____ NO. OF PERSONS	B. _____ NO. OF PERSONS	C. _____ NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION Unknown (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE ≈ 200

04 DISTANCE TO NEAREST OFF-SITE BUILDING 500 ft (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site (e.g., rural, village, densely populated urban area))

Unknown, will update with letter report containing sampling results.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: NC
02 SITE NUMBER: D058517462

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one) Unknown

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one) Unknown

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
Unknown (ft)	Unknown (ft)	Unknown

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
~~48.52~~ 7.5 (in)	3.8-4.0 (in)	0 %	west	%

09 FLOOD POTENTIAL
SITE IS IN _____ YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)
ESTUARINE: A _____ (mi)
OTHER: B _____ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)
_____ (mi)
ENDANGERED SPECIES. _____

13 LAND USE IN VICINITY

DISTANCE TO COMMERCIAL INDUSTRIAL	RESIDENTIAL AREAS, NATIONAL STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A 0.25 (mi)	B _____ (mi)	C _____ (mi)	D. _____ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Prept. - Climatic Atlas of the U.S., U.S. Dept. of Commerce, Nat'l Climatic Ctr, Asheville, N.C., 1979.

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION
01 STATE: NC
02 SITE NUMBER: D058517467

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	5	UBTL	
SURFACE WATER	2	520 Wakara Way	
WASTE	0	Salt Lake City, Utah 84108	
AIR	0	for organic analysis	
RUNOFF	0		
SPILL	0	Wilson Labs	
SOIL	6	528 North 9th St	
VEGETATION	0	Salina KS 67401	July 1985
OTHER		inorganic Analysis	

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Mini-alert	NUS Health & Safety Requirement - No ~~readings~~ detection of radiation
HNU	No readings above background

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

02 IN CUSTODY OF _____ (Name of organization or individual)

03 MAPS ☐ YES ☒ NO

04 LOCATION OF MAPS: Maps to be generated & submitted with report

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

None

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling logs, etc.)

Site inspection 1/7/85

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D058517467

II. CURRENT OWNER(S)			PARENT COMPANY (If applicable)		
01 NAME Southern Wood Piedmont		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
01 NAME		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
01 NAME		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
01 NAME		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)			IV. REALTY OWNER(S) (If applicable, list most recent first)		
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D058516467

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

OPERATOR'S PARENT COMPANY (If applicable)

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
N/C	D058517467

II. ON-SITE GENERATOR

01 NAME: Southern Wood Piedmont	02 D+B NUMBER		
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER		01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME	02 D+B NUMBER		01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER		01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME	02 D+B NUMBER		01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D058517467

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION None

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION No

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION No

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Non-applicable

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Landfarmed

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Unknown

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Unknown

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Landfarmed

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Unknown

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Unknown

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION Unknown

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION None

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION No

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION None installed

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION No

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION None observed

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION None installed

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE: NC
02 SITE NUMBER: D058517467

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: None observed

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: No

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: Non-applicable

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: No

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: No

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: Unknown

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: Unknown

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: None observed

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: No

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: Unknown

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: None

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION:

Five monitoring wells have been installed by SWP, one is no longer functional.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Site inspection 1/7/85

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D058517447

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY ENFORCEMENT ACTION YES X NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY ENFORCEMENT ACTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

STATE OF NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES

DEPARTMENT OF HEALTH SERVICES

In Re: SOUTHERN WOOD PIEDMONT COMPANY NCD058517467	)))	ADMINISTRATIVE ORDER ON CONSENT

BACKGROUND

From about 1964 to 1983, Southern Wood Piedmont Company (Southern Wood), a subsidiary of ITT Rayonier, Inc., a Delaware corporation, owned and operated a plant in Wilmington, North Carolina, which engaged in the business of wood preserving. The preservatives used were creosote coal tar, pentachlorophenol (PCP) in diesel oil and copper, chromate and arsenate (known as CCA). As part of that operation, residues were deposited in several locations on the plant site. The areas, identified in Southern Wood's February 13, 1983, correspondence to Mr. William Paige, Environmental Engineer, are summarized in Attachment I and shown in the map in Attachment II.

AGREEMENT

In order to resolve a dispute regarding the applicability of the Resource Conservation and Recovery Act (RCRA) and the Solid Waste Management Act and rules (N.C.G.S. 130-A, Article 9 and 10 NCAC 10 F), and to avoid costly protracted litigation, Southern Wood and the State do hereby enter into this Administrative Order on Consent (Consent Order).

The purpose of this Order is to address soil and ground water contamination and to provide clean-up/remedial actions which will minimize the site's impact on the environment and public health in a manner which is consistent with the State and Federal hazardous waste laws and rules.

Therefore, in order to further the public interest and to protect the public health and environment, Southern Wood Piedmont and the State, by and through their authorized representatives, do enter into the following Consent Order and agree:

1. That Southern Wood is a Delaware corporation, which rents a plant site in North Carolina at Wilmington owned by the city of Wilmington and the Port Authority of the State.
2. That, to protect the public health and environment, the Solid and Hazardous Waste Management Branch, Environmental Health Section, Department of Human Resources of the State of North Carolina (State) is empowered to implement and seek compliance with the standards for generation, transportation, treatment, storage and disposal of waste pursuant to the Solid Waste Management Act, N.C.G.S. Chapter 130-A (Act), and the rules promulgated thereunder at 40 CFR 260-271, codified at 10 NCAC 10 F (rules). The State has been authorized to implement the State program in lieu of the Federal hazardous waste program under the Resource Conservation and Recovery Act (RCRA). William L. Meyer, Head of the Branch, has been delegated those responsibilities.
3. This Consent Order shall apply and be binding upon Southern Wood, its successors and assigns and upon all persons or firms acting under or for them. Southern Wood shall provide a copy of this Consent Order to each contractor or other person performing any work under this Order and shall condition each contract or agreement for such work upon these Consent Order terms.
4. That nothing in this Consent Order shall be construed as limiting the State from performing its duty to protect the public health and the environment of the State as required by law.

5. That nothing herein shall be construed to affect any rights, claims or defenses as may exist between Southern Wood and any other person or entity.

6. That the State shall suspend the Compliance Order and Notice of Penalty, dated September 7, 1984, if compliance with this Consent Order is achieved as set forth herein. If compliance with this Order is not achieved, the September 7, 1984, Order and penalty shall become effective immediately upon written notice.

7. That Southern Wood shall continue with the ongoing remedial action being implemented in the operating areas as set forth in the remedial action plan submitted to the State on July 31, 1984, as modified by the terms of this Order. This action currently consists of land treatment to reduce the oil preservative residuals in contaminated soil to an acceptable residual level. The land treatment shall be conducted on treated pole storage areas where there are presently low levels of preservative residuals in the soil.

The contaminated areas described below shall be addressed in the following manner:

a. Superfund Area I

Excavate this area and landfarm the discolored soil in one of the treated pole storage areas.

b. Track Area

Remove the visually, heavily contaminated soil and landfarm in a treated pole storage area.

c. Oil Treating Areas

Remove the visually, heavily contaminated soil and landfarm in a treated pole storage area.

d. Large Storage Tank Containment Area

Remove the visually, heavily contaminated soil and landfarm in a treated pole storage area.

e. Treated Product Storage Area

The treated pole storage areas not used for landfarming of heavily contaminated soil shall be tilled in place.

f. CCA Storage Tank Area

Soil testing 0.5PPM arsenic or greater on the basis of the EP toxicity test for arsenic will be excavated from the site, but not from a depth in excess of five feet. Soil testing greater than 5.0 PPM arsenic will be sent offsite to a permitted land disposal facility, while soil which contains between 5.00 PPM and 0.5PPM arsenic will be mixed with Portland cement in a ratio which does not allow arsenic to extract above 0.5PPM as determined by the EP toxicity test. The treated material will then be buried on site.

g. Storage Tank Sludges

Remove the CCA sludge for disposal in a hazardous waste landfill. Remove the sludges from the bottom of the various oil tanks for disposal or energy recovery in a State approved landfill, incinerator, or boiler that has no outstanding Class I RCRA violations, or a landfill or combustion process out of the State which is approved by the environmental agency of the state concerned.

h. The landfarming will be done in an area identified as LF1 or LF2, or both, if needed, as outlined on the plant layout diagram (Attachment II).

i. The designated landfarm areas will be bermed and ditched to prevent rain runoff or runon.

j. Lysimeters will be installed at depths sufficient to monitor soil water quality. These lysimeters shall be protected to prevent damage by tilling equipment. Three down gradient monitoring wells and one upgradient monitoring well shall be installed to monitor groundwater quality. Groundwater monitoring devices shall be in accordance with the standards established by the Division of Environmental Management, Department of Natural Resources.

k. Contaminated soil from the areas identified earlier shall be spread not to exceed a maximum two-inch layer over the landfarm area. Land treatment shall be limited to the upper six inches.

l. The application of a commercial fertilizer shall be determined based upon soil analysis.

m. The soil will be tilled weekly, weather permitting, to promote biological and photochemical breakdown of treating chemical residuals.

n. Tillage and aeration of the land treatment areas shall continue until residual concentrations are determined not to have a significant impact on the public health and the environment as determined by the State.

8. That Southern Wood shall adhere to the following sampling and testing schedule:

   a. Lysimeters will be sampled prior to application of contaminated soil to the landfarm areas, and every two months thereafter.

   b. Soil will be sampled immediately after the initial tilling is completed. Samples will be obtained at 0-3", 9-12", and 21-24" depths. The soil sampling will be in accordance with SW 846.

   c. All samples (soil, water) will be analyzed for PCP and the major constituents of creosote.

   d. The sample results shall be submitted to this agency within 7 days after analysis.

9. All sampling and analysis shall be in accordance with EPA Publication, SW-846, "Test Methods for Evaluating Solid Waste" as revised.

10. That the landfarming operation will continue until a concentration of residual PCP and major constituents of creosote is reached which will protect public health and the environment. At this time it is not known what these concentrations are or how long it will take to reach them, but it is possible that up to two years may be required to stabilize the waste taken from Superfund Area I. Nothing in this order shall be interpreted to preclude Southern Wood from exercising its right to challenge any State determination as to safe residual concentrations if the company does not agree with such determination.

11. It is recognized that groundwater flow under the site is towards the Cape Fear River and that any contaminants reaching the groundwater from the site should eventually reach the river. Accordingly, Southern Wood will monitor the Cape Fear River upstream and downstream from the site to see if any water quality standard which could be affected by residues at the site is causing a violation of state water quality standards. Such monitoring shall be done at least twice per year during the time the land treatment operation to which this Order is in process. Further action to protect surface water quality standards or groundwater may be required by the Department of Human Resources or the Department of Natural Resources and Community Devlopment pursuant to Chapter 143, Articles 21, 21A, and Chapter 87, Article 7 of the North Carolina General Statutes and 15 NCAC 2C, 2E, and 2L depending on the results of such monitoring, and the parties expressly reserve their respective rights with respect to such further action.

12. That Southern Wood shall arrange with the owners of the property, City of Wilmington and the State Port Authority, to provide the notice in the deed that the land has been used for hazardous waste as required by 40 CFR 265.120 codified at 10 NCAC 10 F .0033.

13. That Southern Wood shall complete the clean-up remedial steps authorized in the Consent Order and the Plan in paragraph 7(f) & (g) by November 1, 1985, and shall also commence land treatment of contaminated soil from areas a, b, c, d, and e as described in paragraph 7 by November 1, 1985.

14. The scope of the State's overview shall consist of the following:

    a. The option to inspect the work performed and to collect and perform analysis of waste and soil samples upon any phase completion.

    b. A comprehensive site inspection and record review after June 1, 1985 to determine compliance with the approved plan and other terms of the order.

15. The Branch shall designate Mr. William Paige, Environmental Engineer, as the primary contact for technical matters concerning the implementation of the plan. Mr. Jerry Rhodes, Environmental Chemist, will be available upon Mr. Paige's absence. Other Branch resources may be used for review and inspection as determined by Mr. Paige or Mr. Rhodes.

16. Southern Wood will designate one person as the primary contact for technical matters concerning implementation of the plan.

DEPOSITS REPORTED UNDER SUPERFUND

1. Superfund Area I, Covered Sludge Ditch
An area described as a covered ditch containing creosote sludges from early plant operations. The location is on property leased fron the State's Port Authority.

2. Superfund Area II. Trash Dump Area
An area described as a general waste landfill used by the plant for many years. It is believed to consist almost exclusively of wood waste, dirt, and metal waste. Small amounts of creosote cleanup material may also have been deposited here.

3. Superfund Area III, Dike Area
An area containing old, hard and solid creosote residuals similar to road tar were disposed of in an area near the south slip.

4. Superfund Area IV, Trash Fill Area
Located in the north slip, this area was filled with mill waste consisting of mainly wood waste and metal bands. Some creosote sludge was deposited on the top of part of this area.

OPERATING AREA DEPOSITS

1. Track Area
An area located in front of a treatment cylinder. Residual samples collected by Southern Wood suggest contamination to a depth of approximately six (6) inches.

2. Oil Treating Areas
The soil areas around both oil treating room buildings contain treating chemical residuals. Soil around the working tanks is noticeably contaminated with oil to a depth of approximately two feet. The soil area around the waste water-oil recovered tank system is noticeably discolored to about a one foot depth.

3. Large Storage Tank Containment Area
The soil in this area contains creosote residuals to a depth of approximately one foot.

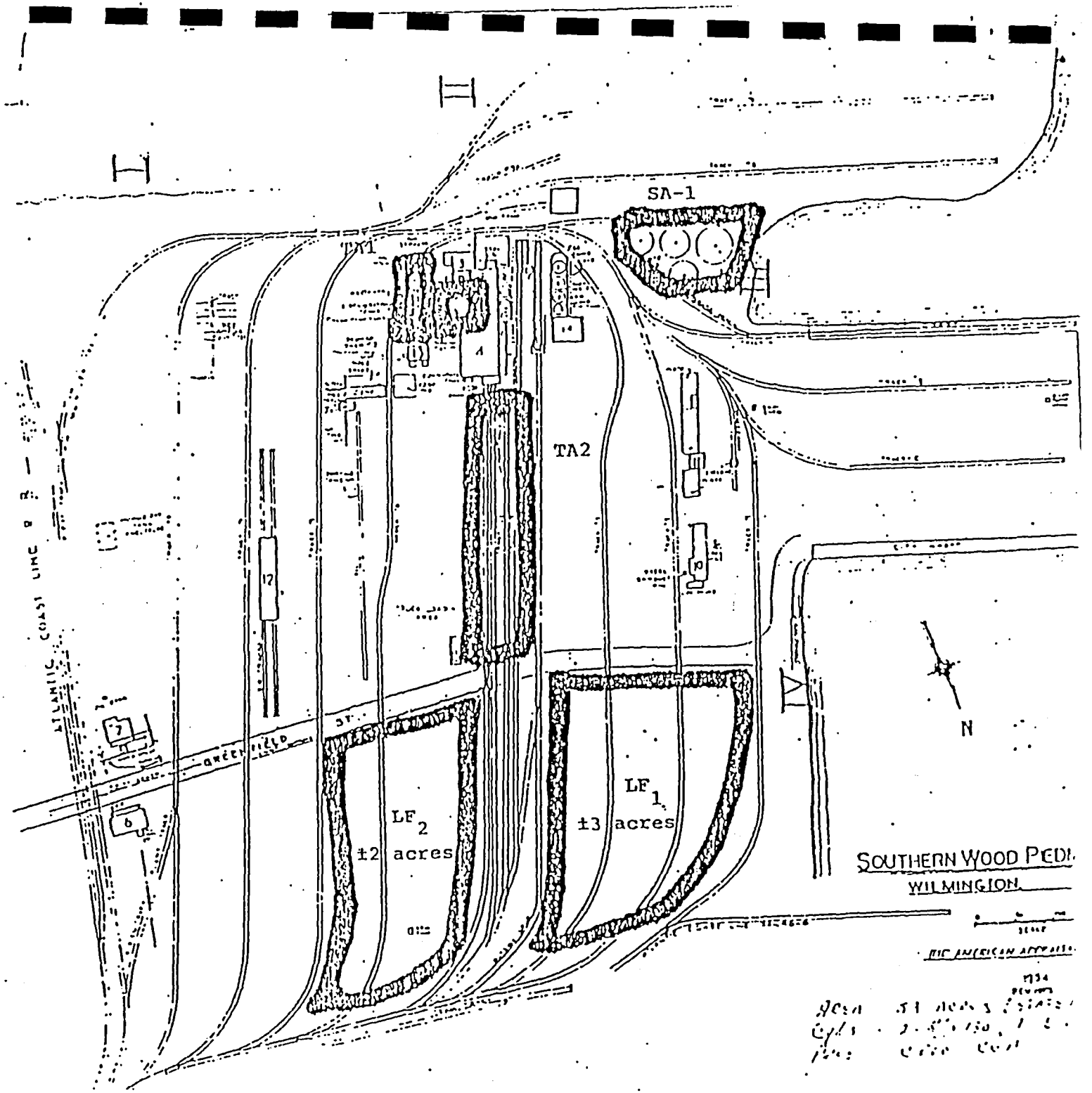
4. Treated Product Storage Areas
Relatively large areas on both State Port Authority property and City of Wilmington property contain creosote residuals in the soil as evidenced by some discoloration. These are areas where the treated poles were stored prior to shipment.

5. CCA Storage Tank Area
Soil around the CCA storage tanks is discolored due to CCA residuals.

6. Storage Tank Sludges
Varying amounts of sludge is present in the bottom of the various treating tanks.

2044A

ATTACHMENT 77



'ES:
S..=Stg. Tank Area
TA=Treating Areas
LF=Landfarming Areas
LF_1=±3 acres
LF_2=±2 acres

IN WITNESS WHEREOF, the parties have executed this Agreement, on this the 20th day of May, 1985, by their duly authorized representatives.

Solid and Hazardous Waste Management
Branch, Environmental Health Section
Division of Health Services
Department of Human Resources of the
State of North Carolina

By: William L. Meyer
William L. Meyer, Head

Southern Wood Piedmont Company

By: Timothy H. Brannon
Vice President and Chief Operator

Reference 12

RISK ASSESSMENT REPORT FOR LANDFARM AREAS, SOUTHERN WOOD PIEDMONT COMPANY WILMINGTON, NORTH CAROLINA

December 1993

Prepared for:

SOUTHERN WOOD PIEDMONT COMPANY
281 Creosote Road
Inman, South Carolina 29349

Prepared by:

GERAGHTY & MILLER, INC.
Risk Evaluation Group
2840 Plaza Place - Suite 350
Raleigh, North Carolina 27612
(919) 571-1662

JAN 1994
Received

RISK ASSESSMENT REPORT
FOR LANDFARM AREAS,
SOUTHERN WOOD PIEDMONT COMPANY
WILMINGTON, NORTH CAROLINA

December 1993

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

Respectfully submitted,

GERAGHTY & MILLER, INC.

Stanley T. Atwood, DABT
Senior Scientist

Christopher W. Lovdahl
Project Scientist/Project Manager

William H. Doucette, Jr., Ph.D.
Project Director/Associate

EXECUTIVE SUMMARY

A risk assessment was conducted for the two landfarm areas at the former wood treating facility operated by Southern Wood Piedmont Company (SWP) in Wilmington, North Carolina. The land farms were operated and maintained by SWP between July 1984 and April 1990 to remediate soils containing pentachlorophenol (PCP) and creosote. The purpose of this risk assessment was to evaluate whether concentrations of PCP and components of creosote (primarily polycyclic aromatic hydrocarbons [PAHs]) remaining in the landfarms posed a potential risk to public health and the environment pursuant to the terms of the Administrative Order on Consent (AOC) Agreement (May 22, 1985) between SWP and the State of North Carolina. Once the terms of the AOC have been met, the property will be returned to the City of Wilmington for development. It was assumed that the site would be used for low intensity industrial purposes such as a loading dock and storage area. Therefore, this risk assessment examined potential risk associated with future industrial development of the site.

Soil samples within the landfarms were collected periodically throughout the active maintenance and operational period (September 1985 to April 1990). Samples were analyzed for soil nutrients, PCP, PAHs, phenol, and microbial counts throughout this period. These samples indicated that the landfarms were effective and that constituents of concern (COCs) were not leaching into the substrate soils or ground water beneath the landfarms. Geraghty & Miller, Inc. subsequently collected soil samples from the landfarms in October 1990 and October 1991. This risk assessment is based on the results of the samples collected by Geraghty & Miller, Inc.

COCs included in the risk assessment were PAHs, phenol, dimethylphenol, trichlorophenol, tetrachlorophenol, PCP, arsenic, chromium, and copper. Fifty samples were analyzed for PAHs and PCP; 20 samples were analyzed for phenol, dimethylphenol, trichlorophenol, pentachlorophenol, arsenic, chromium, and copper.

Because toxicity values (reference doses [RfD] and cancer slope factors [CSFs]) were not available for many of the PAHs, surrogate toxicity values were used. For example, the RfD for pyrene was used to represent non-carcinogenic PAHs which did not have an RfD and a toxicity

equivalency factor (TEF) scheme developed by U.S. Environmental Protection Agency (USEPA) Region IV was used to evaluate carcinogenic PAHs. The TEF approach allows for all carcinogenic PAHs to be expressed in terms of benzo(a)pyrene equivalent concentrations.

It is assumed that several feet of fill and/or concrete pavement will cover the landfarm area following development; therefore, exposure to constituents remaining in the landfarm soils would be eliminated. During the construction period, or subsequent excavation projects to install foundations or utility lines, site workers could contact landfarm soils. Off-site transport of soils via windblown dust could result in some exposure to downwind residents; however, such exposure would be minimal compared to a site construction worker. Therefore, this risk assessment evaluated potential exposures of a site construction worker. Professional judgment and standard USEPA exposure assumptions were used to calculate constituent intakes via incidental soil ingestion, dermal contact, and inhalation of dust. An exposure period of 13 weeks, 6 days per week, and 8 hours per day was assumed. Thirteen weeks was selected as a reasonable maximum period required for grading, filling, and paving the site.

Risk estimates for the site construction worker were compared to USEPA target risk criteria to determine if the terms of the AOC had been met. The USEPA currently uses a target excess lifetime cancer risk (ELCR) range of 1×10^{-4} to 1×10^{-6} and a hazard index (HI) of 1 to indicate if remediation is required. The total ELCR for the construction worker is 6×10^{-6} and is within the target risk range; the HI is 0.5 and is below the target value of 1. Benzo(a)pyrene was responsible for more than half of the ELCR. Ecological impacts from the site were judged to be limited because of the small size of the site, limited migration of the COCs, and planned use of the site as industrial property. These results indicate, that the proposed development of the site could proceed without posing a significant risk to human health and the environment.

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A. Particulate Emission Factor Calculations.

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DRAFT
RISK ASSESSMENT REPORT FOR LANDFARM AREAS, SOUTHERN WOOD PIEDMONT COMPANY WILMINGTON, NORTH CAROLINA

1.0 INTRODUCTION

Geraghty & Miller, Inc., (Geraghty & Miller) was retained by the Southern Wood Piedmont Company (SWP) to prepare a post-remediation residual risk assessment for the Wilmington, North Carolina, landfarm areas. The purpose of the landfarms was to remediate soils which contained wood-treating chemicals, particularly creosote and pentachlorophenol (PCP). This risk assessment was performed to evaluate whether a "concentration of residual PCP and major constituents of creosote is reached which will protect public-health and the environment," according to the terms of the Administrative Order on Consent (AOC) Agreement (May 22, 1985), paragraph 10. Once remediation is in agreement with the AOC, use of the property will be returned to the City of Wilmington. The future site use proposed by the City of Wilmington and the North Carolina Ports Authority is for low intensity industrial use. The report evaluates potential exposure and risk for future construction activities within the landfarm areas. Chronic exposure to landfarm soils following development is not evaluated because it is assumed that several feet of fill and concrete will be placed over the landfarm area during development.

This risk assessment follows U.S. Environmental Protection Agency (USEPA) guidance for risk assessments (USEPA, 1991a; 1989a,b,c) and is further based on the firm's professional judgment developed from preparing several hundred site-specific risk assessments. This risk assessment is a companion document to two other reports: "Data Summary Report for the 1990 Landfarm Area Sampling" (Geraghty & Miller, 1993a) and "Comparison of 1990 and 1991 Soil and Ground-Water Data" (Geraghty & Miller, 1993b). The report is organized according to the following outline:

- Site Characterization,
- Constituent Characterization,
- Environmental Fate and Transport,
- Hazard Characterization,
- Exposure Characterization,
- Risk Characterization,
- Uncertainties, and
- Findings and Conclusions.

The Site Characterization section (Section 2.0) refers to the site location and demographics, site history, regional and site geology and hydrology, and landfarm activities associated with the site. This information is utilized in other sections of the risk assessment.

The Constituent Characterization section (Section 3.0) discusses the data summary of samples collected at the site. Soil and ground-water data results and sampling procedures are discussed in detail.

The Environmental Fate and Transport section (Section 4.0) discusses the chemical and physical properties and the mobility and persistence of the constituents detected at the site. The landfarm bioremediation environment and biodegradation and half-life of organic constituents also are mentioned in this section.

The Hazard Characterization section (Section 5.0) discusses the potential carcinogenic and non-carcinogenic effects associated with constituents detected at the site. Toxicity values used for calculating risks are identified in this section.

The Exposure Characterization section (Section 6.0) addresses release sources, exposure pathways, exposure point concentrations, and exposure dose calculations. Assumptions used in the exposure calculations are presented.

The Risk Characterization section (Section 7.0) utilizes information provided in the previous sections to provide qualitative and quantitative risk estimates. Risks to both humans and ecological receptors are evaluated.

The Uncertainties section (Section 8.0) recognizes and explains the uncertainties associated with a risk assessment, and key Findings and Conclusions are provided in Section 9.0.

2.0 SITE CHARACTERIZATION

This section provides an overview of the site setting. Included are discussions of the site location and demographics, site history, geology and hydrology, and landfarm activities. Analytical data used in this report are summarized in Section 3.0 and discussed in detail in two companion reports (Geraghty & Miller, 1993a,b).

2.1 SITE LOCATION AND DEMOGRAPHICS

The former SWP facility measured approximately 1,000 feet (east to west) by 1,600 feet (north to south) and occupied an industrialized area along the Cape Fear River in Wilmington, North Carolina (Figures 2-1 and 2-2). Industry in the vicinity includes the Hess Fuel Tank Farms separated from the site by a ditch on the north side and the Poctank, Inc., plant separated by an undeveloped lot on the south side of the site. The North Carolina Ports Authority owns and operates property along the Cape Fear River south of the site. The major roads in the vicinity of the SWP facility are Greenfield and Surry Streets. Greenfield Street runs in an east-west direction and dead ends into the center of the facility. Surry Street runs in a north-south direction and is east of the property. The Cape Fear River borders the property on the west.

Residential areas, separated by a buffer zone of trees and commercial property (Figure 2-1), are east of the site. The residential areas include Dry Pond, a residential area which consists of multi-family housing units on the east side of Surry Street. According to the 1980 census (1990 census data are not yet available), approximately 1,600 people live in the area and approximately 12.5 percent were 0 to 5 years old; 12.5 percent were 5 to 15 years old; 61 percent were 15 to 65; and 14 percent were over 65 years old. Of the individuals 5 years old and older, approximately 54 percent lived in a different geographical location 5 years earlier. The 1980 census showed that of the 663 housing units in Dry Pond occupied year-round, 31.2 percent were occupied by owners and 68.2 percent were occupied by renters. There were 106 vacant housing units in this neighborhood, with a rental vacancy ratio of 6.2 percent and a homeowner vacancy rate of 7.6 percent (Wilmington Housing Authority, 1980). The statistics

for this neighborhood indicate that 22.5 percent of all homeowners in Dry Pond had lived in their housing units 10 years or more. Census data also indicated that 11.9 percent of the owners and 23.3 percent of the renters had moved into their units in the 15 months preceding the census. Dry Pond households are connected to City water. No evidence of active private water wells was observed in the immediate area during site visits in 1990 and 1991.

Geographically, the more distant residential areas to the east are North Lakeside and Southside. The combined 1980 population in those areas accounted for approximately 5,200 people. These areas also are connected to city water. Use of private water wells was not evident. School zones and day care centers were not observed in the vicinity of the site. Recreational facilities identified in the immediate area included Greenfield Lake and baseball fields directly adjacent to the southeast facility boundary.

2.2 SITE HISTORY

SWP and its predecessors leased and operated a wood-treatment facility in Wilmington, North Carolina, from approximately 1932 to 1983. In 1932, the North State Company leased the property previously operated by Liberty Shipyards. The North State Company purchased and sold non-treated wood from 1932 to 1935. In 1935, the Taylor Colquitt Company purchased the property to establish a wood-preserving facility to treat piling and poles with creosote. In 1964, the company name was changed to Taylor Piedmont, and the site remained a wood-treatment facility. When International Telephone & Telegraph (ITT) purchased Taylor Piedmont in 1968-1969, the company name and processes were maintained. On January 1, 1971, the company name was changed to SWP. SWP added chromated copper arsenate (CCA) to the wood-treatment process in the early 1970s. Until the facility was closed, raw and dressed lumber was delivered, debarked, kiln dried, and treated at the site. Wood-preserving chemicals were stored on-site in aboveground storage tanks. Additional creosote storage was in the southwestern property corner. In June 1983, the SWP facility ceased its wood-treatment operations and began closure procedures.

3.0 CONSTITUENT CHARACTERIZATION

The soil and ground-water sampling programs used as the basis of this risk assessment are described in detail in the two data summary reports (Geraghty & Miller, 1993a,b). This section discusses how the data were reduced for the risk assessment, summarizes the sampling results, discusses the physical and chemical properties of the constituents, and identifies constituents of potential concern (COCs).

3.1 DATA REDUCTION

The data were reduced according to guidelines provided by the USEPA (1989a) to identify COCs and exposure point concentrations (EPCs) for use in the exposure assessment (Section 4.0). The data summary tables list the frequency and range of detected values, the arithmetic mean, and the 95 percent upper confidence limit (UCL) on the mean. Constituents that were not detected in a specific medium were not included in the data summary tables. However, if a constituent was detected in at least one sample, the mean concentration was based on one-half the reported sample quantitation (SQL) for the non-detects, unless half the SQL exceeded the maximum detected value. When this occurred, the maximum detected value was used instead of half the SQL.

3.2 SOIL

Soil samples were collected from five locations within each landfarm (Figure 2-3) in October 1990 and October 1991 and were analyzed for constituents associated with wood-preserving chemicals used at the site: creosote, PCP, and CCA.

Thirty soil samples collected from LF1 and LF2 were analyzed for PAHs and PCP in 1990. Three samples were collected at each sampling point to represent the upper, middle, and lower portions of the landfarm soil (Figure 2-3). An additional 10 soil samples were collected from the substrate beneath LF1 and LF2 and demonstrated minimal migration of COCs from the

landfarm soils (Geraghty & Miller, 1993a). Two composite soil samples (one from each landfarm) also were analyzed in 1990 for polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). In October 1991, 20 soil samples were collected from LF1 and LF2 and were analyzed for PAHs, phenols (including PCP) and cresols, and three inorganics (arsenic, chromium, and copper). Only two samples were collected at each sampling point (upper and lower portions of the landfarm soil).

PAHs detected at the highest concentrations were anthracene (900 milligrams per kilogram [mg/kg]), fluoranthene (520 mg/kg), and pyrene (980 mg/kg). Five phenols (2,4-dimethylphenol, PCP, phenol, tetrachlorophenol, and trichlorophenol) were detected. PCP was detected at a maximum concentration of 150 mg/kg. The other phenols were detected at lower concentrations ranging from less than 1 to 3.5 mg/kg. Two cresols (o-cresol and m,p-cresol) were detected in 1991 in 6 and 5 out of 20 samples, respectively. The highest concentration for cresol was m,p-cresol at 0.10 mg/kg. Arsenic, chromium, and copper were detected in each sample collected in 1991. The maximum detected concentrations for arsenic, chromium, and copper were 84 mg/kg, 100 mg/kg, and 150 mg/kg, respectively. Soil data are summarized in Table 3-1.

PCDD and PCDF data were reduced using a toxicity equivalency factor (TEF) scheme developed by the USEPA (1989d). The end result is a concentration expressed as a 2,3,7,8-tetrachlorodibenzodioxin (TCDD) equivalent concentration. Using this scheme, TCDD equivalent concentrations of about 0.002 mg/kg and 0.003 mg/kg were detected in LF1 and LF2, respectively (Table 3-2).

3.3 GROUND WATER

Each of the four existing monitoring wells (MW-6, MW-7, MW-8, and MW-9) surrounding the landfarms were sampled in October 1990 (Figure 2-2). None of the wood-preserving COCs identified in soil were detected in ground-water samples from these monitoring wells. Therefore, ground water is not considered further in this risk assessment.

3.4 PHYSICAL AND CHEMICAL PROPERTIES

Physical and chemical properties affect the fate and transport of constituents. Table 3-3 summarizes several important properties of the organic COCs identified at the site. The physical and chemical properties considered in this report include water solubility, specific gravity, vapor pressure, Henry's Law Constant, organic carbon distribution coefficient (K_{oc}), octanol-water partition coefficient (K_{ow}), fish bioconcentration factor (BCF), and half-life.

These physical and chemical properties generally are not available for inorganic constituents because they are highly variable, depending on the particular form of the inorganic molecule. The chemical variables which are primarily responsible for controlling metal speciation (the form of the molecule or ion in solution) are the electrode potential (Eh) and pH (Stumm and Morgan, 1981). Eh is a measure of the electrochemical potential of ions present in soil or water and determines the oxidation state of the metal; pH is a measure of acidity or alkalinity of the medium and also influences the form of the metal and its mobility and bioavailability.

Water solubility is the maximum or saturated concentration of a chemical in pure water at a specific temperature. Specific gravity is the ratio of the density of a chemical to the density of water at a specific temperature. Vapor pressure is a property of a chemical in its pure state and indicates the volatility of a chemical. Henry's Law Constant is the air-water partition coefficient which relates a chemical's concentration in the gas phase to its concentration in the water phase and indicates the rate of evaporation of a chemical from water. K_{oc} is a measure of the tendency for organic chemicals to be adsorbed by soil and sediment; K_{ow} is an indicator of water solubility, mobility, adsorption, and bioconcentration. Generally, a high K_{ow} indicates that a chemical has low water solubility and mobility and a high potential to adsorb to soil or bioaccummulate. BCF is a measure of the tendency for a chemical in water to concentrate in fish tissue. The half-life ($T_{1/2}$) is the time required for the constituent concentration to be reduced by a factor of two.

3.5 CONSTITUENTS OF CONCERN (COCs)

All constituents detected at the site were selected as COCs; however, the PCDD and PCDF data are not included in the quantitative risk assessment. The USEPA currently is reviewing PCDD and PCDF toxicity and likely will have new recommendations regarding sensitive toxic endpoints and toxicity values. Nevertheless, the total TCDD equivalent concentrations detected (0.002 to 0.003 mg/kg) are only slightly above the 0.001 mg/kg recommendation for residential soil by the Centers for Disease Control (USEPA, 1989e). Cleanup values for industrial soil typically have been higher than those detected at the site. Furthermore, PCDDs and PCDFs are not mobile in soil, and bioconcentration is limited. Therefore, the concentrations of PCDDs and PCDFs detected at the site were considered to be acceptable. Pending outcome of USEPA's reassessment, these data can be reevaluated.

2.3 REGIONAL AND SITE GEOLOGY AND HYDROLOGY

The site is in the Coastal Plain Physiographic Province of North Carolina, a region underlain by Cretaceous and Cenozoic marine and non-marine sedimentary sequences. Approximately 1,500 feet of Coastal Plain sediments overlie pre-Mesozoic crystalline basement rock in the Wilmington area (North Carolina Geological Survey [NCGS], 1985). The site is underlain directly by the Cretaceous-age Pee Dee Formation (NCGS, 1985), which consists predominantly of unconsolidated, dark green to gray, clay-rich, marine sand and which may contain calcareous sandstone ledges (Sohl and Owens, 1991).

Five soil borings were advanced at the site to a maximum depth of approximately 50 feet by Soil and Material Engineers, Inc., (SME) during 1981, and an additional four borings (to a maximum depth of 20 feet) were drilled by Law Environmental (Law) in 1985. Lithologic logs (presented in SME [1981] and Law [1985]) indicate that a surficial layer of sandy fill material or sand, which varies from less than 1 foot to 18 feet in thickness, is present at the site. This layer, which appears to be thickest in the northern part of the site, is described as consisting of fine to medium sand, with wood, roots, or other material occasionally found. Below this sandy material is a layer consisting of dark brown, organic-rich silt or peat, which may contain traces of fine sand, roots, and wood fragments. This layer ranges in thickness from 5 to 19 feet in the soil boring locations and apparently increases in thickness toward the Cape Fear River to the west. Fine to medium sands extend from below the organic-rich layers to a depth of 42 to 45.5 feet, below which a gray marl is encountered (SME, 1981).

Based on their observations, SME (1981) concluded that the dominant direction of shallow ground-water flow at the site was to the south, parallel to the Cape Fear River. Water-table maps prepared by Law (1985) indicate westward to southwestward flow (toward the river) near the landfarm areas and generally southward flow at the eastern part of the site. Tidal influences may cause temporary alterations or reversals in these flow directions. Hydraulic conductivities ranging from 3×10^{-5} centimeters per second (cm/sec) to 10^{-6} cm/sec were

determined based on in-situ monitor-well tests; an average ground-water flow velocity of 0.10 feet/year was calculated (Law, 1985).

2.4 LANDFARM ACTIVITIES

At the northwest boundary of the site, a 5-acre area was bermed and ditched following the removal of existing rails and crossties and divided into two landfarm areas: Landfarm 1 (LF1) is closest to the river, and Landfarm (LF2) is closest to the SWP office (Figure 2-2). This area formerly was used as the wood-treatment storage area.

During the period July 1984 through April 1990, soil material originating from the spoil pile area was applied at regular intervals. Over this period, approximately 17 different soil amendments occurred for LF1 and 20 for LF2. Each amendment consisted of a 2-inch-thick layer of spoil pile material being added to the surface of the landfarm. During the landfarm operation, irrigation water, 10-10-10 fertilizer, and chicken and turkey manure were added to promote and enhance microbial growth and polycyclic aromatic hydrocarbon (PAH) degradation. The two landfarm areas were tilled to a depth of 6 inches weekly, promoting biological and photochemical degradation of residual chemicals.

Two composite sets of soil samples were collected periodically by a SWP representative. A composite sample was taken for each of the following depths: 0 to 3 inches, 9 to 12 inches, and 21 to 24 inches. Soil from the four corners of each landfarm was mixed to make up the two composite samples for each depth. Each landfarm was sampled separately. The initial sampling began in September 1985 for LF2 and in November 1985 for LF1. Over the period of operation, 59 sets of soil samples were collected from LF2 and 37 from LF1.

The samples were analyzed for total nitrogen, total phosphorus, chloride, total organic carbon, soil pH, PAHs, PCP, phenol, and microbial counts by the Mississippi State University Forest Products Research Division (MSUFPRD) Laboratory in State College, Mississippi.

The quality of the ground water in the two landfarmed areas was monitored during the landfarm operations. Four monitor wells were installed by Law between September 5 and 10, 1985, on the perimeter of the landfarm area. Ground-water samples from the upgradient (MW-6) and three downgradient (MW-7, MW-8, and MW-9) monitor wells were collected by Environmental Technology Engineering (ETE) and analyzed by Savannah Laboratories. Composite soil samples also were taken by SWP's site manager directly from the spoil pile and were analyzed for PAH constituents by MSUFPRD.

4.0 ENVIRONMENTAL FATE AND TRANSPORT

Environmental fate and transport processes for the COCs at the SWP Wilmington site are dependent on the physical and chemical properties of the constituents and the characteristics of the surrounding environment. Soils at the site underwent active bioremediation up to 1990. This section will describe the landfarm environment and the primary environmental fate and transport processes for the organic constituents.

4.1 LANDFARMING ENVIRONMENT

The basic principle of landfarming bioremediation is to exploit the ability of microorganisms to catabolize a wide range of organic compounds. When successful, landfarming bioremediation results in detoxification (the conversion of a toxic chemical to nontoxic materials).

As might be expected, there are potential limitations which must be addressed if in-situ bioremediation is to be successful. The chemical compound in question must be in a chemical state conducive to microbial utilization. A chemical compound must be in an aqueous phase to enter a microbial cell and to be biologically degraded (although some compounds may be transformed by extracellular enzymes). Typically, many persistent compounds are only slightly soluble in water. Insoluble compounds tend to persist in nature adsorbed to inert matrices.

The addition of large amounts of organic carbon may result in the rapid consumption of oxygen and essential inorganic nutrients (nitrogen, phosphorus, sulfur, and potassium), thereby resulting in an anoxic and nutrient-limiting environment. Although a microbial population may exist with the potential to degrade the chemical compound, the newly developed environment restricts its activity. Hence, on-going aeration and nutrient supplementation are essential elements of the landfarm operation. The environmental fate and transport of wood-treating chemicals and constituents associated with wood-treating chemicals are discussed in the following sections.

4.2 CREOSOTE

Creosote is a complex mixture of chemical constituents encompassing diverse chemical structures. Coal tar creosote is composed of approximately 85 percent PAHs, 10 percent phenolic compounds, and 5 percent nitrogen (N), sulfur (S), and oxygen (O)-heterocyclics. Of the approximately 150 to 200 chemicals in creosote, only a few are present in amounts of 1 percent or more (Mueller et al., 1989).

Although coal tar creosote generally is considered to be environmentally persistent, losses of creosote constituents occur with time. Losses may occur through biological processes and a variety of chemical-physical processes such as volatilization, leaching, and photodegradation (USEPA, 1988). Because biodegradation represents the primary route through which creosote is removed from the environment, exploitation of this naturally-occurring process could yield an efficient means of remediating such sites.

For creosote to be degraded biologically under field conditions, basic criteria must be met. First, an appropriate microbial community must be present. The ability to degrade unique carbon sources often is associated with prior exposure of microbial communities to the chemical or to similar chemicals (Mueller et al., 1989). Second, bioavailability of the potential substrate must be considered along with the requirement for organism-substrate interaction. Finally, environmental parameters such as temperature, redox potential, oxygen and nutrient availability, and moisture must be conducive to growth of the requisite organisms.

4.3 POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

PAHs, the major constituents of creosote, generally tend to sorb strongly to soil particles and have low aqueous solubilities and mobility (Hickock et al., 1982). However, nitrogenous bases present in creosote (e.g., xylidines, aniline, and toluidines) are relatively soluble and mobile (Pereira et al., 1983).

In general, as molecular weight of a PAH increases, its water solubility tends to decrease. For example, phenanthrene is more soluble in water than pyrene (Table 3-3). PAHs dissolved in ground water would remain relatively intact due to slow degradation rates and limited volatilization. Upon release to surface water, PAHs will undergo rapid photolysis. Biodegradation and biotransformation are the ultimate fate processes for PAHs in soils and sediment.

Mueller et al. (1989) reviewed the available literature that outline enzymatic processes and describe microbial oxidation of PAHs and concluded the following:

1. In the presence of appropriate organisms, biodegradation of lower molecular weight PAHs, such as naphthalene, is relatively rapid.

2. Biological transformation of 3-ring PAHs, such as acenaphthene, anthracene, and phenanthrene, usually is slower than 2-ring PAHs.

3. Organisms are capable of transforming higher molecular weight PAHs, such as benzo(a)anthracene, benzo(a)pyrene, fluoranthene, and pyrene. In general, degradation of these compounds usually requires populations of several microbial species (co-metabolism). Pure microbial cultures have not been identified which are capable of mineralizing these compounds.

A variety of microorganisms have been found to possess the ability to degrade PAHs: bacteria from the genera *Aeromonas, Alcaligenes, Beijerinkia, Cyanobacter, Flavobacterium, Micrococcus, Mycobacterium, Nocardia, Pseudomonas, Vibrio*, and the fungus *Phanerochaete chrysosporium*. In addition to pure-culture studies, biodegradation of creosote PAHs by mixed microbial communities has been demonstrated by many researchers (Mueller et al., 1989).

Park et al. (1990) studied the fate of 14 PAHs in two soils and found volatilization to account for 30 and 20 percent loss of naphthalene and 1-methylnaphthalene; for the remaining

12 PAHs, volatilization was negligible. They also found that chemical reactions alone reduced concentrations of 2- and 3-ring PAHs by 2 to 20 percent; no reduction was observed for PAHs containing greater than 3 aromatic rings. Half-life values in the two soils increased from 2 to 60 days for 2-, 3-, and 4-ring PAHs, and to more than 300 days for 5-ring PAHs. Biodegradation rates can vary widely depending on such soil conditions as oxygen availability (aerobic vs. anaerobic), pH, nutrient level, moisture content, temperature, and the resident microbial community.

PAHs are readily bioconcentrated; however, they also are rapidly metabolized and excreted (Niimi and Palazzo, 1986), such that bioaccumulation is not a long-term situation. The available evidence indicates that clearance rates for most PAHs are rapid, with half-lives of 9 days or less (Niimi and Dookhran, 1989). The dominant transport process for PAHs is associated with sorption to soil particles, suspended particulates, and sediments; once sorbed to soil particles and sediments, transport of PAHs would be limited.

4.4 PHENOLIC COMPOUNDS

Bacteria capable of degrading phenolic compounds have been isolated from soil and water, and a variety of microorganisms--bacteria, yeast, and fungi--have been isolated for their ability to degrade phenol and substituted phenols. The primary phenol at the site is PCP.

PCP is quite stable; it does not decompose when heated at temperatures up to its boiling point for extended periods. Pure PCP is considered to be chemically inert (Bevenue and Beckman, 1967). The chlorinated ring structure tends to impart stability, but the polar hydroxyl group facilitates biological degradation (Renberg, 1974). PCP is not subject to the easy oxidative coupling or electrophilic substitution reactions common to most phenols. Monovalent alkali metal salts of PCP are very soluble in water, but the protonated (phenolic) form is virtually insoluble. Hence, transport of PCP in water depends largely on the pH of the environment.

PCP is volatile enough to be steam distilled. Relative to other chlorinated organic compounds with low vapor pressures, volatility may cause significant losses of PCP from soils (Briggs, 1975). Even though PCP's vapor pressure is low, a finite amount will vaporize.

In the aquatic environment, PCP may be present in a dissolved form, associated with suspended matter or bottom sediments, or absorbed by organisms. Metal salts of the compound have a much greater water solubility and therefore would exist primarily in the dissolved form. The tendency of PCP to ionize depends on the pH of the system. It is nonionized in aqueous solutions with a pH less than 5. There is limited evidence of microbiological degradation of PCP in aquatic environments. Photodecomposition and volatilization from water also may occur.

In the soil, PCP is affected by many complex factors; many details of its behavior are unknown or have not been verified (Bevenue and Beckman, 1967). Hilton and Yuen (1963) reported relatively high adsorption of PCP in agricultural soils of Hawaii. Choi and Aomine (1974) studied adsorption of PCP in 13 soil samples which had various clay mineral species, organic matter content, and pH. Seven different concentrations of PCP, ranging from 12.5 to 500 milligrams per liter (mg/L), were studied. They concluded that adsorption behavior depends primarily on the pH of the system; the more acidic the soil is, the more complete the adsorption of PCP. Organic matter content of the soil is important to adsorption of PCP at all pH values. At different pH values, comparisons of untreated soil and soil oxidized with hydrogen peroxide (H_2O_2) to remove organic matter showed that humus-containing soil always adsorbed more PCP than H_2O_2-treated soil. Adsorption of PCP by humus is important when the concentration of PCP is low. At higher concentrations of PCP, the inorganic fractions become more important.

5.0 HAZARD CHARACTERIZATION

The risk associated with exposure to any constituent is a function of the inherent toxicity (hazard) and the exposure dose. Two general categories of toxic effects (carcinogenic and non-carcinogenic) and toxicity values (reference doses [RfDs] and cancer slope factors [CSFs]) used to calculate risk estimates are discussed in this section.

5.1 CARCINOGENIC EFFECTS

Identification of constituents which are regulated as carcinogens is based on a USEPA classification scheme in which chemicals are systematically evaluated for their ability to cause cancer in mammalian species. This classification scheme contains six categories based on the weight of available evidence: A (human carcinogen), B1 (probably human carcinogen -- limited evidence in humans), B2 (probable human carcinogen -- sufficient evidence in animals and inadequate data in humans), C (possible human carcinogen -- limited evidence in animals), D (inadequate evidence to classify), and E (no evidence of carcinogenicity). Categories A, B1, B2, and C are included in this assessment as potential human carcinogens. The USEPA uses a linearized multistage model to derive a 95 percent upperbound estimate of cancer incidence at a given dose. The slope of the extrapolated dose-response curve, called the CSF, is used to calculate the probability of cancer associated with the exposure dose.

5.2 NON-CARCINOGENIC EFFECTS

A finite dose (threshold), below which adverse effects will not occur, is believed to exist for non-carcinogenic chemicals. A single compound might elicit several adverse effects depending on the dose, the route, and the duration of exposure. For a given chemical, the dose which elicits no effect when evaluating the most sensitive response (the no observed effect level [NOEL]) in the most sensitive species is used to establish a reference dose (RfD) for non-carcinogenic effects. The RfD is defined as "an estimate" (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population, including

sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a "lifetime" (USEPA, 1989a). Typically the NOEL is divided by uncertainty factors of 10 to 10,000, depending on the type and quality of the study, to derive the RfD. RfDs are established by USEPA for subchronic exposure (2 weeks to 7 years) and chronic exposure (>7 years) and route of exposure (ingestion and inhalation) and are reported in milligrams per kilogram per day (mg/kg/day). Reference concentrations (RfCs), reported in milligrams per cubic meter (mg/m^3), also may be used to assess inhalation exposure.

5.3 TOXICITY VALUES

In general, CSFs, cancer classifications, and RFDs for oral and inhalation exposures are taken from USEPA's Integrated Risk Information System (IRIS, 1993) or the Health Effects Assessment Summary Tables (HEAST) (USEPA, 1992a). RfDs and CSFs used in this report are listed in Tables 5-1 and 5-2, respectively. Brief toxicity summaries are provided in Table 5-3.

Whenever possible, route-specific toxicity values are used to assess risk. However, RfDs and CSFs have not been developed for dermal exposure. Therefore, oral RfDs are adjusted, as recommended by the USEPA (1989a), by multiplying by the oral absorption efficiency to assess dermal exposure. CSFs are adjusted by dividing by the oral absorption efficiency. The rationale for these adjustments is as follows: most toxicity values are based on administered doses and dermal exposures are calculated as absorbed doses. Therefore, the toxicity value is adjusted to an absorbed dose value prior to evaluating dermal exposures. Constituent-specific dermal and oral absorption efficiencies are shown in Table 5-4. The adjusted toxicity values used to assess dermal exposure are shown in Table 5-5. It is noted that oral CSFs for carcinogenic PAHs were not adjusted for dermal exposure. Carcinogenic PAHs have been associated with skin cancer through a local effect. Therefore, it is inappropriate to use the oral CSF for constituents that cause skin cancer through a local rather than a systemic effect (USEPA, 1989a).

Toxicity values are not available for several PAHs. The RfD for pyrene was used as a surrogate for non-carcinogenic PAHs not having RfDs (acenaphthylene, benzo[g,h,i]perylene, carbazole, 1-methylnaphthalene, 2-methylnaphthalene, and phenanthrene) and dibenzofuran. Benzo(a)pyrene is the only carcinogenic PAH (cPAH) with CSFs. USEPA Region IV has developed a toxicity equivalency factor (TEF) scheme based on structure activity relationships and the toxicity literature to convert all cPAHs to benzo(a)pyrene equivalents (USEPA, 1992b). This TEF approach is used in this report, and benzo(a)pyrene equivalents are shown in Table 5-6.

Isomers of tetrachlorophenols and trichlorophenol were not specified in the data summary. Therefore, 2,3,4,6-tetrachlorophenol was used to represent tetrachlorophenols, and two isomers of trichlorophenol (2,4,5-trichlorophenol and 2,4,6-trichlorophenol) were chosen to represent trichlorophenols. An RfD is available for 2,4,5-trichlorophenol, and CSFs are available for 2,4,6-trichlorophenol.

6.0 EXPOSURE CHARACTERIZATION

This section addresses the potential for on-site exposure to constituents released from the landfarm area during construction activities. Exposure occurs only when a potential receptor comes in contact with constituents released to the environment. In the absence of exposure, there is no risk or hazard; therefore, exposure assessment is one of the key components of risk assessment.

6.1 RELEASE SOURCE ANALYSIS

As a result of past operations as a wood-treating facility, PCP, PAHs, and CCAs were released to site soils. In accordance with an Administrative Order on Consent with the State of North Carolina, signed on May 20, 1985, SWP constructed and operated a landfarm to remediate soils containing PCP and various PAHs associated with creosote. Details of the landfarm operation are provided in Section 4.1. The available data indicate that biodegradation of PCP and PAHs has occurred; however, residual levels of PAHs and PCP remain in the landfarm soil. Leaching from the landfarm area has not occurred, as evidenced by ground-water and subsurface soil analyses. Soil berms control run-on and runoff; therefore, release of constituents from the landfarm to surface water is not known or believed to have occurred. Past fugitive dust emissions during tilling and landfarm maintenance activities may have resulted in minimal off-site transport of COCs. Vegetation currently limits dust emissions. Future dust emissions will be eliminated completely by fill and pavement.

6.2 EXPOSURE PATHWAYS AND RECEPTORS

Potential exposure pathways considered in this report include incidental soil ingestion, dermal (skin) contact with soil, and inhalation of dust on site during future construction activities.

It is assumed that future land use will remain industrial/commercial. A potential use for the site is as a loading dock and storage area for containerized cargo by the State Ports Authority. It is assumed that the site will be covered with fill and/or paved with concrete. Construction of buildings over the landfarm, paving, or additional soil cover should eliminate exposure. However, exposure could occur during a short-term construction period required to develop the property or from future excavations through the fill into the landfarm soils to install utility lines or building foundations. Therefore, this report evaluates exposure of a future site worker during construction and/or excavation within the landfarm area.

6.3 EXPOSURE POINT CONCENTRATIONS (EPCs)

Soil EPCs were selected as the lower of the UCL or maximum concentration from Table 3-2. EPCs for cPAHS (benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene) were multiplied by TEFs to derive benzo(a)pyrene-equivalent EPCs (Table 5-6). Current PAH concentrations were assumed to be representative of future concentrations.

Inhalation exposure was based on fugitive dust emissions from the site, and assumed constituent concentrations in airborne dusts were equal to concentrations in the landfarm soils. Dust emissions were calculated using a model developed by Cowherd et al. (1985). This model assumes that the soil is characterized by bare surfaces of finely divided material with an unlimited reservoir of erodible particles. This model was selected by USEPA (1991b) to calculate risk-based preliminary soil remediation goals (Appendix A). Default parameters (as listed in USEPA, 1991b) were used with the following exceptions: the width of the contaminated area perpendicular to the prevailing wind direction (northeast) was estimated at about 220 meters (m), and the total landfarm area was estimated at about 22,300 m^2. A particulate emission factor of 2.0×10^9 m^3/kg was calculated (Appendix A, Table A-1).

6.4 EXPOSURE DOSE CALCULATIONS

Average daily intakes (ADIs) for non-carcinogenic effects and lifetime average daily intakes (LADIs) for carcinogenic effects were calculated using standard assumptions, risk assessment guidance, site data, and professional judgment. The primary receptor identified was a future site construction worker. Standard USEPA exposure assumptions (USEPA, 1991a; 1989a) considered for use in this report are listed in Table 6-1 and are discussed below. The exposure dose equations and sample calculations for oral, dermal, and inhalation exposures are shown in Tables 6-2, 6-3, and 6-4, respectively.

Future site workers involved with site construction/excavation were selected to represent the reasonably maximally exposed individuals. During construction, workers may be exposed to soil via ingestion, inhalation of dust generated from affected soil, and dermal contact. It was assumed that the construction period would last for 13 weeks (approximately 3 months) and that workers would be on the job 6 days per week and 8 hours per day. Standard USEPA factors for soil ingestion, dermal contact, and inhalation rates for construction workers were used (USEPA, 1991a). The ADIs and LADIs (assuming constant COC concentrations) from ingestion, dermal contact, and inhalation of dust are shown in Tables 6-5, 6-6, and 6-7, respectively.

7.0 RISK CHARACTERIZATION

This section discusses potential risk to future site workers involved in construction/excavation activities at the landfarms. A distinction is made between carcinogenic and non-carcinogenic effects, and two general criteria are used to describe risk: excess lifetime cancer risk (ELCR) (for Class A, B, or C carcinogens) and the hazard quotient (HQ) for non-carcinogenic effects. This section presents the results of the quantitative human risk estimates and provides a qualitative discussion of potential risk to the environment.

The ELCR is an estimate of the increased risk, or probability, of developing cancer, and is an indication of the increased risk which may result from site worker exposure to constituents in landfarm soil. The ELCR is an upperbound estimate; therefore, it is likely that the true risk is less than that predicted by the model. Current regulatory methodology assumes that ELCRs can be summed across routes and media of exposure and COCs to derive a "Total Site Risk" (USEPA, 1989a). ELCRs in the target range of 10^{-4} to 10^{-6} generally do not require remediation (USEPA, 1991c).

The HQ is the ratio of the estimated exposure dose and the RfD. If the HQ exceeds 1, there may be concern for potential non-carcinogenic effects. However, the HQ does not provide the probability of an adverse effect as does the ELCR. An HQ greater than 1 indicates that the estimated exposure dose for that constituent exceeds the RfD, but it does not necessarily imply that adverse health effects will occur because RfDs typically are set an order of magnitude or more below the NOEL as discussed in Section 5. Furthermore, the level of concern does not increase linearly with increasing HQs because RfDs have different levels of confidence, are based on different toxic effects, and do not consider the slope of the dose-response curve. HQs are summed to derive the hazard index (HI). Current regulatory methodology (USEPA, 1989a) advises summing HIs across exposure routes for all media to derive a "Total Site HI." However, if the HI exceeds 1, constituents may be grouped according to critical toxic effects, and HIs may be calculated separately for each effect.

7.1 SITE WORKER

Risks estimates for a future site construction worker are provided in Tables 6-5, 6-6, and 6-7 for ingestion, dermal contact, and inhalation exposures, respectively. ELCRs were calculated to be 6 x 10^{-6} (ingestion), 2 x 10^{-7} (dermal contact), and 1 x 10^{-9} (inhalation). Benzo(a)pyrene was responsible for more than half of the ELCR. Benzo(a)anthracene, benzo(b)- and benzo(k)fluoranthene, dibenzo(a,h)anthracene, and arsenic accounted for about a third of the ELCR. HIs were calculated to be 0.4 (ingestion) and 0.1 (dermal). An HI could not be calculated for the inhalation pathway because appropriate toxicity values were not available; however, the HI from the inhalation pathway is expected to be insignificant compared to the other exposure routes based on the low ADIs. All risk values were within or below the regulatory target values.

Total site risks are shown in Table 7-1. The total ELCR and HI for a hypothetical future site worker (obtained by adding risk from each exposure route) are 6 x 10^{-6} and 0.5. Ingestion was the predominant exposure route.

These estimates are conservative because of the assumed high frequency of contact with affected soil. Actual exposures may be controlled by site safety plans during construction and deed restrictions following initial construction. Nevertheless, the risk calculations indicate that risks to construction workers are within acceptable regulatory ranges.

7.2 ECOLOGICAL ASSESSMENT

The objective of this ecological assessment is to determine if constituents detected at the site have the potential to adversely affect the ecosystems at and/or surrounding the site. Currently, the USEPA has no guidance for quantifying potential impacts to ecological receptors but has developed a qualitative approach generally used for ecological evaluation (USEPA, 1989b). The qualitative approach recommends the comparison of ambient environmental media concentrations to relevant criteria (e.g., water-quality criteria) to determine if any of the

constituents that ecological receptors may potentially contact exceed these criteria. COCs were detected only in soil samples at the site. Currently, there are no established state or federal soil quality criteria for the protection of terrestrial organisms. Therefore, this section discusses some general concepts of environmental toxicology, provides a brief description of the ecological community, and assesses potential impacts from available toxicity data and likelihood of exposure. This discussion is applicable for current conditions at the site. Future development of the property also will prevent exposure of environmental receptors to constituents in the landfarm soil.

7.2.1 General Concepts

Environmental toxicology or ecotoxicology combines the sciences of ecology and toxicology to study the ecological effects of environmental pollutants. Pollutants are defined as environmental contaminants that occur at high enough concentrations to cause deleterious biological effects (Moriarty, 1988). Toxicology has focused largely on studying the effects of single compounds on individual organisms. In ecotoxicology, this must be extended to include effects of multiple contaminants on the ecosystem. An ecosystem is composed of both abiotic and biological components. The organization of biological components are species, populations, and communities. The abiotic component is called the habitat. A population is composed of individuals of a species that occur within a defined area, and a community is a collection of all populations (plant, animal, bacteria, and fungi) that live in a defined area and interact with one another. In practice, it is not always easy to set the boundaries for populations and communities. The community plus its habitat is an ecosystem (Moriarty, 1988).

The prediction of ecotoxicological effects from chemical constituents released to the environment is complicated. To begin with, ecosystems are not static; the biological components experience constant fluctuations both in population numbers and relative composition. Abiotic factors (temperature, precipitation, nutrient availability, etc.) also are changing constantly. The stability of an ecosystem therefore is determined to a great extent by the ability to respond to "normal" stresses. Unfortunately, the normal or baseline conditions are not well understood or

defined for any ecosystem. Therefore, it is difficult to determine whether changes in ecological parameters are associated with pollutants or merely reflect normal fluctuations.

It is possible that effects on individual organisms or even populations may not affect the ecosystem at all. If a prey species is affected, predators may be able to shift to feeding on other species; losses of predators may be compensated for by other predators or by immigration of another predator population. Recognizing when an adverse effect has occurred, or is occurring, is difficult. Unless there is a mass killing within a population or community, effects may go unnoticed. Sublethal effects such as behavioral changes, reduced reproductive success, enzyme level changes, effects on microorganisms, etc., likely will have more of an ecological impact than lethal effects. When effects are measured, it may be difficult to determine the cause.

Predictive abilities also are limited by the amount of available data relevant to environmental conditions. Most of the toxicological database is derived from carefully controlled studies of single compounds on inbred populations of laboratory animals. This is in sharp contrast to environmental exposures, which generally involve multiple contaminants interacting within a complex ecosystem. Furthermore, metabolites and degradation products of contaminants may be of more toxicological significance than the parent compounds. The distribution of environmental contaminants is not uniform, and although there are numerous data on occurrence of contaminants in biological tissues, there are few data on rates of absorption, metabolism, and excretion; therefore, dose estimations are difficult.

To summarize, although the effects of contaminants on populations of organisms are a concern (some perhaps more than others), it is difficult to predict if observed effects on individual populations will result in any real damage to the ecosystem. The science of ecotoxicology is in its infancy and the ability to predict ecological effects is rudimentary at best. Populations are dynamic; therefore, baseline knowledge of the normal range of variability needs to be improved. Sublethal effects, which may be very important to overall ecosystem health, are very difficult to detect. Contaminants at low concentrations may not kill organisms directly but may greatly diminish their ability to survive and reproduce. Finally, it is important to

remember that chemical contamination is not the only way humans impact ecosystems. Habitat destruction from development, agriculture, recreation, forestry, etc., is likely the major way humans exert ecological impacts (Moriarty, 1988).

It is extremely difficult to predict ecological effects of a single chemical released to the environment, let alone multiple chemicals such as detected at the SWP landfarm site. The following discussion will present and evaluate the results obtained from sampling of the ground water and soil at the landfarm site and evaluate the potential for environmental effects.

7.2.2 Community Description

The former SWP site was an active industrial facility for more than 60 years. Prior to initial development, during World War I, the site was a coastal forest. Forest and a small swamp currently border the site to the south. Drainage canals along the northern and western borders also indicate that the property was at least partially a wetland prior to development. Loblolly pine (*Pinus taeda*), oaks (*Quercus* sp.), sycamore (*Platanus occidentalis*), hickory (*Carya* sp.), maple (*Acer* sp.), sweet gum (*Liquidambar styraciflua*), and bald cypress (*Taxodium distichum*) were the primary canopy species; red bay (*Persea borbonia*), wax myrtle (*Murica cerifera*), and holly (*Ilex* sp.) were the primary understory species observed.

The Cape Fear River borders the site to the west. A petroleum tank farm is immediately north, and residential/commercial/recreational areas are east of the site. The landfarm areas cover approximately 5 acres in the northwestern corner of the facility. After the facility was closed, native grasses, shrubs, and herbaceous plants have grown on much of the land which was previously used as a log/lumber stockpile. While landfarms were active, vegetation was limited to the bermed sections between the tilled areas of the landfarm. Vegetation has now grown over the landfill areas.

Wildlife have free access to the site. Herons (*Ardeidae*), sea gulls (*Laridae*), doves (*Columbidae*), fish crows (*Corvus ossifraquis*), warblers (*Parulidae*), sparrows (*Fringillidae*),

and finches (*Fringillidae*) were observed during a brief site visit. Evidence of small mammals such as marsh rabbits (*Sylvilaque palustris*), field mice (*Peromyscus* sp.), and moles (*Talpidae*) also were observed. The adjacent Cape Fear River supports a diverse aquatic community; however, berms surrounding the landfarm areas restrict runoff from the site and hence exposure. No critical habitats of endangered species have been identified in the area.

The North Carolina Heritage Program was requested to search its database for the occurrence of rare species and communities in the vicinity of the site (Appendix B). The Heritage Program identified one priority natural area, Brunswick River-Cape Fear Marshes, northwest of the site. This area is significant for its extensive tidal freshwater marshes and for the habitat it provides to fish and other species. The Brunswick River-Cape Fear Marshes area is approximately 0.6 mile from the site. The Cape Fear River lies between the site and this area.

The Heritage Program also identified records of several rare species within approximately 1 mile of the site. These species include: the state significantly rare cypress knee sedge (*Carex decomposita*); the state threatened Carolina grasswort (*Liliaeopsis carolinensis*); the state candidate Carolina bishopweed (*Ptiliumnium* sp.); the state and federal threatened American alligator (*Alligator mississippiensis*); the state and federal endangered shortnose sturgeon (*Acipenser brevirostrum*); the state special concern species least killfish (*Heterandria formosa*); the state endangered barrel floater (*Anodonta couperiana*); the state endanged magnificent ramshorn (*Planorbella magnifica*); and the extirpated Greenfield ramshorn snail (*Helisoma eucosmium*). The Heritage Program indicated that some of these species have not been seen in the area in recent years; however, they did not indicate which species.

An expanded list of rare species potentially occurring within the Wilmington area was included by the Heritage Program (Appendix B). These species include: the state and federal endangered shortnose sturgeon and red cockaded woodpecker (*Picoides borealis*); the state endangered barrel floater and magnificent ramshorn; the state threatened American alligator, Carolina grasswort, and snowy orchid (*Platanthera nivea*); the extirpated greenfield ramshorn

snail; significantly rare and/or candidate species least killfish, black-necked stilt (*Himantopus mexicanus*), Eastern coral snake (*micrurus fulvius*), mimic glass lizard (*Ophisaurus mimicus*), Carolina gopher frog (*Rana capito capito*), Brazillian free-tailed bat (*Tadarida brasiliensis*), rare skipper (*Problema bulenta*), cypress knee sedge, swamp lily (*Crinum americanum*), Leconte's flatsedge (*Cyperus lecontei*), venus flytrap (*Dionaea muscipula*), blackfruit spikerush (*Eleocharis melanocarpa*), pondspice (*Litsea aestivalis*), ribbed bishop's-weed (*Ptilimnium costatum*), Carolina bishopweed, feather-bristle beakrush (*Rhynchospora oligantha*), and coastal beakrush (*Rhynchospora pleiantha*).

Based on the habitat preferences of these species, none of these species is expected to inhabit the industrial landfarm site. It is not known whether these species existed in this area prior to industrialization of the property.

7.2.3 Community Effects

Constituent concentrations detected in soil samples collected during the 1990 and 1991 sampling are presented in Table 3-2. PAHs were detected in both sampling rounds. PAHs, phenolics, arsenic, chromium, and copper were identified. PAHs detected at the highest concentrations were anthracene (900 mg/kg), fluoranthene (520 mg/kg), and pyrene (980 mg/kg). PCP, arsenic, chromium, and copper were detected at maximum concentrations of 150 mg/kg, 84 mg/kg, 100 mg/kg, and 150 mg/kg, respectively.

PAHs occur in the terrestrial environment both (1) naturally from forest fires, volcanoes, and synthesis by plants and micro-organisms, and (2) from anthropogenic sources such as the burning of fossil fuels, fuel exhausts, and waste products from industry in localized areas, as in this case. Endogenous soil concentrations range from 1 to 10 micrograms per kilogram (μg/kg) and in plants from 10 to 20 μg/kg (Edwards, 1983), and reported background concentrations of total PAHs in urban soils range from 100 mg/kg to 175 mg/kg (USEPA, 1980).

Eventually, much of the PAHs in the environment reaches the soil either by direct accumulation or following deposition on vegetation. Plants are capable of uptake, translocation, metabolism, and degradation. However, in areas with high concentrations of PAHs, assimilation can exceed metabolism and degradation. This can result in accumulation within plant tissues. PAHs accumulate highest in plant peels and oils. Wang and Meresz (1982) compared the levels of 17 PAHs measured in cultivated soil with levels in tomatoes, beets, and onions. The site soil concentration in their study was 1.1 mg/kg PAHs, of which up to 18 percent of this (0.2 mg/kg dry weight) was measured in plant tissues. Phytotoxic effects of PAHs on germination, growth, and development of plants are not well known; however, the presence of plants along the landfarm berms and within the landfarms indicate that some if not all species can adapt to the current site concentrations.

Microorganisms and animals can metabolize PAHs (Edwards, 1983). In fact, high PAH concentrations in soil can lead to increased populations of microorganisms capable of degrading the PAHs (Edwards, 1983).

PAHs may accumulate in terrestrial animals through the food chain or by ingestion of soil; however, they show little tendency to biomagnify in food chains (Eisler, 1987). Although PAHs may accumulate in plants and animals, most are metabolized rapidly or their levels are regulated by homeostatic mechanisms in higher organisms. Invertebrates, small mammals, or birds living in or foraging at the landfarm areas would be exposed to PAHs. Gile et al. (1982) studied the environmental fate of creosote tar distillate (9 percent acenaphthene and 21 percent phenanthrene and dieldrin) in a terrestrial microcosm. The environment contained soil, rye grass, insects, snails, and earthworms. Two voles were added 54 days after the experiment began for ±20 days. Daily average surficial soil concentrations were 1.19 mg/kg acenaphthene and 0.6 mg/kg phenanthrene; various levels of these compounds were detected in all parts of the system. Levels measured in voles exceeded average soil concentrations, but toxic effects were not reported. However, exposure to creosote apparently reduced cricket predation by voles. The concentrations of PAHs in this study are much lower than those detected at the SWP site.

In soils, phenol and trichlorophenols are expected to biodegrade rapidly; however, this process may be hindered or precluded by the presence of excessively high concentrations of these constituents or lack of nutrients or microorganisms capable of degrading the constituents (Agency for Toxic Substances and Disease Registry [ATSDR], 1988; 1989a). There is evidence that cresols biodegrade in soils; however, information on the biodegradation rate is not available (Howard, 1989). Plants can metabolize phenol rapidly; therefore, exposure to phenol by consumption of plant foods is minimal (ATSDR 1988). Based on bioconcentration factors (BCFs) for cresols (approximately 20 Liters per kilogram [L/kg], phenol (approximately 200 L/kg), and trichlorophenols (approximately 300 L/kg) (Howard, 1989), these compounds are not expected to significantly bioconcentrate in organisms. There is no good information in the literature on the bioconcentration of the COCs by terrestrial life. Although BCFs are determined using aquatic species, they can serve as a general indication of a constituent's potential for bioconcentration in other species.

It is not known if the arsenic, chromium, and copper detected at the site are in forms that are bioavailable to potential receptors. The bioavailability of metals to animals at higher trophic levels generally is determined by transfer from water and food organisms rather than soils (Connell and Miller, 1984).

Arsenic can be relatively toxic to plants; however, its toxicity depends on the concentration of soluble, rather than total, arsenic in soils. Above 2 milligrams of soluble arsenic per kilogram of soil, marked damage to plants is known to occur (Vandecaveye et al., 1936). Arsenic poisoning has been reported in some cattle in pastures contaminated by very high levels of arsenic in soil; however, Eisler (1988) reports that episodes of terrestrial wildlife poisoning by arsenic are infrequent. Concentrations causing death in 50 percent of test animals (LD_{50}s) of 40.4 mg/kg body weight have been reported in wild rabbits and hares following acute oral exposure (National Research Council of Canada [NRCC], 1978). Although arsenic can bioaccumulate in terrestrial species, the available data indicate that biomagnification does not occur (Andren et al., 1988; National Academy of Science [NAS], 1977).

Chromium is moderately to severely toxic to plants depending on its form. Chromates have been found to be the most toxic to plants. It is likely that soluble, hexavalent chromium may be responsible for the toxic effects reported for soil-based plants. Symptoms of chromium toxicity in plants generally appears as chlorosis in young leaves, brownish-red coloration of leaves, wilting of tops, and root injury (Kabata-Pendias and Pendias, 1984) at levels as low as 1.37 mg/kg (Mertz, 1967).

Chromium is considered to be an essential trace element for animals. It is biologically non-toxic to animals as chromium III. Chromium VI may be up to 100 times more toxic to animals. Chromium VI causes toxicity to experimental animals at concentrations of 5 mg/kg in feed; chromium III is toxic at 260 mg/kg in feed (Sax and Lewis, 1989).

Copper tolerance in animals varies widely partly because of differences in dietary levels of other trace elements such as iron, molybdenum, selenium, sulfur, and zinc (NAS, 1980). NAS suggested the following tolerable levels for dietary copper: 25 mg/kg for sheep, 100 mg/kg for cattle, 200 mg/kg for rabbits, 250 mg/kg for swine, 300 mg/kg for turkeys and chickens, and 800 mg/kg for horses (NAS, 1980). Furr et al. (1976) and Dowdy and Larson (1975) conducted studies on plant growth in soils amended with sludge. They reported that soil/sludge copper concentrations of 395 mg/kg and 245 mg/kg had no effect on plant growth and physiology, respectively. However, Kabata-Pendias and Pendias (1992) reported that copper levels in soil as low as 60 mg/kg can be phytotoxic to some plants.

Bioaccumulation of the COCs would be most significant for those COCs which have a moderate to high potential for uptake by plants and animals serving as food sources at the site. Arsenic and copper have a moderate potential for uptake into plants (Kabata-Pendias and Pendias, 1992); however, they are not a biomagnification concern and will not be passed on to higher foodchain organisms.

7.2.4 Ecological Summary

Insects, small mammals, birds, and plants potentially have been exposed to PAHs, phenols, creosols, and inorganics at the site; however, it is not known if toxicity has occurred. Toxic effects, if any, would be limited in scope because of the small size of the site and past maintenance activities. In addition, COCs at the site are unlikely to pose a biomagnification hazard to potential receptors. Therefore, the potential for adverse environmental effects (beyond the impact from past and future development and industrial use) are believed to be minimal.

8.0 UNCERTAINTIES

The risk assessment represents conservative estimates of the potential risks associated with constituents at the wood-treatment plant operated by SWP. However, it is important to recognize that considerable uncertainty is inherent in the risk assessment process. There are three basic components of a risk assessment, each of which contributes uncertainties: monitoring data, exposure scenarios, and toxicity values. These components are discussed below.

This risk assessment is founded on the assumption that the monitoring data adequately describe constituent concentrations at the site. It was assumed that the landfill environment would be relatively homogeneous; therefore, a systematic sampling design (points at each corner and one in the middle) was used. The data indicate that the concentrations were relatively evenly distributed. All PAHs and inorganics were detected in each sample, and maximum concentrations were generally less than an order of magnitude greater than the mean.

Uncertainty associated with analysis of samples can be minimized by using appropriate analytical methods and equipment, documenting chain of custody of samples, and implementing strict laboratory data validation and quality assurance procedures. It is also critical that sample detection limits be lower than the standards or other criteria used to evaluate health risk. The sample quantitation limits were adequate for the risk assessment.

Exposure scenarios also are characterized by uncertainty. Because the specific nature and extent of actual exposures are often unknown, it is necessary to use standard assumptions and professional judgment to construct possible scenarios. The scenario presented in this report represents a conservative approach based on the available information concerning probable future site use and was intended to overestimate actual exposure.

The toxicity values and other toxicologic (health effects) information used in this report are associated with uncertainty but are based on the most recent information available. In some cases, particularly for inhalation exposures, toxicity values were not available. The impact of

missing toxicity values on the risk assessment is probably low because inhalation appears to be the least important exposure route.

The use of surrogate toxicity values to evaluate risk also adds to uncertainty. Benzo(a)pyrene TEFs (USEPA, 1992b) were used to calculate ELCRs for cPAHs, and the RfD for pyrene was used to represent PAHs which did not have an RfD. Potential carcinogenic effects of dermal exposure to PAHs could not be evaluated. However, local skin tumors resulting from PAH exposure require high doses over a long exposure period. Normal hygiene practices should eliminate the risk of skin tumors from exposure to PAHs at the site.

It generally is acknowledged that there also is considerable uncertainty associated with the toxicity of mixtures. For the most part, data about the toxicity of chemical mixtures are unavailable. Rather, toxicity studies generally are performed using a single chemical. Chemicals present in a mixture can interact to yield a new compound, or one of the compounds could interfere with absorption, distribution, metabolism, or excretion of another. Chemicals also may act by the same target organ or can act completely independently. This risk assessment assumes that toxicity is additive; the HIs were summed across constituents. This procedure assumes that the mixture of constituents present at the site have neither synergistic nor antagonistic interactions.

Because of the inherent uncertainty associated with risk assessment, current methods are designed to compensate by using conservative toxicity and exposure estimates. Therefore, the risk estimates in this report likely do not underestimate actual risks for the COCs evaluated but may overestimate risks by an order of magnitude or more.

9.0 FINDINGS AND CONCLUSIONS

A risk assessment was conducted for potential exposure during future site construction and development to landfarm soils at the former SWP site in Wilmington, North Carolina. Potential risks were evaluated by considering direct contact with affected soils (ingestion and dermal contact) and inhalation of fugitive dusts by a site construction worker. Actual future exposure likely will be limited to a short construction period (assumed to be 3 months), following which the landfarm areas will likely be covered by fill and pavement. Total risks were compared to the USEPA (1991c) guidelines of 10^{-4} to 10^{-6} for ELCRs and an HI of 1.0 for non-carcinogenic effects. Findings and conclusions are summarized below:

- Based on data from the available monitoring wells, release of constituents from the landfarmed soils to ground water has not occurred. Run-on/runoff controls at the landfarm presumably prevent release to nearby surface water and sediments. Thus, current or foreseeable future exposure to these media were not identified as pathways of concern associated with landfarming operation.

- The potential exists for exposure (ingestion, dermal contact, and inhalation of fugitive dust) to surficial soils at the site during future construction activities.

- The total ELCR calculated for a future site construction worker was 6×10^{-6} and is within the target risk range of 10^{-4} to 10^{-6}. Potential ingestion of benzo(a)pyrene in soil accounted for most of the risk.

- The total HI was 0.5 and is below the target value of 1.0.

- Ecological impacts of the landfarms are limited by their relatively small size and surrounding development. Invertebrates, small mammals, and birds would have the greatest potential to be exposed to COCs at the site. The potential for

threatened or endangered species to be impacted by the site appears to be remote. Future development will prevent exposure to ecological receptors.

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Reference 13

DIOXINS AND FURANS: WHERE THEY COME FROM

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Dioxins have caused a great deal of concern because they have been found in many places and are extremely toxic. Furans are similar chemicals and are often found with dioxins.

Dioxins and furans have never been manufactured deliberately, except in small amounts for research purposes. They are unintentionally created in two major ways: 1) by the processes used to manufacture some products, for example, certain pesticides, preservatives, disinfectants, and paper products; 2) when materials are burned at low temperatures, for example, certain chemical products, leaded gasoline, plastic, paper, and wood.

Dioxins and furans from manufacturing

Dioxins can be inadvertently formed during the manufacture of a group of chemicals called chlorophenols, and the products made from them. Chlorophenols have been widely used to preserve wood, hides, textiles, paints, glues, and other materials, as disinfectants, and to keep industrial cooling waters free of nuisance organisms. Some of these uses have been phased out.

A chlorophenol called 2,4,5-trichlorophenol is always contaminated with the most toxic kind of dioxin or furan, called 2,3,7,8-TCDD. After 2,4,5-trichlorophenol was identified as a source of dioxins, manufacturers that used 2,4,5-trichlorophenol found ways to remove the contaminant from their products. This often meant that the 2,3,7,8-TCDD was then concentrated in the wastes from such production.

Improper disposal of such waste resulted in the contamination of the town of Times Beach in Missouri, the Love Canal in New York, and other areas. Many highly contaminated sites remain where these wastes were handled, stored, or landfilled. 2,4,5-trichlorophenol is no longer produced in the U.S.

Other chlorophenols can contain dioxins and furans. Pentachlorophenols, which are used to preserve wood, can contain relatively high levels of dioxins and furans, including many highly toxic kinds. Wood treatment facilities and sawmills have been significant sources of contamination, and wastes from their facilities are now treated as hazardous, or are proposed to be treated as such.

Polychlorinated biphenyls (PCBs) have been widely used as cooling fluids in electrical equipment and some industrial cooling systems. Such fluids are often a mixture of PCBs and other chemicals. PCBs can

contain low levels of furans, and the other chemicals can contain low levels of both dioxins and furans. Very large amounts of PCBs have been released to the environment. They are no longer manufactured in the U.S., and are being removed from most uses.

Dioxins and furans were discovered in the waste products of some pulp and paper mills in 1985, after fish downstream from the mills were found to contain low levels of 2,3,7,8-TCDD. Since then, extremely small amounts of dioxins and furans have been found in some paper products. The EPA and the paper industry have been working together to understand the problem and reduce or eliminate the amounts inadvertently formed in the manufacture of paper. Presently, it is believed that a chlorine bleaching process used at some paper mills is responsible for the creation of dioxins and furans.

Dioxins and furans from burning

Many of the products and wastes that are contaminated with dioxins and furans will produce larger amounts when burned. For example, when treated wood is eventually burned, the chlorophenols that burn with it could be a widespread source of dioxins and furans. Also, wood treatment facilities often collect waste pentachlorophenol in ponds, and in the past set fire to the ponds to reduce their volume. This practice generated significant amounts of dioxins and furans.

PCBs can produce large amounts of furans when they are burned, and the chemicals that are often mixed with PCBs for use in electrical equipment can produce dioxins. Fires involving transformers and capacitors have contaminated buildings, power stations, locomotives, and other places with dioxins and furans.

Polybrominated biphenyls (PBBs) are widely used as flame retardants in textiles, carpets, and plastics. These materials are resistant to igniting but will burn in a building fire or incinerator. When they burn, they can be a source of dioxins and furans.

Polyvinyl chloride (PVC) is a common plastic that can produce dioxins and furans when burned. PVC is often present in municipal waste in large amounts, and is believed to contribute to the dioxins and furans from incinerators.

Many sources of combustion produce dioxins and furans. Incinerators, both municipal and industrial, are significant sources. Dioxins and furans have been found both in the incinerator ash and in the gases and tiny particles escaping through stacks. Power plants, smelters, steel mills, and oil and wood stoves and furnaces all emit dioxins and furans.

Greater amounts of dioxins and furans are produced when material is burned inefficiently and at low temperatures. For example, the amounts of dioxins and furans formed during incineration can be reduced by higher temperatures and more complete burning. Modern incinerators produce smaller amounts of dioxins and furans than older ones, and new technology is expected to reduce the amounts even further.

Leaded gasolines, which contain chlorinated additives, produce very small amounts of dioxins and furans when they are burned. Thus, autos may contribute significant amounts of dioxins and furans, especially in urban areas. In the U.S. and much of Europe, the use of leaded fuel has declined dramatically in the past decade and will continue to decline, thus reducing this source considerably.

Because dioxins and furans have been found in the chimneys of wood burning stoves, it has been proposed that forest fires and other natural burning is responsible for a large amount of the dioxins and

furans present in our environment.

Cores drilled from the bottom of the Great Lakes and from a lake in Switzerland were analyzed for dioxins and furans. Researchers can count the years in such cores, just as you can count the rings in a tree. In the sediment cores from all lakes, they found almost undetectable amounts of dioxins and furans before around 1940, a time they say corresponds to the large scale production and incineration of chlorinated aromatics. There are many sources of dioxins and furans. Some of them, such as the use of chlorophenols, the incineration of waste, and other sources of combustion, are widespread and numerous. Others, such as contaminated manufacturing and waste sites, are few in number and usually local problems. Reducing the creation and release of dioxins and furans will require attention to all these sources.

This article is based on information contained in a Special Report: Dioxins and Furans, published by the Environmental Associates. Follow this link to learn more.

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