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SOUTHERN WOOD PIEDMONT COMPANY - WILMINGTON SITE
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EXPANDED SITE INSPECTION

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PHASE III GROUNDWATER QUALITY ASSESSMENT WILMINGTON, NORTH CAROLINA FACILITY

Prepared For

SOUTHERN WOOD PIEDMONT COMPANY SPARTANBURG, SOUTH CAROLINA

Prepared By The

ViroGroup
Air • Water • Soil
TECHNOLOGY
ETE Division

ViroGroup Job No. 12-53015.00
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PHASE III GROUNDWATER QUALITY ASSESSMENT
SOUTHERN WOOD PIEDMONT
WILMINGTON, NORTH CAROLINA FACILITY

1.0 BACKGROUND

The Southern Wood Piedmont (SWP) facility is located in an industrialized area adjacent to the eastern bank of the Cape Fear River within the city limits of Wilmington, North Carolina (Figure 1). The facility is bounded to the north by Amerada Hess Corporation Fuel Tank Farm and to the south by Greenfield Creek. Across Greenfield Creek from the facility is the Poctank, Inc. Tank Farm. Optimist Park and residential areas are located to the east of the facility and the Cape Fear River is located to the west. Greenfield street, which runs in an east-west direction, terminates at the SWP facility.

The facility is situated on two parcels of land that are currently leased to Southern Wood Piedmont. The southern parcel is owned by the North Carolina Ports Authority and the northern parcel by the City of Wilmington. A topographic map for the site and adjacent properties has been prepared and is presented in Figure 2. Wetland areas and existing structures are shown on the topographic map.

1.1 Site History

Prior to 1921, E.R. Eubank Sawmill may have occupied the site. Early Sanborn maps indicate that Newport Shipbuilding Company was operating on-site in 1921. In 1932, the North State Treating Company leased the property. Taylor Colquitt Company acquired the property in 1935 and continued to treat wood products with creosote. In 1964, Taylor Colquitt Company changed names to Taylor Piedmont. International Telephone & Telegraph (ITT) purchased Taylor Piedmont in 1969. Early in 1971, ITT changed the company name to Southern Wood Piedmont. Southern Wood Piedmont operated the wood preserving facility until June 1983. At this time wood treating operations ceased and closure operations commenced at the facility.

The wood preservatives used during plant operations included creosote coal tar, pentachlorophenol (PCP), and copper, chromate, and arsenate (CCA). Creosote was used throughout wood preserving operations, whereas, CCA treatment was added by SWP in the early 1970's followed by pentachlorophenol in the late 1970's. Wood-preserving chemicals were stored on-site in aboveground storage tanks adjacent to the respective treating facilities. Additional tanks for creosote storage were located in the southwestern portion of the facility adjacent to the Cape Fear River.

2.0 PREVIOUS SITE ACTIVITIES

This section provides an overview of previous site activities. Previous site activities include a soil and groundwater investigation completed by the City of Wilmington on their parcel of land,

the construction and operation of an on-site landfarm by SWP through an Administrative Order of Consent with the North Carolina Department of Health, Environment, and Natural Resources, a site-wide near-surface soil investigation, and Phase I and II groundwater quality investigations at the facility.

2.1 City of Wilmington Investigation

Five soil borings were advanced on the City of Wilmington parcel to a depth of approximately 50 feet below land surface by Soil and Materials Engineers, Inc., (SME) during 1981. Lithologic logs indicate that a surficial aquifer of sandy fill material, which varies from less than 1 foot to 18 feet in thickness, is present beneath the City of Wilmington parcel. Below this sandy material is a layer consisting of dark brown, organic-rich silt and peat, which contains traces of fine sand and roots. This layer ranges in thickness from 5 to 19 feet and increases in thickness towards the Cape Fear River to the west. Fine to medium sands extend from below the organic-rich layer to a depth of 42 to 45.5 feet below land surface. A marl is present below this depth.

Each of the five exploratory soil borings were converted to monitoring wells (designated City monitoring wells [CW] on the site map; Figure 3). Four of the monitoring wells (CW-1, CW-2, CW-3, and CW-4) were screened above the organic layer (peat) and one well (CW-5) was screened in the sand below the organic layer. Groundwater samples were collected for inorganic and volatile priority pollutants. Wood-preserving constituents were detected in CW-2 adjacent to the wood treating facility.

Based on their observations, SME concluded that the dominant direction of shallow groundwater flow at the site was to the south, parallel to the Cape Fear River. For additional information on the City of Wilmington investigation, please refer to the report by Soil and Materials Engineers, Inc. entitled: GEOTECHNICAL INVESTIGATION REPORT, CITY OF WILMINGTON PROPERTY LEASED BY SOUTHERN WOOD PIEDMONT, WILMINGTON, NORTH CAROLINA, dated 1981.

2.2 State of North Carolina Administrative Order of Consent

On May 20, 1985, Southern Wood Piedmont Company and the Solid and Hazardous Waste Management Branch, Environmental Health Section, Division of Health Services, Department of Human Resources of the State of North Carolina entered into an Administrative Order of Consent. The Administrative Order of Consent addressed soil and groundwater contamination at the site and provided clean-up/remedial action which should 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.

The Administrative Order of Consent allowed land treatment (landfarm) of preservative residuals in contaminated soil to reduce the residuals to an acceptable level. The location of the landfarm was selected to be in a previous treated pole storage area where there are presently low levels of preservative residuals in the soil.

Pursuant to the terms of the Administrative Order of Consent, soil containing preservative residuals were excavated from the covered sludge ditch, the track area in front of the treatment cylinder, the area in the vicinity of the treatment buildings, and the large storage tank containment area and placed in the landfarm for on-site treatment. The treated pole storage areas not used for landfarming were tilled in place. Soil in the vicinity of the CCA storage tank area was excavated and sent off-site to a permitted land disposal facility and the CCA storage tank sludge was disposed in a hazardous waste landfill. The sludge from the bottom of the various oil storage tanks was placed in an approved landfill or burned for fuel recovery in an off-site location.

Once the terms of the Administrative Order of Consent have been met, the properties will be returned to the City of Wilmington and the North Carolina Ports Authority for development.

2.2.1 Landfarm Operation

In cooperation with the North Carolina Department of Human Resources, Solid and Hazardous Waste Management Branch, SWP operated a landfarm to remediate soil containing wood-preserving residuals. Following the removal of the existing railroad spurs and plant buildings at the facility, a 5-acre area was bermed and ditched for landfarm operations. Excavated wood preserving constituent influenced soil was landfarmed between July 1984 and April 1990. Landfarm treatment included the placement of influenced soil in 2-inch lifts on the landfarm. Each lift was treated by weekly tilling and adding irrigation water, fertilizer, and chicken and turkey manure to promote microbial growth and wood preserving constituent degradation. The landfarm is located on the northwest portion of the site in the area bounded by monitoring wells MW-6, MW-7, MW-8, and MW-9 (Figure 3).

Soil samples were collected periodically between September 1985 to April 1990 throughout the active period of landfill operation. The soil samples were analyzed for soil nutrients, pentachlorophenol, PAHs, phenol, and microbial counts. The soil sampling results indicated that the landfarms were effective and that constituents of concern were not leaching into the substrate soils. Subsequent to active landfarm operations, Geraghty & Miller, Inc. collected soil samples in October 1990 and again in October 1991. Analytical results from the post-operational soil sampling indicated minimal migration of constituents of concern into the substrate soils from the landfarm. For further information on the landfarm activities and findings please refer to the reports by Geraghty & Miller, Inc. entitled: DATA SUMMARY REPORT FOR THE 1990 LANDFARM AREA SAMPLING, SOUTHERN WOOD PIEDMONT COMPANY,

WILMINGTON, NORTH CAROLINA and DATA SUMMARY REPORT FOR THE 1991 LANDFARM AREA SAMPLING AND COMPARISON OF 1990 AND 1991 SOIL AND GROUND-WATER DATA, SOUTHERN WOOD PIEDMONT COMPANY, WILMINGTON, NORTH CAROLINA dated September 1993.

2.2.2 Landfarm Groundwater Monitoring

In September, 1985, Law Environmental Services (LES) installed four groundwater monitoring wells around the limits of the landfarm (MW-6, MW-7, MW-8, and MW-9). Each well was installed to an approximate depth of 20 feet below land surface such that the upper portion of the screen bracketed the contact between the fine to medium upper sands and the underlying peat.

In order to evaluate the direction of groundwater flow within the uppermost aquifer LES collected water table elevations from 8 of the existing monitoring wells and the Cape Fear River at the facility. Based on this data groundwater flow around the limits of the landfarm appeared to be northwest, west, and southwest toward the Cape Fear River.

Hydraulic conductivity testing was also conducted by LES on monitoring wells MW-6 through MW-9. Horizontal hydraulic conductivity values ranged from 3×10^{-5} cm/sec to 1×10^{-6} cm/sec, which is typical of silty sediments (the peat unit at the facility is comparable in hydraulic conductivity to silty sediments). Also, the average groundwater flow velocity was evaluated to be 0.1 feet per year for the screened interval.

Additional information on the groundwater monitoring in the landfarm area can be found in the Law Environmental Services report entitled: MONITORING WELL INSTALLATIONS AND HYDROGEOLOGIC REPORT dated November 27, 1985.

2.2.3 Risk Assessment of Landfarm Areas

A risk assessment has been conducted by Geraghty & Miller, Inc. for the two landfarm treatment areas at the former SWP wood treating facility. The purpose of the risk assessment was to evaluate the wood-preserving constituents remaining in the landfarms and any potential risk to public health and/or the environment. It was assumed that the site will be used for future industrial development (deed restriction) and that several feet of fill and/or pavement will cover the landfarm.

As a result of the assumed future site use and development, the only exposure to constituents remaining in the landfarm soils would occur during the construction period. Therefore, the risk assessment evaluated the potential exposure to a site construction worker. Constituent intake was evaluated for 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 evaluated. Thirteen weeks was selected as a reasonable maximum period required for grading, filling, and paving the site.

Constituents of concern (COCs) included in the risk assessment were PAHs, phenol, dimethylphenol, trichlorophenol, tetrachlorophenol, pentachlorophenol, arsenic, copper and chromium. The analytical results of 70 samples were utilized during the risk assessment.

Risk estimates for the site construction worker were compared to USEPA target risk criteria to determine if the terms of the Administrative Order of Consent 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 was calculated to be 6×10^{-6} and is within the target risk range; the HI is 0.5 and is below the target value of 1. These results indicate that the proposed development of the site could proceed without posing a significant risk to human health and the environment. For additional information regarding the landfarm risk assessment, please refer to the report by Geraghty & Miller, Inc. entitled: RISK ASSESSMENT REPORT FOR LANDFARM AREAS, SOUTHERN WOOD PIEDMONT COMPANY, WILMINGTON, NORTH CAROLINA dated December 1993.

2.3 Treated and Non-Treated Wood Storage Area Soil Sampling

Between February 26 and March 1, 1991, Geraghty & Miller, Inc. completed 92 soil borings and collected 48 soil samples from treated and non-treated wood storage areas at the facility. Each of the soil borings were completed to a depth of 18-inches below land surface and visually assessed for the degree of staining and odor. Randomly selected soil boring locations were sampled for select semi-volatile organic constituents and the metals, arsenic, chromium, and copper at depth intervals of 0- to 6-inches and 12- to 18-inches below land surface. A summary of the results of this investigation can be found in the letter report submitted to SWP on June 17, 1992 entitled: WILMINGTON, NORTH CAROLINA SOIL SAMPLING INVESTIGATION.

2.4 Phase I Groundwater Quality Assessment

During February 1992, Environmental Technology Engineering, Inc. (ETE) initiated field activities directed at characterizing the site hydrogeology and evaluating potential groundwater degradation associated with past wood preserving activities at the site. Activities completed during the Phase I groundwater quality assessment include monitoring well installation, visual soil quality evaluation, lithologic interpretation, groundwater flow/tidal influence evaluation, and groundwater sampling.

2.4.1 Monitoring Well Installation

During the Phase I groundwater quality assessment ETE installed 13 groundwater monitoring wells within the upper aquifer (Figure 3). Five of these monitoring wells (B2, B3, B4, B5, and B6) were installed as temporary monitoring wells to aid in groundwater flow and quality interpretation. The remaining 8 monitoring wells (MW-10 through MW-17) were installed as permanent wells in the upper aquifer. Monitoring well MW-14 brackets the contact between the upper sand and the underlying peat, whereas, the other monitoring wells bracket the water table. The temporary monitoring wells were installed such that the base of the screen rested on top of the peat.

2.4.2 Visual Soil Quality

During installation of the monitoring wells, a log of visibly stained sediments was maintained. No visible staining was observed in boreholes B2, B3, B5, B6, or MW-10. Visible wood preserving constituent staining was observed in the soil from boreholes B4, MW-11, MW-12, MW-13, and MW-14. Borehole B4 has visible wood preserving constituent staining near the surface of the borehole and again near the bottom of the borehole. Boreholes MW-11 and MW-12 were observed to have visible wood preserving constituent staining from approximately 3 feet below land surface to the upper sand and peat contact. Visible wood preserving constituent staining was present only near the surface of borehole MW-13. Visible wood preserving constituent staining was encountered near the surface at MW-14 and continued to be observed below the upper sand and peat contact to a depth approximately 14 feet below land surface.

Diesel stained sediments were observed at MW-15, MW-16, and MW-17 located in the southwestern portion of the site in the vicinity of previous aboveground diesel storage tanks. Soils from boreholes MW-15, MW-16 and MW-17 were diesel stained near the surface of the borehole to a depth of approximately 5 feet below land surface.

2.4.3 Site Geology

Soil borings completed during the Phase I monitoring well installation activities indicate that the site is underlain by a brown, fine to medium sand from the land surface to approximately 10 to 15 feet below land surface. A dark brown to black peat with varying amounts of wood and root fragments is present beneath the sand. Based on a single boring (MW-14), the peat unit appears to be approximately 10 to 11.5 feet thick. Underlying the peat is a brown, medium to coarse sand. The thickness of the underlying sand and the depth to the next confining unit was not evaluated during the Phase I groundwater quality assessment.

2.4.4 Site Hydrogeology

In order to characterize groundwater flow changes due to tidal influences at the site, a 12-hour groundwater elevation evaluation was conducted on April 1, 1992 utilizing all existing monitoring wells and 2 staff gauges, one located in the Cape Fear River and one in the on-site drainage ditch. Water level measurements were taken every 2 hours from each monitoring well and the staff gauges. Please refer to Attachment A for a tabulated historical groundwater elevation summary table.

The groundwater flow evaluation indicated that the tidal cycle does affect the groundwater elevations in the monitoring wells located at the site. At times when the tidal stage exceeds mean sea level (the time interval when the tide is approaching and receding high tide) during the tidal cycle, groundwater "stagnation lines" occur along the bank of the Cape Fear River and along the on-site drainage ditch. This zone of stagnation is the result of the surface water in the Cape Fear River and the on-site drainage ditch moving into the aquifer material (recharge) and becoming opposed by groundwater discharging from the aquifer towards the Cape Fear River and the drainage ditch. When the tidal stage is below mean sea level during the tidal cycle, the groundwater flows in a radial pattern from the center of the site and discharges into the Cape Fear River and the surrounding drainage features the circumscribe the site. The tidal cycle appears to only slightly influence water levels in the center of the site. A delayed effect was observed, in that, the highest groundwater elevation in the center portion of the site occurred at a time after high tide within the Cape Fear River.

2.4.5 Groundwater Quality

The quality of the groundwater was evaluated by collecting groundwater samples from all of the existing monitoring wells at the facility that did not contain separate phase fluids. The monitoring wells were sampled on March 13, 1992 and were analyzed for site-specific metals, semi-volatiles, and volatiles. Please refer to Attachment A for tabulated historical groundwater sample analytical results.

Concentrations of wood-preserving metals were detected in all groundwater samples before filtration. However, after filtration all metal concentrations were below detection limits, except for temporary well B5. Groundwater from this well yielded a concentration of 0.006 mg/l for dissolved copper.

The analytical results indicated that wood-preserving constituents were present in the upper sand beneath the facility. The wood preserving constituent plume was partially defined in the northern, eastern, and western portions of the site. However, the southern edge of the plume was not defined. The total organic wood-preserving constituent concentrations were highest in temporary monitoring well B4 with a value of 28.222 mg/l. Monitoring wells MW-13 and MW-

14 yielded the next highest concentrations with values of 6.335 mg/l and 6.268 mg/l, respectively. Lower concentrations of organic wood-preserving constituents were detected in monitoring wells MW-15, MW-16, MW-17, and temporary well B6. Trace amounts of heavy separate phase fluids were detected in monitoring wells MW-11 and MW-12.

Further information on the Phase I groundwater quality assessment is presented in the ETE, Inc. report entitled: SOUTHERN WOOD PIEDMONT GROUNDWATER QUALITY ASSESSMENT - WILMINGTON NORTH CAROLINA FACILITY dated August 3, 1992.

2.5 Phase II Groundwater Quality Assessment

Data collected during the Phase I groundwater quality assessment was utilized by ETE, Inc. in the preparation of recommendations for a Phase II groundwater quality assessment. The purpose of the Phase II groundwater quality assessment was to further define the hydrogeology and groundwater quality with respect to past wood preserving activities at the facility. Phase II groundwater quality assessment activities included the abandonment of five temporary monitoring wells, installation of 12 monitoring wells, groundwater flow evaluation, groundwater sampling, soil sampling, slug testing, and the preparation of an aerial photograph and topographic map depicting the site. For a complete description of the Phase II groundwater quality assessment proposed activities, please refer to the letter report submitted to SWP entitled: RECOMMENDATIONS FOR A PHASE II GROUNDWATER QUALITY ASSESSMENT - SOUTHERN WOOD PIEDMONT COMPANY-WILMINGTON, NORTH CAROLINA dated August 10, 1992.

2.5.1 Temporary Monitoring Well Abandonment

The five Phase I temporary monitoring wells B2, B3, B4, B5, and B6 were abandoned by over-reaming and pressure grouting the borehole to land surface.

2.5.2 Monitoring Well Installation

Based on the data collected during the Phase I groundwater quality assessment, it was determined that additional monitoring wells were necessary to properly define the horizontal and vertical extent of dissolved and separate phase fluid plumes present beneath the facility. Twelve additional monitoring wells were installed between September 28 and October 8, 1992 as part of Phase II groundwater quality assessment activities.

Nine monitoring wells (MW-18 through MW-26) were completed in the upper aquifer and three monitoring wells (MW-8A, MW-11A, and MW-19A) were completed in the lower aquifer at the site during the Phase II investigation.

2.5.3 Site Geology

The site is underlain by a brown, fine to medium sand (upper sand) to a depth of 7 to 16 feet below land surface. Present beneath the upper sand is a 13 to 15 feet thick, dark brown to black clayey peat to peaty clay (peat) with varying amounts of wood and root fragments. Underlying the peat is a 14 to 18 feet thick, light brown, medium to coarse sand (lower sand). Underlying the lower sand is a 2.5 to 4 feet thick, firm, tight, olive gray silty clay with 5 to 10 percent phosphate and glauconite grains (lower clay). Beneath the lower clay is a very dense, light gray sandy shell mold limestone and sand with alternating cemented shell molds and friable silt to large pebble sand laminae. The thickness of this limestone unit is currently unknown but, based on geologic literature, is estimated to be on the order of 650 to 700 feet in thickness.

2.5.4 Site Hydrogeology

Three aquifers and two confining units have been encountered beneath the facility. The upper sand (upper aquifer) is under water table conditions and, as such, is an unconfined or water table aquifer. The upper aquifer at the site is bounded on all sides by groundwater discharge boundaries (e.g. Cape Fear River, on-site drainage ditches, and Greenfield Creek). Groundwater within the upper aquifer migrates from the center of the facility and discharges to these boundaries. The peat, located beneath the upper aquifer, is a leaky confining unit that separates the upper and lower aquifers at the facility. Visual observation of the peat indicates that it is water saturated throughout its entire thickness. The lower sand (lower aquifer) at the facility is bounded above by the leaky peat and below by the lower silty clay and is therefore, a semi-confined aquifer. The groundwater flow direction within the lower aquifer appears to be controlled by the Cape Fear River. Beneath the lower aquifer at the facility is a silty clay. This silty clay is a confining layer at the facility. The third and lowermost aquifer encountered beneath the SWP facility is the Peedee Limestone Formation. The unit is a confined aquifer and is a major source of groundwater in this area.

Groundwater elevations from all of the monitoring wells and surface water elevations from the staff gauges were collected at low tide at the facility on October 15, 1992 (Attachment A). A water table mound was observed beneath the center of the site in the upper aquifer. From this mound groundwater flows to the east and north towards the on-site drainage ditches, to the south towards Greenfield Creek, and to the west towards the Cape Fear River. The average horizontal hydraulic gradient for the upper aquifer was 0.0015 ft/ft. The potentiometric surface for the lower aquifer beneath the facility was evaluated utilizing the three lower aquifer monitoring wells. The groundwater flow direction in the lower aquifer was to the northwest with a horizontal hydraulic gradient of 0.0002 ft/ft.

The vertical hydraulic gradients between the upper and lower aquifers were evaluated by comparing the groundwater elevations in the three well clusters at the facility. An upward

vertical hydraulic gradient of 0.02 ft/ft exists at the MW-8 well cluster and downward vertical hydraulic gradients of 0.012 ft/ft and 0.003 ft/ft exist at MW-11 and MW-19 well clusters, respectively. Please refer to Attachment A for a tabulated historical vertical hydraulic gradient summary.

Slug tests to evaluate the hydraulic conductivity of the upper aquifer, peat, and lower aquifer were completed at 15 monitoring well locations. The average horizontal hydraulic conductivity measured in the upper aquifer is 5.06×10^{-4} cm/sec, in the peat is 3.2×10^{-5} cm/sec, and in the lower aquifer is 4.05×10^{-3} cm/sec.

The horizontal hydraulic gradient and horizontal hydraulic conductivity were utilized to evaluate the groundwater seepage velocity for the upper aquifer, peat and lower aquifer at the facility. The average seepage velocity for the upper aquifer is 0.8 m/year, for the peat is 0.02 m/year, and for the lower aquifer is 0.85 m/year.

2.5.5 Soil Quality

During installation of the monitoring wells, close attention was given to the condition of the soils encountered. Soil observations included visible staining of the soil, odor, total organic vapor screening (OVA), and laboratory soil sampling. Soil observations during the Phase I and II groundwater quality assessments indicate that three main source areas exist (Figure 4). One source is the wood treatment area, which includes the former creosote treatment area, former CCA treatment area and the former sludge ditch. The second source is the former large storage tank containment area and the third source is the former diesel storage tank areas.

Visible staining of the soils in the vicinity of the wood treatment area was observed from 3 feet below land surface to the top of the peat (13 feet below land surface) at MW-11 and to 8 feet below the top of the peat in MW-14 (16 feet below land surface). At MW-26, visible staining first occurs at a depth of 10 feet below land surface and is present to a depth of 1 foot below the top of the peat (17 feet below land surface).

In the vicinity of the large storage tank source area visibly stained soils are present near MW-13 from 3 feet below land surface to a depth of 8 feet below land surface. Visibly stained soils are present in monitoring well MW-22 from 3 feet below land surface to a depth of 9 feet below land surface.

The diesel tank source areas are indicated by monitoring wells MW-15, MW-16, and MW-17. At MW-16 and MW-17, diesel stained soils were observed from the surface to a depth of 5 feet below land surface with a diesel odor occurring to the top of the peat. In the vicinity of MW-15, diesel stained soils were observed to a depth of 5 feet below land surface. Diesel odors were also observed near the surface in monitoring well MW-22.

On December 9 and 14, 1992, ETE collected 11 soil samples along the on-site drainage ditch and along the north bank of Greenfield Creek (Figure 3). Each boring was advanced to an approximate depth of 2 feet below land surface. The sample retrieved from each borehole was analyzed for the Wilmington site-specific metals, semi-volatiles and volatiles. Please refer to Attachment A for a tabulated historical soil sample summary table.

The highest levels of arsenic detected were present in off-site samples SS-1 at 3.5 mg/kg, SS-2 at 5.2 mg/kg, and on-site samples SS-4 at 3.6 mg/kg, SS-5 at 1.5 mg/kg, and SS-7 at 2.3 mg/kg. The highest detected levels of chromium occurred in off-site samples SS-1 at 5.5 mg/kg, SS-2 at 14 mg/kg and in on-site samples SS-4 at 11 mg/kg and SS-7 at 9.2 mg/kg. The highest detected copper and lead concentrations, respectively, occurred in off-site samples SS-1 at 6.1 and 14 mg/kg, SS-2 at 46 and 290 mg/kg, SS-3 at 8 and 61 mg/kg, and in on-site samples SS-4 at 14 and 25 mg/kg. The two highest lead concentrations, 290 and 61 mg/kg occurred in off-site samples.

The CCA and diesel source areas at the site are located roughly 400 to 600 feet northwest of soil samples SS-5 and SS-6. In all cases, the lowest metal concentrations on-site occurred in soil samples SS-5 and SS-6, which are the closest soil sample locations to the source area. Therefore, the laboratory detected values most probably represent naturally occurring background levels or another off-site source. The on-site soil sampling by Geraghty & Miller in 1991 also suggested that the on-site metal concentration results most probably represented background levels for metals.

The soil samples were also analyzed for semi-volatile and volatile organic wood-preserving constituents. The lowest organic wood preserving constituent concentrations occurred at locations SS-2, SS-3, SS-8 and SS-11 with concentrations of 3.25 mg/kg, ND, 1.0 mg/kg, and ND, respectively. Moderate values occurred in soil samples SS-1 at 9.936 mg/kg and SS-4 at 17.691 mg/kg. High concentrations occurred in SS-5 at 167.0724 mg/kg, SS-6 at 150.4248, SS-7 at 203.259 mg/kg, and SS-9 at 357.3546 mg/kg. The highest concentration of organic wood-preserving constituents occurred in SS-10 with a concentration of 6,110.008 mg/kg. As demonstrated by the detected constituents, wood-preserving activities may have contributed to the observed organics in the soil. The on-site source of wood-preserving constituents is located roughly 400 feet northwest of soil sample location SS-5 and SS-6. High concentrations of detected organics occurred at these locations. Further from the source, at SS-1, SS-2, SS-3, SS-4, and SS-8, the concentrations of organic wood-preserving constituents have decreased considerably. The soil samples along Greenfield Creek (SS-1, SS-9, and SS-10) have detectable organic concentration levels, both upstream and downstream from the on-site drainage ditch. The detection along Greenfield Creek may suggest that additional off-site sources of these compounds are present.

2.5.6 Groundwater Quality

Between October 13 and 16, 1992, ETE collected 21 groundwater samples from the existing monitoring wells at the facility. The groundwater samples were analyzed by the laboratory for dissolved and total arsenic, chromium, copper, and lead and semi-volatile and volatile organics. Please refer to Attachment A for a tabulated historical groundwater sample parameter summary.

All dissolved metal concentrations were listed below detection limits, except for monitoring wells MW-15, MW-17, and MW-22. Groundwater from these wells yielded a dissolved arsenic concentration of 0.023 mg/l, 0.0057 mg/l, and 0.013 mg/l, respectively.

The areas of separate phase fluids and areas of greatest organic wood preserving constituent concentrations occurred in close relation to the source areas (large storage tank area, diesel storage tank area, and the wood treatment area). The greatest concentration of organic wood-preserving constituents occurred at MW-13, MW-14 and MW-22, with concentrations of total PAH's of 8.130 mg/l, 8.973 mg/l, and 13.358 mg/l, respectively. Heavy separate phase fluids were present in MW-11, MW-12, and MW-26. For additional information on the Phase II assessment activities please refer to the report by ViroGroup, Inc. entitled: PHASE II GROUNDWATER QUALITY ASSESSMENT WILMINGTON, NORTH CAROLINA FACILITY, dated February 26, 1993.

2.6 Cape Fear River Surface Water Sampling

Surface water samples have been collected from the Cape Fear River adjacent to the former wood treating facility since December 1985. Two upgradient and two downgradient samples are collected along the east bank of the Cape Fear River during each sampling event (Figure 22). The upgradient surface water samples are located near the U.S. Highway #74 bridge and near an old slip at the former wood treating facility. The downgradient surface water samples are located near the mouth of Greenfield Creek and near the North Carolina State Ports Authority. A total of 14 routine sampling events have occurred through July 1993. One resampling event, to evaluate a detection during the routine June 1989 sampling event occurred in July 1989.

The upgradient sample location near U.S. Highway #74 has been below laboratory detection limits for the Wilmington site-specific constituents since initiation of surface water sampling activities. Surface water samples collected near the old slip have also been below laboratory detections limits for the Wilmington site-specific constituents, except on two occasions. Copper was detected at 0.02 mg/l in June 1988 and chromium was detected at 0.011 mg/l in January 1990 near the old slip.

Wilmington site-specific constituents were detected on two occasions at the downgradient location near the mouth of Greenfield Creek. Naphthalene was detected at a concentration of

0.050 mg/l during the June 1989 sampling event. To evaluate the detection of naphthalene, a second sample was immediately collected near the mouth of Greenfield Creek in July 1989. The July 1989 surface water sample near the mouth of Greenfield Creek was below laboratory detection limits for the Wilmington site-specific constituents. During the July 1990 sampling event chromium was detected at 0.046 mg/l and copper was detected at 0.052 mg/l near the mouth of Greenfield Creek. The downgradient sample location near the North Carolina State Ports Authority has been below laboratory detection limits for the Wilmington site-specific constituents since initiation of sampling in December 1985. Please refer to Attachment A for the historical surface water sample parameter summary table for the Cape Fear River.

Multiple sources of potential contamination to the Cape Fear River exist in this vicinity because of heavy industrialization along its banks and along the banks of tributary creeks. Urbanization along Greenfield Creek, including a City water treatment facility and a fuel tank farm present potential sources of contamination that may discharge to the Cape Fear River. The distribution of various constituents detected in soil samples collected along Greenfield Creek suggested the likelihood that multiple sources exist.

3.0 PHASE III GROUNDWATER QUALITY ASSESSMENT

Data collected during the Phase I and Phase II groundwater quality assessments was utilized in the preparation of recommendations for a Phase III groundwater quality assessment. The purpose of the Phase III groundwater quality assessment was to further define the hydrogeology and groundwater quality with respect to past wood preserving activities at the facility. Phase III activities included the abandonment of one monitoring well, installation of six upper aquifer monitoring wells and seven lower aquifer monitoring wells, groundwater sampling, soil sampling, and collection of sequential groundwater elevations from each monitoring well at the site to evaluate the tidal effects on the upper and lower aquifer flow regimes. For a complete description of the proposed Phase III groundwater quality assessment activities, please refer to the letter submitted to SWP entitled: RECOMMENDATIONS FOR A PHASE III GROUNDWATER QUALITY ASSESSMENT - SOUTHERN WOOD PIEDMONT COMPANY WILMINGTON, NORTH CAROLINA dated February 11, 1993. Presented below is ViroGroup, Inc. - ETE Division's summary of findings for the Phase III groundwater quality assessment.

3.1 Monitoring Well Abandonment

During the Phase II groundwater quality assessment, monitoring well MW-24 was installed adjacent to an on-site road that is used by the public for access to the Cape Fear River. This well was vandalized on several occasions. In order to prevent additional vandalism, this well was abandoned and reinstalled approximately 60 feet west in a less visible, wooded area. The designation for the replacement monitoring well is MW-24R. Monitoring well MW-24 was abandoned by over-reaming to below the well depth and removing all well materials from the

borehole. The resultant borehole was then abandoned by pressure grouting with a cement/bentonite (6% bentonite) grout to land surface using the tremie pipe method. Please refer to Attachment B for the MW-24 well abandonment record.

3.2 Monitoring Well Installation

Phase I and II activities included the installation of 17 upper aquifer and 3 lower aquifer monitoring wells at the facility. Based on this data, additional monitoring wells were necessary to properly define the plumes present within the upper and lower aquifers beneath the site. Twelve additional monitoring wells were installed between October 26 and November 13, 1993 as part of the Phase III groundwater quality assessment activities. Please refer to Figure 3 for the locations of the newly installed monitoring wells.

In order to install the proposed monitoring wells, appropriate permits were required. ViroGroup, Inc. contacted the State of North Carolina Department of Health, Environment, and Natural Resources (NCDHENR) officials to notify them of our intent to install monitoring wells in North Carolina. Diane Rossi of the Wilmington Division of NCDHENR stated that current regulations stipulate that well permits are not required if the monitoring wells are located on-site and are not to be used for production or recovery.

Monitoring wells MW-28 and MW-28A were installed on a parcel of land adjacent to the Atlantic Coast Line Railroad located along the eastern property boundary. Access to this parcel could only be accomplished by driving along the railroad track easement. A right-of-entry permit was acquired through H.C. Worsham, Public Project Engineer of CSX Transportation, allowing the transport of the drilling rig and equipment along the railroad easement for monitoring well installation. Please refer to Attachment C for a copy of the letter requesting the Right-of-Entry permit and a copy of the permit issued by CSX Transportation allowing access to the parcel of land.

One upper aquifer monitoring well (MW-27) was installed in a wetland area. Due to the location of the well, it was necessary to notify the U.S. Army Corps of Engineers of the intent to install the well. Please refer to Attachment C for a copy of the letter notifying the Corps of Engineers and a copy of the letter from the Corps of Engineers approving the installation of the monitoring well.

Arrangements were made with the City of Wilmington to provide potable water for well installation through an on-site water hydrant.

In order to better define the horizontal extent of the plumes in the upper aquifer, ViroGroup, Inc. installed 5 additional monitoring wells during the Phase III assessment. One upper aquifer monitoring well (MW-27) is located in the northern portion of the site, adjacent to the Amerada

Hess facility monitoring well. Three of the monitoring wells, designated MW-28 through MW-30, were installed along the eastern property boundary and the southern perimeter of the wetland area. The fifth monitoring well (MW-24R) was installed as a replacement well for abandoned well MW-24.

ViroGroup, Inc. also completed 7 monitoring wells (MW-11B, MW-14A, MW-20A, MW-22A, MW-24A, MW-28A and MW-29A) in the lower aquifer at the site. These lower aquifer monitoring wells were used to evaluate the thickness of the peat, the nature of the aquifer materials underlying the peat, the presence of a lower confining layer, the groundwater quality within the lower aquifer, and the lower aquifer groundwater flow direction(s) and hydraulic gradients.

The monitoring wells were installed using an all-terrain vehicle (ATV) mounted drilling rig. Using the ATV rig allowed the installation of the monitoring wells without the build up of extensive roadways. To ensure representative soil sample collection, the monitoring wells were installed using the mud-rotary drilling technique. All of the monitoring wells were installed according to SWP specifications (Figure 5) with the exception of not using a surface casing during construction of the upper aquifer monitoring wells. A surface casing was not set during completion of the upper aquifer monitoring wells due to the upper aquifer being less than ten feet thick and the water table being located approximately 1 foot below land surface.

The upper aquifer monitoring wells were installed by advancing the borehole to the top of the peat. Borehole depths ranged from 7 to 14 feet below land surface. The borehole for the lower aquifer monitoring wells was advanced to the top of the lower clay. Borehole depths for the lower aquifer monitoring wells ranged from 40 to 46 feet below land surface.

During advancement of the soil borings, split-spoon samples were collected. A representative sample from each split spoon was placed in a zip-lock bag with adequate head space and screened with a photoionization detector (PID) organic vapor analyzer. All observations were recorded and the soil classified using the Unified Soil Classification System.

Except for monitoring well MW-27, all upper aquifer monitoring wells were installed so the base of the screen rests on top of the peat. The screen of monitoring well MW-27 was installed to bracket the water table.

To install the lower aquifer monitoring wells, a 10-inch diameter borehole was advanced into the underlying peat unit to a depth of approximately 20 feet below land surface. A 6-inch diameter PVC surface casing was installed into the open borehole. A grout mixture of cement and bentonite was placed by the tremie method in the annular space around the surface casing and the grout allowed to set a minimum of 24 hours. Within the surface casing, a 3.875-inch

diameter borehole was drilled to the top of the lower confining clay. Split-spoons were collected continuously to a depth of 20 feet, thereafter, they were collected on five-foot centers.

All monitoring wells were constructed using 2-inch diameter, 10-foot sections of flush joint, threaded, PVC riser with a 5-foot section of factory slotted (0.01 inch) stainless steel well screen. A 10-foot screen was used in the completion of monitoring well MW-27 to allow for bracketing the water table which fluctuates due to tidal influences. Well construction included the placement of a sand filter from the base of the well screen to a height of two feet above the top of the screen. A two-foot bentonite plug was placed on top of the sand pack and a bentonite grout was placed in the remaining annular space to land surface.

To prevent cross-contamination during drilling operations, all construction materials and downhole drill equipment were steam cleaned between each borehole. All decontamination fluids were contained in a lined pit on-site.

To maintain the integrity of the wells after installation, each well was secured with a protective pad, aluminum casing, and keyed-alike locks.

Upon completion, all of the newly installed monitoring wells were developed by the swab and pump method.

All soil removed during the advancement of the boreholes, all decontamination fluids, all development fluids, and other drilling derived waste was disposed in labeled roll-off containers and solidified for proper off-site disposal.

The precise location and elevation of the ground surface and top of casing (TOC) of the newly installed monitoring wells were determined by direct field survey.

A well construction summary table and boring logs illustrating the sediments encountered, OVA screening, visual observations, olfactory observations, and monitoring well construction is presented in Attachment D of this report.

3.3 Regional and Site Geologic Conditions

3.3.1 Regional Geology

The SWP Wilmington, North Carolina facility is situated on relatively flat-lying Cretaceous and younger sediments of the Coastal Plain Physiographic Province that extends from the "Fall Line" to the continental margin (Soller and Mills, 1991). Approximately 1,500 feet of Coastal Plain sediments overlie pre-Mesozoic crystalline basement rock in the vicinity of the site (North

Carolina Geological Survey, 1985). Area lithology consists of sands indicative of Post-Miocene surficial deposits overlying sediments of the Upper Cretaceous Peedee Formation (Berry, 1949).

The surficial soils in the site area typically consist of 5 to 60 feet of fine sands. The sands are tan to white in well-drained upland areas, while they are brown to black and contain several feet of organics in low lying or poorly-drained areas. The soils have been eroded and redeposited many times, resulting in buried stream channels, swamps and marsh areas, often containing soft organic silts, clays, and peat (Berry, 1949).

Beneath the surficial soil are sediments of the Peedee Formation that typically range from 650 to 700 feet in thickness. The Peedee soils generally consist of dense to very dense sand with zones of cemented sands and impure limestones. The sands have a characteristic salt and pepper appearance and the Peedee Formation is considered a major aquifer in this area (Blevins and Bradbourne, 1985).

3.3.2 Site Geology

The site is underlain by a very loose to loose, brown, fine to medium sand with a trace of coarse sand and small pebbles to a depth of 7 to 16 feet below land surface. This unit, for the purpose of this report, will be termed the upper sand. Encountered in every boring beneath the upper sand is a 13 to 16 feet thick, very loose, dark brown to black clayey peat to peaty clay with varying amounts of wood and root fragments. The maximum depth below land surface in which the peat was observed was 27.5 feet in monitoring well MW-11A. This unit will be termed the peat. The contact between the upper sand and the underlying peat is sharp. Underlying the peat is a 14 to 18 feet thick, very loose to loose, light brown to brown, medium to coarse sand. This unit has a sharp contact with the overlying peat and was observed to occur to a maximum depth of 44 feet below land surface at monitoring well MW-11A. For this report the lower sandy unit will be termed the lower sand. Encountered in all deep monitoring well borings beneath the lower sand is a 2.5 to 4 feet thick, firm, tight, olive-gray silty clay with 5 to 10% phosphate and glauconite grains. This unit is termed the lower clay. The contact between the lower sand and the top of the lower clay is also sharp. Beneath the lower clay is a very dense, light gray sandy shell mold limestone and sand with alternating cemented shell molds and friable silt to large pebble sand laminae. The thickness of this limestone unit is currently unknown but, based on geologic literature, is estimated to be on the order of 650 to 700 feet in thickness.

Dr. Victor A. Zullo of the University of North Carolina Geology Department located in Wilmington, North Carolina was contacted on November 9, 1992, to discuss the most likely depositional and age history of the units encountered beneath the facility. In order of decreasing age (decreasing depth), the limestone unit encountered may be the top portion of the middle to upper Peedee Formation (65 millon years before present) and has been named the Scotts Hill Member. These sandy limestones are shelf deposits and contain a large fauna that is usually

dominated by pelecypods. In these limestones, the aragonitic shelled mollusc have either been replaced by calcite or, when dissolved, occur as external molds. The locally occurring olive gray clay that caps the limestone at the site is marine in origin and is also most likely part of the upper Peedee Formation (Sohl and Owens, 1991). The Eocene Castle Hayne Limestone is commonly present on top of the Peedee Formation in the North Carolina coastal plain, however in the Wilmington vicinity of the Cape Fear River, the Castle Hayne Formation is missing (Harris and Zullo, 1991). The lower sand at the site is most likely a Pleistocene (10,000 years before present) fluvial deposit occurring as a point bar, cut-off meander or an old oxbow lake sequence. The peat at the site probably occurred as the result of filling an oxbow lake with marsh and swamp type sediments. As a result, the peat at the facility is probably regionally discontinuous in its lateral extent, even though it appears to be continuous beneath the entire facility (Zullo, verbal communication, 1992). The upper sand appears to have been deposited as aeolian sand dunes during the Holocene (Soller and Mills, 1991) or as fill material.

3.4 Site Hydrogeology

3.4.1 Aquifers and Confining Units

Based on the borehole data collected to date, it appears that three aquifers and two confining units have been encountered beneath the facility. The upper sand (upper aquifer) beneath the SWP facility is under water table conditions and should be termed an unconfined or water table aquifer. This aquifer is not likely to be considered a major source of groundwater, except for minor local uses. The upper aquifer at the site appears to be bounded on all sides by groundwater discharge boundaries as shown by the upper aquifer water table flow map to be discussed later in this section. The upper aquifer discharge boundaries include: the Cape Fear River to the west, the drainage ditches located along the north and east property boundaries, and Greenfield Creek along the southern property boundary at the facility. Groundwater in the upper aquifer migrating from the center of the facility discharges to these boundaries rather than migrating beyond their locations.

The peat is located beneath the upper aquifer. This unit consists of silt and clay with varying amounts of wood and root fragments. The nature of the materials making up the peat suggest that this unit should be termed a leaky confining unit that separates the upper and lower aquifers at the facility. Visual observation of the peat indicates that it is water saturated throughout its entire thickness, thereby demonstrating a hydraulic connection between the upper and lower aquifers.

The lower aquifer at the facility consists of a permeable sand material that should, at the facility, be termed a semi-confined aquifer. This lower aquifer is also probably considered a minor source of groundwater in this area, except for local uses. Evidence that the lower aquifer is semi-confined relative to the upper aquifer is elucidated by the facts that the peat is completely

water saturated; the difference in direction of groundwater flow within the lower aquifer relative to the upper aquifer; and by the differences in the elevation head (vertical hydraulic gradient) of the groundwater in the upper and lower aquifers at the facility. The groundwater flow direction and gradients in the lower aquifer appears to be controlled by the surface water elevation of the Cape Fear River. Conversations with the local Corps of Engineers indicated that the Cape Fear River is dredged to the top of the limestone in the vicinity of Wilmington. This dredging of the river allows the lower aquifer to be in complete hydraulic interconnection with the Cape Fear River. The vertical hydraulic gradients, as will be discussed later in this section, indicate that the upper and lower aquifers are to a small degree hydraulically connected.

Beneath the lower aquifer at the facility is an olive gray silty clay of marine origin that acts as a confining unit. This clay is 4 feet thick and on visual observation appears tight and dry.

The third and lowermost aquifer encountered beneath the facility is the Peedee Limestone Formation. The unit is a confined aquifer and is a major source of groundwater in this area.

3.4.2 Groundwater Flow Directions

Groundwater levels were collected from 35 monitoring wells and surface water levels from 3 staff gauges at the facility on November 16 and again on November 19, 1993. Multiple groundwater levels were collected from each monitoring well and staff gauge to evaluate the effect of tidal influences on the groundwater flow direction(s) in the upper and lower aquifers. In addition, the influence of the installation of a tidal flood-control gate at the confluence of Greenfield Creek and the Cape Fear River located at the southwestern edge of the property was evaluated. One set of groundwater levels was collected at low tide; a second set of levels was collected at a time that represents one quarter of a full tidal cycle (one-quarter low tide); a third set of levels was collected at a time that represents three quarters of a full tidal cycle (three-quarter high tide), and; the last set of levels was collected at high tide (Attachment E). The tidal stage and fluctuation in the Cape Fear River, in Greenfield Creek, and in the on-site drainage ditches do not coincide. Therefore, the tidal stage referred to during this evaluation is the tidal stage in the Cape Fear River.

The collected water level measurements were used to develop a series of water table surface maps for the upper aquifer (Figures 6 through 9). The figures progress from low tide conditions to high tide conditions at the site. The data used to construct the water table maps was collected by measuring the depth to water from the top of casing in all monitoring wells screened in the upper aquifer and the staff gauges that exist in the surface water bodies. The elevation of the top of casing was surveyed by a registered land surveyor to within 0.01 feet mean sea level (MSL). The depth to water in each well was subtracted from the top of casing elevation at each respective well to yield the elevation of the water table at that location. The groundwater elevations were plotted on a scaled site map and contoured. Groundwater flow directions are

depicted by arrows showing flow from areas of higher groundwater elevation to areas of lower groundwater elevation.

As illustrated on the low tide upper aquifer water table map (Figure 6), an elongate water table mound exists that is at its highest elevation in the northeast corner of the site. From this location the groundwater mound extends along the central portion of the site to the south with local highs in the center of the site in the vicinity of MW-12 and along the wetland area to the southeast. From this elongate groundwater mound, the groundwater flows off in all directions toward the on-site drainage ditches, Greenfield Creek, and the Cape Fear River. The horizontal hydraulic gradient at low tide is 0.0015 ft/ft along the northern property boundary toward the Cape Fear River; 0.0032 ft/ft in the central portion of the site toward the on-site drainage ditches; 0.0025 ft/ft in the central portion of the site toward the Cape Fear River, and; 0.0017 ft/ft in the southeastern portion of the site toward Greenfield Creek. Local curvatures in the groundwater isoelevation lines result from the groundwater in the upper aquifer discharging to the on-site drainage ditches, Greenfield Creek, and the Cape Fear River. Groundwater within the upper aquifer from off-site in the vicinity of Optimist Park is flowing to the west towards the on-site drainage ditch near monitoring well MW-28 located to the east of the site. Both the Cape Fear River and the on-site drainage ditch staff gauges are at the lowest elevation observed during this flow evaluation. This suggests that the tidal gate is open allowing Greenfield Creek and the on-site drainage ditches to discharge to the Cape Fear River.

To keep reiteration to a minimum, only changes to the upper aquifer water table maps for the remainder of the tidal cycle will be highlighted in the following discussions. At one-quarter low tide the groundwater mound in the central portion of the site and along the eastern flank adjacent to the on-site drainage ditch has decreased in elevation. Groundwater elevations in the upper aquifer immediately adjacent to the Cape Fear River have begun to increase in elevation. The horizontal hydraulic gradients have remained the same, except for a slight decrease to 0.0016 ft/ft in the central portion of the site toward the Cape Fear River. A groundwater deflection line developed along the on-site drainage ditch. This inflection line occurs when the surface water elevation in the on-site drainage ditch is greater than the groundwater elevation in the upper aquifer adjacent to the ditch due to the rising tide. At this tidal stage, the surface water in the ditch is flowing into the upper aquifer and encountering the groundwater flow from the central groundwater mound. These two opposing forces encounter each other and result in an inflection of approximately 90 degree in flow direction and an order of magnitude decrease in gradient near the drainage ditch. As a result, groundwater and constituents in the groundwater can be smeared with the direction of flow along the inflection line. The surface water elevations in the Cape Fear River and in the on-site drainage ditch are approximately the same indicating that the tide control gate is open.

At three-quarter high tide the central groundwater mound and the eastern flank have begun to increase slightly in elevation. A large increase in groundwater elevation of 0.65 feet has occurred adjacent to the Cape Fear River at monitoring well MW-22. The horizontal hydraulic gradients are approximately the same, except for a decrease in gradient to 0.0005 ft/ft from the central portion of the site toward the Cape Fear River. A groundwater inflection line developed in the upper aquifer that reaches from the northern portion of the site along the Cape Fear River to the southeastern corner of the site along the confluence of Greenfield Creek and the on-site drainage ditch. The elevation of the groundwater along the inflection line is approximately 1.88 feet above mean sea level at MW-18 to the north and approximately 0.96 feet above mean sea level at MW-29 to the southeast. This change in elevation (horizontal hydraulic gradient of 0.0003 ft/ft) along the inflection line indicates that a minor groundwater flow component exists to the south along the Cape Fear River and to the east along Greenfield Creek during the formation of the inflection line. The surface water elevation in the on-site drainage ditch is now much lower than the surface water elevation in the Cape Fear River indicating that the tide control gate is now closed preventing flow from the Cape Fear River to Greenfield Creek.

Groundwater flow at high tide in the upper aquifer is similar to three-quarter high tide. The central groundwater mound has increased in elevation very slightly and the groundwater inflection line has migrated further east into the site. The horizontal hydraulic gradients are the same as the three-quarter high tide. The surface water elevation has increased in the on-site drainage ditch either because of increased discharge flow from the upper aquifer due to increased groundwater elevation or less probable, the tide control gate may have just been opened. An important observation is that the groundwater elevations in the central portion of the site are at their highest during low tide in the Cape Fear River. This most likely is the result of the delayed propagation of increased groundwater elevation from high tide along the Cape Fear River migrating to the central portion of the site.

A series of potentiometric surface maps for the lower aquifer have also been constructed (Figures 10 through 13) to evaluate the tidal effects on the lower aquifer flow regime. At low tide a central groundwater mound is also present in the lower aquifer at the site. Groundwater along this mound is divided and flows off in three directions. Lower aquifer groundwater in the western portion of the site flows toward the Cape Fear River; in the eastern portion of the site toward the drainage ditches, and; the southern portion of the site toward Greenfield Creek. At low tide, horizontal groundwater flow in the lower aquifer discharges to the Cape Fear River in the western portion of the site and flows to the east and south under the on-site drainage ditches and Greenfield Creek in the eastern portion of the site. The horizontal hydraulic gradient to the west is 0.0001 ft/ft, to the east is 0.0008 ft/ft, and to the south is 0.0003 ft/ft. Vertical hydraulic gradients between the upper and lower aquifer are downward along the Cape Fear River and in the central portion of the site ranging between 0.013 ft/ft near the Cape Fear River to 0.016 ft/ft near the wetland area in the central portion of the site (Attachment E). Upward vertical hydraulic gradients are present along the eastern portion of Greenfield Creek and along

the on-site drainage ditches. The upward vertical hydraulic gradients ranged from 0.004 ft/ft near the upper reaches of the on-site drainage ditch to 0.036 ft/ft near the confluence of the on-site drainage ditches.

The vertical hydraulic gradients between the upper and lower aquifers were evaluated by comparing the groundwater elevations in the well clusters at the facility (e.g. MW-28 and MW-28A). The vertical hydraulic gradient is calculated by dividing the difference in groundwater elevation in each well in the well cluster by the difference in the mid-point elevation of each well screen in the well cluster. Downward vertical hydraulic gradients exist in areas of flow from the upper aquifer to the lower aquifer and upward vertical hydraulic gradients exist in areas of flow from the lower aquifer to the upper aquifer.

At one-quarter low tide the potentiometric head along the western flank and the central portion of the groundwater mound have increased. The groundwater divide disappeared and flow in the western portion of the site has reversed and is now flowing toward the southeast. A minor component of flow still exists to the west, however, in a narrow band immediately adjacent to the Cape Fear River. The horizontal gradient across the site to the southeast has decreased to 0.0005 ft/ft. The vertical gradient between the upper and lower aquifer along the western flank has also reversed (MW-8/MW-8A) and is now upward at 0.022 ft/ft. The vertical hydraulic gradient has remained downward in the central portion of the site but has decreased to an average gradient of 0.008 ft/ft. Upward vertical hydraulic gradients are still present along the eastern portion of Greenfield Creek and along the on-site drainage ditches. These upward gradients have increased slightly to an average vertical gradient of 0.029 ft/ft.

During three-quarter high tide the potentiometric head along the Cape Fear River has continued to increase. All flow in the lower aquifer is now to the southeast. The minor flow component to the west toward the Cape Fear River has reversed. The horizontal hydraulic gradient across the site to the southeast has increased to 0.0008 ft/ft. The upward vertical hydraulic gradient has increased to 0.035 ft/ft along the Cape Fear River and has decreased to an average of 0.025 ft/ft along the on-site drainage ditches. Downward vertical hydraulic gradients remain approximately the same in the central portion of the site with an average gradient of 0.008 ft/ft.

The groundwater flow at high tide is similar to three-quarter high tide in the lower aquifer, except that the potentiometric head along the western and central portion of the site has increased. As a result, the horizontal hydraulic gradient to the southeast has also increased to 0.0009 ft/ft. The upward vertical hydraulic gradient increased along the Cape Fear River to 0.042 ft/ft and to an average of 0.027 ft/ft along the on-site drainage ditches. Downward vertical gradients are present in the central portion of the site throughout the tidal cycle with the lowest downward vertical gradients occurring at high tide at an average of 0.005 ft/ft.

3.5 Soil Quality

During installation of the monitoring wells, close attention was given to the condition of the soils encountered. The soil observations were made by collecting split-spoon soil samples continuously from land surface to the bottom of the borehole in the upper aquifer monitoring wells. The soils in the lower aquifer monitoring well boreholes were observed by collecting split-spoon soil samples continuously from land surface to the bottom of the peat, followed by five-foot intervals below the peat to the bottom of the borehole. Soil observations included visible staining of the soil, odor, total organic vapor screening (OVA) using a photoionization detector, and laboratory analyses.

Soil observations during the Phase I and II groundwater quality assessments indicate three main source areas exist (Figure 4). The first area is the wood treatment source area, and includes the former creosote treatment area, former CCA treatment area and the former sludge ditch. The contaminants from these areas appear to have coalesced and are following the same migration pathways in the subsurface. The second source is the large storage tank area. Contaminants from this area are separated from the other areas and appear to be following a different migration pathway. The third source is the diesel storage tank areas. This source can be separated by its location on the site and the physical behavior of the contaminants in the subsurface. The diesel contaminants are less dense than water and tend to float when present as a separate phase. In addition, the dissolved phase associated with diesel does not tend to display a large degree of vertical movement into the subsurface. Wood-preserving constituents are more dense than water and are, therefore, more likely to more downward into the subsurface.

For clarity, soil quality observations will be addressed by source area and will include only observations made during the Phase III groundwater quality assessment. For a review of the observations from previous assessments, please refer to the boring logs in Attachment D or the previously referenced Phase II groundwater quality assessment report.

Visible staining of the soils in the vicinity of the wood treatment source area were further evaluated by Phase III monitoring wells MW-11B, MW-14A, MW-20A, MW-24A, MW-28A, MW-29A, and MW-30. Monitoring well MW-11B is located in the area formerly occupied by the creosote treatment facility. Wood-preserving constituents were observed in the soil from 5 feet below land surface to 17 feet below land surface at this location. Staining was observed to a depth of 1 foot below the top of the peat. Monitoring well MW-14A is located hydraulically downgradient from the former wood treating facility at the upper reaches of the former sludge ditch. Staining was observed at a depth of 3 feet to 22 feet below land surface. Staining was present to a depth of 14.5 feet below the top of peat at MW-14A. Monitoring well MW-20A is located upgradient of the former wood treatment facility. No staining or odors were detected in this boring, however, organic vapors were detected by the OVA in a thin zone on top of the

peat. Monitoring well MW-24A, located downgradient to the south of the former wood treatment facility, had stained sediments from 7 to 12 feet below land surface. Located to the east of the former sludge ditch and across the on-site drainage ditch is monitoring well MW-28A. No staining or odors were detected in this boring. Elevated OVA readings, however, were detected in the upper aquifer and in the peat at this location. Monitoring well MW-29A is located near the confluence of the on-site drainage ditch and Greenfield Creek in the southeastern portion of the property. No visible wood-preserving constituents were present at this location, however, a moderate odor and elevated OVA results were detected in the lower aquifer on top of the lower clay at a depth from 34 to 38 feet below land surface. Monitoring well MW-29A appeared clean until a depth of 34 feet below land surface. This suggests that dissolved constituents have migrated from the wood preserving source area through the upper aquifer, peat, and the upper portion of the lower aquifer and are now being detected downgradient of the source on top of the lower clay. Monitoring well MW-30 is also located downgradient of the wood preserving source area adjacent to the on-site wetland area. No staining was observed, however, a moderate odor and elevated OVA results were detected in the upper aquifer immediately on top of the peat.

Monitoring well MW-22A is completed in the vicinity of the former large storage tank containment area adjacent to the Cape Fear River. Visible staining was observed at a depth from 4 to 6 feet below land surface. A slight diesel odor was observed in the upper 4 feet of the borehole followed by a wood preserving constituent odor from 4 to 14 feet below land surface in the upper aquifer. A slight wood preserving constituent odor and elevated OVA results were also detected in the upper portion of the lower aquifer at MW-22A.

The Amerada Hess Corporation petroleum tank farm is located adjacent to the northern property boundary. A truck fueling and wash area is located near the northeast portion of the City of Wilmington property. Amerada Hess corporation investigated and documented a release in this portion of the site. In addition, Hess installed a monitoring well on the City of Wilmington property. In order to further investigate this release area, monitoring well MW-27 was installed during the Phase III assessment activities. Diesel stained soils, odors, and elevated OVA results were detected to a depth of 6 feet below land surface at this location.

Soil sampling completed during the Phase II groundwater quality assessment indicated high constituent levels in the vicinity of SS-10 along Greenfield Creek (Figure 3). This soil sample was suspect because the laboratory results were a magnitude higher than the other samples collected and the field observations were not indicative of high levels of contamination. Therefore, ViroGroup, Inc. collected a second soil sample (SS-10A) at this location to compare to the original soil sampling results.

To collect the soil sample, a pre-cleaned hand auger was used to advance a borehole into the sediment along the on-site side of Greenfield Creek. The hand auger boring was conducted at

low tide so that the boring could be completed in the creekbed. The boring was advanced to a depth of approximately 2 feet below land surface with the deepest sample retrieved from the borehole sent to the laboratory for analysis of Wilmington site-specific constituents (Attachment F). The sample was removed from the hand auger with a clean stainless-steel spoon and placed in respective clean sample containers provided by the laboratory. All soil excavated during completion of the soil boring was containerized in a roll-off container for proper disposal.

The sediment encountered in the borehole was a fine to very coarse, dark brown sand. No visible staining or odor was present in the soil sample. Please refer to the soil sample collection summary sheet located in Attachment F of this report.

Of the Wilmington site-specific list of constituents analyzed, only a fraction of the constituents were detected. The semi-volatile organics that were detected in the soil included: acenaphthene at 3.3 mg/kg dw, benzo(a)anthracene at 7.3 mg/kg dw, benzo(a)pyrene at 2.6 mg/kg dw, benzo(b)fluoranthene at 6 mg/kg dw, benzo(k)fluoranthene at 2.1 mg/kg dw, chrysene at 9 mg/kg dw, and fluoranthene at 15 mg/kg dw, (7 out of 23 constituents were detected). No volatile organics were detected in soil sample SS-10A. Arsenic was detected at a concentration of 13 mg/kg dw, chromium at 38 mg/kg dw and copper at 34 mg/kg dw. Please refer to Attachment F for a summary of the detected constituents in SS-10A.

Results from the second soil sample collected at location SS-10 are much lower than the first sample collected. The summed total for detected semi-volatile organics in the first sample, SS-10 is 6,110 mg/kg dw and for the second sample SS-10A is 45.3 mg/kg dw. As shown, the first sample is suspect. Please refer to Attachment A for a tabulated historical soil sample parameter summary from the Phase II assessment.

At completion of field activities, the roll-offs containing all assessment derived wastes were solidified by mixing the materials with kiln dust. Following solidification, a composite soil sample was collected for analysis by the Toxicity Characteristic Leaching Procedure (TCLP) to evaluate disposal options for the soil. The soil sample was analyzed for arsenic, chromium, lead, mercury, benzene, methyl ethyl ketone, o-cresol, m+p cresol, hexachlorobenzene, pentachlorophenol, pyridine, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol. All analytical results were below laboratory detection limits. Please refer to Attachment F for a summary table for the TCLP analysis and for the soil sample collection sheet.

3.6 Groundwater Quality

On November 16 through 19, 1993, ViroGroup collected 31 groundwater samples from the existing monitoring wells at the facility. Groundwater samples were not collected from monitoring wells MW-11, MW-14, MW-22, or MW-26 because a heavy (sinker) separate phase fluid was observed in these monitoring wells. Separate phase fluid thickness measurements were

collected from these monitoring wells using an interface probe. A thickness of 0.01 feet at MW-11, 0.41 feet at MW-14, 0.23 feet at MW-22 and 5.24 feet at MW-26 was measured during the Phase III assessment. A trace of heavy separate phase fluid was present in MW-12. A trace light (floating) sheen was observed in monitoring wells MW-12, MW-13, MW-16, MW-17, and MW-28.

Subsequent to the separate phase fluid evaluation, representative groundwater samples were collected from the remaining monitoring wells utilizing a clean disposable bailer to evacuate a minimum of three well volumes of groundwater from the well. The salinity, pH, conductivity, and temperature of the groundwater at each well were recorded and the groundwater sample placed into respective sterile groundwater sample containers for each well. The containers were labeled according to owner, site name, well number, date, time, and type of analysis to be performed. The collected samples were kept cool by placing the samples immediately into a cooler chilled to 4°C with ice. The sealed samples were then shipped with the appropriate chain-of-custody form via Federal Express overnight to Savannah Laboratories and Environmental Services, Inc. for analysis. The groundwater samples were analyzed for the Wilmington site-specific constituent list (Attachment G). Standard groundwater sampling protocol was followed as documented in the report entitled: SAMPLING AND ANALYSIS PLAN FOR GROUNDWATER MONITORING - SOUTHERN WOOD PIEDMONT COMPANY revised October 1991. Please refer to the groundwater sample collection summary sheets located in Attachment G for a listing of water level, well depth, sample appearance, volume purged, temperature, conductivity, pH, salinity, the presence of separate phase fluids and additional observations made during this groundwater sampling event for each monitoring well at the facility.

All purge water was containerized in a labeled roll-off container for proper disposal.

Temperature-compensated salinity measurements were collected in the field at each monitoring well at the facility using a YSI Model 33 SCT meter. Please refer to Attachment G for the salinity measurement summary table and Figure 14 for the upper aquifer salinity isoconcentration map. The EPA recommended limit for chloride concentration is 250 mg/l. At chloride concentration above 250 mg/l water begins to have an objectional taste. As shown on the upper aquifer salinity isoconcentration map, a mound a fresh water (salinity < 250 mg/l) is present in the northern portion of the site. This mound becomes elongate to the south reaching into the wetland area in the southeastern portion of the property. Brackish water is present in the upper aquifer along the Cape Fear River, Greenfield Creek, and the on-site drainage ditches.

Slightly saline groundwater is also present in the lower aquifer at 200 mg/l in MW-22A adjacent to the Cape Fear River and in MW-29A adjacent to Greenfield Creek. Otherwise, the lower aquifer appears to contain freshwater.

The groundwater samples were analyzed by the laboratory for Wilmington site-specific wood preserving metals, semi-volatiles and volatiles. These constituents were selected to evaluate potential groundwater contamination from the former wood treating facility at the site. Please refer to the groundwater sample parameter summary tables presented in Attachment G for a listing of the individual constituents that were detected at each monitoring well at the facility. Presented below is a summary of the detected constituents at the facility.

The groundwater samples for metals were analyzed after filtration (dissolved metals) and with no filtration (total metals). After filtration, all dissolved arsenic, chromium, and copper concentrations were below laboratory detection limits.

Total arsenic, chromium and copper concentrations were detected in many of the monitoring wells in the upper aquifer at the facility. Total arsenic concentrations in the upper aquifer ranged from ND (non-detected) to 0.088 mg/l. The highest level of total arsenic detected was present at MW-15 in close proximity to the CCA treatment area. Concentrations of total chromium ranged from ND to 4.6 mg/l. The highest detected level of chromium occurred along the northern property boundary at MW-18. Total copper concentrations ranged from ND to 0.058 mg/l. The highest area of detected total copper occurred in the vicinity of the large storage tank area at MW-13. No concentrations of total arsenic, chromium or copper were detected in the lower aquifer at the facility.

Groundwater samples were also analyzed for semi-volatile and volatile organic wood-preserving constituents. Please refer to the Wilmington site-specific groundwater sample list located in Attachment G for a complete listing of the semi-volatile and volatile constituents. From the entire list of constituents analyzed, only a small fraction of the constituents were detected. The semi-volatile organics that were detected in the groundwater included: acenaphthene, anthracene, carbazole, fluoranthene, naphthalene, and phenanthrene (6 out of 23 constituents were detected). The volatile organics that were detected in the groundwater during Phase III include: benzene, ethyl benzene, m/p xylene, o-xylene, and toluene (5 out 30 constituents were detected).

For simplification the organic wood preserving constituent concentrations in each well are summed to arrive at a total organic wood preserving constituent concentration. This total concentration is used to produce organic wood preserving constituent isoconcentration maps for the upper and lower aquifers depicted in Figures 15 and 16.

The areas of separate phase fluid and elevated dissolved constituent concentrations occur in close relation to the source areas (large storage tank area, diesel storage tank area, and the wood treatment area). As demonstrated by the concentration of organic constituents in the source areas, relative to the rest of the site, and by the list of detected constituents, wood-preserving activities most likely contributed to the observed organics in the groundwater at the site.

In the upper aquifer at the facility, heavy separate phase fluids are present in monitoring wells MW-11, MW-14, MW-22, and MW-26. The highest detected dissolved concentrations of total organic wood-preserving constituents are present in MW-12 at 5.155 mg/l and MW-13 at 5.289 mg/l. An east to west trending band of dissolved and free-phase organics occurs along the southern City of Wilmington property boundary between the Cape Fear River to the west and the on-site drainage ditch to the east. Along this band, dissolved organics from the former wood treatment area and sludge ditch migrate to the east toward the on-site drainage ditch and then turn to the south toward Greenfield Creek. Once the dissolved organics approached the area where the stagnation line occurs, the dissolved organics are smeared to the north and south parallel to the on-site drainage ditch. The dissolved organics do not appear to migrate off-site to the east due to the westerly direction of groundwater flow toward the on-site drainage ditch in the vicinity of Optimist Park. Segments of the dissolved plume emanating from the former wood treatment area are also migrating to the southwest toward monitoring well MW-19 and MW-24 and to the west toward MW-17. The dissolved organics in the vicinity of the former diesel storage tanks and the large storage tank area are migrating to the west toward the Cape Fear River.

The lateral extent of the upper aquifer dissolved organic wood preserving constituent plume is defined in the northern portion of the site. The southern portion of the site and the areas off-site to the east of the drainage ditch are defined to low concentrations of wood-preserving constituents.

The dissolved organic wood preserving constituent plume has also migrated vertically through the peat and into the lower aquifer at the facility. Wood-preserving constituents entered the lower aquifer in the vicinity of former wood treatment area, former sludge ditch and the former large storage tank area. In the vicinity of the former wood treatment area and the sludge ditch the dissolved constituents in the lower aquifer have migrated to the east toward the on-site drainage ditch, then to the south toward Greenfield Creek and finally turning southwest toward the Cape Fear River. Near the large storage tank source area, the wood preserving constituents in the lower aquifer are migrating to the west toward the Cape Fear River.

The lateral extent of the lower aquifer dissolved wood preserving constituent plume is defined to the north and west in the central portion of the site and to the east in the vicinity of MW-28A. The downgradient southeastern portion of the site has been defined to low concentrations of wood-preserving constituents.

In order to further investigate the documented release from Amerada Hess Corporation located to the north of the site, groundwater samples for hydrocarbons were collected from monitoring wells MW-6, MW-18, and MW-27. The groundwater samples were analyzed for hydrocarbons as gasoline, as kerosene, as heavy oils, as mineral spirits, as varsol, and as fuel oil/diesel. All

hydrocarbon analyses were below laboratory detection limits for these constituents. Please refer to Attachment G for a summary of the hydrocarbon analyses.

The concentration of each organic wood preserving constituent was compared to the Environmental Protection Agency's Drinking Water Regulations and Health Advisories (EPA, 1993). The EPA lists a maximum contaminant level (MCL) for several of the organic wood-preserving constituents. The MCL for constituents analyzed during the Phase III groundwater quality assessment are: 0.001 mg/l pentachlorophenol, 0.0002 mg/l benzo(a)pyrene, 0.005 mg/l 1,1,2-trichloroethane, 0.002 mg/l vinyl chloride, 0.005 mg/l benzene, 0.005 mg/l carbon tetrachloride, 0.005 mg/l 1,2-dichloroethane, 0.005 mg/l dichloromethane, 0.005 mg/l 1,2-dichloropropane, 0.7 mg/l ethyl benzene, 10 mg/l total xylenes, 1 mg/l toluene, 0.1 mg/l trans-1,2-dichloroethylene, and 0.2 mg/l 1,1,1 trichloroethane. Out of all the constituents analyzed at each monitoring well, only benzene exceeded its MCL. The benzene concentration exceeded the MCL at MW-19 at 0.0055 mg/l and at MW-13 at 0.046 mg/l in the vicinity of the former diesel storage tanks and the former large storage tank area (Figure 17). The laboratory detection limits of 0.05 mg/l pentachlorophenol and 0.01 mg/l benzo(a)pyrene used during the Phase III assessment were not low enough to compare the results to the MCLs for these constituents. However, at the quantitation limit used for the Phase III assessment no pentachlorophenol or benzo(a)pyrene was detected at the facility. Groundwater samples were not collected from monitoring wells that contained separate phase constituents.

3.7 Surface Water Quality

Surface water samples were collected along the east bank of the Cape Fear River adjacent to the former wood treating facility on January 18, 1994. Two upgradient and two downgradient samples were collected. The upgradient surface water samples are located near the U.S. Highway #74 bridge and near the old slip at the former wood treating facility (Figure 22). The downgradient surface water samples are located near the mouth of Greenfield Creek and near the North Carolina State Ports Authority. Both the upgradient and downgradient surface water samples were below laboratory detection limits for the Wilmington site-specific constituents. Please refer to Attachment G for the Phase III surface water sample parameter summary table and laboratory data for the Cape Fear River surface water samples.

4.0 SUBSURFACE WOOD PRESERVING CONSTITUENT MIGRATION

Wood-preserving constituents (creosote/coal tar) are considered to be dense non-aqueous phase liquids (DNAPLS). As a whole, wood-preserving constituents are slightly heavier than water, have a high viscosity, and a low dissolved phase mobility (Cherry, 1992). Because wood-preserving constituents are heavier than water, gravity and interfacial tension between the DNAPL and groundwater play an important role in the migration of the DNAPL. The DNAPL will continue to migrate vertically downward in the subsurface until it intercepts a barrier to its

vertical migration. The barrier to migration could be a fine-grained layer or a clay or any material in which the pore spaces are smaller than that of the host material. If the barrier is flat lying, the DNAPL will begin to pool and spread laterally on this barrier until a critical pool height is encountered. The critical pool height is the height of the DNAPL pool required to exceed the entry pressure (capillary pore pressure and interfacial tension) within the pores of the material restricting the movement of the DNAPL. Once this critical pool height is reached, the DNAPL will then begin to flow through the original barrier to flow (Kueper, 1992). Once the entrance pressure is achieved and flow through the barrier has begun, the reduced interfacial tension can allow the entire free product pool to drain leaving only residual DNAPL behind. If the barrier encountered is sloping, the DNAPL will most likely flow by gravity downslope until another barrier to flow is encountered causing the DNAPL to pool. This can continue until the required entry pressure cannot be met or until the separate phase fluid volume is reduced to residual concentrations.

As the DNAPL is migrating through porous media, residual DNAPL is left behind the trailing edge of the moving DNAPL body due to snap-off and by-passing mechanisms. It can be expected that an estimated 20 percent of the DNAPL body will be left behind as residual during free-phase migration (U.S. EPA, 1993). After a certain distance of migration, the free phase will be reduced to just residual concentrations (Kueper, 1992).

At the Wilmington, North Carolina facility it appears that the concepts presented above exist (Figures 18, 19, 20, and 21). Wood-preserving constituents entered the subsurface at the former wood treatment area (MW-11), along the former sludge ditch (MW-14), and at the confluence of the on-site drainage ditches near (MW-26). In the subsurface, the free-phase wood-preserving constituents migrated to the top of the peat. Once the free-phase wood-preserving constituents encountered the peat, the product began to pool near MW-11 adjacent to a mound in the peat at MW-14. As the pool height increased, its width began to migrate to the northwest toward MW-12 and MW-17, to the southwest toward MW-19 and MW-24, and to the east toward MW-26. For a period of time, the fine-grained nature and the sloping surface of the peat prevented the downward infiltration of free-phase wood-preserving constituents into the peat. However, the pool height continued to increase until the critical pool height was reached. At that time, the free-phase wood-preserving constituents migrated into the peat at MW-11 and MW-14. Because the entry pressure into the peat was exceeded, the pool drained into the peat and migrated to the east toward MW-26 and the on-site drainage ditch. Presently, it appears that the migration of free-phase wood-preserving constituents has reached a standstill by pooling beneath the confluence of the on-site drainage ditches near MW-26. Free-phase measurements indicate that residual concentrations are present in the upper aquifer near MW-11 at 0.01 feet, in MW-12 at trace levels and in the peat near MW-14 at 0.41 feet. Residual concentrations in these areas indicate that the free-phase constituents have migrated from this area leaving a trail of residual concentrations behind. The free-phase constituents appear to have become stationary and are pooled near MW-26 at a thickness of 5.24 feet.

Free-phase wood-preserving constituents also entered the subsurface near the former large storage tank area (MW-13). Once in the subsurface, the free-phase constituents migrated to the west toward the Cape Fear River. It appears that these constituents did not pool on top of the peat as indicated by residual concentrations of 0.23 feet at MW-22.

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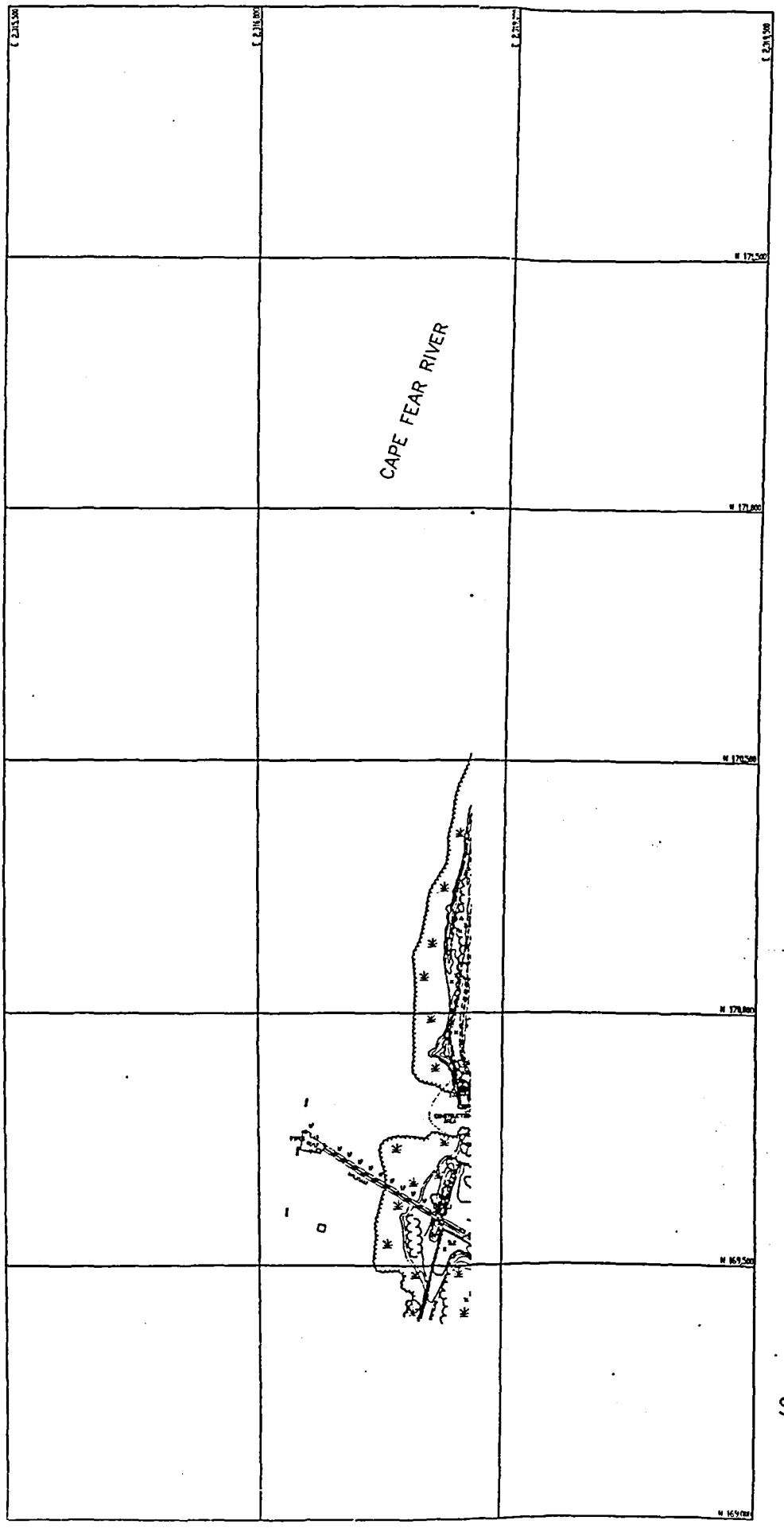

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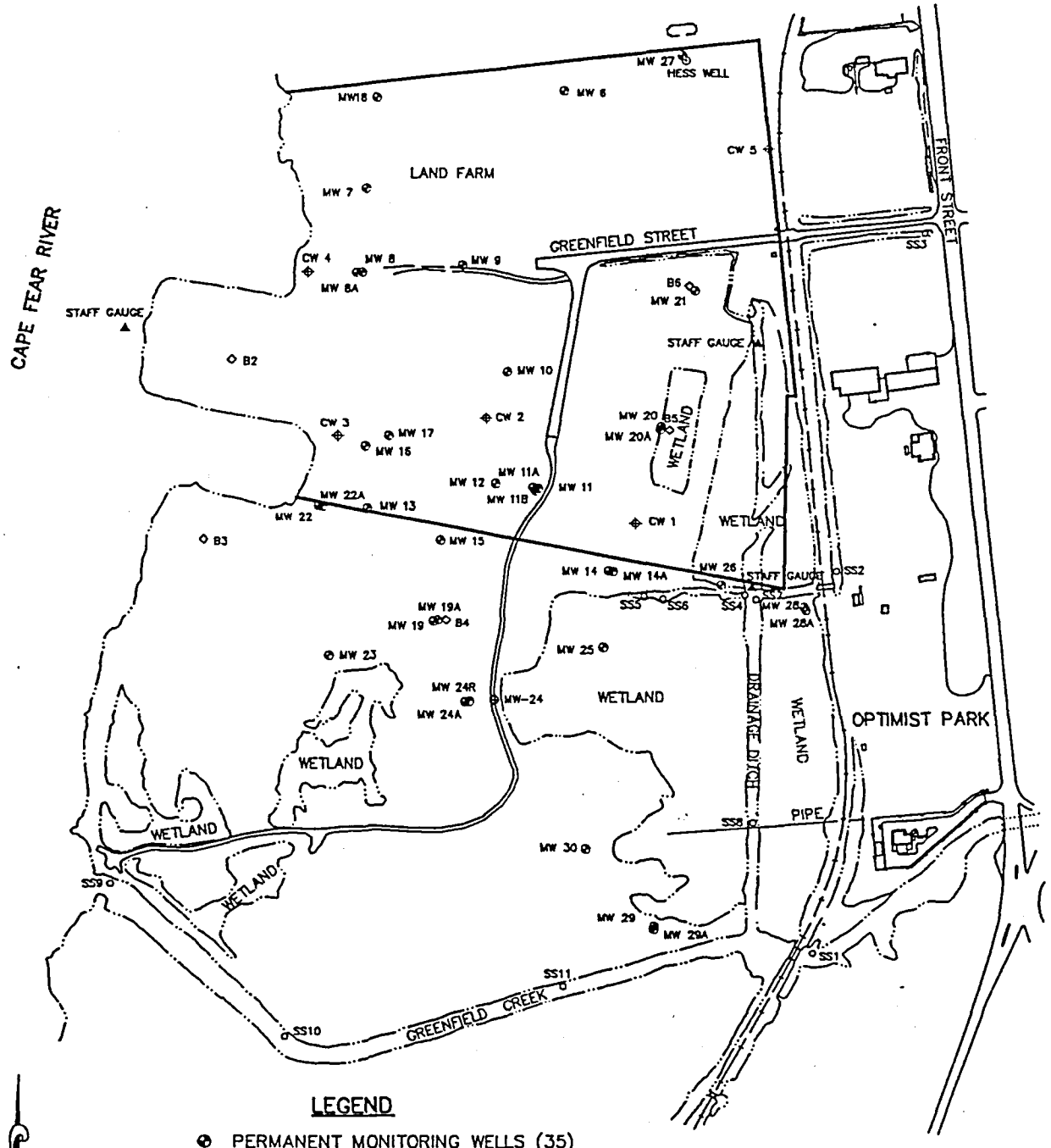
DATE OF PHOTOGRAPHY: 24-FEB-93

FIGURE 2

SITE TOPOGRAPHIC MAP

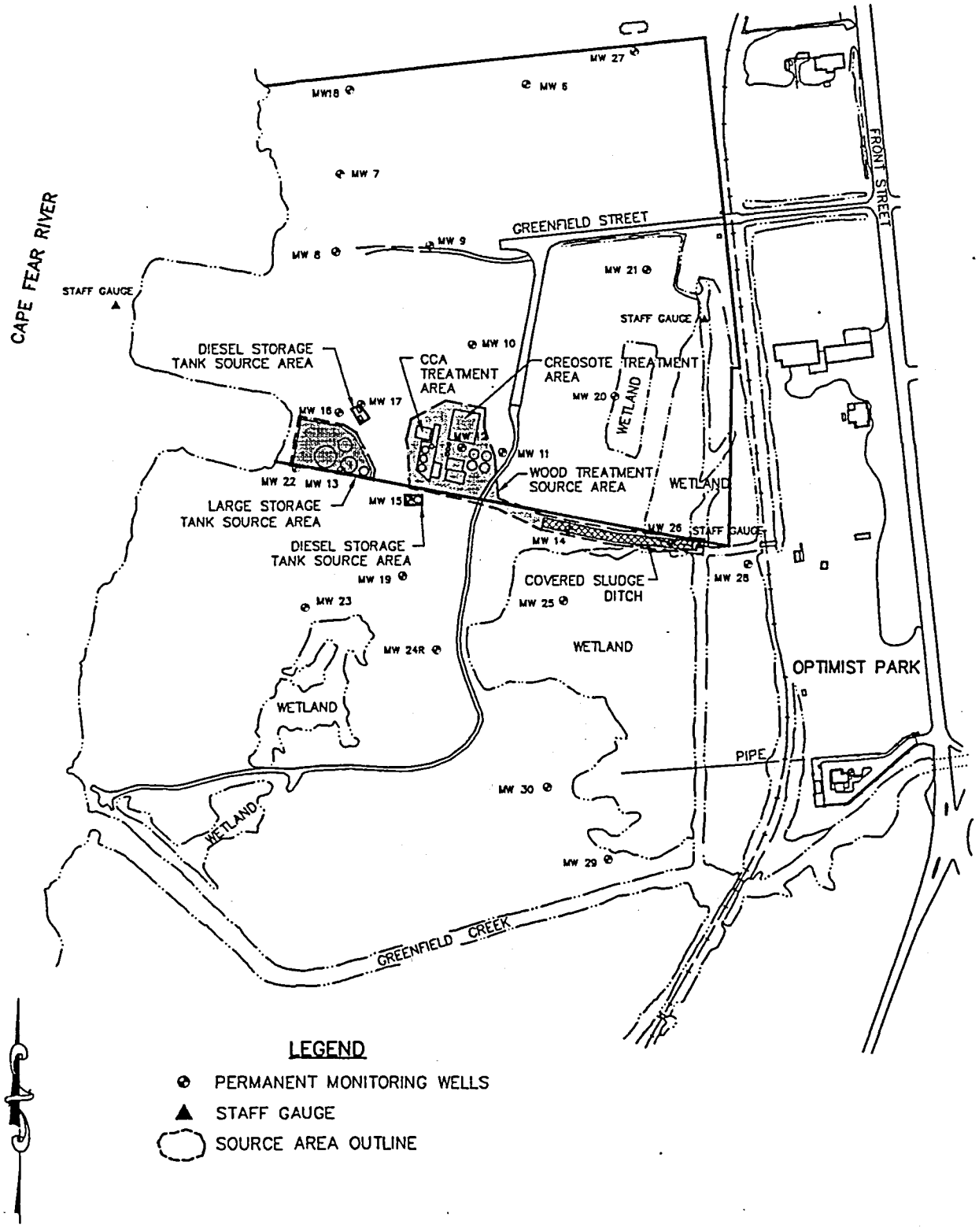
SOUTHERN WOOD PIEDMON
WILMINGTON, N.C. FACILIT



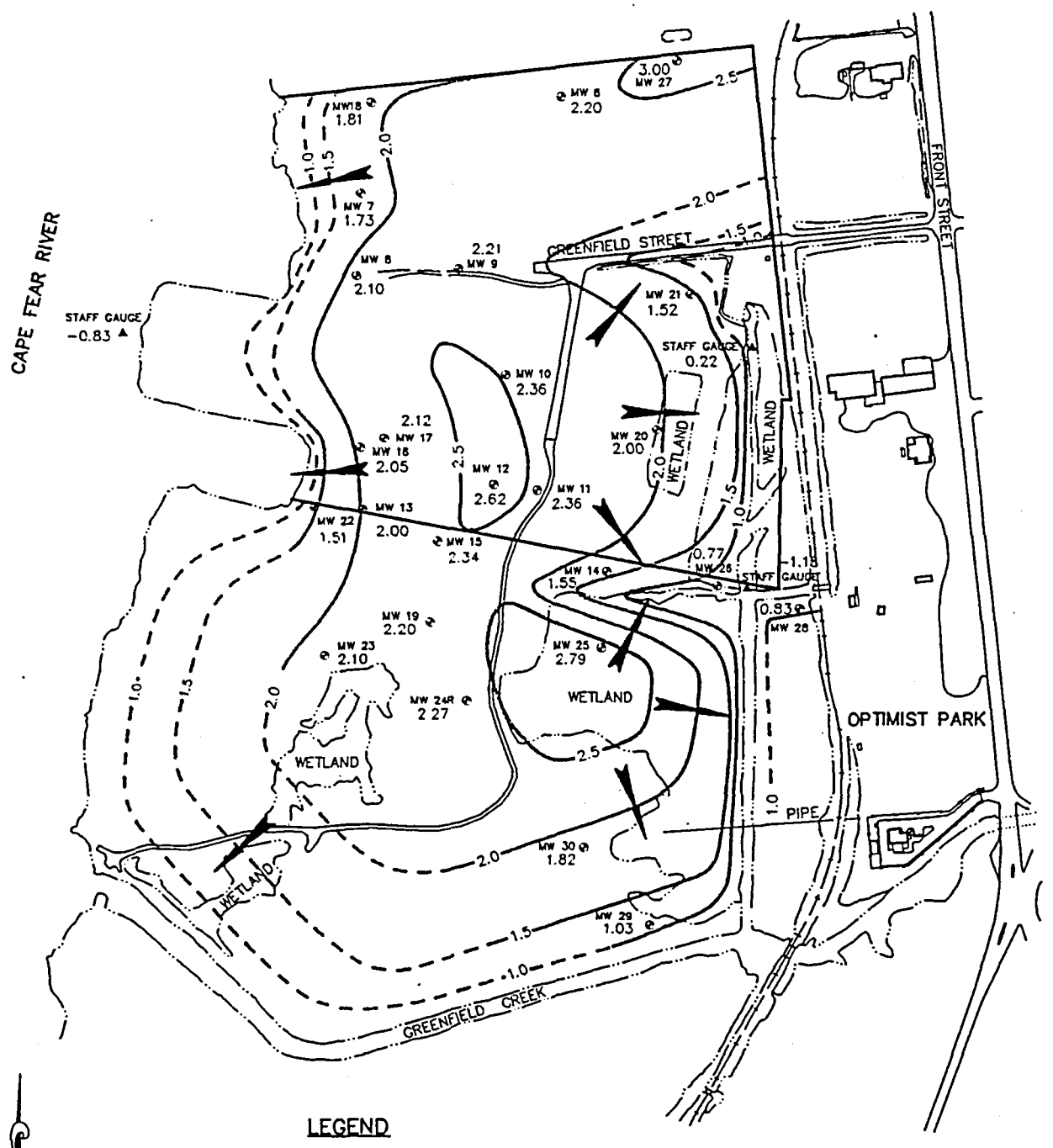
LEGEND

- PERMANENT MONITORING WELLS (35)
- STAFF GAUGE (3)
- SOIL SAMPLES (11)
- ABANDONED TEMPORARY MONITORING WELLS (5)
- CITY WELLS (5)
- HESS WELLS (1)
- ABANDONED MONITORING WELL (1)

ViroGroup ETG Division P.O. Box 1867 • 1445 Pleasant Church Rd. • Lexington, S.C. 29072 (803) 957-6270	SCALE 1"=400'	SITE MAP	FIGURE NO. 3
	DRAWN BY CAB	SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	CADD NO. G:5301501B
	CHECKED BY GBK		PROJECT NO. 12-53015.00
	DATE 2/11/94		



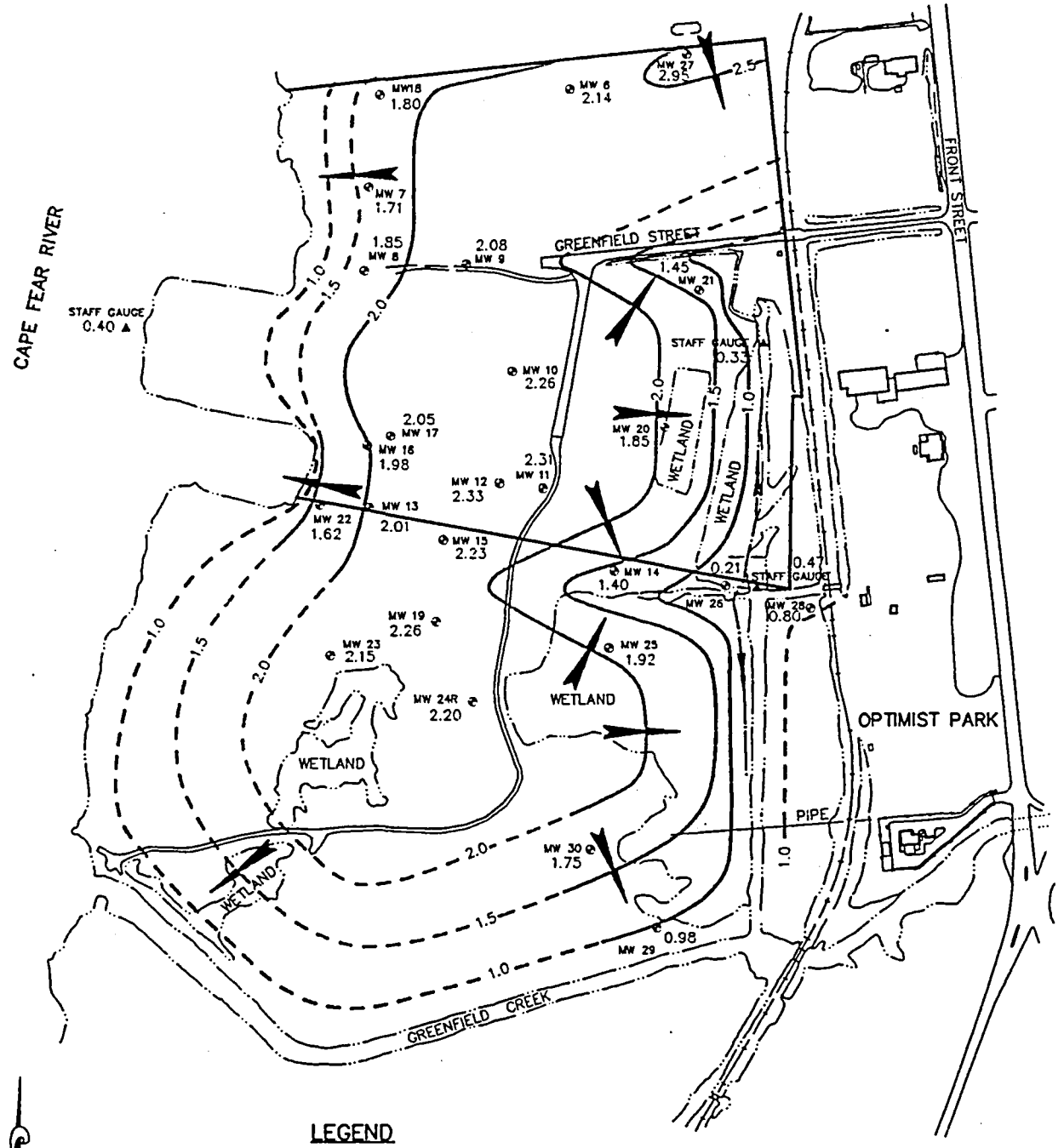
ViroGroup ETE Division P.O. Box 1867 • 1445 Plaugh Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	SOURCE AREA LOCATION MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 4 CADD NO. G:5301501B PROJECT NO. 12-53015.00



LEGEND

- PERMANENT MONITORING WELLS
- STAFF GAUGE
- GROUNDWATER ISOELEVATION LINE
- 1.82 GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

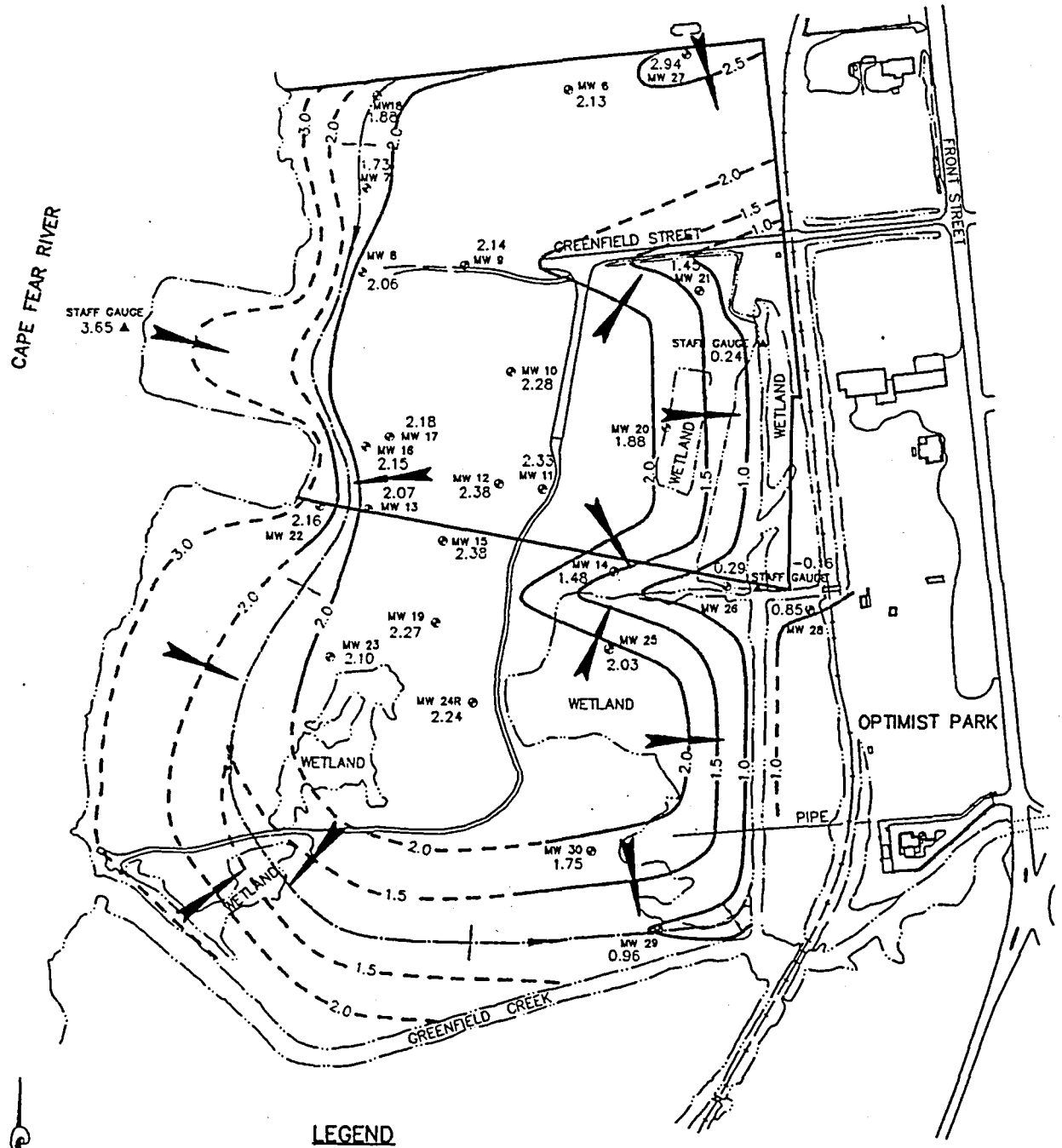
ViroGroup ETE Division P.O. Box 1867 • 1445 Plaugh Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	LOW TIDE UPPER AQUIFER WATER TABLE MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 6 CADD NO. G:5301501A PROJECT NO. 12-53015.00



LEGEND

- PERMANENT MONITORING WELLS
- STAFF GAUGE
- GROUNDWATER ISOELEVATION LINE
- 1.75 GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER INFLECTION LINE

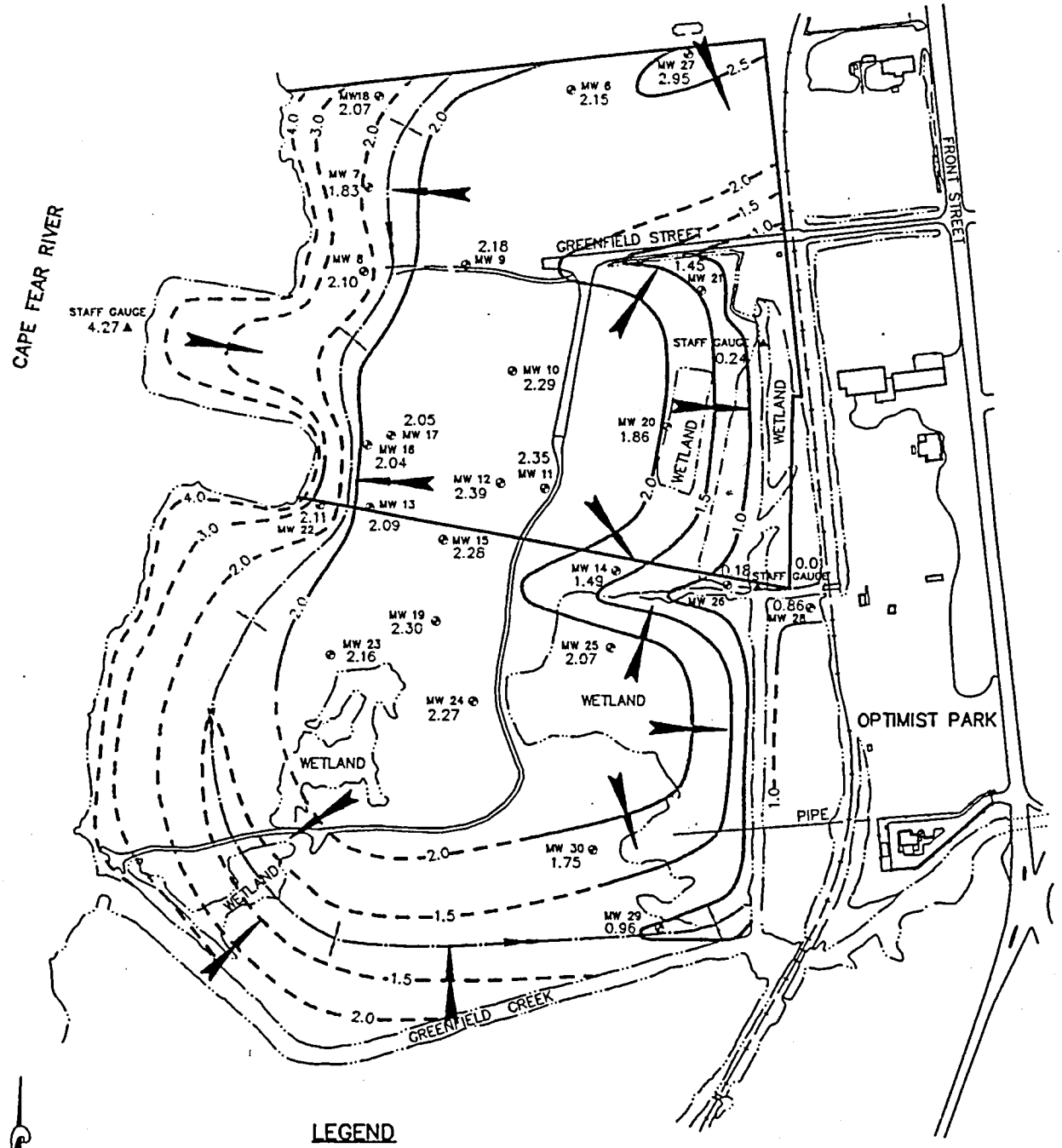
ViroGroup ETE Division P.O. Box 1867 • 1445 Plaugh Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	ONE QUARTER LOW TIDE UPPER AQUIFER WATER TABLE MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 7 CADD NO. G:5301501A PROJECT NO. 12-53015.00



LEGEND

- PERMANENT MONITORING WELLS
- STAFF GAUGE
- GROUNDWATER ISOELEVATION LINE
- 1.75 GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER INFLECTION LINE

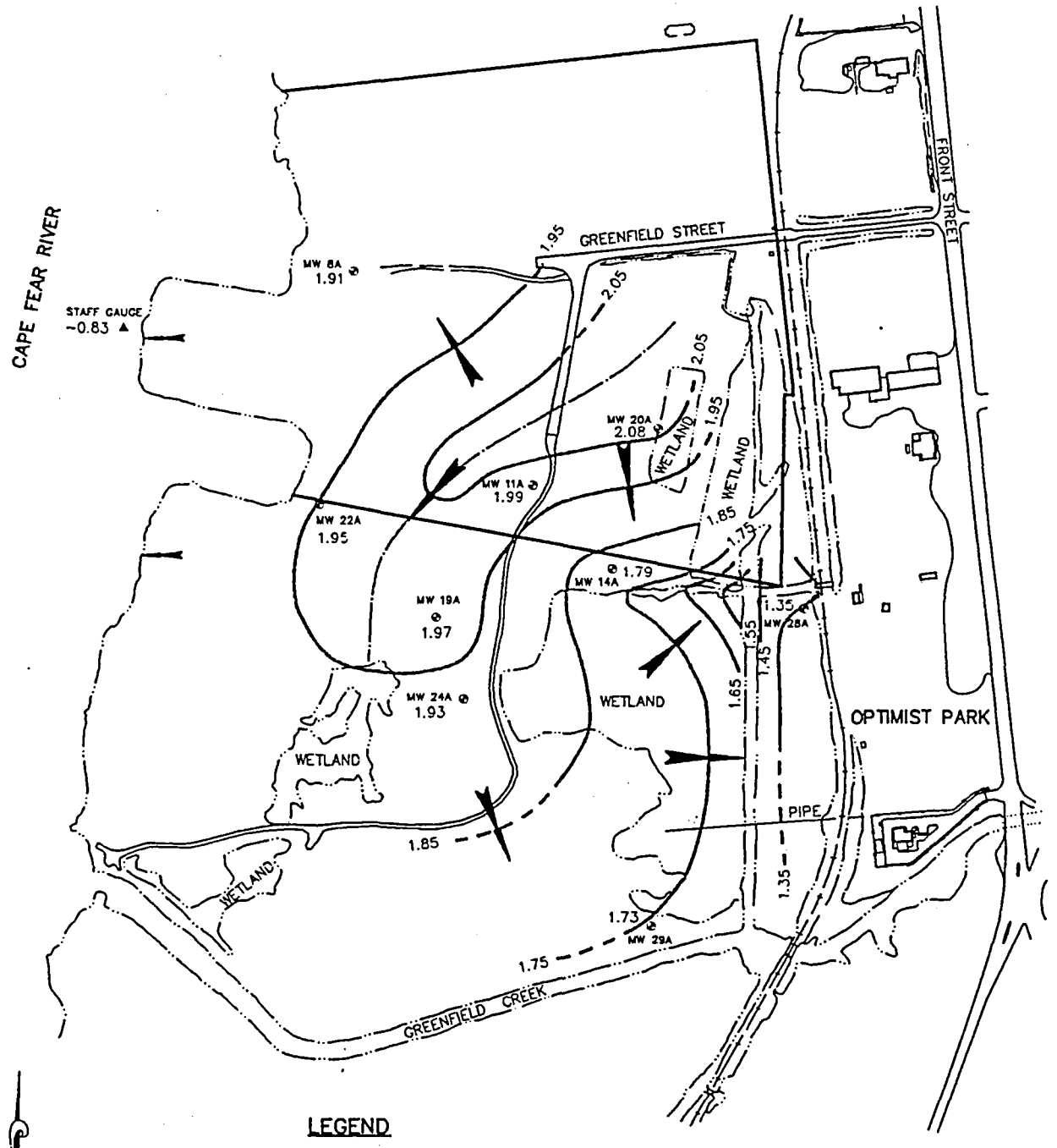
ViroGroup ETE Division P.O. Box 1867 • 1445 Pleasant Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	THREE QUARTER HIGH TIDE UPPER AQUIFER WATER TABLE MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 8 CADD NO. G:5301501A PROJECT NO. 12-53015.00



LEGEND

- PERMANENT MONITORING WELLS
- STAFF GAUGE
- GROUNDWATER ISOELEVATION LINE
- 1.75 GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER INFLECTION LINE

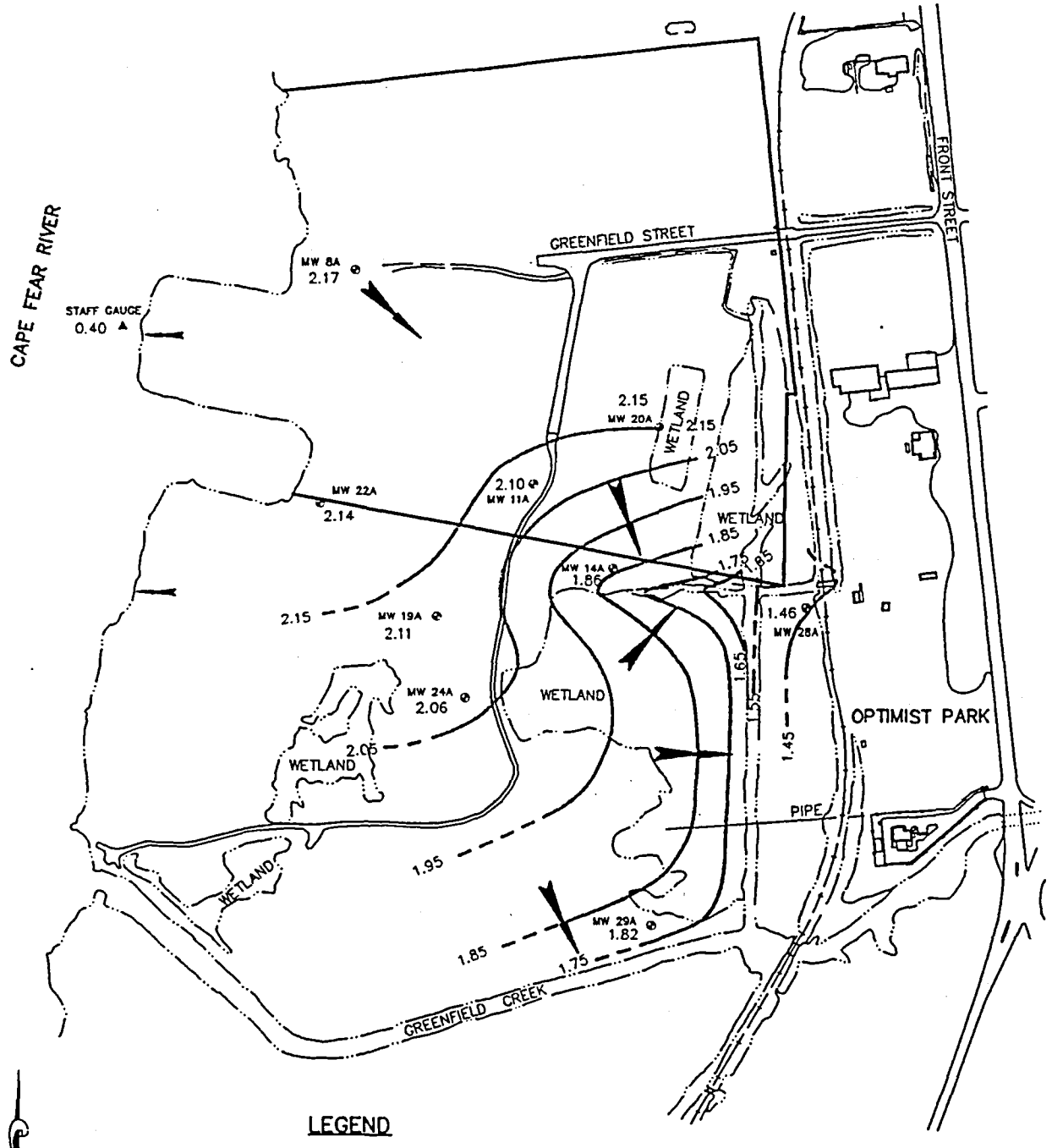
ViroGroup ETE Division P.O. Box 1867 • 1445 Pleasant Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	HIGH TIDE UPPER AQUIFER WATER TABLE MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 9 CADD NO. G:5301501A PROJECT NO. 12-53015.00



LEGEND

- PERMANENT MONITORING WELLS
- GROUNDWATER ISOELEVATION LINE
- 1.73 GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER DIVIDE

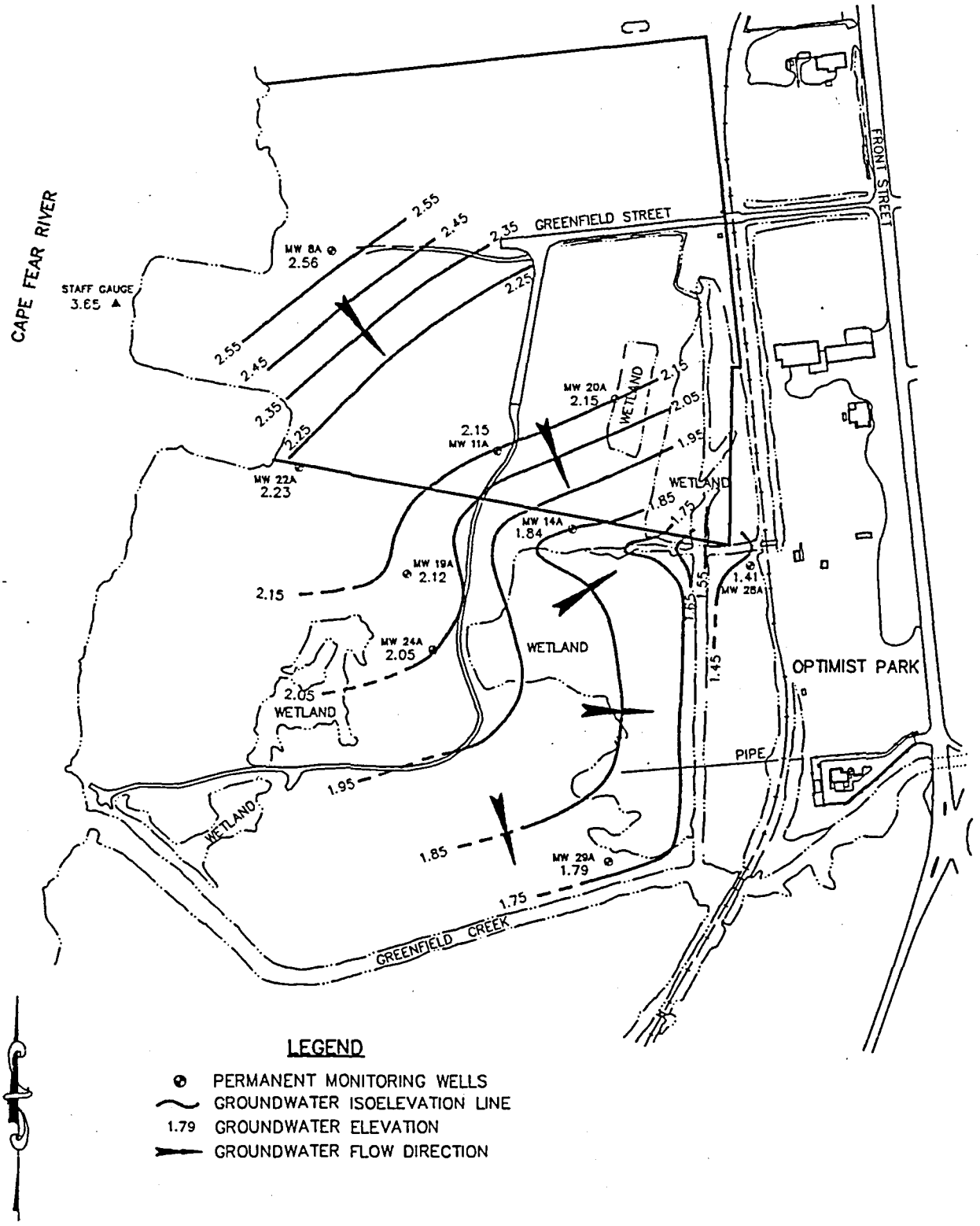
ViroGroup ETE Division P.O. Box 1867 • 1445 Pleasant Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	LOW TIDE LOWER AQUIFER POTENTIOMETRIC MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 10 CADD NO. G:5301501B PROJECT NO. 12-53015.00



LEGEND

- PERMANENT MONITORING WELLS
- GROUNDWATER ISOELEVATION LINE
- 1.82 GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

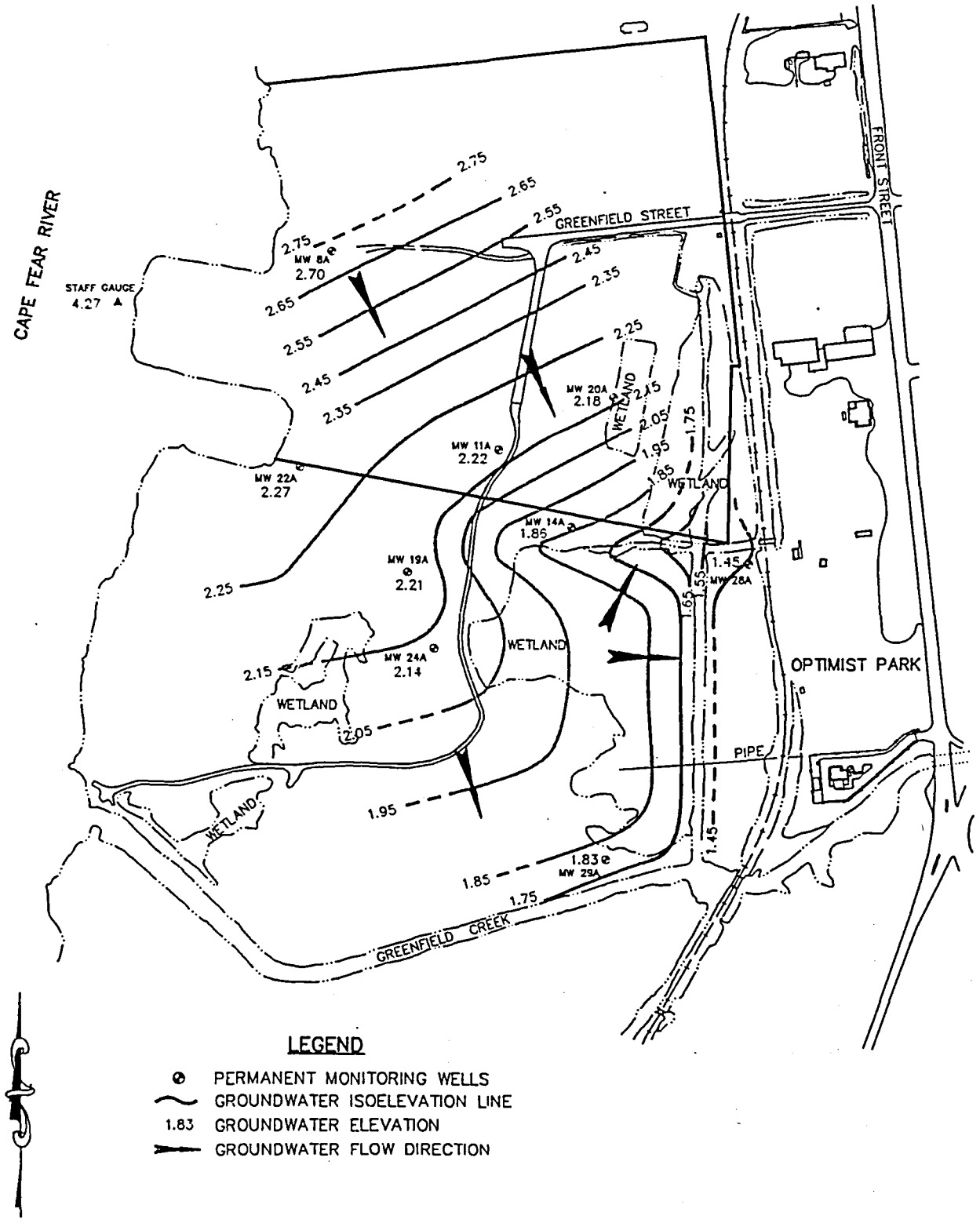
ViroGroup ETE Division P.O. Box 1867 • 1446 Peach Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	ONE QUARTER LOW TIDE LOWER AQUIFER POTENTIOMETRIC MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 11 CADD NO. G:5301501B PROJECT NO. 12-53015.00



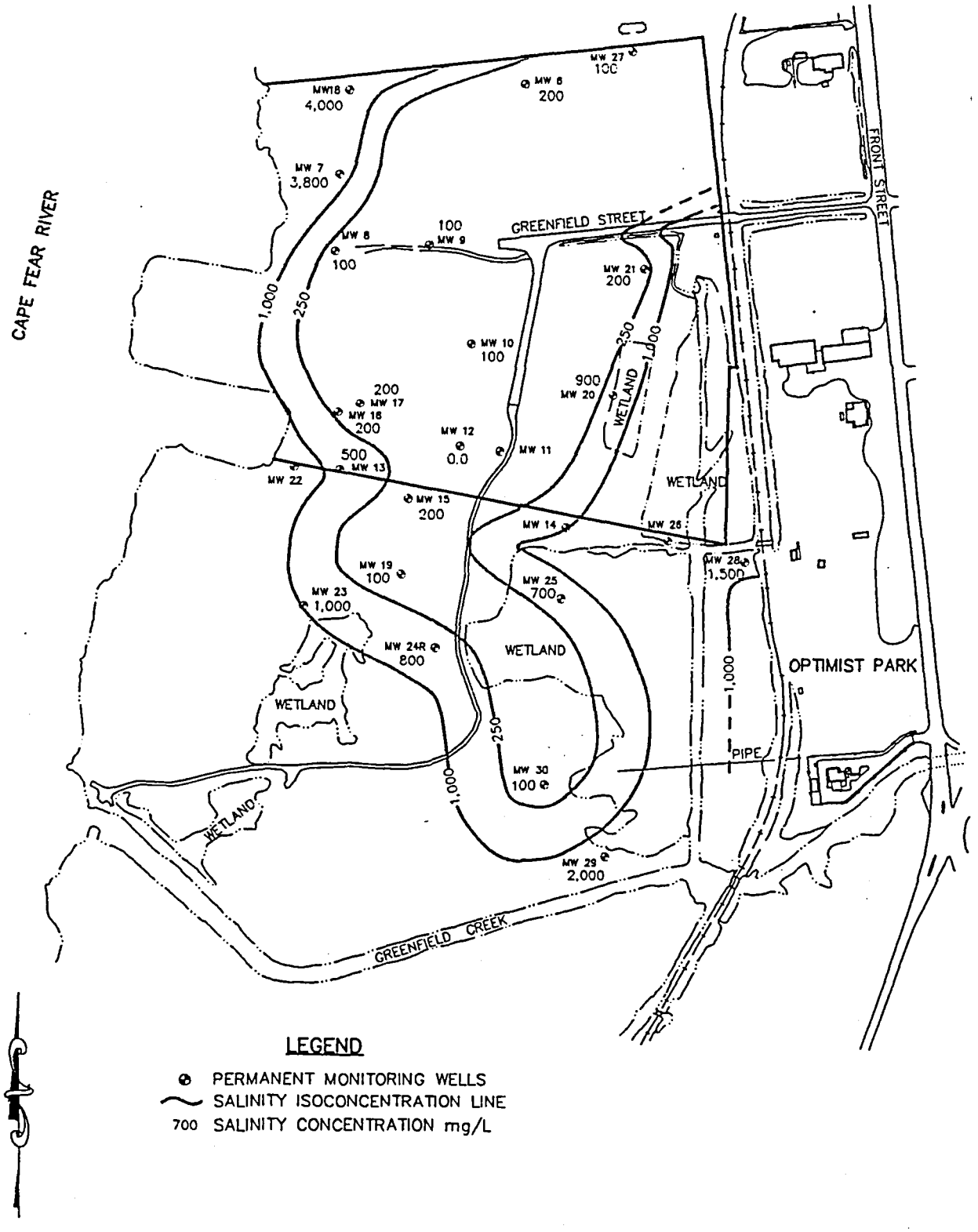
LEGEND

- PERMANENT MONITORING WELLS
- GROUNDWATER ISOELEVATION LINE
- 1.79 GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

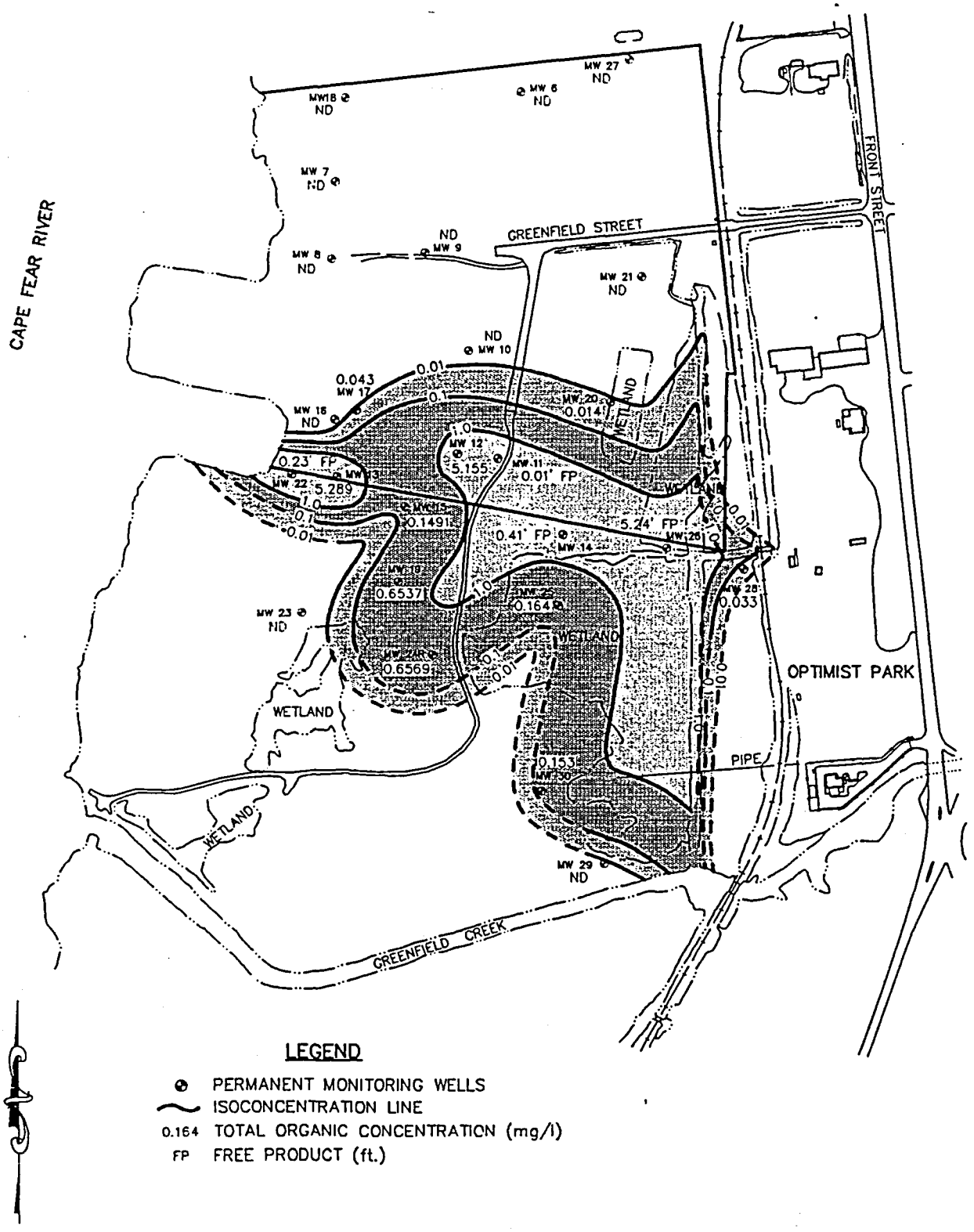
ViroGroup EIE, Division P.O. Box 1867 • 1445 Peach Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	THREE QUARTER HIGH TIDE LOWER AQUIFER POTENTIOMETRIC MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 12 CADD NO. G:5301501B PROJECT NO. 12-53015.00



ViroGroup ETE Division P.O. Box 1867 • 1445 Pleasant Church Rd. • Lexington, S.C. 29072 (803) 957-9270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	HIGH TIDE LOWER AQUIFER POTENTIOMETRIC MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 13 CADD NO. G:5301501B PROJECT NO. 12-53015.00



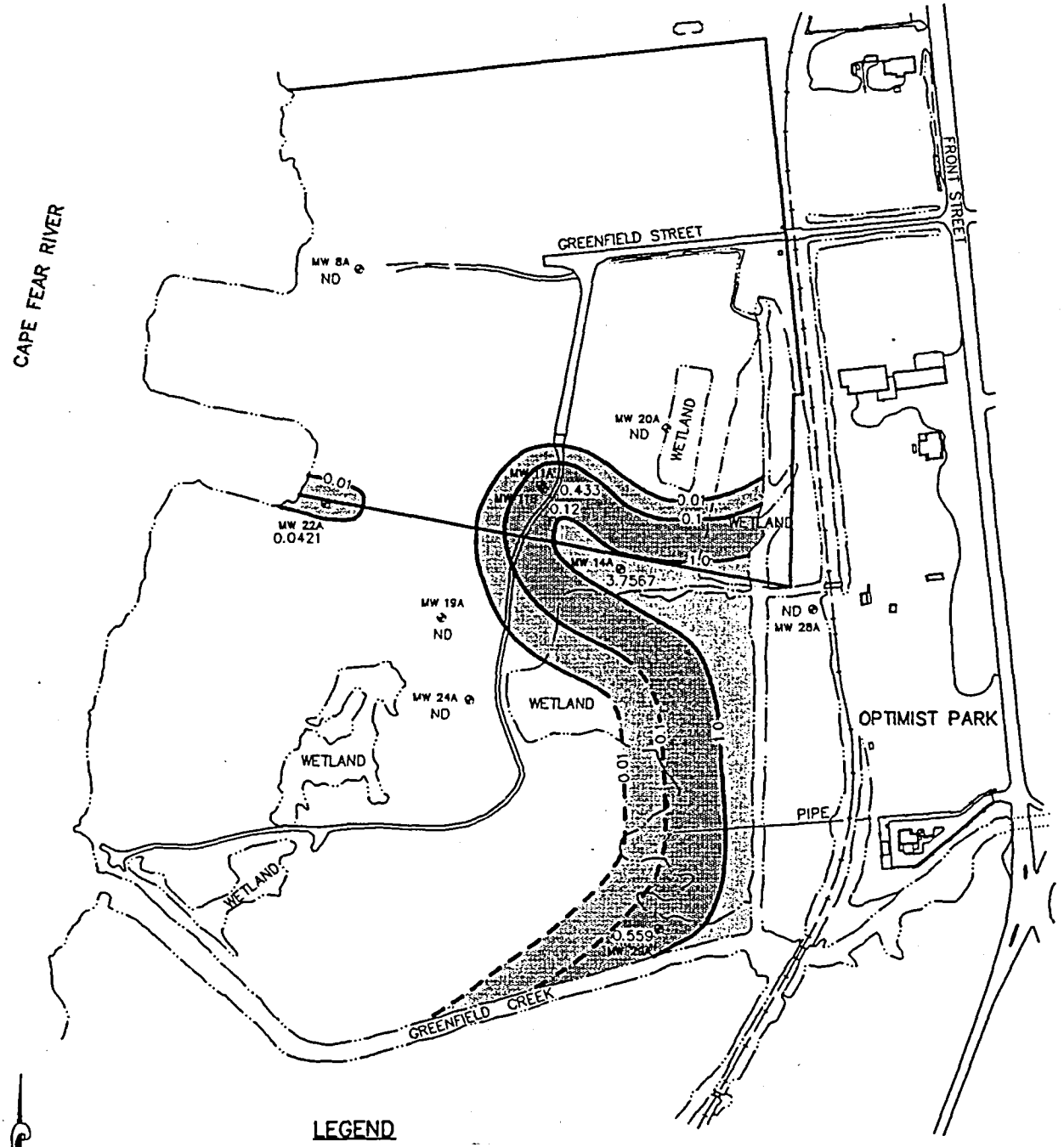
ViroGroup ETE Division P.O. Box 1867 • 1445 Plaugh Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	UPPER AQUIFER SALINITY ISOCONCENTRATION MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 14 CADD NO. G:5301501A PROJECT NO. 12-53015.00



LEGEND

- ⊕ PERMANENT MONITORING WELLS
- ~ ISOCONCENTRATION LINE
- 0.164 TOTAL ORGANIC CONCENTRATION (mg/l)
- FP FREE PRODUCT (ft.)

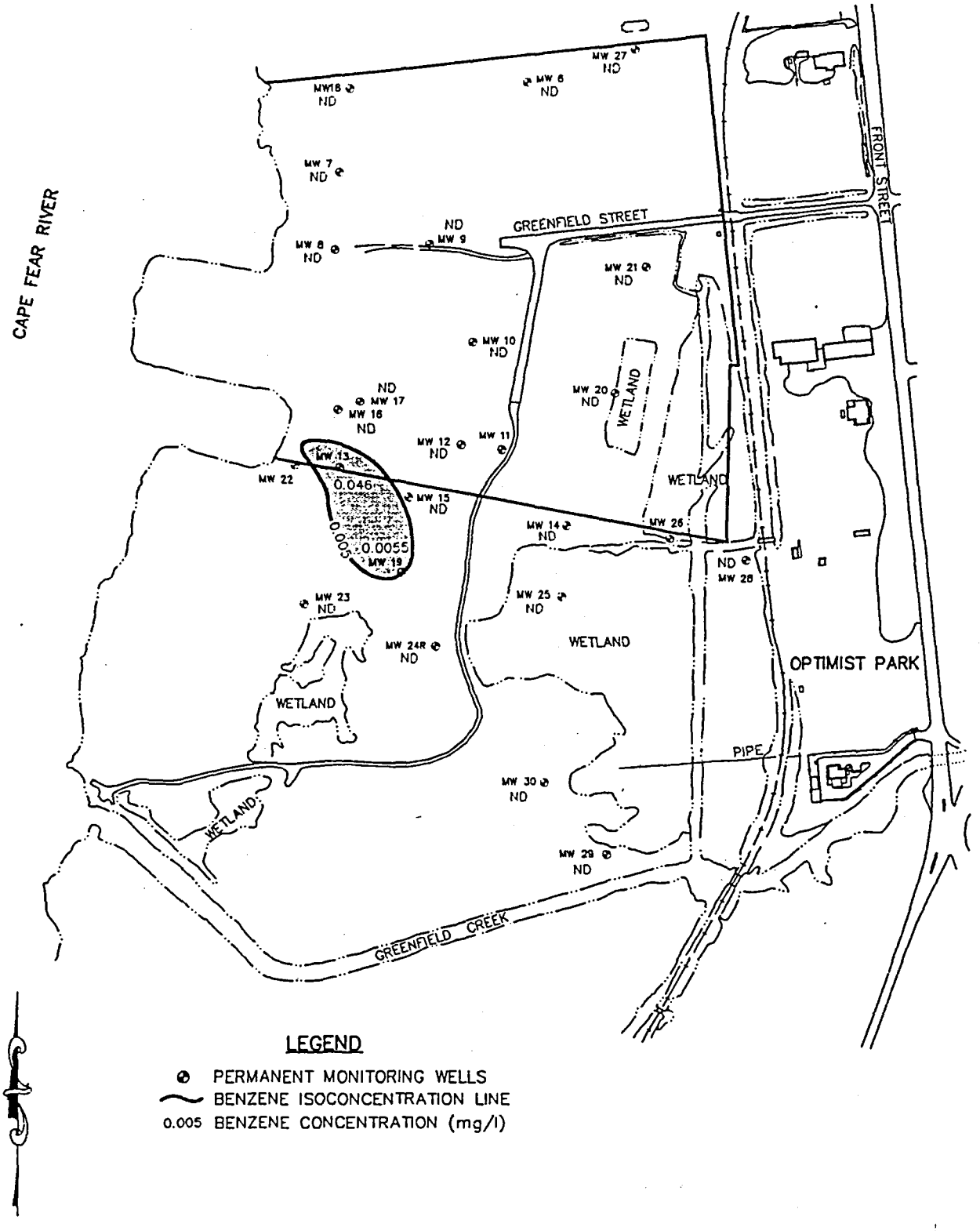
ViroGroup ETE Division P.O. Box 1887 • 1445 Plaugh Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400'	UPPER AQUIFER ORGANIC WOOD PRESERVING CONSTITUENTS ISOCONCENTRATION MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 15
	DRAWN BY CAB		CADD NO. G:5301501A
	CHECKED BY GBK		PROJECT NO. 12-53015.00
	DATE 2/11/94		



LEGEND

- PERMANENT MONITORING WELLS
- ISOCONCENTRATION LINE
- 0.433 TOTAL ORGANIC CONCENTRATION (mg/l)

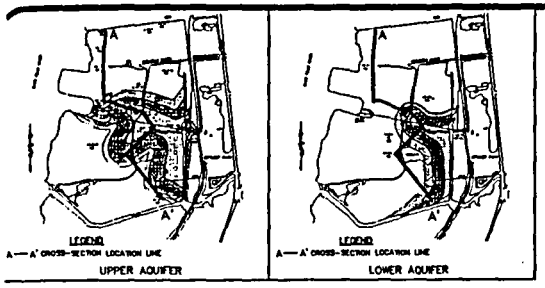
ViroGroup ETE, Division P.O. Box 1867 • 1445 Pleasant Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	LOWER AQUIFER ORGANIC WOOD PRESERVING CONSTITUENTS ISOCONCENTRATION MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 16 CADD NO. G:5301501B PROJECT NO. 12-53015.00



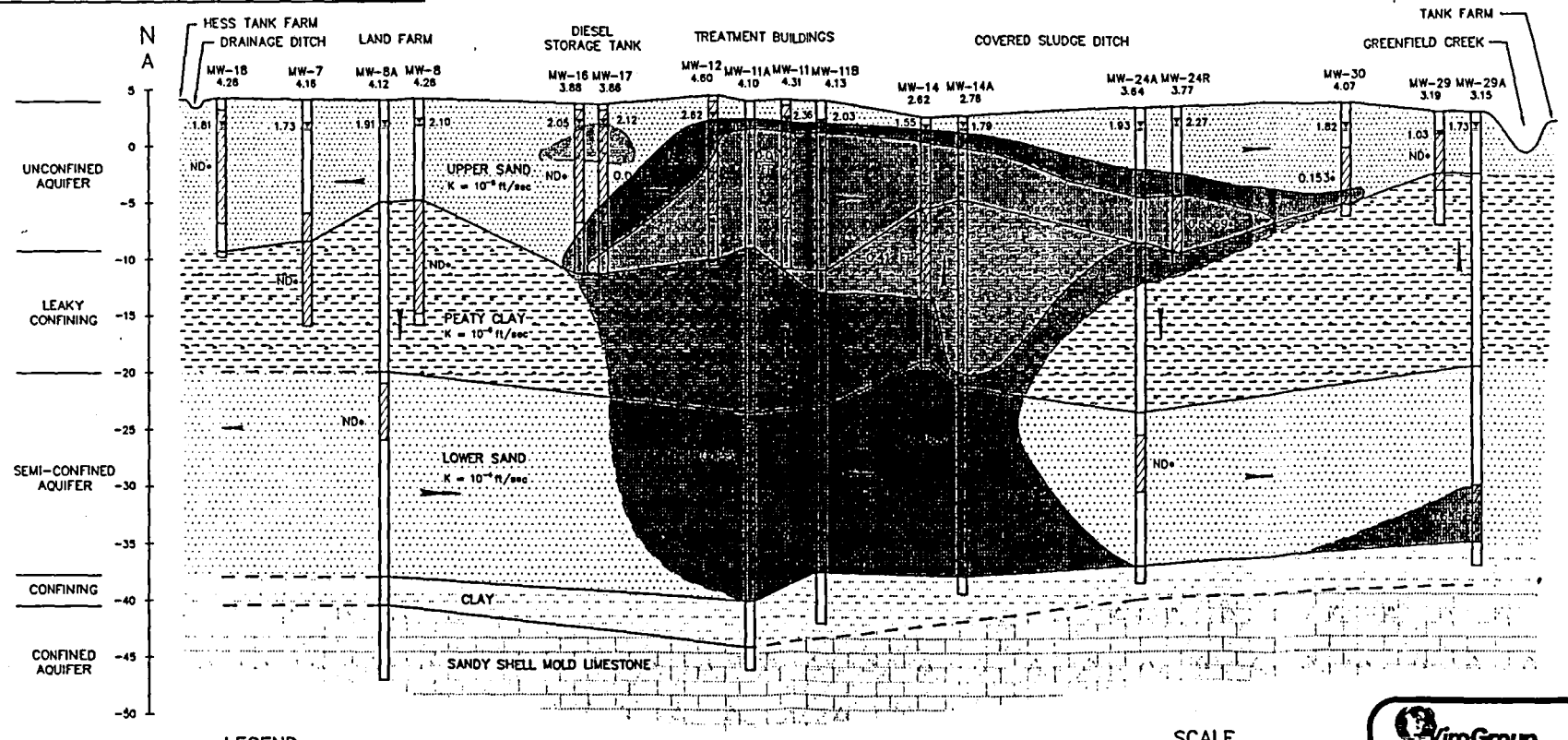
LEGEND

- PERMANENT MONITORING WELLS
- BENZENE ISOCONCENTRATION LINE
- 0.005 BENZENE CONCENTRATION (mg/l)

ViroGroup ETE Division P.O. Box 1867 • 1445 Pleasant Church Rd. • Lexington, S.C. 29072 (803) 957-8270	SCALE 1"=400' DRAWN BY CAB CHECKED BY GBK DATE 2/11/94	UPPER AQUIFER BENZENE ISOCONCENTRATION MAP SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY	FIGURE NO. 17 CADD NO. G:5301501A PROJECT NO. 12-53015.00



NO.	REVISION	DATE	BY



LEGEND

- UPPER SAND
- PEATY CLAY
- LOWER SAND
- CLAY
- SANDY SHELL MOLD LIMESTONE
- RESIDUAL & POOLED WOOD PRESERVING CONSTITUENTS
- RESIDUAL DIESEL CONSTITUENTS
- DISSOLVED WOOD PRESERVING CONSTITUENTS ORGANIC PLUME
- SCREEN INTERVAL
- 0.98 ▽ GROUNDWATER ELEVATION
- ND* DISSOLVED ORGANICS (mg/l)
- 0.01' FP FREE PRODUCT (FT.)
- K HYDRAULIC CONDUCTIVITY
- GROUNDWATER GRADIENT

SCALE

HORIZONTAL: 1" = 300'
VERTICAL: 1" = 10'

NOTE:
HORIZONTAL SPACING BETWEEN WELLS IN THE WELL CLUSTERS ARE NOT TO SCALE. (IE: MW-11, MW-11A, & MW-11B).

EnviroGroup Air•Water•Soil

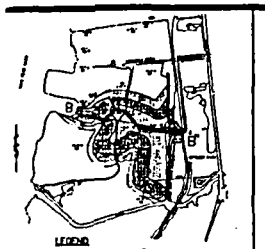
ETS Division
Windstream, Inc.
1440 Forest Church Road
Lexington, SC 29073
Phone 803-957-4170
FAX 803-957-3645
Delta 1-800-788-9664

HYDROGEOLOGIC CROSS-SECTION A – A'

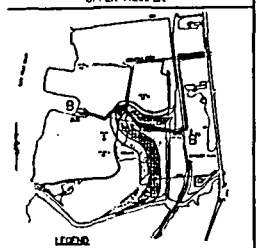
SOUTHERN WOOD PIEDMONT/ WILMINGTON, N.C. FACILITY

DRAWN BY:	CAB	DATE:	3/2/94
REVIEWED BY:	GBK	CASE NO.	C-330AA
APPROVED BY:		PROJECT NO.	12-53015.00
SCALE:	AS SHOWN	FIGURE NO.	18

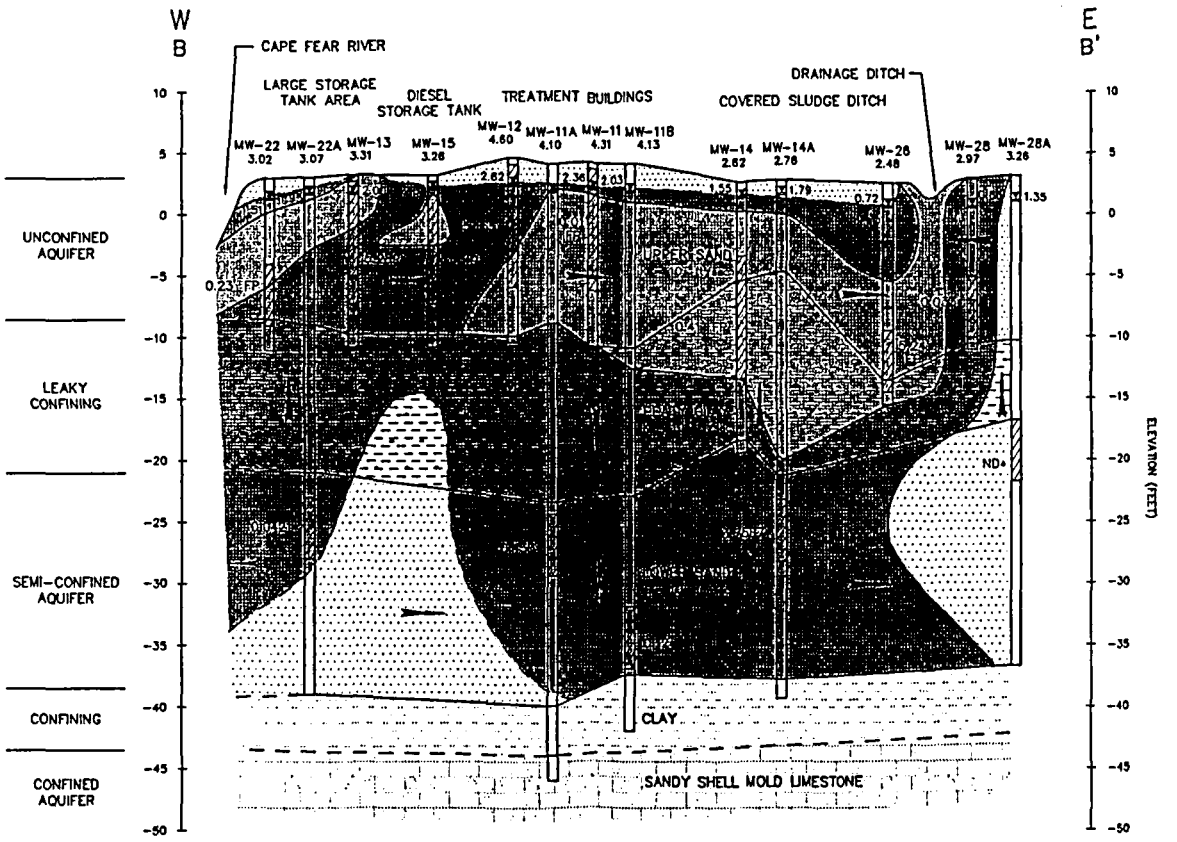
NO	REVISION	DATE	BY



UPPER AQUIFER



LOWER AQUIFER



LEGEND

- UPPER SAND
- PEATY CLAY
- LOWER SAND
- CLAY
- SANDY SHELL MOLD LIMESTONE
- RESIDUAL & POOLED WOOD PRESERVING CONSTITUENTS
- RESIDUAL DIESEL CONSTITUENTS
- DISSOLVED WOOD PRESERVING CONSTITUENTS ORGANIC PLUME
- SCREEN INTERVAL
- 0.98 ▼ GROUNDWATER ELEVATION
- ND* DISSOLVED ORGANICS (mg/l)
- 0.01' FP FREE PRODUCT (FT.)
- K HYDRAULIC CONDUCTIVITY
- GROUNDWATER GRADIENT

SCALE

HORIZONTAL: 1" = 300'
VERTICAL: 1" = 10'

NOTE:
HORIZONTAL SPACING BETWEEN WELLS IN THE WELL CLUSTERS ARE NOT TO SCALE. (IE: MW-11, MW-11A, & MW-11B).

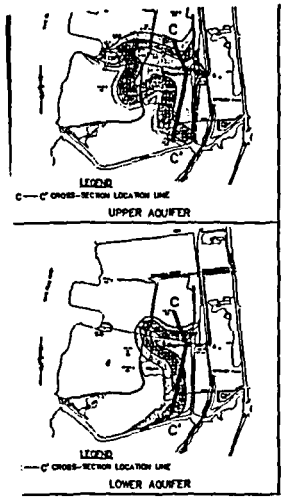
EnviroGroup
Air/Water/Soil

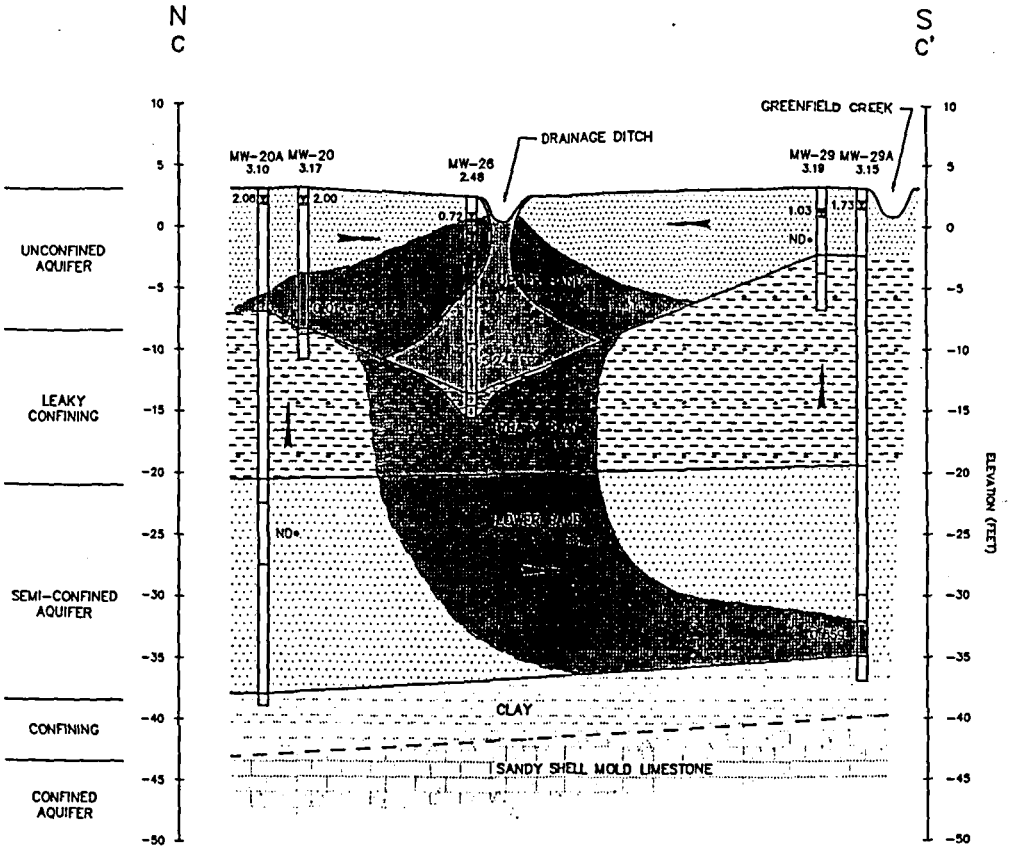
HYDROGEOLOGIC CROSS-SECTION
B – B'

SOUTHERN WOOD PIEDMONT/
WILMINGTON, N.C. FACILITY

DRAWN BY:	CAB	DATE:	3/2/94
DESIGNED BY:	CBK	CADD NO:	0-330618
APPROVED BY:		PROJECT NO:	12-5301S.00
SCALE:	AS SHOWN	FIGURE NO:	18

NO.	REVISION	DATE





LEGEND

- UPPER SAND
- PEATY CLAY
- LOWER SAND
- CLAY
- SANDY SHELL MOLD LIMESTONE
- RESIDUAL & POOLED WOOD PRESERVING CONSTITUENTS
- RESIDUAL DIESEL CONSTITUENTS
- DISSOLVED WOOD PRESERVING CONSTITUENTS ORGANIC PLUME
- SCREEN INTERVAL
- 0.98 ▼ GROUNDWATER ELEVATION
- ND• DISSOLVED ORGANICS (mg/l)
- 0.01' FP FREE PRODUCT (FT.)
- K HYDRAULIC CONDUCTIVITY
- GROUNDWATER GRADIENT

SCALE

HORIZONTAL: 1" = 300'
VERTICAL: 1" = 10'

NOTE:
HORIZONTAL SPACING BETWEEN WELLS IN THE WELL CLUSTERS ARE NOT TO SCALE. (IE: MW-11, MW-11A, & MW-11B).

ViroGroup Air·Water·Soil

HYDROGEOLOGIC CROSS-SECTION
C – C'

SOUTHERN WOOD PIEDMONT/
WILMINGTON, N.C. FACILITY

DRAWN BY:	CAB	DATE:	3/2/94
DESIGNED BY:	GBK	CAD FILE:	C.530CC
APPROVED BY:		PROJECT NO.	12-53015.00
SCALE:	AS SHOWN	FIGURE NO.	20

Boring Logs

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. B

PROJECT: SOUTHERN WOOD PIEDMONNT – WILMINGTON, NC		SHEET NO. 1 OF 1	
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED 2-19-92	JOB NO. 530-06-5	
BORING CONTRACTOR: ETE	DRILLER C. AARON	ELEVATION	
RIG USED MOBILE B-57	INSPECTOR K. ANDERSON	DATE STARTED 2-19-	

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: LITHOLOGY	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
	0						
			1	SS		Medium to coarse brown SAND	Water saturated OVA = 0.0
CLAY / PLUG	5						
SAND PACK / SAND PACK			2	SS		Same as above	No visual contamination OVA = 0.0
	10						
			3	SS		Brown to black PEAT with root fragments	No visual contamination OVA = 2.0
	15						
	20						
	25						
	30						
	35						
	40						
	45						
	50						

H:530501B2

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO.

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC		SHEET NO. 1 OF 1	
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED 2-20-92	JOB NO. 530-06-	
BORING CONTRACTOR: ETE	DRILLER C. AARON	ELEVATION	
RIG USED MOBILE B-57	INSPECTOR K. ANDERSON	DATE STARTED 2-20	

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: BLOWS PER 6"	SAMPLE: No.	SAMPLE: TYPE	CLASSIFICATION	REMARKS
	0					
	5		1	SS	Fine to medium brown SAND with small wood fragments at 4.5 feet	Water saturated OVA = 3.1
CLAY / PLUG						
SAND PACK / SAND PACK	10		2	SS	Same as above	No visual contamination OVA = 0.9
	15		3	SS	Dark brown to black PEAT with wood fragments	No visual contamination OVA = 0.8
	20					
	25					
	30					
	35					
	40					
	45					
	50					

H:530501B3

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. E

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			SHEET NO. 1 OF 1
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2–20–92	JOB NO. 530–06–
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B–57	INSPECTOR	K. ANDERSON	DATE STARTED 2–20–

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: LITHOLOGY	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
	0						Visual creosote at top of I
			1	SS		Fine to medium brown SAND with wood fragments	No visual contamination OVA = 1.7
CLAY / PLUG	5						
SAND PACK / SAND PACK			2	SS		Same as above	No visual contamination OVA = 5.1
	10						
			3	SS			Visual creosote in sand above PEAT
	15					Dark brown to black PEAT with wood fragments	OVA = 98.9
	20						
	25						
	30						
	35						
	40						
	45						
	50						

H:530501B4

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. E

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			SHEET NO. 1 OF 1
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2–20–92	JOB NO. 530–06–!
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B–57	INSPECTOR	K. ANDERSON	DATE STARTED 2–20–

WELL CONSTRUCTION: CLAY; SAND PACK; PLUG; SAND PACK

DEPTH FEET	SAMPLE No.	SAMPLE TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS		Fine to medium brown SAND	Water saturated No visual contamiation OVA = 54.3
5					
10	2	SS		Same as above	OVA = 21.7
15	3	SS		Dark black to brown PEAT with wood fragments	No visual contamination OVA = 3.9
20					
25					
30					
35					
40					
45					
50					

H:53C50185

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO.

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			SHEET NO. 1 OF 1
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2–20–923	JOB NO. 530–06–
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B–57	INSPECTOR	K. ANDERSON	DATE STARTED 2–20

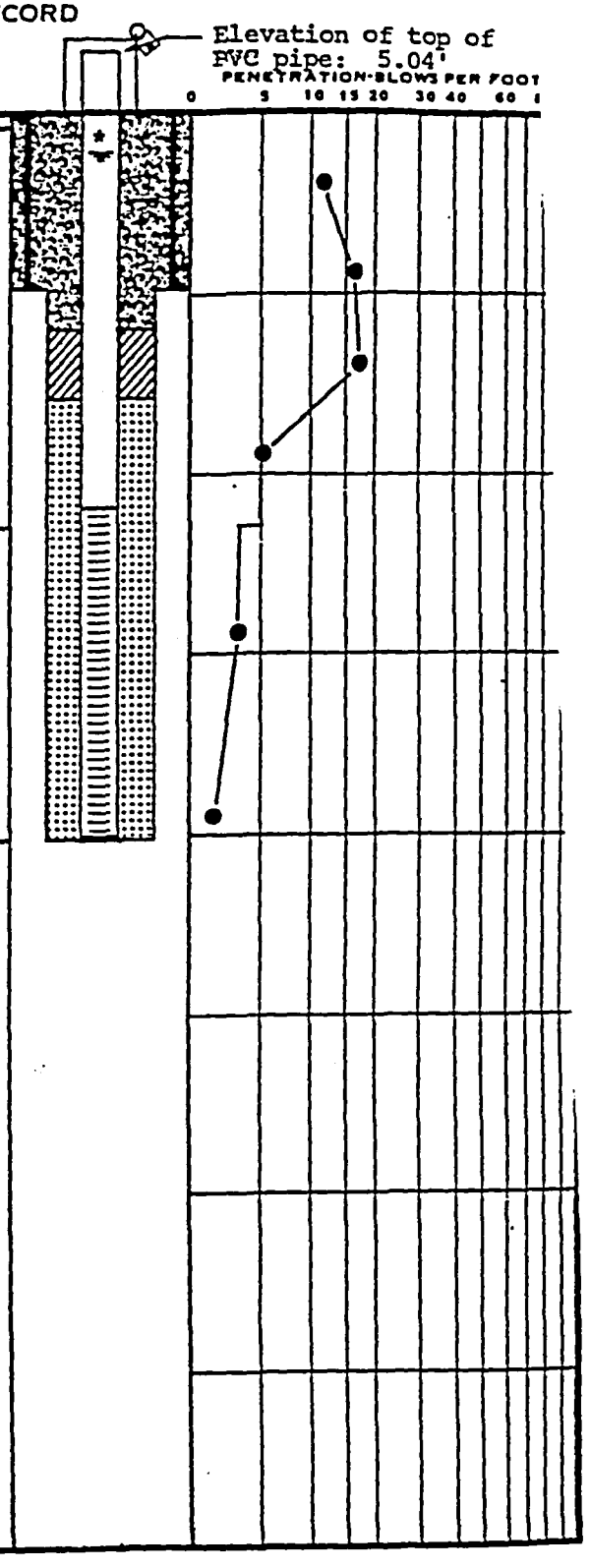
WELL CONSTRUCTION	DEPTH FEET	SAMPLE: UNCLASS.	SAMPLE: No.	SAMPLE: TYPE	SAMPLE: BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY; PLUG; SAND PACK; SAND PACK	0						
	5		1	SS		Fine to mdedium brown SAND	Water saturated No visual contamination OVA = 1.7
			2	SS		Dark brown to black PEAT with wood fragments	OVA = 1.0
	10						
	15						
	20						
	25						
	30						
	35						
	40						
	45						
	50						

H:53050186

TEST BORING RECORD

Elevation of top of PVC pipe: 5.04'

ELEV.	DEPTH FEET	DESCRIPTION
3.46	0.0	
	0.5	FILL: Dark brown and black CINDERS and silty fine to medium SAND
-1.54		Firm to loose dark to light brownish-gray/grayish-brown fine to medium SAND with traces of silt
-6.54		
	11.5	
-11.54		Soft to very soft dark brown PEAT and ORGANIC SILT with wood and root fragments
-16.54	20.0	BORING TERMINATED
-21.54		



REMARKS:

* Water level on 9-19-85

1) Wash drilled with 10-inch wing bit using a bentonite and potable water drilling fluid mixture to 4.8 feet; Wash drilled with 5 7/8-inch rotary bit using a bentonite and potable water drilling fluid mixture from 4.8 to 20.0 feet

2) Well developed on 9-10-85

DRILLED BY L.S.
LOGGED BY J.T.B.
CHECKED BY C.A.S.

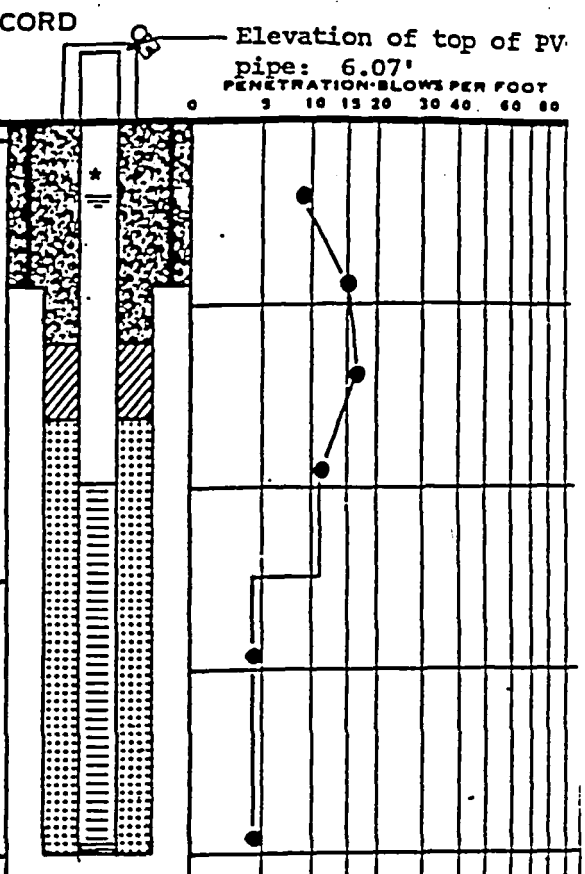
BORING NUMBER MW-6
DATE STARTED 9-4-85
DATE COMPLETED 9-5-85
JOB NUMBER HA-5276

SWP - Wilmington

TEST BORING RECORD

Elevation of top of PV pipe: 6.07'

ELEV.	DEPTH FEET	DESCRIPTION
4.16	0.0	FILL: Brown slightly silty fine SAND with cinders
	8.5	
-0.84		Loose to firm brown slightly silty fine to medium SAND to fine to medium SAND with traces of silt
-5.84		
	12.5	
-10.84		Soft to firm dark brown PEAT and ORGANIC SILT with wood and root fragments becoming predominantly wood in last sample
-15.84	20.0	BORING TERMINATED
-20.84		



REMARKS:

* Water level on 9-19-85

1) Wash drilled with 10-inch wing bit using a bentonite and potable water drilling fluid mixture to 4.5 feet; wash drilled with 5 7/8-inch roller bit using a bentonite and potable water drilling fluid mixture from 4.5 to 20.0 feet

2) Well developed on 9-11-85

DRILLED BY L.S.
LOGGED BY J.T.B.
CHECKED BY C.A.S.

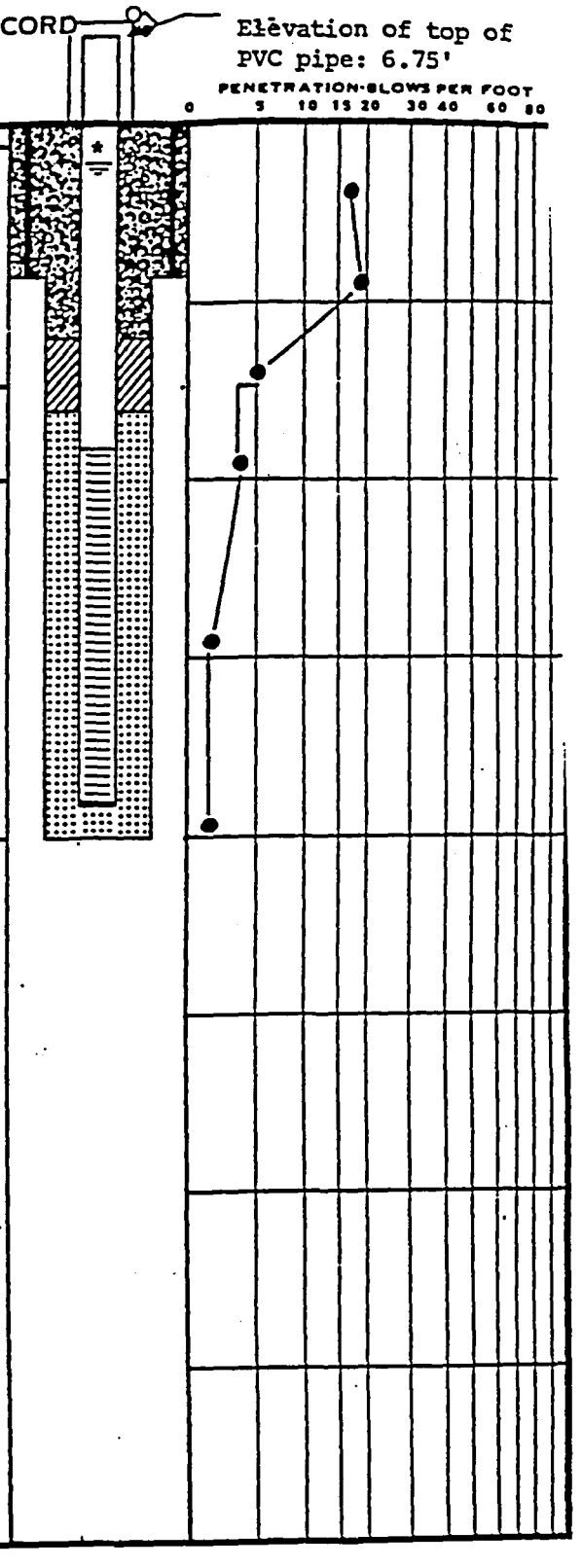
BORING NUMBER MW-7
DATE STARTED 9-4-85
DATE COMPLETED 9-6-85
JOB NUMBER HA-5276

SWP - Wilmington

TEST BORING RECORD

Elevation of top of PVC pipe: 6.75'

ELEV.	DEPTH FEET	DESCRIPTION
4.26	0.7	FILL: Dark brown silty fine SAND with occasional coarse sand
-0.74		Firm to loose dark brown to grayish-brown and brown slightly silty fine to medium SAND with traces of coarse sand
	7.4	Buried log from 7.4 to 10.0 feet
-5.74	10.0	Very soft to soft dark brown PEAT and ORGANIC SILT with wood and root fragments
-10.74		
-15.74	20.0	BORING TERMINATED
-20.74		



REMARKS:

* Water level on 9-19-85

1) Wash drilled with 10-inch wing bit using a bentonite and potable water drilling fluid mixture to 4.5 feet; wash drilled with 5 7/8-inch roller bit using a bentonite and potable water drilling fluid mixture from 4.5 to 20.0 feet

2) Well developed on 9-11-85

DRILLED BY L.S.
LOGGED BY J.T.B.
CHECKED BY C.A.S.

BORING NUMBER MW-8
DATE STARTED 9-4-84
DATE COMPLETED 9-9-85
JOB NUMBER HA-5276

SWP - Wilmington

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-

PROJECT: SOUTHERN WOOD PIEDMONT–WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10–1–92	JOB NO. 530–06–!	
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION 4	
RIG USED ATV MUD ROTARY	INSPECTOR G.KUNTZ	DATE STARTED 9–28-	

WELL CONSTRUCTION: GROUT; 6" PVC CASING; 2" PVC CASING; 6" PVC CASING; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

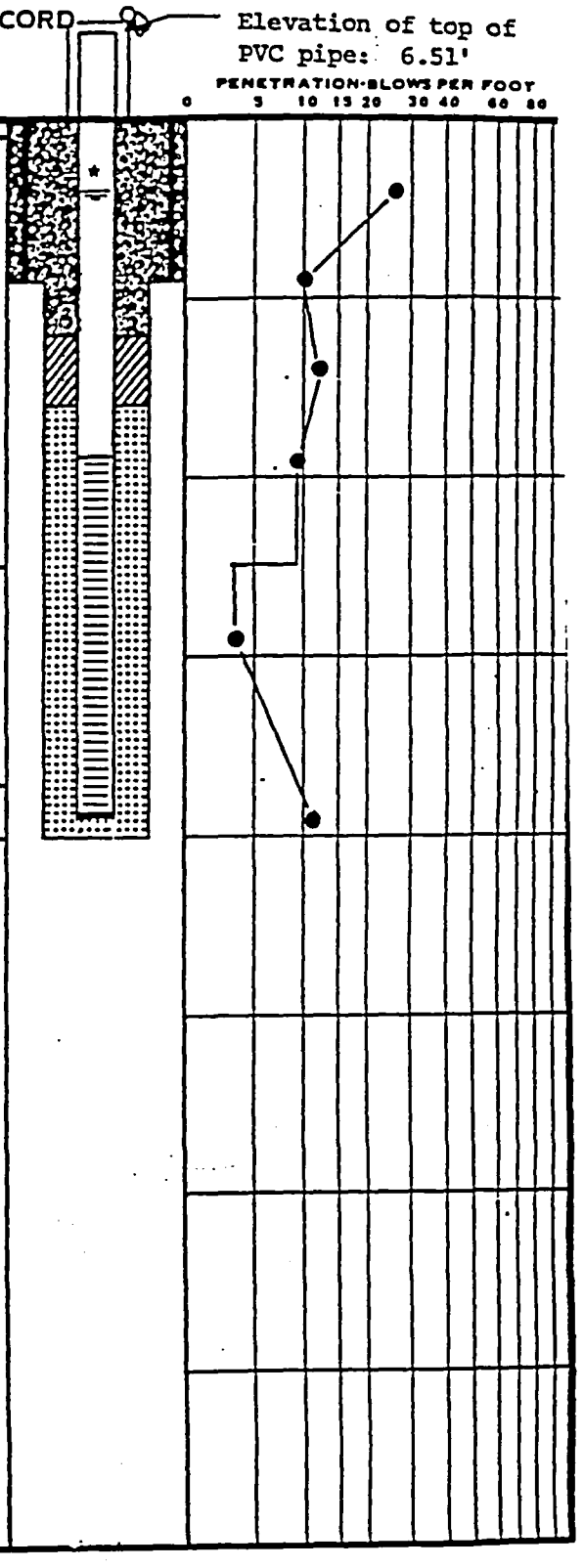
DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	7–6 / 6–11	Loose, yellowish brown SAND, fine to coarse, 5% clay	16" recovery No odor OVA = 114 ppm
	2	SS	5–10 / 18–16	Firm, brownish gray SAND, fine to coarse	18" recovery No odor OVA = 38.1 ppm
5	3	SS	14–15 / 16–20	Firm, brownish black organic rich silty SAND, silt to medium, 10% small pebble, 5% clay, 5% organics	8" recovery No odor OVA = 25.6 ppm
	4	SS	2–3 / 4–4	Very loose, brown SAND, fine to coarse	8" recovery No odor OVA = 38.6 ppm
10	5	SS	1–1 / 1–1	Very loose, same to 9 feet, then dark brown CLAY, trace coarse to small pebble, 10% wood	12" recovery No odor OVA = 32.7 ppm
	6	SS	1–1 / 1–1	Very loose, same as above	8" recovery No odor OVA = 28.4 ppm
	7	SS	1–1 / 1–2	Very loose, dark brown peaty CLAY, 30% wood	14" recovery No odor OVA = 25.7 ppm
15	8	SS	1–1 / 1–1	Very loose, same as above, 40% wood	12" recovery No odor OVA = 20.8 ppm
	9	SS	1–1 / 1–1	Very loose, dark brown peaty CLAY, 50% wood	10" recovery No odor OVA = 6.0 ppm
	10	SS	1–1 / 6–2	Loose, dark brown clayey PEAT, 35% clay	18" recovery No odor OVA = 14.3 ppm
20	11	SS	1–0 / 1–1	Very loose, same as above	12" recovery No odor OVA = 3.9 ppm
	12	SS	1–1 / 1–1	Very loose, PEAT, large wood chunk blocked shoe	2" recovery No odor OVA = 7.3 ppm
25	13	SS	1–5 / 7–8	Loose, brown SAND, fine to coarse, well sorted coarse	10" recovery Very slight odor OVA = 78.6 ppm
	14	SS	6–7 / 6–6	Loose, same as above	18" recovery Very slight odor OVA = 99.2 ppm
30	15	SS	1–0 / 4–5	Very loose, brown SAND, fine to coarse, moderately sorted medium, trace granule, 2% phosphate	16" recovery No odor OVA = 53.7 ppm
35	16	SS	6–4 / 3–3	Very loose, brown SAND, well sorted medium, 2% phosphate	10" recovery No odor OVA = 42.6 ppm
40	17	SS	2–2 / 1–1	Very loose, brown SAND, fine to coarse, poorly sorted, 10% granule to medium pebble, 2% phosphate, trace lignite	12" recovery No odor OVA = 9.5 ppm
	18	SS	12–22 / 36–50	Dense, olive gray CLAY to 44.5 feet with 5% phosphate and glauconite then light gray sandy shell mold LIMESTONE and SAND, alternating cemented shell molds and friable sand laminae, silt to large pebble	24" recovery No odor OVA = 2.5 ppm
45					24" recovery No odor OVA = 1.1 ppm
50	19	SS	15–35 / 48–15	Dense, same as above	TD = 51 feet

H:530MW8A

TEST BORING RECORD

Elevation of top of PVC pipe: 6.51'

ELEV.	DEPTH FEET	DESCRIPTION
4.46	0.5	FILL: Dark brown silty fine SAND with occasional coarse sand
-0.54		Very firm to loose gray to grayish-brown fine to medium SAND with traces of silt
-5.54		
	12.5	
-10.54		Soft dark brown PEAT and ORGANIC SILT with root and wood fragments
	18.5	
-15.54	20.0	Buried log from 18.5 to 20.0 feet
		BORING TERMINATED
-20.54		



REMARKS:

* Water level on 9-19-85

1) Wash drilled with 10-inch wing bit using a bentonite and potable water drilling fluid mixture to 4.5 feet; wash drilled with 5 7/8-inch roller bit using a bentonite and potable water drilling fluid mixture from 4.5 to 20.0 feet

2) Well developed on 9-11-85

DRILLED BY L.S.
LOGGED BY J.T.B.
CHECKED BY C.A.S.

BORING NUMBER MW-9
DATE STARTED 9-5-85
DATE COMPLETED 9-10-85
JOB NUMBER HA-5276

SWP - Wilmington

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC		SHEET NO. 1 OF 1	
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED 2-18-92	JOB NO. 530-06-	
BORING CONTRACTOR: ETE	DRILLER C. AARON	ELEVATION	
RIG USED MOBILE B-57	INSPECTOR K. ANDERSON	DATE STARTED 2-18-	

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: VISIBILITY	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY / PLUG; SAND PACK / SAND PACK	0						
	5		1	SS	06-10 10-15	Black – tan fine to meduium SAND	Saturated with water OVA = 0.0
	10		2	SS	04-26 50	Tan fine to medium SAND	Saturated with water; OVA = 0.0
	15		3	SS		Tan fine to medium SAND in upper portion of spoon; Dark brown to black PEAT at bottom of spoon	Boring terminated at 13.0 OVA = 0.0
	20						
	25						
	30						
	35						
	40						
	45						
	50						

H:53050110

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC		SHEET NO. 1 OF 1	
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED 2-18-92	JOB NO. 530-06-	
BORING CONTRACTOR: ETE	DRILLER C. AARON	ELEVATION	
RIG USED MOBILE B-57	INSPECTOR K. ANDERSON	DATE STARTED 2-18	

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: LITHOLOGY	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY / PLUG / SAND PACK / SAND PACK	0						
			1	SS		Hit concrete and other buried debris	
	5		2	SS	10-05 05-05	Brown-tan fine to medium SAND	Saturated with Creosote from 5 to 7 feet: OVA =
			3	SS	02-02 02-01	Brown-tan fine to medium SAND	Saturated with Creosote OVA = 38.1
	10						
			4	SS		Brown-tan fine to medium SAND in upper spoon; Encountered a dark brown to black PEAT with roots at 15.0'	Sand unit saturated with Creosote; OVA = 69.8
	15						
	20						
	25						
	30						
	35						
	40						
	45						
	50						

H:53050111

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

BORING NO. MW-11

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10-1-92	JOB NO. 530-06-50	
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION 4.1	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 9-29-9	

WELL CONSTRUCTION: GROUT; 6" PVC CASING; 2" PVC CASING; 6" PVC CASING; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	8-8 10-24	Loose, brown SAND, fine to coarse, well sorted medium	18" recovery No odor OVA = 124 ppm
	2	SS	7-7 10-22	Loose, brown SAND, fine to coarse, 5% wood. At 3 feet visually stained soil.	12" recovery Strong odor OVA = 877
5	3	SS	2-1 1-1	Very loose, brown SAND, fine to coarse, 5% wood, 2" dark brown CLAY layer at 5 feet. Visually stained soil.	8" recovery Strong odor OVA = 89.1 ppm
	4	SS	6-8 1-1	Very loose, brown SAND, fine to coarse, trace wood, 8-inch dark brown peaty CLAY lense at 6 feet. Visually stained soil.	24" recovery Strong odor OVA = 153 ppm
10	5	SS	4-4 5-7	Loose, brown SAND, fine to coarse, 5% wood, visually stained soils to 8.5' then 1/4" seams of stained soil	24" recovery Strong odor OVA = 113 ppm
	6	SS	2-4 5-4	Very loose, brown SAND, fine to coarse. Visually stained soils.	12" recovery Strong odor OVA = 186 ppm
15	7	SS	2-2 3-2	Very loose, same as above to 13 feet, then dark brown peaty CLAY, 30% wood. Visually stained soils in sands, no visual staining in peaty clay.	10" recovery Strong odor OVA = 131
	8	SS	2-3 2-3	Very loose, dark brown PEAT, 20% clay	24" recovery Strong odor OVA = 66.2 ppm
	9	SS	2-4 2-3	Very loose, brownish black peaty CLAY, 30% peat	10" recovery Strong odor OVA = 98.1 ppm
	10	SS	2-2 3-2	Very loose, same as above, 40% wood	16" recovery Strong odor OVA = 113 ppm
20	11	SS	50	Grout	3" recovery
	12	SS	6-2 3-2	Very loose, brownish black peaty CLAY, 25% wood	4" recovery Moderate odor OVA = 112 ppm
25	13	SS	0-0 0-0	Very loose, same as above	24" recovery No odor OVA = 17.3 ppm
	14	SS	2-2 4-6	Very loose, same to 27.5 feet, then dark brown SAND, fine to coarse, well sorted medium	24" recovery Very slight odor OVA = 34.3 ppm
	15	SS	3-4 7-8	Loose, same as above, 10% wood	12" recovery Very slight odor OVA = 26.9 ppm
30	16	SS	5-8 7-14	Loose, light brown SAND, very fine to medium, well sorted fine, 2% phosphate	12" recovery No odor OVA = 18.6 ppm
35	17	SS	4-8 8-12	Loose, brown SAND, fine to granule, poorly sorted, 5% small pebble, 2% phosphate	12" recovery No odor OVA = 12.8 ppm
40	18	SS	25-22 20-28	Firm, brown SAND, fine to granule to 44 feet, then olive gray CLAY, 5% phosphate and glauconite, tight and dry	24" recovery No odor OVA = 7.2 ppm
45				Dense, lt gray shell mold	14" recovery
	19	SS	48-26 50+	LIMESTONE and SAND, alternating lenses of indurated cemented shell molds and friable sand, silt to very coarse, 10% granule	No odor OVA = 10.8 ppm TD = 50 feet
50					

H:530MW11A

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
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TEST BORING LOG

BORING NO. MW-11B

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 10-31-93	JOB NO.	12-53015.00
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION	4.13
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED	10-26-93

WELL CONSTRUCTION: GROUT; 6" PVC; 2" PVC; 6" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE NO.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Loose, brown SAND, fine to coarse, well sorted medium, trace wood & organics	No odor OVA = 0.0 ppm
	2	PH		Loose, brown SAND, fine to coarse, well sorted medium, 5% wood	Slight odor OVA = 87.0 ppm
5	3	SS	2-3 / 4-6	Loose, brown SAND, fine to coarse, 5% wood. Visual staining starting @ 5'.	14" recovery Strong odor OVA = 177 ppm
	4	SS	5-7 / 7-8	Firm, brown SAND, fine to coarse, 15% wood, 6" dark brown PEAT lense. Visual staining.	14" recovery Strong odor OVA = 253 ppm
	5	SS	3-4 / 4-5	Loose, brown SAND, fine to coarse, 5% wood to 9', then peaty CLAY, 50% peat. Visually stained.	14" recovery Strong odor OVA = 405 ppm
10	6	SS	5-6 / 6-7	Firm, brown SAND, fine to coarse. Visually stained.	14" recovery Strong odor OVA = 418 ppm
	7	SS	3-2 / 2-2	Very loose, same as above to 13 feet, then dark brown peaty CLAY, 50% peat. Visually stained in sands.	24" recovery Strong odor OVA = 187 ppm
15	8	SS	1-1 / 1-2	Very loose, dark brown PEAT, 20% clay. 8" sand lense. Visual staining in sand.	14" recovery Strong odor OVA = 592 ppm
	9	SS	2-3 / 2-2	Very loose, brownish black peaty CLAY, 50% peat. Visual staining to 17'.	18" recovery Strong odor OVA = 370 ppm
	10	SS	2-1 / 1-4	Loose, same as above, 40% peat. Pit casing to 20'	16" recovery Strong odor OVA = 372 ppm
20	11	SS	2-1 / 1-2	Very loose, brownish black peaty CLAY, 25% peat	4" recovery Slight odor OVA = 139 ppm
	12	SS	1-1 / 1-3	Very loose, brownish black peaty CLAY, 25% peat	24" recovery Slight odor OVA = 78.7 ppm
25	13	SS	1-1 / 1-2	Very loose, same as above, 35% peat	8" recovery Slight odor OVA = 40.1 ppm
	14	SS	2-4 / 4-5	Very loose, same to 27 feet, then dark brown SAND, fine to coarse, trace very coarse to granule	24" recovery Slight odor OVA = 56.9 ppm
30	15	SS	2-4 / 8-9	Firm, dark brown SAND, fine to medium, well sorted	12" recovery Very slight odor OVA = 65.6 ppm
35	16	SS	2-3 / 3-7	Loose, brown SAND, fine to coarse, coarse dominant	12" recovery No odor OVA = 58.6 ppm
40	17	SS	6-5 / 8-7	Firm, brown SAND, fine to granule, 10% granule to small pebble, poorly sorted, to 41.5', then olive gray marine CLAY, 5% phosphate and glauconite. Sheen appeared in drilling mud when hit top of clay	12" recovery No odor OVA = 63.3 ppm
	18	SS	9-15 / 13-17	Very stiff, olive gray CLAY, 10% phosphate & glauconite, 1% mollusc fragments	24" recovery Slight odor OVA = 78.4 ppm
45	19	SS	15-26 / 22-24	Hard, olive gray CLAY, 15% silt to very fine sand, 10% phosphate and glauconite	24" recovery No odor OVA = 20.3 ppm TD = 46 feet
50					

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HYDROGEOLOGIC SERVICES

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			BORING NO. MW-12
			SHEET NO. 1 OF 1
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2-18-92	JOB NO. 530-06-501
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B-57	INSPECTOR	K. ANDERSON	DATE STARTED 2-18-92

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: LITHOLOGY	SAMPLE: NO.	SAMPLE: TYPE	SAMPLE: BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY PLUG; SAND PACK; SAND PACK	0						
	5		1	SS	19-14 06-07	Brown-tan fine to medium well sorted SAND	No visual Creosote OVA = 13.3
	10		2	SS	03-05 10-18	Same as above except Sand is saturated with Creosote	OVA = 72.7
			3	SS	08-11 19-28	Same as above	OVA = 45.1
	15					Organic rich dark brown to black PEAT with roots	
	20						
	25						
	30						
	35						
	40						
	45						
	50						

H:53050112

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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			SHEET NO. 1 OF 1
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2-18-92	JOB NO. 530-06-
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B-57	INSPECTOR	K. ANDERSON	DATE STARTED 2-18-

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: UNCLASS.	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY; PLUG; SAND PACK; SAND PACK	0						
	5		1	SS	03-01 / 01-0	Brown-tan fine to medium SAND	Visual Creosote encountered in borehole immediately upon drilling OVA = 102.0
	10		2	SS	05-07 / 12	Same as above	No visual Creosote; OVA = 47.8
	15		3	SS		Dark brown to balck organic rich PEAT	No visual Creosote OVA = 3.0
	20						
	25						
	30						
	35						
	40						
	45						
	50						

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CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

BORING NO. MW-1

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			SHEET NO. 1 OF 1
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2-19-92	JOB NO. 530-06-50
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B-57	INSPECTOR	K. ANDERSON	DATE STARTED 2-19-92

WELL CONSTRUCTION	DEPTH FEET	SAMPLE No.	SAMPLE TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
	0	1	SS	2-5 / 6-5	Dark brown-black Fill material	OVA = 0.0
CLAY / PLUG		2	SS	9-5 / 4-3	Brown-tan fine to medium SAND	Visual Creosote OVA = 0.0
SAND PACK	5	3	SS	2-2 / 4-3	Same as above	Visual Creosote OVA = 19.3
		4	SS	3-3 / 4-10	Same as above	Visual Creosote OVA = 34.7
		5	SS		Black-brown organic rich PEAT with roots	Visual Creosote OVA = 27.1
	10	6	SS		Same as above with large wood fragments throughout	Visual Creosote OVA = 9.6
		7	SS		Black PEAT with brown-orange wood fragment at end of spoon	Visual Creosote OVA = 25.3
	15	8	SS		Black-brown PEAT with root fragments	Visual Creosote OVA = 19.4
		9	SS		No sample retrieved	
		10	SS		Black-brown PEAT with root fragments	No visual Creosote OVA = 8.0
	20	11	SS		Black-brown PEAT to approximately 21.5 ft bgs; Brown-tan medium to coarse SAND below peat	No visual Creosote OVA = 5.2
	25					
	30					
	35					
	40					
	45					
	50					

H:53050114

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-14A

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 11-2-93	JOB NO. 12-53015.00	
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 2.76	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-27-93	

WELL CONSTRUCTION: GROUT; 6" PVC; 2" PVC; 6" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Loose, brown SAND, fine to coarse, coarse dominant, fill, trace granule	No odor OVA = 26.1 ppm
	2	PH		Loose, brown SAND, very fine to coarse, medium dominant. Visual staining @ 3'.	Strong odor OVA = 94.3 ppm
5	3	SS	2-8 1-3	Very loose, brown SAND and PEAT, 50% peat, 3" wood fragment. Visual staining.	6" recovery Strong odor OVA = 88.3 ppm
	4	SS	2-1 1-3	Very loose, brown SAND, fine to coarse to 7.5', then dark brown CLAY. Visual staining in sand.	14" recovery Strong odor OVA = 149 ppm
	5	SS	1-1 1-1	Very soft, dark brown CLAY to 8.5', then dark brown PEAT	18" recovery Moderate odor OVA = 85.3 ppm
10	6	SS	1-1 1-1	Very soft, dark brown clayey PEAT, 30% clay	24" recovery Slight odor OVA = 89.5 ppm
	7	SS	1-1 1-1	Very soft, dark brown peaty CLAY, 50% peat	24" recovery Very slight odor OVA = 82.8 ppm
15	8	SS	1-1 3-5	Firm, dark brown peaty CLAY, 35% peat Pit casing to 16'	18" recovery Very slight odor OVA = 65.1
	9	SS	1-1 1-3	Soft, brownish black peaty CLAY, 25% peat	4" recovery Moderate odor OVA = 116 ppm
	10	SS	2-2 2-4	Firm, same as above. Slight sheen in drilling mud.	4" recovery Moderate odor OVA = 88.1 ppm
20	11	SS	3-1 1-2	Soft, same as above. Sheen in drilling mud.	2" recovery Moderate odor OVA = 107 ppm
	12	SS	2-2 3-5	Firm, brownish black peaty CLAY, 50% peat. Little visual staining.	18" recovery Moderate odor OVA = 137 ppm
25	13	SS	3-2 2-3	Loose, brown SAND, fine to coarse, 5% very coarse, trace wood.	18" recovery Moderate odor OVA = 447 ppm
	14	SS	4-5 5-6	Firm, same as above.	18" recovery Moderate odor OVA = 69.4 ppm
30	15	SS	2-1 3-5	Loose, brown SAND, fine to granule, 5% granule to small pebble	18" recovery Slight odor OVA = 62.0 ppm
35	16	SS	3-6 6-6	Firm, brown SAND, fine to coarse, well sorted medium	12" recovery Slight odor OVA = 28.5 ppm
40	17	SS	3-7 6-8	Firm, same sand as above to 40.5', then olive gray CLAY	24' recovery Slight odor OVA = 27.6 ppm TD = 42'
45					
50					

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			BORING NO. MW-1
			SHEET NO. 1 OF 2
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2-19-92	JOB NO. 530-06-50
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B-57	INSPECTOR	K. ANDERSON	DATE STARTED 2-19-92

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: UNCLASS.	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY PLUG; SAND PACK; SAND PACK	0						
	-5		1	SS	1-1 / 4-4	Fine to medium, loose to very loose brown SAND	Visual oil; diesel fuel odor OVA = 58.3
	-10		2	SS		Fine to medium, brown SAND	No visual oil; OVA = 15.6
	-15		3	SS		Fine to medium, brown SAND in upper spoon; Dark brown to black PEAT with root fragments in lower part of spoon	No visual oil OVA = 5.4
	-20						
	-25						
	-30						
	-35						
	-40						
	-45						
	-50						

H:53050115

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TEST BORING LOG

BORING NO. MV

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC		SHEET NO. 1 OF 1	
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED 2-19-92	JOB NO. 530-06	
BORING CONTRACTOR: ETE	DRILLER C. AARON	ELEVATION	
RIG USED MOBILE B-57	INSPECTOR K. ANDERSON	DATE STARTED 2-19	

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: LITHOLOGY	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY PLUG; SAND PACK; SAND PACK	0						
	5		1	SS		Fine to medium, brown SAND	Saturated with diesel fuel OVA = 104
	10		2	SS		Medium tan to brown SAND with some wood fragments	Little odor OVA = 42.6
						Same as above	Slight diesel odor OVA = 32.5
	15		3	SS		Dark brown to black PEAT contact at 15.0 ft.	
	20						
	25						
	30						
	35						
	40						
	45						
	50						

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CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

PROJECT: SOUTHERN WOOD PIEDMONT – WILMINGTON, NC			BORING NO. MW-17
			SHEET NO. 1 OF 1
CLIENT: SOUTHERN WOOD PIEDMONT	DATE FINISHED	2-19-92	JOB NO. 530-06-50
BORING CONTRACTOR: ETE	DRILLER	C. AARON	ELEVATION
RIG USED MOBILE B-57	INSPECTOR	K. ANDERSON	DATE STARTED 2-19-92

WELL CONSTRUCTION	DEPTH FEET	SAMPLE No.	SAMPLE TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY / PLUG	0					
SAND PACK / SAND PACK		1	SS	10-2 / 2-2	Fine to medium brown SAND with wood fragment at bottom of spoon	Saturated with diesel fuel: OVA = 118
	5					
		2	SS	2-2 / 2-2	Wood fragments in upper portion of spoon with a fine to medium brown SAND in bottom of spoon	Diesel fuel odor OVA = 57.1
	10					
		3	SS		Fine to medium brown SAND	Saturated with diesel fuel; OVA = 72.3
	15	4	SS		Dark Brown PEAT with root fragments	No visual oil OVA = 39.1
	20					
	25					
	30					
	35					
	40					
	45					
	50					

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CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

BORING NO. MW-18

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10-7-92	JOB NO. 530-06-503	
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION 4.26	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-6-92	

WELL CONSTRUCTION: CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	0-0 / 0-0	Very loose, brown SAND, fine to medium, 5% coarse to granule	14" recovery No odor OVA = 30 ppm
	2	SS	4-4 / 10-13	Loose, brown SAND, fine to coarse, 5% granule, poorly sorted	18" recovery Slight diesel odor OVA = 35.3 ppm
5	3	SS	3-2 / 3-2	Very loose, brown SAND, fine to coarse, coarse dominant, 20% very coarse	14" recovery No odor OVA = 27.9 ppm
	4	SS	4-5 / 6-7	Loose, same as above, 35% very coarse to granule, 2% small pebble	18" recovery Slight diesel odor OVA = 20.6 ppm
10	5	SS	6-12 / 12-10	Firm, brown pebbly SAND, fine to coarse, 30% granule to small pebble	12" recovery No odor OVA = 9.9 ppm
	6	SS	4-6 / 5-11	Loose, brown SAND, fine to coarse, medium dominant	18" recovery No odor OVA = 6.6 ppm
	7	SS	6-8 / 10-9	Loose, brown pebbly SAND, very fine to coarse, 30% granule to small pebble to 13.5 feet, then dark brown clayey PEAT, 30% clay	24" recovery No odor OVA = 5.1 ppm TD = 14 feet
15					
20					
25					
30					
35					
40					
45					
50					

H:530MW18

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

PROJECT: SOUTHERN WOOD PIEDMONT–WILMINGTON		BORING NO.	MW–19
		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10–6–92	JOB NO.	530–06–503
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION	3.19
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED	10–6–92

WELL CONSTRUCTION: GROUT; 2" STAINLESS STEEL; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	0–0 / 0–0	Very loose, dark brown SAND, fine to coarse, 5% granule	8" recovery; No odor; OVA = 201 ppm
	2	SS	4–4 / 5–5	Loose, brown SAND, fine to coarse, poorly sorted	18" recovery; No odor; OVA = 276 ppm
5	3	SS	6–7 / 5–7	Loose, brown SAND, fine to medium, well sorted medium	12" recovery; No odor; OVA = 92.4 ppm
	4	SS	5–5 / 6–8	Loose, brown SAND, fine to coarse, poorly sorted	18" recovery; No odor; OVA = 69.6 ppm
10	5	SS	6–7 / 8–9	Loose, same as above, 10% wood	24" recovery; Slight odor; OVA = 183 ppm
	6	SS	3–3 / 3–1	Very loose, same as above, 20% wood. Visually stained soil 11.5 to 12 feet.	24" recovery; Strong odor; OVA = 210 ppm
	7	SS	1–1 / 1–1	Very loose, brownish black clayey PEAT, 25% clay	18" recovery; Moderate odor; OVA = 45.6 ppm; TD = 14 feet
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H:530MW19

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

PROJECT: SOUTHERN WOOD PIEDMONT–WILMINGTON			BORING NO. MW–19A
CLIENT: CHUCK DAVIS	DATE FINISHED	10–2–92	SHEET NO. 1 OF 1
BORING CONTRACTOR: ETE	DRILLER	T. COPPIN	JOB NO. 530–06–503
RIG USED ATV MUD ROTARY	INSPECTOR	G. KUNTZ	ELEVATION 3.15
			DATE STARTED 9–30–92

WELL CONSTRUCTION: GROUT; 6" PVC CASING; 2" PVC CASING; 6" PVC CASING; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	3–2 / 2–3	Very loose, brown SAND, fine to coarse	16" recovery; No odor; OVA = 214 ppm
	2	SS	8–7 / 6–8	Loose, brown pebbly SAND, fine to coarse, 25% small pebble	8" recovery; No odor; OVA = 290 ppm
5	3	SS	4–5 / 6–8	No recovery	
	4	SS	6–8 / 8–9	Loose, brown SAND, fine to coarse, 5% wood	16" recovery; No odor; OVA = 89.5 ppm
	5	SS	4–4 / 3–1	Very loose, same as above	12" recovery; Slight odor; OVA = 183 ppm
10	6	SS	5–4 / 3–1	Very loose, same as above to 11.5 feet, then 1–inch dark brown clay lense followed by same sand to 12 feet	18" recovery; Visual creosote 11.5' to 12'; OVA = 210 ppm
	7	SS	1–1 / 1–2	Very loose, brownish black clayey PEAT, 25% clay	18" recovery; Moderate odor; OVA = 42.3 ppm
15	8	SS	1–1 / 1–1	Very loose, brownish black peaty CLAY, 30% peat	24" recovery; No odor; OVA = 19.0 ppm
	9	SS	1–1 / 1–1	Very loose, same as above, 50% wood	18" recovery; No odor; OVA = 10.1 ppm
	10	SS	1–2 / 1–0	Same as above	14" recovery; No odor; OVA = 8.6 ppm
20	11	SS	5–1 / 1–2		No recovery
	12	SS	0–0 / 2–3	Very loose, dark brown peaty CLAY, 30% wood	12" recovery; No odor; OVA = 11.9 ppm
25	13	SS	1–2 / 2–4	Very loose, same as above to 25 feet, then brown SAND, fine to coarse, poorly sorted	24" recovery; No odor; OVA = 8.6 ppm
30	14	SS	6–9 / 7–7	Loose, light brown SAND, fine to coarse, well sorted medium	12" recovery; No odor; OVA = 9.8 ppm
35	15	SS	5–3 / 3–2	Very loose, brown SAND, fine to granule, moderately sorted medium, 2% phosphate	12" recovery; No odor; OVA = 4.6 ppm
40	16	SS	0–0 / 12–16	Firm, olive gray CLAY, 5% phosphate and glauconite, tight and dry	24" recovery; No odor; OVA = 4.9 ppm
	17	SS	8–27 / 27–26	Firm, same as above, 10% phosphate and glauconite	24" recovery; No odor; OVA = 5.2 ppm
45	18	SS	65	Very dense, light gray sandy shell mold LIMESTONE, 35% sand	2" recovery; No odor; OVA = 3.1 ppm; TD = 43 feet 2 inches
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H:530MW19A

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-20

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10-7-92	JOB NO. 530-06-503	
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION 3.17	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-7-92	

WELL CONSTRUCTION: GROUT; CLAY; SAND PACK; 2" PVC CASING; GROUT; PLUG; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	1-0	Very loose, black clayey PEAT to 1 foot then brown SAND, fine to coarse	18" recovery
			0-0		Slight odor
					OVA = 120 ppm
	2	SS	5-5	Loose, brown SAND, fine to coarse, poorly sorted	24" recovery
			7-11		Very slight odor
					OVA = 66.0 ppm
5	3	SS	0-0	Very loose, same as above	18" recovery
			5-5		Very slight odor
					OVA = 106 ppm
	4	SS	5-5	Loose, same as above	18" recovery
			5-6		No odor
					OVA = 43.5 ppm
	5	SS	4-2	Very loose, brown SAND, very fine to medium, 10% coarse, 1/4" dark gray clay lense at 10 feet	14" recovery
			1-2		No odor
					OVA = 57.1 ppm
10	6	SS	1-0	Very loose, brownish gray silty SAND, silt to medium, 35% silt, 10% clay, 1-inch dark gray lense at 11.5 feet	20" recovery
			1-2		No odor
					OVA = 9.8 ppm
	7	SS	1-2	Very loose, brownish black peaty CLAY, 25% wood	24" recovery
			1-2		Very slight odor
					OVA = 15.7 ppm
					TD = 14 feet
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H:530MW20

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-20A

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 11-8-93	JOB NO. 12-53015.00	
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 3.10	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-29-93	

WELL CONSTRUCTION: GROUT; 6" PVC; 2" PVC; 6" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Very loose, black clayey PEAT to 1', then brown SAND, fine to coarse, coarse dominant	No odor OVA = 75.8 ppm
	2	PH		Very loose, brown SAND, fine to coarse	No odor OVA = 35.4 ppm
5	3	SS	2-1 1-2	Very loose, brown SAND, fine to coarse	14" recovery No odor OVA = 131 ppm
	4	SS	3-2 2-5 4-5 5-4	Loose, brown SAND, fine to coarse to 7.5', then brownish gray sandy SILT, 30% very fine to fine sand, 5% clay, trace mica, multiple 1/4" lignite laminae	18" recovery No odor OVA = 225 ppm 24" recovery
10	5	SS	3-5 5-2	Loose, same to 9.5', then brownish black peaty CLAY, 40% peat	No odor OVA = 190 ppm 20" recovery
	6	SS	2-4 2-2	Loose, dark brown peaty CLAY, 30% peat	No odor OVA = 236 ppm
	7	SS	2-2 1-1	Very loose, brownish black PEAT and CLAY	12" recovery No odor OVA = 164 ppm
15	8	SS	2-1 1-3	Very loose, dark brown peaty CLAY, 30% peat Pit casing to 16' Grout in spoon	18" recovery No odor OVA = 121 ppm No recovery
	9	SS	3-4 3-3	Grout in spoon	No recovery
20	10	SS	2-2 2-4	Firm, dark brown peaty CLAY, 25% peat	4" recovery No odor OVA = 24.3 ppm
	11	SS	3-7 5-5	Loose, brownish black PEAT to 23.5', then brown SAND, fine to coarse, coarse dominant	18" recovery No odor OVA = 33.0 ppm
25	12	SS	6-3 3-5	Loose, dark brown SAND, fine to very coarse, 10% very coarse, 5% wood	18" recovery No odor OVA = 35.4 ppm
30	13	SS	3-4 4-8	Firm, brown SAND, fine to coarse	10" recovery No odor OVA = 42.4 ppm
35	14	SS	5-6 6-7	Firm, whitish brown SAND, fine to coarse, 2" gray clay lense at 36'	8" recovery No odor OVA = 47.1 ppm
40	15	SS	3-4 5-7	Firm, brown SAND, fine to granule, 25% very coarse to granule to 41', then olive gray CLAY, 10% glauconite and phosphate	18" recovery No odor OVA = 41.1 ppm TD = 42'
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BORING LOG

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

BORING NO. MW-2

PROJECT: SOUTHERN WOOD PIEDMONT–WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED	10–7–92	JOB NO. 530–06–50
BORING CONTRACTOR: ETE	DRILLER	T. COPPIN	ELEVATION 3.1
RIG USED ATV MUD ROTARY	INSPECTOR	G. KUNTZ	DATE STARTED 10–7–9

WELL CONSTRUCTION: CLAY; 2" PVC; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	1–1 / 1–1	Very loose, brownish black clayey PEAT to 6", then brown SAND, fine to coarse	18" recovery No odor OVA = 43.2 ppm
	2	SS	5–3 / 6–8	Loose, brown SAND, fine to coarse, coarse dominant	18" recovery No odor OVA = 86.6 ppm
5	3	SS	4–2 / 2–2	Very loose, brown SAND, fine to coarse, medium dominant	12" recovery No odor OVA = 52.6 ppm
	4	SS	1–3 / 7–8	Loose, same to 7', then 4" dark gray clay lense, then peaty CLAY, 30% wood	24" recovery No odor OVA = 20.6 ppm
	5	SS	1–1 / 0–1	Very loose, brownish black peaty CLAY, 30% wood	24" recovery No odor OVA = 10.8 ppm TD= 10 feet
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H:530MW21

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-2

PROJECT: SOUTHERN WOOD PIEDMONT–WILMINTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10–7–92	JOB NO. 530–06–50	
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION 3.0	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10–7–9	

WELL CONSTRUCTION: GROUT; 2" STAINLESS STEEL; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE NO.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	5–4, 6–5	Loose, black organic rich SAND, silt to coarse, 20% clay, 15% plant and wood material to 1.5', then brown SAND	18" recovery Slight diesel odor OVA = 109 ppm
	2	SS	5–6, 6–4	Loose, brown SAND, fine to coarse	24" recovery Creosote stained soil at 3' OVA = 87.7 ppm
5	3	SS	4–2, 4–3	Very loose, same as above	14" recovery Creosote stained soils OVA = 107 ppm
	4	SS	4–2, 6–9	Loose, brown SAND, fine to coarse, well sorted medium	24" recovery Creosote stained soils OVA = 157 ppm
	5	SS	4–3, 4–4	Very loose, same as above	20" recovery Creosote stained soils to 9' OVA = 75.6 ppm
10	6	SS	2–3, 6–7	Loose, brown SAND, fine to coarse, poorly sorted, few 1/2" dark brown clay lenses at 11.5'	18" recovery Moderate odor OVA = 84.7 ppm
	7	SS	1–1, 1–2	Very loose, brownish black clayey PEAT, 35% clay	24" recovery Slight creosote odor OVA = 25.5 ppm TD = 14 feet
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H:530MW22

ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
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TEST BORING LOG

BORING NO. MW-22A

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 11-3-93	JOB NO. 12-53015.00	
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 3.07	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-29-93	

WELL CONSTRUCTION: GROUT; 6" PVC; 2" PVC; 6" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Loose, dark brown SAND, fine to coarse. Diesel staining.	Slight diesel odor OVA = 32.9 ppm
	2	PH		Loose, brown SAND, fine to coarse, trace granule. Visual staining.	Strong odor OVA = 32.5 ppm
5	3	SS	2-3, 3-8	Firm, grayish brown SAND, very fine to very coarse. Multiple 1/4" visually stained seams.	24" recovery Strong odor OVA = 63.4 ppm
	4	SS	3-2, 2-4	Loose, brown SAND, very fine to very coarse	18" recovery Moderate odor OVA = 58.6 ppm
	5	SS	3-6, 4-5	Loose, brown SAND, fine to coarse	12" recovery Slight odor OVA = 25.2 ppm
10	6	SS	2-4, 3-3	Loose, same, two 1/8" clayey SAND laminae	14" recovery Slight odor OVA = 63.5 ppm
	7	SS	1-1, 2-1	Very soft, brownish black clayey PEAT, 25% clay	24" recovery Very slight odor OVA = 88.4 ppm
15	8	SS	1-1, 1-2	Very soft, brownish black peaty CLAY, 45% peat Pit casing to 16'	18" recovery No odor OVA = 86.2 ppm
	9	SS	1-1, 1-2	Very soft, brownish black peaty CLAY, 25% peat	4" recovery Very slight odor OVA = 68.4 ppm
	10	SS	3-4, 4-6	Grout in spoon	No recovery
20	11	SS	6-5, 2-1	Grout in spoon	No recovery
	12	SS	3-5, 5-5	Loose, brownish black peaty CLAY	12" recovery No odor OVA = 49.3 ppm
25	13	SS	2-3, 2-4	Loose, brown peaty SAND, fine to coarse, 30% large wood fragments	6" recovery No odor OVA = 108 ppm
	14	SS	4-5, 4-6	Loose, brown SAND, medium to coarse, well sorted coarse	18" recovery Slight odor OVA = 189 ppm
30	15	SS	3-5, 5-4	Loose, brown SAND, medium to coarse, 10% very coarse	14" recovery Very slight odor OVA = 159 ppm
35	16	SS	6-5, 5-3	Loose, brown SAND, medium to coarse, 30% very coarse to small pebble	14" recovery No odor OVA = 165 ppm
40	17	SS	3-7, 7-9	Firm, brown pebbly SAND, medium to coarse, 30% very coarse to small pebble. Small pebble laminae between 41' and 41'4", then sharp contact to olive gray CLAY at 42'	24" recovery No odor OVA = 105 ppm TD = 42'
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CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-23

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10-8-92	JOB NO. 530-06-503	
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION 2.67	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-8-92	

WELL CONSTRUCTION: GROUT; CLAY; 2" PVC; GROUT; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	2-50	Very loose, brownish black PEAT to 6", then brown SAND, fine to coarse, 5% granule, wood fragment blocked shoe	8" recovery Very slight odor OVA = 12.2 ppm
	2	SS	0-2 1-0	Very loose, brownish gray SAND, silt to coarse, 20% clay	12" recovery No odor OVA = 12.7 ppm
5	3	SS	2-4 3-4	Very loose, brownish gray CLAY to 5', then brown SAND, fine to coarse, well sorted coarse	20" recovery No odor OVA = 14.6 ppm
	4	SS	3-4 4-4	Very loose, same as above	24" recovery No odor OVA = 16.2 ppm
	5	SS	1-1 1-1	Very loose, same as above to 9', then PEAT, 20% clay	14" recovery No odor OVA = 16.2 ppm
10	6	SS	2-2 2-2	Very loose, brownish black clayey PEAT, 35% clay	18" recovery No odor OVA =13.4 ppm TD = 12 feet
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H:530MW23

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

BORING NO. MW-24

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10-5-92	JOB NO. 530-06-503	
BORING CONTRACTOR: ETE	DRILLER T. COPPIN	ELEVATION 3.58	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-5-92	

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: LITHOLOGY	NO.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
GROUT; 2" PVC; GROUT	0		1	SS	6-8, 8-7	Loose, dark brown with black SAND, silt to coarse, 10% clay, 10% organics, 2% small pebble	18" recovery; No odor; OVA = 36.2 ppm
			2	SS	7-9, 7-9	Loose, light brown SAND, fine to coarse, 5% clay, trace small pebble	18" recovery; No odor; OVA = 47.1 ppm
CLAY; PLUG	-5		3	SS	5-6, 4-3	Very loose, light grayish brown SAND, very fine to medium, 5% heavy minerals	12" recovery; No odor; OVA = 52.9 ppm
SAND PACK; SAND PACK			4	SS	3-3, 3-2	Very loose, brown SAND, fine to coarse	12" recovery; Very slight odor; OVA = 105 ppm
			5	SS	4-2, 2-1	Very loose, same as above	6" recovery; Very slight odor; OVA = 71.3 ppm
	-10		6	SS	4-3, 2-3	Very loose, same as above to 11.5 feet, then brownish black clayey PEAT, 35% clay	18" recovery; Very slight odor; OVA = 104 ppm; TD = 12 feet
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H:530MW24

CONSULTING ENGINEERS, SURVEYORS AND HYDROGEOLOGISTS
HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-24A

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 11-1-93	JOB NO. 12-53015.00	
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 3.64	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 10-28-93	

WELL CONSTRUCTION: GROUT; 6" PVC; 2" PVC; 6" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Very loose, brown SAND, fine to coarse	No odor OVA = 129 ppm
	2	PH		Very loose, same as above	Slight odor OVA = 148 ppm H20 at 3'
5	3	SS	2-2 1-2	Very loose, brown SAND, fine to coarse, multiple 1/4" to 1/8" brown clay laminae	14" recovery Slight odor OVA = 204 ppm
	4	SS	2-3 3-4	Loose, brown SAND as above to 7', then dark gray CLAY to 7.5', then brown SAND, fine to coarse. Visual in lower sand.	24" recovery Moderate odor OVA = 199 ppm
10	5	SS	4-5 5-8	Firm, dark gray CLAY with 1/4" wood laminae to 9', then brown SAND, fine to coarse, 1/8" coarse grained sand laminae. Visual staining in wood laminae and in lower sand.	24" recovery Strong odor OVA = 308 ppm
	6	SS	2-3 2-2	Very loose, brown SAND, fine to coarse to 12', few 1/4" clay laminae	12" recovery Moderate odor OVA = 191 ppm
	7	SS	3-4 4-2	Loose, brownish black peaty CLAY, 30% peat	18" recovery Slight odor OVA = 207 ppm
15	8	SS	2-4 3-5	Loose, brownish black peaty CLAY, 30% peat	10" recovery Very slight odor OVA = 175 ppm
	9	SS	2-4 4-3	No recovery. Grout in spoon. Blow counts suggest PEAT.	Pit casing to 16'
	10	SS	2-8 8-9	Same as above	
20	11	SS	1-1 1-1	Very loose, dark brown peaty CLAY, 25% wood fragments	6" recovery No odor OVA = 58.4 ppm
	12	SS	1-1 1-3	Very loose, dark brown peaty CLAY, 25% wood	18" recovery No odor OVA = 31.8 ppm
25	13	SS	3-4 8-11	Firm, same as above	18" recovery No odor OVA = 52.3 ppm
	14	SS	2-2 4-7	Firm, same to 27', then sharp contact to brown SAND, fine to coarse, 5% very coarse, 5% wood	16" recovery No odor OVA = 54.0 ppm
30	15	SS	2-4 6-8	Firm, brown SAND, fine to coarse, trace very coarse to granule	18" recovery No odor OVA = 45.3 ppm
35	16	SS	3-4 4-6	Loose, brown SAND, very fine to medium, 20% silt	18" recovery No odor OVA = 31.6 ppm
40	17	SS	6-8 8-10	Firm, brown SAND, fine to very coarse, 5% small pebble to 40.5', then sharp contact to olive gray CLAY, 5% phosphate and glauconite, 2% mollusc shells	24" recovery No odor OVA = 11.8 ppm TD = 42'
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TEST BORING LOG

BORING NO. MW-24F

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON			SHEET NO. 1 OF 1
CLIENT: T.M. DAVIS	DATE FINISHED	11-12-93	JOB NO. 12-53015.0(
BORING CONTRACTOR: ETE	DRILLER	LAYNE ENVIRONMENTAL	ELEVATION 3.7
RIG USED ATV MUD ROTARY	INSPECTOR	G. KUNTZ	DATE STARTED 11-12-9

WELL CONSTRUCTION: GROUT; 2" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Very loose, brown SAND, fine to very coarse, 10% very coarse	Slight odor OVA = 2212 ppm
	2	PH		Very loose, grayish brown SAND, fine to coarse	Slight odor OVA = 767 ppm
5	3	SS	2-1 / 2-1	Very loose, grayish brown SAND, fine to coarse to 5.5', then brownish black CLAY	24" recovery Slight odor OVA = 570 ppm
	4	SS	1-3 / 2-2	Very loose, same CLAY to 7', then brown SAND, fine to coarse. Visual staining beginning in sand at 7'.	18" recovery Moderate odor OVA = 682 ppm
10	5	SS	2-3 / 3-4	Loose, brown SAND, fine to coarse. No visual.	8" recovery Moderate odor OVA = 699 ppm
	6	SS	3-4 / 2-2	Very loose, grayish brown SAND, fine to coarse. No visual.	24" recovery Moderate odor OVA = 640 ppm
	7	SS	2-2 / 3-3	Loose, grayish brown SAND, fine to coarse to 13', then sharp contact to brownish black, clayey, PEAT. Visual staining in SAND, no visual in peat.	24" recovery Moderate odor OVA = 463 ppm TD = 14'
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ENVIRONMENTAL TECHNOLOGY ENGINEERING, INC.
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-25

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: CHUCK DAVIS	DATE FINISHED 10-8-92	JOB NO. 530-06-503	
BORING CONTRACTOR: ETE	DRILLER J. MASSEY	ELEVATION 1.78	
RIG USED HAND AUGER	INSPECTOR G. KUNTZ	DATE STARTED 10-8-92	

WELL CONSTRUCTION	DEPTH FEET	SAMPLE: LITHOLOGY	No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
CLAY / 2" PVC CASING / PLUG / NATURAL PACK / NATURAL PACK	0		1	HA		Borehole was hand augered because well location is within a wetland area. Representative samples were not obtained during the augering process because the loose nature of the sediments prevented sample retrival. Sediments encountered are believed to be marsh mud to 2 feet, then loose brown sand to 13 feet, then the peat unit was encountered. The well was hand pushed to 13 feet using a well point and was constructed using a natural filter pack.	
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H:530MW25

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PROJECT: SOUTHERN WOOD PIEDMONT–WILMINGTON			BORING NO. MW–26
CLIENT: CHUCK DAVIS	DATE FINISHED	10–5–92	SHEET NO. 1 OF 1
BORING CONTRACTOR: ETE	DRILLER	T. COPPIN	JOB NO. 530–06–503
RIG USED ATV MUD ROTARY	INSPECTOR	G. KUNTZ	ELEVATION 2.48
			DATE STARTED 10–5–92

WELL CONSTRUCTION: GROUT; 2" STAINLESS STEEL; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	SS	7–6 / 6–5	Loose, brown SAND, fine to coarse, poorly sorted	18" recovery; No odor; OVA = 13.5 ppm
	2	SS	7–6 / 6–6	Loose, brown SAND, silt to coarse, well sorted medium	18" recovery; No odor; OVA = 14.6 ppm
5	3	SS	3–3 / 2–3	Very loose, brown SAND, very fine to coarse, poorly sorted	8" recovery; No odor; OVA = 14.7 ppm
	4	SS	1–1 / 0–1	Very loose, same as above	10" recovery; Very slight odor; OVA = 15.1 ppm
	5	SS	1–1 / 6–7	Loose, same as above	14" recovery; Creosote stained soil; OVA = 140 ppm
10	6	SS	4–4 / 7–8	Loose, same as above	16" recovery; Creosote stained soil; OVA = 206 ppm
	7	SS	3–7 / 50	Loose, dark brown SAND, medium to coarse, 10% wood, wood blocked shoe	14" recovery; Creosote stained soil; OVA = 236 ppm
15	8	SS	2–1 / 1–1	Very loose, no recovery, pebble blocked shoe	Creosote stained soils
	9	SS	6–7 / 9–8	Loose, dark blackish brown clayey PEAT grading to peaty CLAY, interval between 16' and 17' visually stained with creosote, no staining below 17'	18" recovery; Strong odor; OVA = 110 ppm; TD = 18 feet
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H:530MW26

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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-27

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 11-13-93	JOB NO. 12-53015.00	
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 3.22	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 11-13-93	

WELL CONSTRUCTION: CLAY, PLUG, SAND PACK, SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Very loose, dark brown SAND, fine to granule, 10% very coarse to granule. Diesel stained.	Moderate odor OVA = 411 ppm
	2	PH		Very loose, brown SAND, fine to very coarse, 5% very coarse. Little diesel staining.	Slight diesel odor OVA = 834 ppm 20" recovery
	3	SS	2-1 1-1	Very loose, same to 4.5' then grayish brown peaty CLAY, 25% peat. Diesel staining to 3.5'.	Very slight odor OVA = 1577 ppm 24" recovery
5	4	SS	1-1 2-1	Very loose, brown SAND, fine to very coarse, 5% very coarse, diesel stained to 6', then dark gray CLAY. No staining in clay.	Very slight odor OVA = 1237 ppm 18" recovery
	5	SS	2-1 2-1	Very loose, CLAY as above, 10% peat	Very slight odor OVA = 417 ppm TD = 9'
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-28

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 11-10-93	JOB NO. 12-53015.00	
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 2.97	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 11-10-93	

WELL CONSTRUCTION: GROUT; 2" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Loose, blackish brown SAND, fine to coarse, poorly sorted, 15% organics	No odor OVA = 1285 ppm
	2	PH		Loose, brown SAND, fine to coarse	No odor OVA = 2630 ppm
5	3	SS	2-3 3-4	Loose, grayish brown SAND, silt to coarse, 5% clay	18" recovery No odor OVA = 801 ppm
	4	SS	3-2 2-3	Loose, dark brown SAND, fine to coarse, 10% clay, scattered brick fragments	18" recovery No odor OVA = 512 ppm
	5	SS	1-3 3-5	Loose, same as above	24" recovery No odor OVA = 556 ppm
10	6	SS	2-1 3-2	Loose, brown SAND, silt to coarse, well sorted medium, brick fragments	18" recovery No odor OVA = 306 ppm
	7	SS	2-1 3-2	Loose, brown SAND, silt to granule, 5% granule, 5% silt and clay, trace small to large pebble to 13.5', then PEAT, 20% clay	24" recovery No odor OVA = 362 ppm TD = 14'
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-28A

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON			SHEET NO. 1 OF 1
CLIENT: T.M. DAVIS	DATE FINISHED	11-10-93	JOB NO. 12-53015.00
BORING CONTRACTOR: ETE	DRILLER	LAYNE ENVIRONMENTAL	ELEVATION 3.26
RIG USED ATV MUD ROTARY	INSPECTOR	G. KUNTZ	DATE STARTED 11-9-93

WELL CONSTRUCTION: GROUT; 6" PVC; 2" PVC; 6" PVC; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE NO.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Loose, blackish brown SAND, fine to coarse, poorly sorted, 15% organics	No odor OVA = 1285 ppm
	2	PH		Loose, brown SAND, fine to coarse	No odor OVA = 2630 ppm
5	3	SS	2-3 3-4	Loose, grayish brown SAND, silt to coarse, 5% clay	18" recovery No odor OVA = 801 ppm
	4	SS	3-2 2-3	Loose, dark brown SAND, fine to coarse, 10% clay, scattered brick fragments	18" recovery No odor OVA = 512 ppm
	5	SS	1-3 3-5	Loose, same as above	24" recovery No odor OVA = 556 ppm
10	6	SS	2-1 3-2	Loose, brown SAND, silt to coarse, well sorted medium, brick fragments	18" recovery No odor OVA = 306 ppm
	7	SS	2-1 3-2	Loose, brown SAND, silt to granule, 5% granule, 5% silt and clay, trace small to large pebble to 13.5', then PEAT, 20% clay	24" recovery No odor OVA = 362 ppm
15	8	SS	2-1 2-3	Loose, blackish brown peaty CLAY, 25% peat	24" recovery No odor OVA = 296 ppm
	9	SS	2-3 2-4	Loose, same as above, 6" diameter wood fragment between 17.5' and 18'	24" recovery No odor OVA = 232 ppm Pit casing to 18'
20	10	SS	3-4 4-6	Loose, brown to black SAND, fine to coarse, medium dominant, 15% peat	12" recovery No odor OVA = 244 ppm
	11	SS	6-8 5-4	Loose, brown to black SAND, fine to coarse, medium dominant	20" recovery No odor OVA = 337 ppm
25	12	SS	3-4 4-5	Loose, same to 25', then sharp contact to gray CLAY, wood fragments at contact	24" recovery No odor OVA = 274 ppm
	13	SS	4-5 3-8	Firm, gray CLAY to 27', then gradational contact to gray silty SAND, silt to medium, 30% silt, 5% phosphate grains, fining downward	24" recovery No odor OVA = 267 ppm
	14	SS	6-9 11-13	Firm, greenish gray silty SAND, silt to medium, 30% silt, 5% phosphate	24" recovery No odor OVA = 123 ppm
30	15	SS	10-15 23-35	Very dense, greenish gray silty SAND, silt to medium, 25% silt, 5% phosphate	18" recovery Very slight odor OVA = 290 ppm
	16	SS	8-8 9-5	Firm, grayish brown SAND, very fine to coarse	12" recovery No odor OVA = 84.1 ppm
35	17	SS	3-7 7-8	Firm, brown SAND, very fine to coarse	16" recovery No odor OVA = 162 ppm
	18	SS	6-5 9-10	Firm, brown SAND, very fine to coarse	12" recovery No odor OVA = 137 ppm
	19	SS	8-7 7-16	Firm, same SAND to 40', then greenish gray silty CLAY	24" recovery No odor OVA = 181 ppm TD = 40'
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-29

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1	
CLIENT: T.M. DAVIS	DATE FINISHED 11-12-93	JOB NO. 12-53015.00	
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 3.19	
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 11-12-93	

WELL CONSTRUCTION: CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Very loose, blackish brown organic SAND and PEAT to 1', then brown SAND, fine to very coarse, medium dominant	No odor OVA = 210 ppm
	2	PH		Very loose, brown SAND, very fine to coarse, fine dominant	No odor OVA = 183 ppm
5	3	SS	2-2 3-3	Loose, light gray SAND, silt to medium, fine dominant, 20% silt to 5.5', then dark brown CLAY, 20% peat	12" recovery No odor OVA = 111 ppm
	4	SS	2-4 2-1	Very loose, dark brown CLAY, 20% peat	18" recovery No odor OVA = 133 ppm
	5	SS	2-1 1-3	Very loose, large wood fragment blocked shoe.	4" recovery No odor OVA = 53.2 ppm TD = 10'
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HYDROGEOLOGIC SERVICES

TEST BORING LOG

BORING NO. MW-29A

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON			SHEET NO. 1 OF 1
CLIENT: T.M. DAVIS	DATE FINISHED 11-9-93		JOB NO. 12-53015.00
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL		ELEVATION 3.15
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ		DATE STARTED 10-30-93

WELL CONSTRUCTION: 6" PVC; 2" PVC; 6" PVC; GROUT; GROUT; CLAY; PLUG; SAND PACK; SAND PACK

DEPTH FEET	SAMPLE No.	TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0	1	PH		Very loose, blackish brown organic SAND and PEAT to 1', then brown SAND, fine to very coarse, medium dominant	No odor OVA = 210 ppm
	2	PH		Very loose, brown SAND, very fine to coarse, fine dominant	No odor OVA = 183 ppm
5	3	SS	2-2 3-3	Loose, light gray SAND, silt to medium, fine dominant, 20% silt to 5.5', then dark brown CLAY, 20% peat	12" recovery No odor OVA = 111 ppm
	4	SS	2-4 2-1	Very loose, dark brown CLAY, 20% peat	18" recovery No odor OVA = 133 ppm
	5	SS	2-1 1-3	Very loose, large wood fragment blocked shoe	4" recovery No odor OVA = 53.2 ppm Pit casing to 10'
10					
	6	SS	2-1 1-3	Grout in spoon. No recovery.	
15	7	SS	2-2 2-4	Loose, dark gray CLAY, 10% peat	18" recovery No odor OVA = 32.7 ppm
	8	SS	2-1 1-2	Very loose, dark gray CLAY, 5% peat	24" recovery No odor OVA = 40.7 ppm
	9	SS	3-2 1-2	Very loose, dark grayish brown peaty CLAY, 25% peat	24" recovery No odor OVA = 37.8 ppm
20	10	SS	3-1 1-2	Very loose, same as above	12" recovery No odor OVA = 44.5 ppm
	12	SS	2-4 4-3	Loose, same to 22.5', then sharp contact to dark brown SAND, silt to medium, 15% peat	20" recovery No odor OVA = 49.5 ppm
25	13	SS	2-4 3-5	Loose, alternating peaty CLAY, 25% peat and brown SAND, fine to coarse to 25', then brown SAND, fine to coarse	18" recovery No odor OVA = 46.8 ppm
	14	SS	4-3 3-7	Loose, brown SAND, fine to coarse, medium dominant	14" recovery No odor OVA = 45.9 ppm
30	15	SS	3-4 4-5	Loose, brownish black peaty CLAY, 25% peat	18" recovery No odor OVA = 46.0 ppm
	16	SS	2-3 1-3	Very loose, brownish black clayey SAND, silt to medium, 25% clay, 5% peat to 33.5' then brown SAND, fine to granule, 10% very coarse to granule	20" recovery Very slight odor OVA = 49.4 ppm
35	17	SS	4-5 3-5	Loose, brown pebbly SAND, fine to granule, 25% granule to small pebble, 1/4" gray clay laminae at 35.5'	15" recovery Very slight odor OVA = 50.6 ppm
	18	SS	6-5 3-1	Very loose, brown SAND, fine to granule, 5% granule alternating with a dark brown silty SAND, 25% silt, 20% peat	24" recovery Moderate odor OVA = 53.4 ppm
	19	SS	3-7 9-5	Firm, brown SAND to 38', then olive gray marine silty CLAY, 25% silt	24" recovery No odor OVA = 57.6 ppm TD = 40'
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HYDROGEOLOGIC SERVICES

BORING NO. MW-30

PROJECT: SOUTHERN WOOD PIEDMONT-WILMINGTON		SHEET NO. 1 OF 1
CLIENT: T.M. DAVIS	DATE FINISHED 11-12-93	JOB NO. 12-53015.00
BORING CONTRACTOR: ETE	DRILLER LAYNE ENVIRONMENTAL	ELEVATION 4.07
RIG USED ATV MUD ROTARY	INSPECTOR G. KUNTZ	DATE STARTED 11-12-93

WELL CONSTRUCTION: GROUT; CLAY; SAND PACK; GROUT; PLUG; SAND PACK

DEPTH FEET	SAMPLE LITHOLOGY	SAMPLE NO.	SAMPLE TYPE	BLOWS PER 6"	CLASSIFICATION	REMARKS
0		1	PH		Very loose, brown SAND, fine to very coarse, coarse dominant	No odor OVA = 320 ppm
		2	PH		Very loose, brown SAND, fine to coarse	No odor OVA = 357 ppm
5		3	SS	2-1 1-3	Very loose, brown SAND, very fine to coarse, few 1/8" clay laminae	24" recovery No odor OVA = 345 ppm
		4	SS	2-4 4-3	Loose, brown SAND, fine to coarse, thin organic laminae	20" recovery No odor OVA = 296 ppm
		5	SS	2-4 4-3	Loose, same as above to 9', then sharp contact to brownish black peaty CLAY, 25% peat	24" recovery Moderate odor OVA = 380 ppm TD = 10'
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Phase III Groundwater Elevation Summary Table

PHASE III GROUNDWATER ELEVATION MEASUREMENT SUMMARY
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

WELL	RISER ELEVATION	DATE	DEPTH TO WATER	GROUNDWATER ELEVATION
MW-6	5.07	11/16/93	2.87	2.20
		11/19/93	2.93	2.14
		11/19/93	2.94	2.13
		11/19/93	2.92	2.15
MW-7	6.03	11/16/93	4.30	1.73
		11/19/93	4.32	1.71
		11/19/93	4.30	1.73
		11/19/93	4.20	1.83
MW-8	6.80	11/16/93	4.70	2.10
		11/19/93	4.95	1.85
		11/19/93	4.74	2.06
		11/19/93	4.70	2.10
MW-8A	6.43	11/16/93	4.52	1.91
		11/19/93	4.26	2.17
		11/19/93	3.87	2.56
		11/19/93	3.73	2.70
MW-9	6.43	11/16/93	4.22	2.21
		11/19/93	4.35	2.08
		11/19/93	4.29	2.14
		11/19/93	4.25	2.18
MW-10	7.41	11/16/93	5.05	2.36
		11/19/93	5.15	2.26
		11/19/93	5.13	2.28
		11/19/93	5.12	2.29
MW-11	8.02	11/16/93	5.66	2.36
		11/19/93	5.71	2.31
		11/19/93	5.69	2.33
		11/19/93	5.67	2.35
MW-11A	6.38	11/16/93	4.39	1.99
		11/19/93	4.28	2.10
		11/19/93	4.23	2.15
		11/19/93	4.16	2.22
MW-11B	6.26	11/16/93	4.23	2.03
		11/19/93	4.16	2.10
		11/19/93	4.11	2.15
		11/19/93	4.04	2.22
MW-12	8.22	11/16/93	5.60	2.62
		11/19/93	5.89	2.33
		11/19/93	5.84	2.38
		11/19/93	5.83	2.39
MW-13	6.97	11/16/93	4.97	2.00
		11/19/93	4.96	2.01
		11/19/93	4.90	2.07
		11/19/93	4.88	2.09

PHASE III GROUNDWATER ELEVATION MEASUREMENT SUMMARY
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

WELL	RISER ELEVATION	DATE	DEPTH TO WATER	GROUNDWATER ELEVATION
MW-14	6.30	11/16/93	4.75	1.55
		11/19/93	4.90	1.40
		11/19/93	4.82	1.48
		11/19/93	4.81	1.49
MW-14A	5.05	11/16/93	3.26	1.79
		11/19/93	3.19	1.86
		11/19/93	3.21	1.84
		11/19/93	3.19	1.86
MW-15	7.07	11/16/93	4.73	2.34
		11/19/93	4.84	2.23
		11/19/93	4.69	2.38
		11/19/93	4.79	2.28
MW-16	7.69	11/16/93	5.64	2.05
		11/19/93	5.71	1.98
		11/19/93	5.54	2.15
		11/19/93	5.65	2.04
MW-17	7.65	11/16/93	5.53	2.12
		11/19/93	5.60	2.05
		11/19/93	5.47	2.18
		11/19/93	5.60	2.05
MW-18	6.61	11/16/93	4.80	1.81
		11/19/93	4.81	1.80
		11/19/93	4.73	1.88
		11/19/93	4.54	2.07
MW-19	5.44	11/16/93	3.24	2.20
		11/19/93	3.18	2.26
		11/19/93	3.17	2.27
		11/19/93	3.14	2.30
MW-19A	5.25	11/16/93	3.28	1.97
		11/19/93	3.14	2.11
		11/19/93	3.13	2.12
		11/19/93	3.04	2.21
MW-20	5.44	11/16/93	3.44	2.00
		11/19/93	3.59	1.85
		11/19/93	3.56	1.88
		11/19/93	3.58	1.86
MW-20A	5.23	11/16/93	3.15	2.08
		11/19/93	3.08	2.15
		11/19/93	3.08	2.15
		11/19/93	3.05	2.18
MW-21	5.34	11/16/93	3.82	1.52
		11/19/93	3.89	1.45
		11/19/93	3.89	1.45
		11/19/93	3.89	1.45

PHASE III GROUNDWATER ELEVATION MEASUREMENT SUMMARY
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

WELL	RISER ELEVATION	DATE	DEPTH TO WATER	GROUNDWATER ELEVATION
MW-22	5.26	11/16/93	3.75	1.51
		11/19/93	3.64	1.62
		11/19/93	3.10	2.16
		11/19/93	3.15	2.11
MW-22A	5.32	11/16/93	3.37	1.95
		11/19/93	3.18	2.14
		11/19/93	3.09	2.23
		11/19/93	3.05	2.27
MW-23	4.96	11/16/93	2.86	2.10
		11/19/93	2.81	2.15
		11/19/93	2.86	2.10
		11/19/93	2.80	2.16
MW-24	5.98	11/16/93	3.71	2.27
		11/19/93	3.78	2.20
		11/19/93	3.74	2.24
		11/19/93	3.71	2.27
MW-24A	5.81	11/16/93	3.88	1.93
		11/19/93	3.75	2.06
		11/19/93	3.76	2.05
		11/19/93	3.67	2.14
MW-25	4.96	11/16/93	2.17	2.79
		11/19/93	3.04	1.92
		11/19/93	2.93	2.03
		11/19/93	2.89	2.07
MW-26	4.91	11/16/93	4.14	0.77
		11/19/93	4.70	0.21
		11/19/93	4.62	0.29
		11/19/93	4.73	0.18
MW-27	5.41	11/16/93	2.41	3.00
		11/19/93	2.46	2.95
		11/19/93	2.47	2.94
		11/19/93	2.46	2.95
MW-28	5.18	11/16/93	4.35	0.83
		11/19/93	4.38	0.80
		11/19/93	4.33	0.85
		11/19/93	4.32	0.86
MW-28A	5.47	11/16/93	4.12	1.35
		11/19/93	4.01	1.46
		11/19/93	4.06	1.41
		11/19/93	4.02	1.45
MW-29	5.32	11/16/93	4.29	1.03
		11/19/93	4.34	0.98
		11/19/93	4.36	0.96
		11/19/93	4.36	0.96

PHASE III GROUNDWATER LEVEL MEASUREMENT SUMMARY
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

WELL	RISER ELEVATION	DATE	DEPTH TO WATER	GROUNDWATER ELEVATION
MW–29A	5.14	11/16/93	3.41	1.73
		11/19/93	3.32	1.82
		11/19/93	3.35	1.79
		11/19/93	3.31	1.83
MW–30	6.26	11/16/93	4.44	1.82
		11/19/93	4.51	1.75
		11/19/93	4.51	1.75
		11/19/93	4.51	1.75
Staff Gauge Cape Fear	5.93	11/16/93	–0.1	–0.83
		11/19/93	1.13	0.40
		11/19/93	4.38	3.65
		11/19/93	5.0	4.27
Staff Gauge North Channel	6.64	11/16/93	0.24	0.22
		11/19/93	0.35	0.33
		11/19/93	0.26	0.24
		11/19/93	0.26	0.24
Staff Gauge South Channel	2.13	11/16/93	0.2	–1.18
		11/19/93	1.67	0.47
		11/19/93	1.04	–0.16
		11/19/93	1.21	0.01

NOTE: Top of Staff Gauge at Cape Fear and North Channel is 6.66
Top of Staff Gauge at South Channel is 3.33
Cape Fear River Elevation = 5.93–(6.66–Depth to water)
North Channel Elevation = 6.64–(6.66–Depth to water)
South Channel Elevation = 2.13–(3.33–Depth to water)

Wilmington Site-Specific Soil Constituent List

SITE-SPECIFIC SOIL SAMPLE LIST
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

METALS

Arsenic
Copper
Chromium

SEMI-VOLATILES

Acenaphthene
Benzo(a)anthracene
Benzo(b)fluoranthene
Bis(2-chloroethyl)ether
4-chloro-3-methylphenol
Chrysene
2,4-dimethylphenol
Fluoranthene
Naphthalene
Phenanthrene
Tetrachlorophenol
2,4,6-trichlorophenol
Anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Carbazole
2-chlorophenol
Dibenzo(a,h)anthracene
2,4-dinitrophenol
Indeno(1,2,3-cd)pyrene
Pentachlorophenol
Phenol
2,4,5-trichlorophenol

VOLATILES

Benzene
Bromomethane
Chlorobenzene
2-chloroethylvinylether
Cis-1,3-dichloropropene
1,2-dibromomethane (Edb)
1,1-dichloroethane
1,1-dichloroethene
1,2-dichloropropane
Fluorotrichloromethane
Methyl-T-Butyl Ether (Mtbe)
1,1,2,2-tetrachloroethane
Trans-1,2-dichloroethene
1,1,2-trichloroethane
Vinyl Chloride
Bromodichloromethane
Carbon Tetrachloride
Chloroethane
Chloromethane
Dibromochloromethane
Dichlorodifluoromethane
1,2-dichloroethane
Dichloromethane
Ethyl benzene
M/P-Xylene
O-Xylene
Toluene
1,1,1-trichloroethane
Trichloroethene

Soil Sample Collection Summary Sheets

SOIL SAMPLE COLLECTION SHEET

Project Number: 12-53015.00 Date: 11/19/93

Sampled By: Kuntz Time: 10:50

Sampling Point Identification: SS-10A

Site Name/City/County: SWP-Wilmington

Weather Conditions: Clear 65

Sample Type: Soil

Sampling Method: Stainless spoon and stainless steel hand auger

Splits/Spikes/Duplicates:

Sampling Containers: (Number/Size/Type) 1/500ml/G; 2/250ml/G

Appearance of Sample: Dark Brown Sand. No odor or visual staining

Reason for Sampling: Phase III Assessment

Lab Performing Analysis: Savannah Labs

Respiratory Protection: None

SOIL SAMPLE COLLECTION SHEET

Project Number: 12–53015.00 Date: 11/19/93

Sampled By: Kuntz Time: 11:30

Sampling Point Identification: Roll–off

Site Name/City/County: SWP–Wilmington

Weather Conditions: Clear 65

Sample Type: Soil

Sampling Method: Stainless spoon and stainless steel hand auger

Splits/Spikes/Duplicates:

Sampling Containers: (Number/Size/Type) 4/500ml/G

Appearance of Sample: Brown sand and clay

Reason for Sampling: Phase III Assessment

Lab Performing Analysis: Savannah Labs

Respiratory Protection: None

Phase III Soil Sample Parameter Summary Table

Phase III Roll-Off Composite TCLP Analysis Summary Table

PHASE III SOIL SAMPLE PARAMETER SUMMARY TABLE
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

ROLLOFF – TCLP ANALYSIS

PARAMETER	DL*	R*
Arsenic	0.20	ND
Chromium	0.05	ND
Lead	0.20	ND
Mercury	0.02	ND
Benzene	0.02	ND
Methyl ethyl ketone	0.05	ND
Cresol (ortho)	0.05	ND
Cresol m & p	0.05	ND
Hexachlorobenzene	0.05	ND
Pentachlorophenol	0.25	ND
Pyridine	1.00	ND
2,4,5–Trichlorophenol	0.05	ND
2,4,6–Trichlorophenol	0.05	ND

NOTE: All units in mg/l
DL = Laboratory Detection Limit
R = Laboratory Analytical Result

Phase III Soil Sample Laboratory Analytical Data and QA/QC

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Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE SAMPLED
46613-1	SS-10A (# 11504)	11-19-93

PARAMETER	46613-1
Semivolatile Organics (8270)	
bis(2-Chloroethyl)ether, mg/kg dw	ND
Naphthalene, mg/kg dw	ND
Acenaphthene, mg/kg dw	3.3
Phenanthrene, mg/kg dw	ND
Anthracene, mg/kg dw	ND
Fluoranthene, mg/kg dw	15
Chrysene, mg/kg dw	9.0
Benzo(a)Anthracene, mg/kg dw	7.3
Benzo(b)fluoranthene, mg/kg dw	6.0
Benzo(k)fluoranthene, mg/kg dw	2.1
Benzo(a)pyrene, mg/kg dw	2.6
Indeno(1,2,3-cd)pyrene, mg/kg dw	ND
Dibenz(a,h)anthracene, mg/kg dw	ND
2-Chlorophenol, mg/kg dw	ND
Phenol, mg/kg dw	ND
2,4-Dimethylphenol, mg/kg dw	ND
2,4,6-Trichlorophenol, mg/kg dw	ND
4-Chloro-3-methylphenol, mg/kg dw	ND
2,4-Dinitrophenol, mg/kg dw	ND
Pentachlorophenol, mg/kg dw	ND
2,4,5-Trichlorophenol, mg/kg dw	ND
Carbazole, mg/kg dw	ND
Tetrachlorophenols, mg/kg dw	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE SAMPLED
46613-1	SS-10A (# 11504)	11-19-93

PARAMETER	46613-1
Volatiles by GC/MS	
Chloromethane, mg/kg dw	ND
Bromomethane, mg/kg dw	ND
Vinyl Chloride, mg/kg dw	ND
Chloroethane, mg/kg dw	ND
Methylene Chloride (Dichloromethane), mg/kg dw	ND
1,1-Dichloroethene, mg/kg dw	ND
1,1-Dichloroethane, mg/kg dw	ND
Trans-1,2-Dichloroethylene, mg/kg dw	ND
1,2-Dichloroethane, mg/kg dw	ND
1,1,1-Trichloroethane, mg/kg dw	ND
Carbon Tetrachloride, mg/kg dw	ND
Bromodichloromethane, mg/kg dw	ND
1,1,2,2-Tetrachloroethane, mg/kg dw	ND
1,2-Dichloropropane, mg/kg dw	ND
Trichloroethene, mg/kg dw	ND
Dibromochloromethane, mg/kg dw	ND
1,1,2-Trichloroethane, mg/kg dw	ND
Benzene, mg/kg dw	ND
Cis-1,3-Dichloropropene, mg/kg dw	ND
2-Chloroethylvinyl Ether, mg/kg dw	ND
Toluene, mg/kg dw	ND
Chlorobenzene, mg/kg dw	ND
Ethylbenzene, mg/kg dw	ND

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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE SAMPLED
46613-1	SS-10A (# 11504)	11-19-93

PARAMETER	46613-1
o-Xylene, mg/kg dw	ND
m&p-Xylene, mg/kg dw	ND
1,2-Dibromoethane (EDB) , mg/kg dw	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/kg dw	ND
Fluorotrichloromethane, mg/kg dw	ND
Dichlorodifluoromethane, mg/kg dw	ND
Arsenic (7060), mg/kg dw	13
Chromium (6010), mg/kg dw	38
Copper (6010), mg/kg dw	34
Percent Solids, %	24

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Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE SAMPLED
46613-2	Rolloff (# 11483)	11-19-93

PARAMETER	46613-2
Arsenic (TCLP), mg/l	ND
Chromium (TCLP), mg/l	ND
Lead (TCLP), mg/l	ND
Mercury (TCLP - 7470), mg/l	ND
Benzene (TCLP), mg/l	ND
Methyl ethyl ketone (TCLP), mg/l	ND
Cresol (ortho) (TCLP), mg/l	ND
Cresol m & p (TCLP), mg/l	ND
Hexachlorobenzene (TCLP), mg/l	ND
Pentachlorophenol (TCLP), mg/l	ND
Pyridine (TCLP), mg/l	ND
2,4,5-Trichlorophenol (TCLP), mg/l	ND
2,4,6-Trichlorophenol (TCLP), mg/l	ND

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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE SAMPLED
46613-3	Rolloff (# 11483) Matrix Spike % Rec.	11-19-93

PARAMETER	46613-3
Arsenic (TCLP)	99 %
Chromium (TCLP)	83 %
Lead (TCLP)	88 %
Mercury (TCLP - 7470)	89 %
Benzene (TCLP)	88 %
Methyl ethyl ketone (TCLP)	60 %
Cresol (ortho) (TCLP)	94 %
Cresol m & p (TCLP)	---
Hexachlorobenzene (TCLP)	79 %
Pentachlorophenol (TCLP)	56 %
Pyridine (TCLP)	11 %
2,4,5-Trichlorophenol (TCLP)	---
2,4,6-Trichlorophenol (TCLP)	66 %

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Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-4	Method Blank Extraction Fluid

PARAMETER	46613-4
Arsenic (TCLP), mg/l	ND
Chromium (TCLP), mg/l	ND
Lead (TCLP), mg/l	ND
Mercury (TCLP - 7470), mg/l	ND
Benzene (TCLP), mg/l	ND
Methyl ethyl ketone (TCLP), mg/l	ND
Cresol (ortho) (TCLP), mg/l	ND
Cresol m & p (TCLP), mg/l	ND
Hexachlorobenzene (TCLP), mg/l	ND
Pentachlorophenol (TCLP), mg/l	ND
Pyridine (TCLP), mg/l	ND
2,4,5-Trichlorophenol (TCLP), mg/l	ND
2,4,6-Trichlorophenol (TCLP), mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-5	Detection Limits
46613-6	Accuracy (mean % recovery)
46613-7	Precision (% RPD)
46613-8	Analyst Initials
46613-9	EPA Method Numbers

PARAMETER	46613-5	46613-6	46613-7	46613-8	46613-9
Semivolatile Organics (8270)					
bis(2-Chloroethyl)ether, mg/kg dw	0.33	---	---	BK	8270
Naphthalene, mg/kg dw	0.33	---	---	BK	8270
Acenaphthene, mg/kg dw	0.33	---	---	BK	8270
Phenanthrene, mg/kg dw	0.33	---	---	BK	8270
Anthracene, mg/kg dw	0.33	---	---	BK	8270
Fluoranthene, mg/kg dw	0.33	---	---	BK	8270
Chrysene, mg/kg dw	0.33	---	---	BK	8270
Benzo(a)Anthracene, mg/kg dw	0.33	---	---	BK	8270
Benzo(b)fluoranthene, mg/kg dw	0.33	---	---	BK	8270
Benzo(k)fluoranthene, mg/kg dw	0.33	---	---	BK	8270
Benzo(a)pyrene, mg/kg dw	0.33	---	---	BK	8270
Indeno(1,2,3-cd)pyrene, mg/kg dw	0.33	---	---	BK	8270
Dibenz(a,h)anthracene, mg/kg dw	0.33	---	---	BK	8270
2-Chlorophenol, mg/kg dw	0.33	76 %	3.9 %	BK	8270
Phenol, mg/kg dw	0.33	70 %	5.7 %	BK	8270
2,4-Dimethylphenol, mg/kg dw	0.33	---	---	BK	8270
2,4,6-Trichlorophenol, mg/kg dw	0.33	---	---	BK	8270
4-Chloro-3-methylphenol, mg/kg dw	0.33	92 %	4.3 %	BK	8270
2,4-Dinitrophenol, mg/kg dw	1.7	---	---	BK	8270
Pentachlorophenol, mg/kg dw	1.7	96 %	5.1 %	BK	8270
2,4,5-Trichlorophenol, mg/kg dw	1.7	---	---	BK	8270
Tetrachlorophenols, mg/kg dw	1.7	---	---	BK	8270
Carbazole, mg/kg dw	0.33	---	---	BK	8270

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Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-5	Detection Limits
46613-6	Accuracy (mean % recovery)
46613-7	Precision (% RPD)
46613-8	Analyst Initials
46613-9	EPA Method Numbers

PARAMETER	46613-5	46613-6	46613-7	46613-8	46613-9
Volatiles by GC/MS					
Chloromethane, mg/kg dw	0.010	---	---	TCS	8240
Bromomethane, mg/kg dw	0.010	---	---	TCS	8240
Vinyl Chloride, mg/kg dw	0.010	---	---	TCS	8240
Chloroethane, mg/kg dw	0.010	---	---	TCS	8240
Methylene Chloride (Dichloromethane), mg/kg dw	0.0050	---	---	TCS	8240
1,1-Dichloroethene, mg/kg dw	0.0050	132 %	0.76 %	TCS	8240
1,1-Dichloroethane, mg/kg dw	0.0050	---	---	TCS	8240
Trans-1,2-Dichloroethylene, mg/kg dw	0.0050	---	---	TCS	8240
1,2-Dichloroethane, mg/kg dw	0.0050	---	---	TCS	8240
1,1,1-Trichloroethane, mg/kg dw	0.0050	---	---	TCS	8240
Carbon Tetrachloride, mg/kg dw	0.0050	---	---	TCS	8240
Bromodichloromethane, mg/kg dw	0.0050	---	---	TCS	8240
1,1,2,2-Tetrachloroethane, mg/kg dw	0.0050	---	---	TCS	8240
1,2-Dichloropropane, mg/kg dw	0.0050	---	---	TCS	8240
Trichloroethene, mg/kg dw	0.0050	134 %	1.5 %	TCS	8240
Dibromochloromethane, mg/kg dw	0.0050	---	---	TCS	8240

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Spartanburg, SC 29304

Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-5	Detection Limits
46613-6	Accuracy (mean % recovery)
46613-7	Precision (% RPD)
46613-8	Analyst Initials
46613-9	EPA Method Numbers

PARAMETER	46613-5	46613-6	46613-7	46613-8	46613-9
1,1,2-Trichloroethane, mg/kg dw	0.0050	---	---	TCS	8240
Benzene, mg/kg dw	0.0050	125 %	0.76 %	TCS	8240
Cis-1,3-Dichloropropene, mg/kg dw	0.0050	---	---	TCS	8240
2-Chloroethylvinyl Ether, mg/kg dw	0.050	---	---	TCS	8240
Toluene, mg/kg dw	0.0050	132 %	0.76 %	TCS	8240
Chlorobenzene, mg/kg dw	0.0050	134 %	0.75 %	TCS	8240
Ethylbenzene, mg/kg dw	0.0050	---	---	TCS	8240
m&p-Xylene, mg/kg dw	0.0050	---	---	TCS	8240
o-Xylene, mg/kg dw	0.0050	---	---	TCS	8240
Methyl-Tert-Butyl-Ether (MTBE), mg/kg dw	0.050	---	---	TCS	8240
Fluorotrichloromethane, mg/kg dw	0.0050	---	---	TCS	8240
1,2-Dibromoethane (EDB) , mg/kg dw	0.0050	---	---	TCS	8240
Dichlorodifluoromethane, mg/kg dw	0.0050	---	---	TCS	8240
Arsenic (7060), mg/kg dw	1.0	126 %	4.0 %	LR	7060
Chromium (6010), mg/kg dw	1.0	100 %	1.0 %	SD	6010
Copper (6010), mg/kg dw	2.5	102 %	0.98 %	SD	6010
Arsenic (TCLP), mg/l	0.20	94 %	3.2 %	DM	6010

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Spartanburg, SC 29304

Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-5	Detection Limits
46613-6	Accuracy (mean % recovery)
46613-7	Precision (% RPD)
46613-8	Analyst Initials
46613-9	EPA Method Numbers

PARAMETER	46613-5	46613-6	46613-7	46613-8	46613-9
Chromium (TCLP), mg/l	0.050	94 %	5.3 %	DM	6010
Lead (TCLP), mg/l	0.20	97 %	4.1 %	DM	6010
Mercury (TCLP - 7470), mg/l	0.020	112 %	11 %	BB	7470
Benzene (TCLP), mg/l	0.020	118 %	1.7 %	KA	8240
Methyl ethyl ketone (TCLP), mg/l	0.050	---	---	KA	8240
Cresol (ortho) (TCLP), mg/l	0.050	---	---	RB	8270
Cresol m & p (TCLP), mg/l	0.050	---	---	RB	8270
Hexachlorobenzene (TCLP), mg/l	0.050	---	---	RB	8270
Pentachlorophenol (TCLP), mg/l	0.25	70 %	7.1 %	RB	8270
Pyridine (TCLP), mg/l	1.0	---	---	RB	8270
2,4,5-Trichlorophenol (TCLP), mg/l	0.050	---	---	RB	8270
2,4,6-Trichlorophenol (TCLP), mg/l	0.050	---	---	RB	8270

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Spartanburg, SC 29304

Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-10	Date Extracted
46613-11	Date Analyzed

PARAMETER	46613-10	46613-11
Semivolatile Organics (8270)		
bis(2-Chloroethyl)ether	11.24.93	11.29.93
Naphthalene	11.24.93	11.29.93
Acenaphthene	11.24.93	11.29.93
Phenanthrene	11.24.93	11.29.93
Anthracene	11.24.93	11.29.93
Fluoranthene	11.24.93	11.29.93
Chrysene	11.24.93	11.29.93
Benzo(a)Anthracene	11.24.93	11.29.93
Benzo(b)fluoranthene	11.24.93	11.29.93
Benzo(k)fluoranthene	11.24.93	11.29.93
Benzo(a)pyrene	11.24.93	11.29.93
Indeno(1,2,3-cd)pyrene	11.24.93	11.29.93
Dibenz(a,h)anthracene	11.24.93	11.29.93
2-Chlorophenol	11.24.93	11.29.93
Phenol	11.24.93	11.29.93
2,4-Dimethylphenol	11.24.93	11.29.93
2,4,6-Trichlorophenol	11.24.93	11.29.93
4-Chloro-3-methylphenol	11.24.93	11.29.93
2,4-Dinitrophenol	11.24.93	11.29.93
Pentachlorophenol	11.24.93	11.29.93
2,4,5-Trichlorophenol	11.24.93	11.29.93
Carbazole	11.24.93	11.29.93
Tetrachlorophenols	11.24.93	11.29.93

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

RECEIVED
JAN 06 1994
ENVIRONMENTAL AFFAIRS

LOG NO: S3-46613

Received: 20 NOV 93

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-10	Date Extracted
46613-11	Date Analyzed

PARAMETER	46613-10	46613-11
Volatiles by GC/MS		
Chloromethane	---	12.02.93
Bromomethane	---	12.02.93
Vinyl Chloride	---	12.02.93
Chloroethane	---	12.02.93
Methylene Chloride (Dichloromethane)	---	12.02.93
1,1-Dichloroethene	---	12.02.93
1,1-Dichloroethane	---	12.02.93
Trans-1,2-Dichloroethylene	---	12.02.93
1,2-Dichloroethane	---	12.02.93
1,1,1-Trichloroethane	---	12.02.93
Carbon Tetrachloride	---	12.02.93
Bromodichloromethane	---	12.02.93
1,1,2,2-Tetrachloroethane	---	12.02.93
1,2-Dichloropropane	---	12.02.93
Trichloroethene	---	12.02.93
Dibromochloromethane	---	12.02.93
1,1,2-Trichloroethane	---	12.02.93
Benzene	---	12.02.93
Cis-1,3-Dichloropropene	---	12.02.93
2-Chloroethylvinyl Ether	---	12.02.93
Toluene	---	12.02.93
Chlorobenzene	---	12.02.93

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
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Spartanburg, SC 29304

Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
46613-10	Date Extracted
46613-11	Date Analyzed

PARAMETER	46613-10	46613-11
Ethylbenzene	---	12.02.93
m&p-Xylene	---	12.02.93
o-Xylene	---	12.02.93
1,2-Dibromoethane (EDB)	---	12.02.93
Methyl-Tert-Butyl-Ether (MTBE)	---	12.02.93
Dichlorodifluoromethane	---	12.02.93
Fluorotrichloromethane	---	12.02.93
Arsenic (7060)	---	12.04.93
Chromium (6010)	---	12.05.93
Copper (6010)	---	12.05.93
Arsenic (TCLP)	---	12.01.93
Chromium (TCLP)	---	12.01.93
Lead (TCLP)	---	12.01.93
Mercury (TCLP - 7470)	---	11.30.93
Benzene (TCLP)	---	12.12.93
Methyl ethyl ketone (TCLP)	---	12.12.93
Cresol (ortho) (TCLP)	12.01.93	12.02.93
Cresol m & p (TCLP)	12.01.93	12.02.93
Hexachlorobenzene (TCLP)	12.01.93	12.02.93
Pentachlorophenol (TCLP)	12.01.93	12.02.93
Pyridine (TCLP)	12.01.93	12.02.93
2,4,5-Trichlorophenol (TCLP)	12.01.93	12.02.93
2,4,6-Trichlorophenol (TCLP)	12.01.93	12.02.93

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RECEIVED
JAN 06 1994
ENVIRONMENTAL AFFAIRS

LOG NO: S3-46613

Received: 20 NOV 93

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46613-12	Report Completion Date

PARAMETER	46613-12
Date Reported	12.30.93

Methods: EPA SW-846
ND = Not Detected

J. W. Andrews

J. W. Andrews, Ph. D.

Final Page Of Report

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC. 05181

☒ 5102 LaRoche Avenue, Savannah, GA 31404 — Phone: (912) 354-78[illegible] — Fax (912) 352-0165
☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 878-35[illegible] — Fax (904) 878-9504
☐ 414 Southwest 12th Avenue, Deerfield Beach, FL 33442 — Phone: (305) 421-7400 — Fax (305) 421-2584
☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (205) 666-6633 — Fax (205) 666-6698
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax (813) 885-7049

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

O. NUMBER	PROJECT NUMBER	PROJECT NAME
	12-53015.00	SWP-Wilmington

LIENT NAME	TELEPHONE/FAX NO.
Iro Group, Inc.	803-957-6270 803-957-3845

LIENT ADDRESS	CITY, STATE, ZIP CODE
445 Pisgah Church Rd	Lexington, SC 29072

AMPLER(S) NAME(S)	CLIENT PROJECT MANAGER
Greg Kuntz, James Leaphart	Greg Kuntz

MATRIX TYPE: AQUEOUS MATRIX / NONAQUEOUS MATRIX / OIL MATRIX / AIR MATRIX

REQUIRED ANALYSES: As, Cr, Cu; VOC; SV; *TCLP Site Specific

PAGE 1 OF 1

☒ STANDARD TAT
☐ EXPEDITED TAT *

REPORT DUE DATE _____

* SUBJECT TO RUSH FEES

SAMPLING DATE	SAMPLING TIME	SAMPLE IDENTIFICATION	AQUEOUS MATRIX	NONAQUEOUS MATRIX	OIL MATRIX	AIR MATRIX	As	Cr	Cu	VOC	SV							
-19-93	10:50	SS-10A #11504	X				1	1	1									
-19-93	11:30	Roll-off #11483	↓							4								

NUMBER OF CONTAINERS SUBMITTED

*TCLP Site Specific List
Arsenic
Benzene
Chromium
o-cresol
m-cresol
p-cresol
hexachlorobenzene
lead
Mercury
Methyl ethyl ketone
pentachlorophenol
pyridine
2,4,5-trichlorophenol
2,4,6-trichlorophenol

RECEIVED JAN 03 1994 ENVIRONMENTAL AFFAIRS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	11/11	12:00	[signature]	11/19/93	12:57			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RELINQUISHED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Gregory B. Kuntz	11/16/93	7:30	Gregory B. Kuntz	11/18/93	12:58			

FOR SAVANNAH LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	S.L. LOG NO.	LABORATORY REMARKS
[signature]	11/20/93	11:25	☑ YES ☐ NO		46613	

BOTTLE ORDER 11/18/93

Send bottles to ETE for Mon. 11/15

SITE-SPECIFIC GROUND WATER SAMPLE LIST
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

METALS
(Total + Dissolved)

- Arsenic
- Copper
- Chromium

SEMI-VOLATILES

- Acenaphthene
- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Bis(2-chloroethyl)ether
- 4-chloro-3-methylphenol
- Chrysene
- 2,4-dimethylphenol
- Fluoranthene
- Naphthalene
- Phenanthrene
- Tetrachlorophenol
- 2,4,6-trichlorophenol
- Anthracene
- Benzo(a)pyrene
- Benzo(k)fluoranthene
- Carbazole
- 2-chlorophenol
- Dibenzo(a,h)anthracene
- 2,4-dinitrophenol
- Indeno(1,2,3-cd)pyrene
- Pentachlorophenol
- Phenol
- 2,4,5-trichlorophenol

VOLATILES

- Benzene
- Bromomethane
- Chlorobenzene
- 2-chloroethylvinylether
- Chloromethane
- Dibromochloromethane
- Dichlorodifluoromethane
- 1,2-dichloroethane
- Dichloromethane
- Ethyl benzene
- M/P-Xylene
- O-Xylene
- Toluene
- 1,1,1-trichloroethane
- Trichloroethene
- Bromodichloromethane
- Carbon Tetrachloride
- Chloroethane
- MTBE
- Cis-1,3-dichloropropene
- 1,2-dibromomethane (Edb)
- 1,1-dichloroethane
- 1,1-dichloroethene
- 1,2-dichloropropane
- Fluorotrichloromethane
- Methyl-T-Butyl Ether (Mtbe)
- 1,1,2,2-tetrachloroethane
- Trans-1,2-dichloroethene
- 1,1,2-trichloroethane
- Vinyl Chloride

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1
To: Phillip F. | From: Linda K.
Co. | Co.: Southern Wood
Dept. | Phone #
Fax # | Fax #

36 H_2O's for above constituents
2 Field Blanks
2 Trip Blanks
> for all constituents
3 H_2O's: Total Petroleum Hydrocarbons - gasoline
TPH - Diesel
3 soils for Above site specific list

HISTORICAL GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	B-2		B-3		B-4		B-5		B-6		MW-6				MW-7				MW-8				MW-8A	
	3/92		3/92		3/92		3/92		3/92		3/92		10/92		3/92		10/92		3/92		10/92		10/92	
VOLATILES	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*
Benzene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Bromodichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Bromomethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.001	ND	0.005
Carbon Tetrachloride	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001
Chlorobenzene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Chloroethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.001	ND	0.005
2-Chloroethylvinyl Ether	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001
Chloroform	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.002	0.001
Chloromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.001	ND	0.005
Cis-1,3-Dichloropropene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001
Dibromochloromethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,2-Dibromomethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001	ND	0.005	ND	0.001	ND	0.001	ND	0.005
Dichlorodifluoromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.001
1,1-Dichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001
1,2-Dichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,1-Dichloroethene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Dichloromethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.002	0.001	ND	0.001
1,2-Dichloropropane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Ethyl Benzene	ND	0.001	ND	0.001	0.110	0.02	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Fluorotrichloromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.001	ND	0.005
M/P-Xylene	ND	0.001	ND	0.001	0.09	0.02	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001
Methyl-T-Butyl Ether (Mtbe)	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.001	ND	0.005
o-Xylene	ND	0.001	ND	0.001	0.04	0.02	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001
1,1,2,2-Tetrachloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Tetrachloroethene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001			ND	0.001			ND	0.001				
Toluene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Trans-1,2-Dichloroethylene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,1,1-Trichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,1,2-Trichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Trichloroethene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Vinyl Chloride	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005

NOTE: DL = Laboratory Detection Limit

All units in mg/l

HISTORICAL GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	MW-9				MW-10				MW-11A		MW-13				MW-14				MW-15				MW-16			
	3/92		10/92		3/92		10/92		10/92		3/92		10/92		3/92		10/92		3/92		10/92		3/92		10/92	
VOLATILES	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*
Benzene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.003	0.001	0.073	0.01	0.1	0.01	0.03	0.01	0.019	0.005	ND	0.005	0.005	0.001	ND	0.001	ND	0.001
Bromodichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Bromomethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.05	ND	0.005	ND	0.025	ND	0.025	ND	0.005	ND	0.005	ND	0.005
Carbon Tetrachloride	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Chlorobenzene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Chloroethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.05	ND	0.005	ND	0.025	ND	0.025	ND	0.005	ND	0.005	ND	0.005
2-Chloroethylvinyl Ether	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Chloroform	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	0.0011	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Chloromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.05	ND	0.005	ND	0.025	ND	0.025	ND	0.005	ND	0.005	ND	0.005
Cis-1,3-Dichloropropene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Dibromochloromethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
1,2-Dibromomethane	ND	0.001	ND	0.005	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.05	ND	0.001	ND	0.025	ND	0.005	ND	0.005	ND	0.001	ND	0.005
Dichlorodifluoromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.05	ND	0.005	ND	0.025	ND	0.025	ND	0.005	ND	0.005	ND	0.005
1,1-Dichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
1,2-Dichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.005	ND	0.001	ND	0.001	ND	0.001
1,1-Dichloroethene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Dichloromethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	0.001	0.001
1,2-Dichloropropane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Ethyl Benzene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.004	0.001	0.041	0.01	0.04	0.01	0.067	0.01	0.06	0.005	0.008	0.005	0.008	0.001	0.0027	0.001	ND	0.001
Fluorotrichloromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.05	ND	0.005	ND	0.025	ND	0.025	ND	0.005	ND	0.005	ND	0.005
M/P-Xylene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.007	0.001	0.044	0.01	0.05	0.01	0.073	0.01	0.078	0.005	0.008	0.005	0.008	0.001	0.0037	0.001	ND	0.001
Methyl-T-Butyl Ether (Mtbe)	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.05	ND	0.005	ND	0.025	ND	0.025	ND	0.005	ND	0.005	ND	0.005
o-Xylene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.003	0.001	0.025	0.01	0.02	0.01	0.036	0.01	0.038	0.005	ND	0.005	0.003	0.001	0.0032	0.001	ND	0.001
1,1,2,2-Tetrachloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Tetrachloroethene	ND	0.001			ND	0.001					ND	0.001			ND	0.001			ND	0.005			ND	0.001		
Toluene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.001	0.001	0.031	0.01	0.01	0.01	0.046	0.01	0.028	0.005	0.008	0.005	ND	0.001	ND	0.001	ND	0.001
Trans-1,2-Dichloroethylene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
1,1,1-Trichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
1,1,2-Trichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Trichloroethene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.01	ND	0.001	ND	0.005	ND	0.005	ND	0.001	ND	0.001	ND	0.001
Vinyl Chloride	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.05	ND	0.005	ND	0.025	ND	0.025	ND	0.005	ND	0.005	ND	0.005

NOTE: DL = Laboratory Detection Limit

All units in mg/l

HISTORICAL GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	MW-17				MW-18		MW-19		MW-19A		MW-20		MW-21		MW-22		MW-23		MW-24		MW-25	
	3/92		10/92		10/92		10/92		10/92		10/92		10/92		10/92		10/92		10/92		10/92	
VOLATILES	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*
Benzene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.005	0.001	ND	0.001	ND	0.001	ND	0.001
Bromodichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Bromomethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Carbon Tetrachloride	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Chlorobenzene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Chloroethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005
2-Chloroethylvinyl Ether	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Chloroform	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.001	0.001	ND	0.001	0.001	0.001	0.004	0.001	ND	0.001	ND	0.001	ND	0.001
Chloromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Cis-1,3-Dichloropropene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Dibromochloromethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,2-Dibromomethane	ND	0.001	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Dichlorodifluoromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005
1,1-Dichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,2-Dichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,1-Dichloroethene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Dichloromethane	ND	0.001	0.003	0.001	0.002	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	0.002	0.001	0.003	0.001	ND	0.001	ND	0.001
1,2-Dichloropropane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Ethyl Benzene	0.0039	0.001	0.006	0.001	ND	0.001	0.011	0.001	ND	0.001	ND	0.001	ND	0.001	0.037	0.001	ND	0.001	0.002	0.001	ND	0.001
Fluorotrichloromethane	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005
M/P-Xylene	0.0088	0.001	0.016	0.001	ND	0.001	0.007	0.001	ND	0.001	ND	0.001	ND	0.001	0.048	0.001	ND	0.001	0.002	0.001	ND	0.001
Methyl-T-Butyl Ether (Mtbe)	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005
o-Xylene	0.0046	0.001	0.01	0.001	ND	0.001	0.005	0.001	ND	0.001	ND	0.001	ND	0.001	0.023	0.001	ND	0.001	0.001	0.001	ND	0.001
1,1,2,2-Tetrachloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Tetrachloroethene	ND	0.001																				
Toluene	0.0011	0.001	0.017	0.001	ND	0.001	0.001	0.001	ND	0.001	ND	0.001	ND	0.001	0.011	0.001	ND	0.001	ND	0.001	ND	0.001
Trans-1,2-Dichloroethylene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,1,1-Trichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
1,1,2-Trichloroethane	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Trichloroethene	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Vinyl Chloride	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005	ND	0.005

NOTE: DL = Laboratory Detection Limit

All units in mg/l

HISTORICAL SURFACE WATER SAMPLE PARAMETER SUMMARY TABLE
SEMI–VOLATILES AND METALS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	U.S. HIGHWAY #74 BRIDGE																											
	12/85		6/86		1/87		7/87		1/88		6/88		1/89		6/89		1/90		7/90		12/91		6/92		1/93		7/93	
SEMI–VOLATILES	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*
Acenaphthene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Acenaphthylene	NA	--	NA	--	NA	--	NA	--	NA	--	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Anthracene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Anthracene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Pyrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(b,k)Fluoranthene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Carbazole	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2–Chlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Chrysene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Dibenzo(a,h)Anthracene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4–Dimethylphenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4–Dinitrophenol	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.05	ND	0.05	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Fluoranthene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Indeno(1,2,3–cd)pyrene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Naphthalene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
p–chloro–m–cresol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Pentachlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Phenanthrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Phenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Tetrachlorophenols	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.050	ND	0.050	ND	0.050
Trichlorophenols	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
METALS																												
Arsenic	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Chromium	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Copper	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.025	ND	--	ND	0.025	ND	0.025	ND	0.025

NOTE: R* = Laboratory Result
DL* = Detection Limit
ND = Below Laboratory Detection Limit
NA = Not Analyzed
All units in mg/l

HISTORICAL SURFACE WATER SAMPLE PARAMETER SUMMARY TABLE
SEMI–VOLATILES AND METALS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	OLD SLIP																											
	12/85		6/86		1/87		7/87		1/88		6/88		1/89		6/89		1/90		7/90		12/91		6/92		1/93		7/93	
SEMI–VOLATILES	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*
Acenaphthene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Acenaphthylene	NA	--	NA	--	NA	--	NA	--	NA	--	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Anthracene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Anthracene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Pyrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(b,k)Fluoranthene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Carbazole	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2–Chlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Chrysene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Dibenzo(a,h)Anthracene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4–Dimethylphenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4–Dinitrophenol	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.05	ND	0.05	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Fluoranthene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Indeno(1,2,3–cd)pyrene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Naphthalene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
p–chloro–m–cresol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Pentachlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Phenanthrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Phenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Tetrachlorophenols	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.050	ND	0.050	ND	0.050
Trichlorophenols	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
METALS																												
Arsenic	ND	0.01	NA	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Chromium	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.01	ND	0.010	ND	0.010	ND	0.010	0.011	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Copper	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	0.02	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.025	ND	--	ND	0.025	ND	0.025	ND	0.025

NOTE: R* = Laboratory Result
DL* = Detection Limit
ND = Below Laboratory Detection Limit
NA = Not Analyzed
All units in mg/l

HISTORICAL SURFACE WATER SAMPLE PARAMETER SUMMARY TABLE
SEMI-VOLATILES AND METALS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	GREENFIELD CREEK																													
	12/85		6/86		1/87		7/87		1/88		6/88		1/89		6/89		7/89		1/90		7/90		12/91		6/92		1/93		7/93	
SEMI-VOLATILES	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*
Acenaphthene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Acenaphthylene	NA	--	NA	--	NA	--	NA	--	NA	--	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Anthracene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Anthracene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Pyrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(b,k)Fluoranthene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Carbazole	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2-Chlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Chrysene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Dibenzo(a,h)Anthracene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4-Dimethylphenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4-Dinitrophenol	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.05	ND	0.05	ND	0.050	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Fluoranthene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Indeno(1,2,3-cd)pyrene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Naphthalene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	0.050	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
p-chloro-m-cresol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Pentachlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.050	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Phenanthrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Phenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Tetrachlorophenols	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.050	ND	0.050	ND	0.050
Trichlorophenols	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
METALS																														
Arsenic	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Chromium	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	0.046	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Copper	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	0.052	0.025	ND	--	ND	0.025	ND	0.025	ND	0.025

NOTE: R* = Laboratory Result
DL* = Detection Limit
ND = Below Laboratory Detection Limit
NA = Not Analyzed
All units in mg/l

HISTORICAL SURFACE WATER SAMPLE PARAMETER SUMMARY TABLE
SEMI-VOLATILES AND METALS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	STATE PORTS AUTHORITY																											
	12/85		6/86		1/87		7/87		1/88		6/88		1/89		6/89		1/90		7/90		12/91		6/92		1/93		7/93	
SEMI-VOLATILES	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*	R*	DL*
Acenaphthene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Acenaphthylene	NA	--	NA	--	NA	--	NA	--	NA	--	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Anthracene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Anthracene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Pyrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(b,k)Fluoranthene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Carbazole	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2-Chlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Chrysene	ND	0.01	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Dibenzo(a,h)Anthracene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4-Dimethylphenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4-Dinitrophenol	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.05	ND	0.05	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Fluoranthene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Indeno(1,2,3-cd)pyrene	ND	0.02	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Naphthalene	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
p-chloro-m-cresol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Pentachlorophenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.050	ND	0.05	ND	0.050	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Phenanthrene	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Phenol	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Tetrachlorophenols	ND	0.01	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.050	ND	0.050	ND	0.050
Trichlorophenols	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	0.010
METALS																												
Arsenic	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Chromium	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.010	ND	--	ND	0.010	ND	0.010	ND	0.010
Copper	ND	0.01	ND	0.05	ND	0.05	ND	0.05	ND	0.05	ND	0.01	ND	0.010	ND	0.010	ND	0.010	ND	0.025	ND	--	ND	0.025	ND	0.025	ND	0.025

NOTE: R* = Laboratory Result
DL* = Detection Limit
ND = Below Laboratory Detection Limit
NA = Not Analyzed
All units in mg/l

WELL LOG DATABASE

SOUTHERN WOOD PIEDMONT – WILMINGTON, NORTH CAROLINA FACILITY

PLANT	WELL	INST DAT	BORING TERM	SURFACE ELEV	RISER ELEV	BOTTOM ELEV	WELL DEPTH	RISER DEPTH	COORDINATES NORTHING	COORDINATES EASTING
WIL	MW-6	09/05/85	20.00	3.40	5.07	-16.38	19.78	21.45	171759.04	2317555.49
WIL	MW-7	09/06/85	19.80	3.87	6.03	-15.65	19.52	21.68	171516.87	2317057.66
WIL	MW-8	09/09/85	19.20	4.16	6.80	-14.86	19.02	21.66	171308.46	2317048.69
WIL	MW-8A	10/01/92	51.00	4.12	6.43	-26.63	30.75	33.06	171307.81	2317034.99
WIL	MW-9	09/10/85	19.40	4.26	6.43	-14.96	19.22	21.39	171324.83	2317300.56
WIL	MW-10	02/18/92	13.00	3.63	7.41	-6.87	10.50	14.28	171060.33	2317416.43
WIL	MW-11	02/18/92	13.00	4.31	8.02	-6.19	10.50	14.21	170769.34	2317497.46
WIL	MW-11A	10/01/92	50.00	4.10	6.38	-29.79	33.89	36.17	170771.95	2317484.42
WIL	MW-11B	10/31/93	46.00	4.13	6.26	-38.06	42.19	44.32	170762.69	2317489.76
WIL	MW-12	02/18/92	12.00	4.60	8.22	-5.90	10.50	14.12	170782.73	2317389.15
WIL	MW-13	02/18/92	12.00	3.31	6.97	-7.19	10.50	14.16	170721.30	2317066.52
WIL	MW-14	02/19/92	22.00	2.62	6.30	-13.38	16.00	19.68	170565.41	2317675.19
WIL	MW-14A	11/02/93	42.00	2.76	5.05	-28.39	31.15	33.44	170564.17	2317685.19
WIL	MW-15	02/19/92	13.00	3.26	7.07	-7.24	10.50	14.31	170641.86	2317249.76
WIL	MW-16	02/19/92	13.00	3.88	7.69	-6.62	10.50	14.31	170875.45	2317059.82
WIL	MW-17	02/19/92	15.00	3.86	7.65	-6.64	10.50	14.29	170899.08	2317118.35
WIL	MW-18	10/07/92	14.00	4.26	6.61	-6.87	11.13	13.48	171744.30	2317083.05
WIL	MW-19	10/06/92	14.00	3.19	5.44	-9.68	12.87	15.12	170439.85	2317232.30
WIL	MW-19A	10/02/92	43.17	3.15	5.25	-28.02	31.17	33.27	170443.47	2317244.14
WIL	MW-20	10/07/92	14.00	3.17	5.44	-9.13	12.30	14.57	170921.86	2317799.93
WIL	MW-20A	11/08/93	42.00	3.10	5.23	-27.88	30.98	33.11	170913.19	2317797.41
WIL	MW-21	10/07/92	10.00	3.17	5.34	-3.62	6.79	8.96	171260.09	2317881.59
WIL	MW-22	10/07/92	14.00	3.02	5.26	-8.09	11.11	13.35	170728.25	2316945.44
WIL	MW-22A	11/02/93	42.00	3.07	5.32	-28.79	31.86	34.11	170726.23	2316955.36
WIL	MW-23	10/08/92	12.00	2.67	4.96	-6.39	9.06	11.35	170355.68	2316972.19
WIL	MW-24	10/05/92	12.00	3.58	5.79	-8.02	11.06	13.81	170245.75	2317388.60
WIL	MW-24R	11/12/93	14.00	3.77	5.98	-9.63	13.40	15.61	170242.09	2317324.15
WIL	MW-24A	11/01/93	42.00	3.64	5.81	-30.64	34.28	36.45	170240.18	2317313.97
WIL	MW-25	10/08/92	13.00	1.78	4.96	-10.27	12.05	15.23	170374.77	2317662.47
WIL	MW-26	10/05/92	18.00	2.48	4.91	-15.14	17.62	20.05	170529.26	2317951.33
WIL	MW-27	11/13/93	9.00	3.22	5.41	-1.90	5.12	7.31	171848.14	2317846.63
WIL	MW-28	11/10/93	14.00	2.97	5.18	-8.10	11.07	13.28	170473.09	2318157.25
WIL	MW-28A	11/10/93	40.00	3.26	5.47	-22.42	25.68	27.89	170465.44	2318161.94
WIL	MW-29	11/12/93	7.00	3.19	5.32	-4.04	7.23	9.36	169681.45	2317783.77
WIL	MW-29A	11/09/93	40.00	3.15	5.14	-35.83	38.98	40.97	169673.28	2317782.13
WIL	MW-30	11/12/93	10.00	4.07	6.26	-4.95	9.02	11.21	169874.49	2317618.08
WIL	SG*-Cape Fear	10/12/92			5.93	-0.73			171166.75	2316464.93
WIL	SG*-North	10/12/92			6.64	-0.02			171129.56	2318037.12
WIL	SG*-South	11/09/93			2.13	-1.20			170523.78	2318024.91

* SG = Staff Gauge

ATTACHMENT G

PHASE III VERTICAL HYDRAULIC GRADIENT SUMMARY TABLE
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

WELL PAIR	DATE	TIDE	GW ELEVATION UPPER AQUIFER	GW ELEVATION LOWER AQUIFER	MID SCREEN ELEV. UPPER AQUIFER	MID SCREEN ELEV. LOWER AQUIFER	VERT. HYDRAULIC GRADIENT
MW-8/MW-8A	11/93	Low	2.10	1.91	-9.86	-24.13	+0.013
		1/4	1.85	2.17	-9.86	-24.13	-0.022
		3/4	2.06	2.56	-9.86	-24.13	-0.035
		High	2.10	2.70	-9.86	-24.13	-0.042
MW-11/MW-11A	11/93	Low	2.36	1.99	-1.19	-27.29	+0.014
		1/4	2.31	2.10	-1.19	-27.29	+0.008
		3/4	2.33	2.15	-1.19	-27.29	+0.007
		High	2.35	2.22	-1.19	-27.29	+0.005
MW-14/MW-14A	11/93	Low	1.55	1.79	-8.38	-25.89	-0.014
		1/4	1.40	1.86	-8.38	-25.89	-0.026
		3/4	1.48	1.84	-8.38	-25.89	-0.021
		High	1.49	1.86	-8.38	-25.89	-0.021
MW-19/MW-19A	11/93	Low	2.20	1.97	-7.18	-25.52	+0.013
		1/4	2.26	2.11	-7.18	-25.52	+0.008
		3/4	2.27	2.12	-7.18	-25.52	+0.008
		High	2.30	2.21	-7.18	-25.52	+0.005
MW-20/MW-20A	11/93	Low	2.00	2.08	-6.63	-25.38	-0.004
		1/4	1.85	2.15	-6.63	-25.38	-0.016
		3/4	1.88	2.15	-6.63	-25.38	-0.014
		High	1.86	2.18	-6.63	-25.38	-0.017
MW-22/MW-22A	11/93	Low	1.51	1.95	-10.59	-26.29	-0.028
		1/4	1.62	2.14	-10.59	-26.29	-0.033
		3/4	2.16	2.23	-10.59	-26.29	-0.004
		High	2.11	2.27	-10.59	-26.29	-0.010
MW-24/MW-24A	11/93	Low	2.27	1.93	-7.13	-28.14	+0.016
		1/4	2.20	2.06	-7.13	-28.14	+0.007
		3/4	2.24	2.05	-7.13	-28.14	+0.009
		High	2.27	2.14	-7.13	-28.14	+0.006
MW-28/MW-28A	11/93	Low	0.83	1.35	-5.60	-19.92	-0.036
		1/4	0.80	1.46	-5.60	-19.92	-0.046
		3/4	0.85	1.41	-5.60	-19.92	-0.039
		High	0.86	1.45	-5.60	-19.92	-0.041
MW-29/MW-29A	11/93	Low	1.03	1.73	-1.54	-33.33	-0.022
		1/4	0.98	1.82	-1.54	-33.33	-0.026
		3/4	0.96	1.79	-1.54	-33.33	-0.026
		High	0.96	1.83	-1.54	-33.33	-0.027

NOTE: Vertical Hydraulic Gradient = $\frac{\text{Upper Aquifer Elevation} - \text{Lower Aquifer Elevation}}{\text{Upper Aquifer Mid Screen Elevation} - \text{Lower Aquifer Mid Screen Elevation}}$

- Upward Vertical Hydraulic Gradient

+ Downward Vertical Hydraulic Gradient

All Measurements in Feet

Vertical Hydraulic Gradient in ft/ft

SITE-SPECIFIC GROUNDWATER SAMPLE LIST
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

METALS

Arsenic
Copper
Chromium

SEMI-VOLATILES

Acenaphthene
Benzo(a)anthracene
Benzo(b)fluoranthene
Bis(2-chloroethyl)ether
4-chloro-3-methylphenol
Chrysene
2,4-dimethylphenol
Fluoranthene
Naphthalene
Phenanthrene
Tetrachlorophenol
2,4,6-trichlorophenol
Anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Carbazole
2-chlorophenol
Dibenzo(a,h)anthracene
2,4-dinitrophenol
Indeno(1,2,3-cd)pyrene
Pentachlorophenol
Phenol
2,4,5-trichlorophenol

VOLATILES

Benzene
Bromomethane
Chlorobenzene
2-chloroethylvinylether
Cis-1,3-dichloropropene
1,2-dibromomethane (Edb)
1,1-dichloroethane
1,1-dichloroethene
1,2-dichloropropane
Fluorotrichloromethane
Methyl-T-Butyl Ether (Mtbe)
1,1,2,2-tetrachloroethane
Trans-1,2-dichloroethene
1,1,2-trichloroethane
Vinyl Chloride
Bromodichloromethane
Carbon Tetrachloride
Chloroethane
Chloromethane
Dibromochloromethane
Dichlorodifluoromethane
1,2-dichloroethane
Dichloromethane
Ethyl benzene
M/P-Xylene
O-Xylene
Toluene
1,1,1-trichloroethane
Trichloroethene

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

VOLATILES	DL*	MW-6	MW-7	MW-8	MW-8A	MW-9	MW-10	MW-11A	MW-11B	MW-12	MW-13
Benzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.046
Bromodichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromomethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.026
Fluorotrichloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M/P-Xylene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	0.011	0.014
Methyl-T-Butyl Ether (Mtbe)	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	0.0066	0.013
1,1,2,2-Tetrachloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	0.0074	ND
Trans-1,2-Dichloroethylene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: DL = Laboratory Detection Limit
All units in mg/l

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

VOLATILES	DL*	MW-14A	MW-15	MW-16	MW-17	MW-18	MW-19	MW-19A	MW-20	MW-20A	MW-21
Benzene	0.005	ND	ND	ND	ND	ND	0.0055	ND	ND	ND	ND
Bromodichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromomethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	0.005	0.018	0.0051	ND	ND	ND	0.0058	ND	ND	ND	ND
Fluorotrichloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M/P-Xylene	0.005	0.02	ND	ND	ND	ND	0.0054	ND	ND	ND	ND
Methyl-T-Butyl Ether (Mtbe)	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	0.005	0.0087	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: DL = Laboratory Detection Limit
All units in mg/l

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

VOLATILES	DL*	MW-22A	MW-23	MW-24	MW-24A	MW-25	MW-27	MW-28	MW-28A	MW-29	MW-29A	MW-30
Benzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromomethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	0.005	ND	ND	0.0089	ND	ND	ND	ND	ND	ND	ND	ND
Fluorotrichloromethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M/P-Xylene	0.005	0.0061	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-T-Butyl Ether (Mtbe)	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	0.005	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: DL = Laboratory Detection Limit

All units in mg/l

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
SEMI-VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

SEMI-VOLATILES	DL*	MW-6	MW-7	MW-8	MW-8A	MW-9	MW-10	MW-11A	MW-11B	MW-12	MW-13
Acenaphthene	0.01	ND	ND	ND	ND	ND	ND	0.076	0.081	0.77	0.8
Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)Pyrene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)Fluoranthene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-Chloroethyl)Ether	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	0.01	ND	ND	ND	ND	ND	ND	ND	ND	0.21	0.22
4-Chloro-3-Methylphenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	0.31	0.3
Indeno(1,2,3-Cd)Pyrene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	0.01	ND	ND	ND	ND	ND	ND	0.31	ND	3.1	3.1
Pentachlorophenol	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	0.01	ND	ND	ND	ND	ND	ND	0.047	0.039	0.74	0.77
Phenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachlorophenols	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: DL = Laboratory Detection Limit

All units in mg/l.

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
SEMI–VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

SEMI–VOLATILES	DL*	MW–14A	MW–15	MW–16	MW–17	MW–18	MW–19	MW–19A	MW–20	MW–20A	MW–21
Acenaphthene	0.01	0.41	0.074	ND	0.016	ND	0.27	ND	0.014	ND	ND
Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)Pyrene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)Fluoranthene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2–Chloroethyl)Ether	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4–Chloro–3–Methylphenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2–Chlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4–Dimethylphenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4–Dinitrophenol	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	0.01	ND	ND	ND	0.01	ND	ND	ND	ND	ND	ND
Indeno(1,2,3–Cd)Pyrene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	0.01	3.3	0.055	ND	ND	ND	0.29	ND	ND	ND	ND
Pentachlorophenol	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	0.01	ND	0.015	ND	0.017	ND	0.077	ND	ND	ND	ND
Phenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachlorophenols	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5–Trichlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6–Trichlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: DL = Laboratory Detection Limit

All units in mg/l.

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
SEMI-VOLATILES
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

SEMI-VOLATILES	DL*	MW-22A	MW-23	MW-24	MW-24A	MW-25	MW-27	MW-28	MW-28A	MW-29	MW-29A	MW-30
Acenaphthene	0.01	0.012	ND	0.29	ND	0.043	ND	0.012	ND	ND	0.54	0.04
Anthracene	0.01	ND	ND	ND	ND	0.025	ND	ND	ND	ND	ND	0.026
Benzo(a)Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)Pyrene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)Fluoranthene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)Fluoranthene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-Chloroethyl)Ether	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.019	0.013
4-Chloro-3-Methylphenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)Anthracene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	0.01	ND	ND	ND	ND	0.034	ND	ND	ND	ND	ND	0.016
Indeno(1,2,3-Cd)Pyrene	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	0.01	0.018	ND	0.29	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	0.01	ND	ND	0.068	ND	0.062	ND	0.021	ND	ND	ND	0.058
Phenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachlorophenols	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: DL = Laboratory Detection Limit

All units in mg/l.

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
METALS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

METALS	DL*	MW-6	MW-7	MW-8	MW-8A	MW-9	MW-10	MW-11A	MW-11B	MW-12	MW-13
Arsenic	0.01	ND	ND	ND	ND	0.049	0.05	ND	ND	0.029	0.049
Arsenic (Dissolved)	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	0.01	ND	ND	ND	ND	ND	ND	ND	ND	0.024	0.04
Chromium (Dissolved)	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	0.025	ND	ND	ND	ND	ND	ND	ND	ND	0.043	0.058
Copper (Dissolved)	0.025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

METALS	DL*	MW-14A	MW-15	MW-16	MW-17	MW-18	MW-19	MW-19A	MW-20	MW-20A	MW-21
Arsenic	0.01	ND	0.088	ND	0.023	0.016	ND	ND	ND	ND	0.019
Arsenic (Dissolved)	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	0.01	ND	ND	ND	0.012	4.6	ND	ND	ND	ND	0.016
Chromium (Dissolved)	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	0.025	ND	ND	ND	0.025	0.05	ND	ND	ND	ND	ND
Copper (Dissolved)	0.025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

METALS	DL*	MW-22A	MW-23	MW-24	MW-24A	MW-25	MW-27	MW-28	MW-28A	MW-29	MW-29A	MW-30
Arsenic	0.01	ND	ND	ND	ND	ND	0.014	ND	ND	ND	ND	ND
Arsenic (Dissolved)	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	0.01	ND	ND	0.01	ND	0.011	ND	ND	ND	ND	ND	0.024
Chromium (Dissolved)	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	0.025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (Dissolved)	0.025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: DL = Laboratory Detection Limit
All units in mg/l.

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
HYDROCARBONS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

HYDROCARBONS	DL*	MW-6	MW-18	MW-27
Hydrocarbons as Gasoline	0.05	ND	ND	ND
Hydrocarbons as Kerosene	0.3	ND	ND	ND
Hydrocarbons as Heavy Oils	1.0	ND	ND	ND
Hydrocarbons as Mineral Spirits	0.3	ND	ND	ND
Hydrocarbons as Varsol	0.3	ND	ND	ND
Hydrocarbons as Fuel Oil/Diesel	0.3	ND	ND	ND

NOTE: DL = Laboratory Detection Limit
All units in mg/l

PHASE III GROUNDWATER SAMPLE PARAMETER SUMMARY TABLE
HYDROCARBONS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

HYDROCARBONS	DL*	MW–6	MW–18	MW–27
Hydrocarbons as Gasoline	0.05	ND	ND	ND
Hydrocarbons as Kerosene	0.3	ND	ND	ND
Hydrocarbons as Heavy Oils	1.0	ND	ND	ND
Hydrocarbons as Mineral Spirits	0.3	ND	ND	ND
Hydrocarbons as Varsol	0.3	ND	ND	ND
Hydrocarbons as Fuel Oil/Diesel	0.3	ND	ND	ND

NOTE: DL = Laboratory Detection Limit
All units in mg/l

Phase III Groundwater Sample Laboratory Analytical Data and QA/QC

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LOG NO: S3-46553

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-1	MW-7 (# 11437)	11-17-93
46553-2	MW-8A (# 11438)	11-17-93
46553-3	MW-8 (# 11439)	11-17-93
46553-4	MW-9 (# 11440)	11-17-93
46553-5	MW-10 (# 11441)	11-17-93

PARAMETER	46553-1	46553-2	46553-3	46553-4	46553-5
Semivolatile Organics (8270)					
bis(2-Chloroethyl)ether, mg/l	ND	ND	ND	ND	ND
Naphthalene, mg/l	ND	ND	ND	ND	ND
Acenaphthene, mg/l	ND	ND	ND	ND	ND
Phenanthrene, mg/l	ND	ND	ND	ND	ND
Anthracene, mg/l	ND	ND	ND	ND	ND
Fluoranthene, mg/l	ND	ND	ND	ND	ND
Chrysene, mg/l	ND	ND	ND	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND	ND	ND	ND
Benzo(b)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(k)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(a)pyrene, mg/l	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene, mg/l	ND	ND	ND	ND	ND
2-Chlorophenol, mg/l	ND	ND	ND	ND	ND
Phenol, mg/l	ND	ND	ND	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol, mg/l	ND	ND	ND	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND	ND	ND	ND
Pentachlorophenol, mg/l	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
Carbazole, mg/l	ND	ND	ND	ND	ND
Tetrachlorophenols, mg/l	ND	ND	ND	ND	ND

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-1	MW-7 (# 11437)	11-17-93
46553-2	MW-8A (# 11438)	11-17-93
46553-3	MW-8 (# 11439)	11-17-93
46553-4	MW-9 (# 11440)	11-17-93
46553-5	MW-10 (# 11441)	11-17-93

PARAMETER	46553-1	46553-2	46553-3	46553-4	46553-5
Volatiles by GC/MS					
Chloromethane, mg/l	ND	ND	ND	ND	ND
Bromomethane, mg/l	ND	ND	ND	ND	ND
Vinyl Chloride, mg/l	ND	ND	ND	ND	ND
Chloroethane, mg/l	ND	ND	ND	ND	ND
Methylene Chloride (Dichloromethane), mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethene, mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethane, mg/l	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene, mg/l	ND	ND	ND	ND	ND
1,2-Dichloroethane, mg/l	ND	ND	ND	ND	ND
1,1,1-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Carbon Tetrachloride, mg/l	ND	ND	ND	ND	ND
Bromodichloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, mg/l	ND	ND	ND	ND	ND
1,2-Dichloropropane, mg/l	ND	ND	ND	ND	ND
Trichloroethene, mg/l	ND	ND	ND	ND	ND
Dibromochloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Benzene, mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

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46553-3	MW-8 (# 11439)	11-17-93
46553-4	MW-9 (# 11440)	11-17-93
46553-5	MW-10 (# 11441)	11-17-93

PARAMETER	46553-1	46553-2	46553-3	46553-4	46553-5
Cis-1,3-Dichloropropene, mg/l	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether, mg/l	ND	ND	ND	ND	ND
Toluene, mg/l	ND	ND	ND	ND	ND
Chlorobenzene, mg/l	ND	ND	ND	ND	ND
Ethylbenzene, mg/l	ND	ND	ND	ND	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND	ND	ND	ND	ND
Dichlorodifluoromethane, mg/l	ND	ND	ND	ND	ND
m&p-Xylene, mg/l	ND	ND	ND	ND	ND
o-Xylene, mg/l	ND	ND	ND	ND	ND
Fluorotrichloromethane, mg/l	ND	ND	ND	ND	ND
1,2-Dibromoethane (EDB) , mg/l	ND	ND	ND	ND	ND
Arsenic, mg/l	ND	ND	ND	0.049	0.050
Arsenic (Dissolved), mg/l	ND	ND	ND	ND	ND
Chromium, mg/l	ND	ND	ND	ND	ND
Chromium (Dissolved), mg/l	ND	ND	ND	ND	ND
Copper, mg/l	ND	ND	ND	ND	ND
Copper (Dissolved), mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-6	MW-20A (# 11442)	11-17-93
46553-7	MW-21 (# 11443)	11-17-93
46553-8	MW-23 (# 11444)	11-17-93
46553-9	MW-24A (# 11445)	11-17-93
46553-10	Trip Blank	11-17-93

PARAMETER	46553-6	46553-7	46553-8	46553-9	46553-10
Semivolatile Organics (8270)					
bis(2-Chloroethyl)ether, mg/l	ND	ND	ND	ND	ND
Naphthalene, mg/l	ND	ND	ND	ND	ND
Acenaphthene, mg/l	ND	ND	ND	ND	ND
Phenanthrene, mg/l	ND	ND	ND	ND	ND
Anthracene, mg/l	ND	ND	ND	ND	ND
Fluoranthene, mg/l	ND	ND	ND	ND	ND
Chrysene, mg/l	ND	ND	ND	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND	ND	ND	ND
Benzo(b)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(k)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(a)pyrene, mg/l	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene, mg/l	ND	ND	ND	ND	ND
2-Chlorophenol, mg/l	ND	ND	ND	ND	ND
Phenol, mg/l	ND	ND	ND	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol, mg/l	ND	ND	ND	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND	ND	ND	ND
Pentachlorophenol, mg/l	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
Carbazole, mg/l	ND	ND	ND	ND	ND
Tetrachlorophenols, mg/l	ND	ND	ND	ND	ND

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46553-7	MW-21 (# 11443)	11-17-93
46553-8	MW-23 (# 11444)	11-17-93
46553-9	MW-24A (# 11445)	11-17-93
46553-10	Trip Blank	11-17-93

PARAMETER	46553-6	46553-7	46553-8	46553-9	46553-10
Volatiles by GC/MS					
Chloromethane, mg/l	ND	ND	ND	ND	ND
Bromomethane, mg/l	ND	ND	ND	ND	ND
Vinyl Chloride, mg/l	ND	ND	ND	ND	ND
Chloroethane, mg/l	ND	ND	ND	ND	ND
Methylene Chloride (Dichloromethane), mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethene, mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethane, mg/l	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene, mg/l	ND	ND	ND	ND	ND
1,2-Dichloroethane, mg/l	ND	ND	ND	ND	ND
1,1,1-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Carbon Tetrachloride, mg/l	ND	ND	ND	ND	ND
Bromodichloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, mg/l	ND	ND	ND	ND	ND
1,2-Dichloropropane, mg/l	ND	ND	ND	ND	ND
Trichloroethene, mg/l	ND	ND	ND	ND	ND
Dibromochloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Benzene, mg/l	ND	ND	ND	ND	ND

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46553-7	MW-21 (# 11443)	11-17-93
46553-8	MW-23 (# 11444)	11-17-93
46553-9	MW-24A (# 11445)	11-17-93
46553-10	Trip Blank	11-17-93

PARAMETER	46553-6	46553-7	46553-8	46553-9	46553-10
Cis-1,3-Dichloropropene, mg/l	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether, mg/l	ND	ND	ND	ND	ND
Toluene, mg/l	ND	ND	ND	ND	ND
Chlorobenzene, mg/l	ND	ND	ND	ND	ND
Ethylbenzene, mg/l	ND	ND	ND	ND	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND	ND	ND	ND	ND
Dichlorodifluoromethane, mg/l	ND	ND	ND	ND	ND
m&p-Xylene, mg/l	ND	ND	ND	ND	ND
o-Xylene, mg/l	ND	ND	ND	ND	ND
Fluorotrichloromethane, mg/l	ND	ND	ND	ND	ND
1,2-Dibromoethane (EDB) , mg/l	ND	ND	ND	ND	ND
Arsenic, mg/l	ND	0.019	ND	ND	ND
Arsenic (Dissolved), mg/l	ND	ND	ND	ND	ND
Chromium, mg/l	ND	0.016	ND	ND	ND
Chromium (Dissolved), mg/l	ND	ND	ND	ND	ND
Copper, mg/l	ND	ND	ND	ND	ND
Copper (Dissolved), mg/l	ND	ND	ND	ND	ND

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Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-11	Field Blank	11-17-93

PARAMETER	46553-11
Semivolatile Organics (8270)	
bis(2-Chloroethyl)ether, mg/l	ND
Naphthalene, mg/l	ND
Acenaphthene, mg/l	ND
Phenanthrene, mg/l	ND
Anthracene, mg/l	ND
Fluoranthene, mg/l	ND
Chrysene, mg/l	ND
Benzo(a)Anthracene, mg/l	ND
Benzo(b)fluoranthene, mg/l	ND
Benzo(k)fluoranthene, mg/l	ND
Benzo(a)pyrene, mg/l	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND
Dibenz(a,h)anthracene, mg/l	ND
2-Chlorophenol, mg/l	ND
Phenol, mg/l	ND
2,4-Dimethylphenol, mg/l	ND
2,4,6-Trichlorophenol, mg/l	ND
4-Chloro-3-methylphenol, mg/l	ND
2,4-Dinitrophenol, mg/l	ND
Pentachlorophenol, mg/l	ND
2,4,5-Trichlorophenol, mg/l	ND
Carbazole, mg/l	ND
Tetrachlorophenols, mg/l	ND

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-11	Field Blank	11-17-93

PARAMETER	46553-11
Volatiles by GC/MS	
Chloromethane, mg/l	ND
Bromomethane, mg/l	ND
Vinyl Chloride, mg/l	ND
Chloroethane, mg/l	ND
Methylene Chloride (Dichloromethane), mg/l	ND
1,1-Dichloroethene, mg/l	ND
1,1-Dichloroethane, mg/l	ND
Trans-1,2-Dichloroethylene, mg/l	ND
1,2-Dichloroethane, mg/l	ND
1,1,1-Trichloroethane, mg/l	ND
Carbon Tetrachloride, mg/l	ND
Bromodichloromethane, mg/l	ND
1,1,2,2-Tetrachloroethane, mg/l	ND
1,2-Dichloropropane, mg/l	ND
Trichloroethene, mg/l	ND
Dibromochloromethane, mg/l	ND
1,1,2-Trichloroethane, mg/l	ND
Benzene, mg/l	ND
Cis-1,3-Dichloropropene, mg/l	ND
2-Chloroethylvinyl Ether, mg/l	ND
Toluene, mg/l	ND
Chlorobenzene, mg/l	ND
Ethylbenzene, mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-11	Field Blank	11-17-93

PARAMETER	46553-11
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND
Dichlorodifluoromethane, mg/l	ND
m&p-Xylene, mg/l	ND
o-Xylene, mg/l	ND
Fluorotrichloromethane, mg/l	ND
1,2-Dibromoethane (EDB) , mg/l	ND
Arsenic, mg/l	ND
Arsenic (Dissolved), mg/l	ND
Chromium, mg/l	ND
Chromium (Dissolved), mg/l	ND
Copper, mg/l	ND
Copper (Dissolved), mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-12	MW-6 (# 11435)	11-17-93
46553-13	MW-18 (# 11436)	11-17-93

PARAMETER	46553-12	46553-13
Semivolatile Organics (8270)		
bis(2-Chloroethyl)ether, mg/l	ND	ND
Naphthalene, mg/l	ND	ND
Acenaphthene, mg/l	ND	ND
Phenanthrene, mg/l	ND	ND
Anthracene, mg/l	ND	ND
Fluoranthene, mg/l	ND	ND
Chrysene, mg/l	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND
Benzo(b)fluoranthene, mg/l	ND	ND
Benzo(k)fluoranthene, mg/l	ND	ND
Benzo(a)pyrene, mg/l	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND
Dibenz(a,h)anthracene, mg/l	ND	ND
2-Chlorophenol, mg/l	ND	ND
Phenol, mg/l	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND
2,4,6-Trichlorophenol, mg/l	ND	ND
4-Chloro-3-methylphenol, mg/l	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND
Pentachlorophenol, mg/l	ND	ND
2,4,5-Trichlorophenol, mg/l	ND	ND
Carbazole, mg/l	ND	ND
Tetrachlorophenols, mg/l	ND	ND

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-12	MW-6 (# 11435)	11-17-93
46553-13	MW-18 (# 11436)	11-17-93

PARAMETER	46553-12	46553-13
Volatiles by GC/MS		
Chloromethane, mg/l	ND	ND
Bromomethane, mg/l	ND	ND
Vinyl Chloride, mg/l	ND	ND
Chloroethane, mg/l	ND	ND
Methylene Chloride (Dichloromethane), mg/l	ND	ND
1,1-Dichloroethene, mg/l	ND	ND
1,1-Dichloroethane, mg/l	ND	ND
Trans-1,2-Dichloroethylene, mg/l	ND	ND
1,2-Dichloroethane, mg/l	ND	ND
1,1,1-Trichloroethane, mg/l	ND	ND
Carbon Tetrachloride, mg/l	ND	ND
Bromodichloromethane, mg/l	ND	ND
1,1,2,2-Tetrachloroethane, mg/l	ND	ND
1,2-Dichloropropane, mg/l	ND	ND
Trichloroethene, mg/l	ND	ND
Dibromochloromethane, mg/l	ND	ND
1,1,2-Trichloroethane, mg/l	ND	ND
Benzene, mg/l	ND	ND
Cis-1,3-Dichloropropene, mg/l	ND	ND
2-Chloroethylvinyl Ether, mg/l	ND	ND
Toluene, mg/l	ND	ND
Chlorobenzene, mg/l	ND	ND

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LOG NO: S3-46553

Received: 18 NOV 93

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46553-12	MW-6 (# 11435)	11-17-93
46553-13	MW-18 (# 11436)	11-17-93

PARAMETER	46553-12	46553-13
Ethylbenzene, mg/l	ND	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND	ND
Dichlorodifluoromethane, mg/l	ND	ND
m&p-Xylene, mg/l	ND	ND
o-Xylene, mg/l	ND	ND
Fluorotrichloromethane, mg/l	ND	ND
1,2-Dibromoethane (EDB) , mg/l	ND	ND
Arsenic, mg/l	ND	0.016
Arsenic (Dissolved), mg/l	ND	ND
Chromium, mg/l	ND	4.6
Chromium (Dissolved), mg/l	ND	ND
Copper, mg/l	ND	0.050
Copper (Dissolved), mg/l	ND	ND
Hydrocarbons (Modified 8015 - Ext.)		
Hydrocarbons as Kerosene, mg/l	ND	ND
Hydrocarbons as Heavy Oils, mg/l	ND	ND
Hydrocarbons as Mineral Spirits, mg/l	ND	ND
Hydrocarbons as Varsol, mg/l	ND	ND
Hydrocarbons as Fuel Oil/Diesel, mg/l	ND	ND
Hydrocarbons (Modified 8015)		
Hydrocarbons as Gasoline, mg/l	ND	ND

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Ms. Sandra Watson
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P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-14	Detection Limits
46553-15	Accuracy (mean % recovery)
46553-16	Precision (% RPD)
46553-17	Analyst Initials)
46553-18	EPA Method Numbers

PARAMETER	46553-14	46553-15	46553-16	46553-17	46553-18
Semivolatile Organics (8270)					
1,4-Dichlorobenzene, mg/l	0.010	85 %	14 %	BK	8270
bis(2-Chloroethyl)ether, mg/l	0.010	---	---	BK	8270
N-Nitrosodi-N-Propylamine, mg/l	0.010	115 %	10 %	BK	8270
1,2,4-Trichlorobenzene, mg/l	0.010	93 %	13 %	BK	8270
Naphthalene, mg/l	0.010	---	---	BK	8270
Acenaphthene, mg/l	0.010	96 %	10 %	BK	8270
2,4-Dinitrotoluene, mg/l	0.010	116 %	12 %	BK	8270
Phenanthrene, mg/l	0.010	---	---	BK	8270
Anthracene, mg/l	0.010	---	---	BK	8270
Fluoranthene, mg/l	0.010	---	---	BK	8270
Pyrene, mg/l	0.010	113 %	11 %	BK	8270
Chrysene, mg/l	0.010	---	---	BK	8270
Benzo(a)Anthracene, mg/l	0.010	---	---	BK	8270
Benzo(b)fluoranthene, mg/l	0.010	---	---	BK	8270
Benzo(k)fluoranthene, mg/l	0.010	---	---	BK	8270
Benzo(a)pyrene, mg/l	0.010	---	---	BK	8270
Indeno(1,2,3-cd)pyrene, mg/l	0.010	---	---	BK	8270
Dibenz(a,h)anthracene, mg/l	0.010	---	---	BK	8270
2-Chlorophenol, mg/l	0.010	85 %	14 %	BK	8270

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Southern Wood Piedmont (WI)
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Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-14	Detection Limits
46553-15	Accuracy (mean % recovery)
46553-16	Precision (% RPD)
46553-17	Analyst Initials)
46553-18	EPA Method Numbers

PARAMETER	46553-14	46553-15	46553-16	46553-17	46553-18
Phenol, mg/l	0.010	86 %	13 %	BK	8270
2,4-Dimethylphenol, mg/l	0.010	---	---	BK	8270
2,4,6-Trichlorophenol, mg/l	0.010	---	---	BK	8270
4-Chloro-3-methylphenol, mg/l	0.010	89 %	10 %	BK	8270
2,4-Dinitrophenol, mg/l	0.050	---	---	BK	8270
Pentachlorophenol, mg/l	0.050	61 %	16 %	BK	8270
4-Nitrophenol, mg/l	0.050	78 %	13 %	BK	8270
2,4,5-Trichlorophenol, mg/l	0.010	---	---	BK	8270
Carbazole, mg/l	0.010	---	---	BK	8270
Tetrachlorophenols, mg/l	0.010	---	---	BK	8270

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Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-14	Detection Limits
46553-15	Accuracy (mean % recovery)
46553-16	Precision (% RPD)
46553-17	Analyst Initials)
46553-18	EPA Method Numbers

PARAMETER	46553-14	46553-15	46553-16	46553-17	46553-18
Volatiles by GC/MS					
Chloromethane, mg/l	0.010	---	---	KA	8240
Bromomethane, mg/l	0.010	---	---	KA	8240
Vinyl Chloride, mg/l	0.010	---	---	KA	8240
Chloroethane, mg/l	0.010	---	---	KA	8240
Methylene Chloride (Dichloromethane), mg/l	0.0050	---	---	KA	8240
1,1-Dichloroethene, mg/l	0.0050	80 %	8.7 %	KA	8240
1,1-Dichloroethane, mg/l	0.0050	---	---	KA	8240
Trans-1,2-Dichloroethylene, mg/l	0.0050	---	---	KA	8240
1,2-Dichloroethane, mg/l	0.0050	---	---	KA	8240
1,1,1-Trichloroethane, mg/l	0.0050	---	---	KA	8240
Carbon Tetrachloride, mg/l	0.0050	---	---	KA	8240
Bromodichloromethane, mg/l	0.0050	---	---	KA	8240
1,1,2,2-Tetrachloroethane, mg/l	0.0050	---	---	KA	8240
1,2-Dichloropropane, mg/l	0.0050	---	---	KA	8240
Trichloroethene, mg/l	0.0050	95 %	11 %	KA	8240
Dibromochloromethane, mg/l	0.0050	---	---	KA	8240
1,1,2-Trichloroethane, mg/l	0.0050	---	---	KA	8240
Benzene, mg/l	0.0050	107 %	15 %	KA	8240

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Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-14	Detection Limits
46553-15	Accuracy (mean % recovery)
46553-16	Precision (% RPD)
46553-17	Analyst Initials)
46553-18	EPA Method Numbers

PARAMETER	46553-14	46553-15	46553-16	46553-17	46553-18
Cis-1,3-Dichloropropene, mg/l	0.0050	---	---	KA	8240
2-Chloroethylvinyl Ether, mg/l	0.050	---	---	KA	8240
Toluene, mg/l	0.0050	103 %	9.3 %	KA	8240
Chlorobenzene, mg/l	0.0050	112 %	8.0 %	KA	8240
Ethylbenzene, mg/l	0.0050	---	---	KA	8240
Methyl-Tert-Butyl-Ether (MTBE), mg/l	0.010	---	---	KA	8240
Dichlorodifluoromethane, mg/l	0.0050	---	---	KA	8240
m&p-Xylene, mg/l	0.0050	---	---	KA	8240
o-Xylene, mg/l	0.0050	---	---	KA	8240
Fluorotrichloromethane, mg/l	0.0050	---	---	KA	8240
1,2-Dibromoethane (EDB) , mg/l	0.0050	---	---	KA	8240
Arsenic, mg/l	0.010	103 %	2.3 %	CH	7060
Arsenic (Dissolved), mg/l	0.010	110 %	1.5 %	CH	7060
Chromium, mg/l	0.010	100 %	0.39 %	AL	6010
Chromium (Dissolved), mg/l	0.010	99 %	0.26 %	AL	6010
Copper, mg/l	0.025	100 %	0.60 %	AL	6010
Copper (Dissolved), mg/l	0.025	99 %	0.14 %	AL	6010

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Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-14	Detection Limits
46553-15	Accuracy (mean % recovery)
46553-16	Precision (% RPD)
46553-17	Analyst Initials)
46553-18	EPA Method Numbers

PARAMETER	46553-14	46553-15	46553-16	46553-17	46553-18
Hydrocarbons (Modified 8015 - Ext.)					
Hydrocarbons as Kerosene, mg/l	0.30	---	---	LM	8015
Hydrocarbons as Heavy Oils, mg/l	1.0	---	---	LM	8015
Hydrocarbons as Mineral Spirits, mg/l	0.30	---	---	LM	8015
Hydrocarbons as Varsol, mg/l	0.30	---	---	LM	8015
Hydrocarbons as Fuel Oil/Diesel, mg/l	0.30	78 %	15 %	LM	8015
Hydrocarbons (Modified 8015)					
Hydrocarbons as Gasoline, mg/l	0.050	94 %	2.1 %	SLG	8015

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Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-19	Dates Extracted
46553-20	Dates Analyzed

PARAMETER	46553-19	46553-20
Semivolatile Organics (8270)		
bis(2-Chloroethyl)ether	11.23.93	12.02.93
Naphthalene	11.23.93	12.02.93
Acenaphthene	11.23.93	12.02.93
Phenanthrene	11.23.93	12.02.93
Anthracene	11.23.93	12.02.93
Fluoranthene	11.23.93	12.02.93
Chrysene	11.23.93	12.02.93
Benzo(a)Anthracene	11.23.93	12.02.93
Benzo(b)fluoranthene	11.23.93	12.02.93
Benzo(k)fluoranthene	11.23.93	12.02.93
Benzo(a)pyrene	11.23.93	12.02.93
Indeno(1,2,3-cd)pyrene	11.23.93	12.02.93
Dibenz(a,h)anthracene	11.23.93	12.02.93
2-Chlorophenol	11.23.93	12.02.93
Phenol	11.23.93	12.02.93
2,4-Dimethylphenol	11.23.93	12.02.93
2,4,6-Trichlorophenol	11.23.93	12.02.93
4-Chloro-3-methylphenol	11.23.93	12.02.93
2,4-Dinitrophenol	11.23.93	12.02.93
Pentachlorophenol	11.23.93	12.02.93
2,4,5-Trichlorophenol	11.23.93	12.02.93

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-19	Dates Extracted
46553-20	Dates Analyzed

PARAMETER	46553-19	46553-20
Volatiles by GC/MS		
Chloromethane	---	11.25.93
Bromomethane	---	11.25.93
Vinyl Chloride	---	11.25.93
Chloroethane	---	11.25.93
Methylene Chloride (Dichloromethane)	---	11.25.93
1,1-Dichloroethene	---	11.25.93
1,1-Dichloroethane	---	11.25.93
Trans-1,2-Dichloroethylene	---	11.25.93
1,2-Dichloroethane	---	11.25.93
1,1,1-Trichloroethane	---	11.25.93
Carbon Tetrachloride	---	11.25.93
Bromodichloromethane	---	11.25.93
1,1,2,2-Tetrachloroethane	---	11.25.93
1,2-Dichloropropane	---	11.25.93
Trichloroethene	---	11.25.93
Dibromochloromethane	---	11.25.93
1,1,2-Trichloroethane	---	11.25.93
Benzene	---	11.25.93
Cis-1,3-Dichloropropene	---	11.25.93
2-Chloroethylvinyl Ether	---	11.25.93
Toluene	---	11.25.93
Chlorobenzene	---	11.25.93

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-19	Dates Extracted
46553-20	Dates Analyzed

PARAMETER	46553-19	46553-20
Ethylbenzene	---	11.25.93
Methyl-Tert-Butyl-Ether (MTBE)	---	11.25.93
Dichlorodifluoromethane	---	11.25.93
m&p-Xylene	---	11.25.93
o-Xylene	---	11.25.93
Fluorotrichloromethane	---	11.25.93
1,2-Dibromoethane (EDB)	---	11.25.93
Fluorotrichlorome	---	---
M/P-Xylenes	---	---
O-Xylenes	---	---
Arsenic	---	12.07.93
Arsenic (Dissolved)	---	12.07.93
Chromium	---	12.07.93
Chromium (Dissolved)	---	12.08.93
Copper	---	12.07.93
Copper (Dissolved)	---	12.08.93
Hydrocarbons (Modified 8015 - Ext.)		
Hydrocarbons as Kerosene	11.23.93	12.05.93
Hydrocarbons as Heavy Oils	11.23.93	12.05.93
Hydrocarbons as Mineral Spirits	11.23.93	12.05.93
Hydrocarbons as Varsol	11.23.93	12.05.93
Hydrocarbons as Fuel Oil/Diesel	11.23.93	12.05.93

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Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-19	Dates Extracted
46553-20	Dates Analyzed

PARAMETER	46553-19	46553-20
Hydrocarbons (Modified 8015)		
Hydrocarbons as Gasoline	---	11.24.93

SL SAVANNAH LABORATORIES
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Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46553-21	Report Completion Date

PARAMETER	46553-21
Date Reported	12.30.93

Methods: EPA SW-846
ND = Not Detected

J. W. Andrews

J. W. Andrews, Ph. D.

Final Page Of Report

U5184

SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

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☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 8[illegible]94 — Fax (904) 878-95[illegible]
☐ 414 Southwest 12th Avenue, Deerfield Beach, FL 33442 — Phone: (305) 421-7400 — Fax (305) 421-25[illegible]
☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (205) 666-6633 — Fax (205) 666-66[illegible]
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax (813) 885-70[illegible]

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

P.O. NUMBER	PROJECT NUMBER	PROJECT NAME
	12-53015.00	SWP-Wilmington

Wilmington Site Specific

CLIENT NAME	TELEPHONE/FAX NO.
ViroGroup, Inc.	803-957-6270 803-957-3845

CLIENT ADDRESS / CITY, STATE, ZIP CODE: 1445 Pisgah Church Rd Lexington, SC 29072

SAMPLER(S) NAME(S): Greg Kuntz, James Leaphart

CLIENT PROJECT MANAGER: Greg Kuntz

PAGE 1 OF 1

☒ STANDARD TAT
☐ EXPEDITED TAT *

REPORT DUE DATE _____

* SUBJECT TO RUSH FEES

MATRIX TYPE: AQUEOUS MATRIX / NONAQUEOUS MATRIX / OIL MATRIX / AIR MATRIX

REQUIRED ANALYSES: SV, VOC, Total Cr, Cr Dissolved, Cr, Cu, As, TPH Diesel, TPH GAS + MTBE

NUMBER OF CONTAINERS SUBMITTED

SAMPLING DATE	SAMPLING TIME	SAMPLE IDENTIFICATION	AQUEOUS MATRIX	NONAQUEOUS MATRIX	OIL MATRIX	AIR MATRIX	SV	VOC	Total Cr	Cr Dissolved	Cr, Cu, As	TPH Diesel	TPH GAS + MTBE
11-17-93	2:20	MW-6 SWP Log# 11435	X				2	3	1	1	2	3	
	2:50	MW-18 11436											
	3:10	MW-7 11437											
	3:20	MW-8A 11438											
	3:40	MW-8 11439											
	3:50	MW-9 11440											
	4:00	MW-10 11441											
	4:15	MW-20A 11442											
	4:30	MW-21 11443											
	4:40	MW-23 11444											
	4:50	MW-24A 11445											
	5:15	Field Blank Trip Blank											

RECEIVED JAN 03 1994 ENVIRONMENTAL

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[illegible]	11/11	12:00	Gregory B. Kuntz	11/16/93	7:30			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
			Gregory B. Kuntz	11/17/93	6:20	[illegible]	11.17.93	6:20

FOR SAVANNAH LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	S.L. LOG NO.	LABORATORY REMARKS
[illegible]	11/17/93	10:20	☑ YES ☐ NO		46553	

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G. Kurtz - ETE

LOG NO: S3-46595

Received: 19 NOV 93

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ENVIRONMENTAL

Ms. Sandra Watson
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P.O. Box 5477, I-85 and Sigsbee Rd
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-1	MW-29 (# 11484)	11-18-93
46595-2	MW-29A (# 11485)	11-18-93
46595-3	MW-30 (# 11486)	11-18-93
46595-4	MW-25 (# 11487)	11-18-93
46595-5	MW-20 (# 11488)	11-18-93

PARAMETER	46595-1	46595-2	46595-3	46595-4	46595-5
Semivolatile Organics (8270)					
bis(2-Chloroethyl)ether, mg/l	ND	ND	ND	ND	ND
Naphthalene, mg/l	ND	ND	ND	ND	ND
Acenaphthene, mg/l	ND	0.54	0.040	0.043	0.014
Phenanthrene, mg/l	ND	ND	0.058	0.062	ND
Anthracene, mg/l	ND	ND	0.026	0.025	ND
Fluoranthene, mg/l	ND	ND	0.016	0.034	ND
Chrysene, mg/l	ND	ND	ND	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND	ND	ND	ND
Benzo(b)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(k)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(a)pyrene, mg/l	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene, mg/l	ND	ND	ND	ND	ND
2-Chlorophenol, mg/l	ND	ND	ND	ND	ND
Phenol, mg/l	ND	ND	ND	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol, mg/l	ND	ND	ND	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND	ND	ND	ND
Pentachlorophenol, mg/l	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
Tetrachlorophenols, mg/l	ND	ND	ND	ND	ND
Carbazole, mg/l	ND	0.019	0.013	ND	ND

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-1	MW-29 (# 11484)	11-18-93
46595-2	MW-29A (# 11485)	11-18-93
46595-3	MW-30 (# 11486)	11-18-93
46595-4	MW-25 (# 11487)	11-18-93
46595-5	MW-20 (# 11488)	11-18-93

PARAMETER	46595-1	46595-2	46595-3	46595-4	46595-5
Volatiles by GC/MS					
Chloromethane, mg/l	ND	ND	ND	ND	ND
Bromomethane, mg/l	ND	ND	ND	ND	ND
Vinyl Chloride, mg/l	ND	ND	ND	ND	ND
Chloroethane, mg/l	ND	ND	ND	ND	ND
Methylene Chloride (Dichloromethane), mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethene, mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethane, mg/l	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene, mg/l	ND	ND	ND	ND	ND
1,2-Dichloroethane, mg/l	ND	ND	ND	ND	ND
1,1,1-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Carbon Tetrachloride, mg/l	ND	ND	ND	ND	ND
Bromodichloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, mg/l	ND	ND	ND	ND	ND
1,2-Dichloropropane, mg/l	ND	ND	ND	ND	ND
Trichloroethene, mg/l	ND	ND	ND	ND	ND
Dibromochloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Benzene, mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-1	MW-29 (# 11484)	11-18-93
46595-2	MW-29A (# 11485)	11-18-93
46595-3	MW-30 (# 11486)	11-18-93
46595-4	MW-25 (# 11487)	11-18-93
46595-5	MW-20 (# 11488)	11-18-93

PARAMETER	46595-1	46595-2	46595-3	46595-4	46595-5
Cis-1,3-Dichloropropene, mg/l	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether, mg/l	ND	ND	ND	ND	ND
Toluene, mg/l	ND	ND	ND	ND	ND
Chlorobenzene, mg/l	ND	ND	ND	ND	ND
Ethylbenzene, mg/l	ND	ND	ND	ND	ND
Dichlorodifluoromethane, mg/l	ND	ND	ND	ND	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND	ND	ND	ND	ND
1,2-Dibromomethane, mg/l	ND	ND	ND	ND	ND
o-Xylene, mg/l	ND	ND	ND	ND	ND
m&p-Xylene, mg/l	ND	ND	ND	ND	ND
Fluorotrichloromethane, mg/l	ND	ND	ND	ND	ND
Arsenic, mg/l	ND	ND	ND	ND	ND
Arsenic (Dissolved), mg/l	ND	ND	ND	ND	ND
Chromium, mg/l	ND	ND	0.024	0.011	ND
Chromium (Dissolved), mg/l	ND	ND	ND	ND	ND
Copper, mg/l	ND	ND	ND	ND	ND
Copper (Dissolved), mg/l	ND	ND	ND	ND	ND

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
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Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-6	MW-11B (# 11489)	11-18-93
46595-7	MW-19A (# 11490)	11-18-93
46595-8	MW-28A (# 11491)	11-18-93
46595-9	MW-22A (# 11492)	11-18-93
46595-10	MW-15 (# 11493)	11-18-93

PARAMETER	46595-6	46595-7	46595-8	46595-9	46595-10
Semivolatile Organics (8270)					
bis(2-Chloroethyl)ether, mg/l	ND	ND	ND	ND	ND
Naphthalene, mg/l	ND	ND	ND	0.018	0.055
Acenaphthene, mg/l	0.081	ND	ND	0.012	0.074
Phenanthrene, mg/l	0.039	ND	ND	ND	0.015
Anthracene, mg/l	ND	ND	ND	ND	ND
Fluoranthene, mg/l	ND	ND	ND	ND	ND
Chrysene, mg/l	ND	ND	ND	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND	ND	ND	ND
Benzo(b)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(k)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(a)pyrene, mg/l	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene, mg/l	ND	ND	ND	ND	ND
2-Chlorophenol, mg/l	ND	ND	ND	ND	ND
Phenol, mg/l	ND	ND	ND	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol, mg/l	ND	ND	ND	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND	ND	ND	ND
Pentachlorophenol, mg/l	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
Tetrachlorophenols, mg/l	ND	ND	ND	ND	ND
Carbazole, mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-6	MW-11B (# 11489)	11-18-93
46595-7	MW-19A (# 11490)	11-18-93
46595-8	MW-28A (# 11491)	11-18-93
46595-9	MW-22A (# 11492)	11-18-93
46595-10	MW-15 (# 11493)	11-18-93

PARAMETER	46595-6	46595-7	46595-8	46595-9	46595-10
Volatiles by GC/MS					
Chloromethane, mg/l	ND	ND	ND	ND	ND
Bromomethane, mg/l	ND	ND	ND	ND	ND
Vinyl Chloride, mg/l	ND	ND	ND	ND	ND
Chloroethane, mg/l	ND	ND	ND	ND	ND
Methylene Chloride (Dichloromethane), mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethene, mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethane, mg/l	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene, mg/l	ND	ND	ND	ND	ND
1,2-Dichloroethane, mg/l	ND	ND	ND	ND	ND
1,1,1-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Carbon Tetrachloride, mg/l	ND	ND	ND	ND	ND
Bromodichloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, mg/l	ND	ND	ND	ND	ND
1,2-Dichloropropane, mg/l	ND	ND	ND	ND	ND
Trichloroethene, mg/l	ND	ND	ND	ND	ND
Dibromochloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Benzene, mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

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46595-7	MW-19A (# 11490)	11-18-93
46595-8	MW-28A (# 11491)	11-18-93
46595-9	MW-22A (# 11492)	11-18-93
46595-10	MW-15 (# 11493)	11-18-93

PARAMETER	46595-6	46595-7	46595-8	46595-9	46595-10
Cis-1,3-Dichloropropene, mg/l	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether, mg/l	ND	ND	ND	ND	ND
Toluene, mg/l	ND	ND	ND	ND	ND
Chlorobenzene, mg/l	ND	ND	ND	ND	ND
Ethylbenzene, mg/l	ND	ND	ND	ND	0.0051
Dichlorodifluoromethane, mg/l	ND	ND	ND	ND	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND	ND	ND	ND	ND
1,2-Dibromomethane, mg/l	ND	ND	ND	ND	ND
o-Xylene, mg/l	ND	ND	ND	0.0060	ND
m&p-Xylene, mg/l	ND	ND	ND	0.0061	ND
Fluorotrichloromethane, mg/l	ND	ND	ND	ND	ND
Arsenic, mg/l	ND	ND	ND	ND	0.088
Arsenic (Dissolved), mg/l	ND	ND	ND	ND	ND
Chromium, mg/l	ND	ND	ND	ND	ND
Chromium (Dissolved), mg/l	ND	ND	ND	ND	ND
Copper, mg/l	ND	ND	ND	ND	ND
Copper (Dissolved), mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-11	MW-19 (# 11495)	11-18-93
46595-12	MW-24 (# 11496)	11-18-93
46595-13	MW-11A (# 11497)	11-18-93
46595-14	MW-14A (# 11498)	11-18-93
46595-15	MW-28 (# 11499)	11-18-93

PARAMETER	46595-11	46595-12	46595-13	46595-14	46595-15
Semivolatile Organics (8270)					
bis(2-Chloroethyl)ether, mg/l	ND	ND	ND	ND	ND
Naphthalene, mg/l	0.29	0.29	0.31	3.3	ND
Acenaphthene, mg/l	0.27	0.29	0.076	0.41	0.012
Phenanthrene, mg/l	0.077	0.068	0.047	ND	0.021
Anthracene, mg/l	ND	ND	ND	ND	ND
Fluoranthene, mg/l	ND	ND	ND	ND	ND
Chrysene, mg/l	ND	ND	ND	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND	ND	ND	ND
Benzo(b)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(k)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(a)pyrene, mg/l	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene, mg/l	ND	ND	ND	ND	ND
2-Chlorophenol, mg/l	ND	ND	ND	ND	ND
Phenol, mg/l	ND	ND	ND	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol, mg/l	ND	ND	ND	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND	ND	ND	ND
Pentachlorophenol, mg/l	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
Tetrachlorophenols, mg/l	ND	ND	ND	ND	ND
Carbazole, mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-11	MW-19 (# 11495)	11-18-93
46595-12	MW-24 (# 11496)	11-18-93
46595-13	MW-11A (# 11497)	11-18-93
46595-14	MW-14A (# 11498)	11-18-93
46595-15	MW-28 (# 11499)	11-18-93

PARAMETER	46595-11	46595-12	46595-13	46595-14	46595-15
Volatiles by GC/MS					
Chloromethane, mg/l	ND	ND	ND	ND	ND
Bromomethane, mg/l	ND	ND	ND	ND	ND
Vinyl Chloride, mg/l	ND	ND	ND	ND	ND
Chloroethane, mg/l	ND	ND	ND	ND	ND
Methylene Chloride (Dichloromethane), mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethene, mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethane, mg/l	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene, mg/l	ND	ND	ND	ND	ND
1,2-Dichloroethane, mg/l	ND	ND	ND	ND	ND
1,1,1-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Carbon Tetrachloride, mg/l	ND	ND	ND	ND	ND
Bromodichloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, mg/l	ND	ND	ND	ND	ND
1,2-Dichloropropane, mg/l	ND	ND	ND	ND	ND
Trichloroethene, mg/l	ND	ND	ND	ND	ND
Dibromochloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Benzene, mg/l	0.0055	ND	ND	ND	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-11	MW-19 (# 11495)	11-18-93
46595-12	MW-24 (# 11496)	11-18-93
46595-13	MW-11A (# 11497)	11-18-93
46595-14	MW-14A (# 11498)	11-18-93
46595-15	MW-28 (# 11499)	11-18-93

PARAMETER	46595-11	46595-12	46595-13	46595-14	46595-15
Cis-1,3-Dichloropropene, mg/l	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether, mg/l	ND	ND	ND	ND	ND
Toluene, mg/l	ND	ND	ND	ND	ND
Chlorobenzene, mg/l	ND	ND	ND	ND	ND
Ethylbenzene, mg/l	0.0058	0.0089	ND	0.018	ND
Dichlorodifluoromethane, mg/l	ND	ND	ND	ND	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND	ND	ND	ND	ND
1,2-Dibromomethane, mg/l	ND	ND	ND	ND	ND
o-Xylene, mg/l	ND	ND	ND	0.0087	ND
m&p-Xylene, mg/l	0.0054	ND	ND	0.020	ND
Fluorotrichloromethane, mg/l	ND	ND	ND	ND	ND
Arsenic, mg/l	ND	ND	ND	ND	ND
Arsenic (Dissolved), mg/l	ND	ND	ND	ND	ND
Chromium, mg/l	ND	0.010	ND	ND	ND
Chromium (Dissolved), mg/l	ND	ND	ND	ND	ND
Copper, mg/l	ND	ND	ND	ND	ND
Copper (Dissolved), mg/l	ND	ND	ND	ND	ND

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Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-16	MW-12 (# 11500)	11-18-93
46595-17	MW-13 (# 11501)	11-18-93
46595-18	MW-17 (# 11502)	11-18-93
46595-19	MW-16 (# 11503)	11-18-93
46595-20	Trip Blank	11-18-93

PARAMETER	46595-16	46595-17	46595-18	46595-19	46595-20
Semivolatile Organics (8270)					
bis(2-Chloroethyl)ether, mg/l	ND	ND	ND	ND	ND
Naphthalene, mg/l	3.1	3.1	ND	ND	ND
Acenaphthene, mg/l	0.77	0.80	0.016	ND	ND
Phenanthrene, mg/l	0.74	0.77	0.017	ND	ND
Anthracene, mg/l	ND	ND	ND	ND	ND
Fluoranthene, mg/l	0.31	0.30	0.010	ND	ND
Chrysene, mg/l	ND	ND	ND	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND	ND	ND	ND
Benzo(b)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(k)fluoranthene, mg/l	ND	ND	ND	ND	ND
Benzo(a)pyrene, mg/l	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene, mg/l	ND	ND	ND	ND	ND
2-Chlorophenol, mg/l	ND	ND	ND	ND	ND
Phenol, mg/l	ND	ND	ND	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol, mg/l	ND	ND	ND	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND	ND	ND	ND
Pentachlorophenol, mg/l	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol, mg/l	ND	ND	ND	ND	ND
Tetrachlorophenols, mg/l	ND	ND	ND	ND	ND
Carbazole, mg/l	0.21	0.22	ND	ND	ND

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-16	MW-12 (# 11500)	11-18-93
46595-17	MW-13 (# 11501)	11-18-93
46595-18	MW-17 (# 11502)	11-18-93
46595-19	MW-16 (# 11503)	11-18-93
46595-20	Trip Blank	11-18-93

PARAMETER	46595-16	46595-17	46595-18	46595-19	46595-20
Volatiles by GC/MS					
Chloromethane, mg/l	ND	ND	ND	ND	ND
Bromomethane, mg/l	ND	ND	ND	ND	ND
Vinyl Chloride, mg/l	ND	ND	ND	ND	ND
Chloroethane, mg/l	ND	ND	ND	ND	ND
Methylene Chloride (Dichloromethane), mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethene, mg/l	ND	ND	ND	ND	ND
1,1-Dichloroethane, mg/l	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene, mg/l	ND	ND	ND	ND	ND
1,2-Dichloroethane, mg/l	ND	ND	ND	ND	ND
1,1,1-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Carbon Tetrachloride, mg/l	ND	ND	ND	ND	ND
Bromodichloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane, mg/l	ND	ND	ND	ND	ND
1,2-Dichloropropane, mg/l	ND	ND	ND	ND	ND
Trichloroethene, mg/l	ND	ND	ND	ND	ND
Dibromochloromethane, mg/l	ND	ND	ND	ND	ND
1,1,2-Trichloroethane, mg/l	ND	ND	ND	ND	ND
Benzene, mg/l	ND	0.046	ND	ND	ND

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Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-16	MW-12 (# 11500)	11-18-93
46595-17	MW-13 (# 11501)	11-18-93
46595-18	MW-17 (# 11502)	11-18-93
46595-19	MW-16 (# 11503)	11-18-93
46595-20	Trip Blank	11-18-93

PARAMETER	46595-16	46595-17	46595-18	46595-19	46595-20
Cis-1,3-Dichloropropene, mg/l	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether, mg/l	ND	ND	ND	ND	ND
Toluene, mg/l	0.0074	ND	ND	ND	ND
Chlorobenzene, mg/l	ND	ND	ND	ND	ND
Ethylbenzene, mg/l	ND	0.026	ND	ND	ND
Dichlorodifluoromethane, mg/l	ND	ND	ND	ND	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND	ND	ND	ND	ND
1,2-Dibromomethane, mg/l	ND	ND	ND	ND	ND
o-Xylene, mg/l	0.0066	0.013	ND	ND	ND
m&p-Xylene, mg/l	0.011	0.014	ND	ND	ND
Fluorotrichloromethane, mg/l	ND	ND	ND	ND	ND
Arsenic, mg/l	0.029	0.049	0.023	ND	ND
Arsenic (Dissolved), mg/l	ND	ND	ND	ND	ND
Chromium, mg/l	0.024	0.040	0.012	ND	ND
Chromium (Dissolved), mg/l	ND	ND	ND	ND	ND
Copper, mg/l	0.043	0.058	0.025	ND	ND
Copper (Dissolved), mg/l	ND	ND	ND	ND	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-21	Field Blank	11-18-93

PARAMETER	46595-21
Semivolatile Organics (8270)	
bis(2-Chloroethyl)ether, mg/l	ND
Naphthalene, mg/l	ND
Acenaphthene, mg/l	ND
Phenanthrene, mg/l	ND
Anthracene, mg/l	ND
Fluoranthene, mg/l	ND
Chrysene, mg/l	ND
Benzo(a)Anthracene, mg/l	ND
Benzo(b)fluoranthene, mg/l	ND
Benzo(k)fluoranthene, mg/l	ND
Benzo(a)pyrene, mg/l	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND
Dibenz(a,h)anthracene, mg/l	ND
2-Chlorophenol, mg/l	ND
Phenol, mg/l	ND
2,4-Dimethylphenol, mg/l	ND
2,4,6-Trichlorophenol, mg/l	ND
4-Chloro-3-methylphenol, mg/l	ND
2,4-Dinitrophenol, mg/l	ND
Pentachlorophenol, mg/l	ND
2,4,5-Trichlorophenol, mg/l	ND
Tetrachlorophenols, mg/l	ND
Carbazole, mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-21	Field Blank	11-18-93

PARAMETER	46595-21
Volatiles by GC/MS	
Chloromethane, mg/l	ND
Bromomethane, mg/l	ND
Vinyl Chloride, mg/l	ND
Chloroethane, mg/l	ND
Methylene Chloride (Dichloromethane), mg/l	ND
1,1-Dichloroethene, mg/l	ND
1,1-Dichloroethane, mg/l	ND
Trans-1,2-Dichloroethylene, mg/l	ND
1,2-Dichloroethane, mg/l	ND
1,1,1-Trichloroethane, mg/l	ND
Carbon Tetrachloride, mg/l	ND
Bromodichloromethane, mg/l	ND
1,1,2,2-Tetrachloroethane, mg/l	ND
1,2-Dichloropropane, mg/l	ND
Trichloroethene, mg/l	ND
Dibromochloromethane, mg/l	ND
1,1,2-Trichloroethane, mg/l	ND
Benzene, mg/l	ND
Cis-1,3-Dichloropropene, mg/l	ND
2-Chloroethylvinyl Ether, mg/l	ND
Toluene, mg/l	ND
Chlorobenzene, mg/l	ND
Ethylbenzene, mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-21	Field Blank	11-18-93

PARAMETER	46595-21
Dichlorodifluoromethane, mg/l	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND
1,2-Dibromomethane, mg/l	ND
o-Xylene, mg/l	ND
m&p-Xylene, mg/l	ND
Fluorotrichloromethane, mg/l	ND
Arsenic, mg/l	ND
Arsenic (Dissolved), mg/l	ND
Chromium, mg/l	ND
Chromium (Dissolved), mg/l	ND
Copper, mg/l	ND
Copper (Dissolved), mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-22	MW-27 (# 11494)	11-18-93

PARAMETER	46595-22
Semivolatile Organics (8270)	
bis(2-Chloroethyl)ether, mg/l	ND
Naphthalene, mg/l	ND
Acenaphthene, mg/l	ND
Phenanthrene, mg/l	ND
Anthracene, mg/l	ND
Fluoranthene, mg/l	ND
Chrysene, mg/l	ND
Benzo(a)Anthracene, mg/l	ND
Benzo(b)fluoranthene, mg/l	ND
Benzo(k)fluoranthene, mg/l	ND
Benzo(a)pyrene, mg/l	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND
Dibenz(a,h)anthracene, mg/l	ND
2-Chlorophenol, mg/l	ND
Phenol, mg/l	ND
2,4-Dimethylphenol, mg/l	ND
2,4,6-Trichlorophenol, mg/l	ND
4-Chloro-3-methylphenol, mg/l	ND
2,4-Dinitrophenol, mg/l	ND
Pentachlorophenol, mg/l	ND
2,4,5-Trichlorophenol, mg/l	ND
Tetrachlorophenols, mg/l	ND
Carbazole, mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-22	MW-27 (# 11494)	11-18-93

PARAMETER	46595-22
Volatiles by GC/MS	
Chloromethane, mg/l	ND
Bromomethane, mg/l	ND
Vinyl Chloride, mg/l	ND
Chloroethane, mg/l	ND
Methylene Chloride (Dichloromethane), mg/l	ND
1,1-Dichloroethene, mg/l	ND
1,1-Dichloroethane, mg/l	ND
Trans-1,2-Dichloroethylene, mg/l	ND
1,2-Dichloroethane, mg/l	ND
1,1,1-Trichloroethane, mg/l	ND
Carbon Tetrachloride, mg/l	ND
Bromodichloromethane, mg/l	ND
1,1,2,2-Tetrachloroethane, mg/l	ND
1,2-Dichloropropane, mg/l	ND
Trichloroethene, mg/l	ND
Dibromochloromethane, mg/l	ND
1,1,2-Trichloroethane, mg/l	ND
Benzene, mg/l	ND
Cis-1,3-Dichloropropene, mg/l	ND
2-Chloroethylvinyl Ether, mg/l	ND
Toluene, mg/l	ND
Chlorobenzene, mg/l	ND
Ethylbenzene, mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
46595-22	MW-27 (# 11494)	11-18-93

PARAMETER	46595-22
Dichlorodifluoromethane, mg/l	ND
Methyl-Tert-Butyl-Ether (MTBE), mg/l	ND
1,2-Dibromomethane, mg/l	ND
o-Xylene, mg/l	ND
m&p-Xylene, mg/l	ND
Fluorotrichloromethane, mg/l	ND
Arsenic, mg/l	0.014
Arsenic (Dissolved), mg/l	ND
Chromium, mg/l	ND
Chromium (Dissolved), mg/l	ND
Copper, mg/l	ND
Copper (Dissolved), mg/l	ND
Hydrocarbons (Modified 8015)	
Hydrocarbons as Gasoline, mg/l	ND
Hydrocarbons (Modified 8015 - Ext.)	
Hydrocarbons as Kerosene, mg/l	ND
Hydrocarbons as Heavy Oils, mg/l	ND
Hydrocarbons as Mineral Spirits, mg/l	ND
Hydrocarbons as Varsol, mg/l	ND
Hydrocarbons as Fuel Oil/Diesel, mg/l	ND

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-23	Detection Limits
46595-24	Accuracy (mean % recovery)
46595-25	Precision (% RPD)
46595-26	Analyst Initials
46595-27	EPA Method Numbers

PARAMETER	46595-23	46595-24	46595-25	46595-26	46595-27
Semivolatile Organics (8270)					
Bis(2-chloroisopropyl)ether, mg/l	0.010	---	---	RB	8270
Naphthalene, mg/l	0.010	---	---	RB	8270
Acenaphthene, mg/l	0.010	88 %	8.0 %	RB	8270
Phenanthrene, mg/l	0.010	---	---	RB	8270
Anthracene, mg/l	0.010	---	---	RB	8270
Fluoranthene, mg/l	0.010	---	---	RB	8270
Chrysene, mg/l	0.010	---	---	RB	8270
Benzo(a)Anthracene, mg/l	0.010	---	---	RB	8270
Benzo(b)fluoranthene, mg/l	0.010	---	---	RB	8270
Benzo(k)fluoranthene, mg/l	0.010	---	---	RB	8270
Benzo(a)pyrene, mg/l	0.010	---	---	RB	8270
Indeno(1,2,3-cd)pyrene, mg/l	0.010	---	---	RB	8270
Dibenz(a,h)anthracene, mg/l	0.010	---	---	RB	8270
2-Chlorophenol, mg/l	0.010	98 %	7.1 %	RB	8270
Phenol, mg/l	0.010	82 %	6.1 %	RB	8270
2,4-Dimethylphenol, mg/l	0.010	---	---	RB	8270
2,4,6-Trichlorophenol, mg/l	0.010	---	---	RB	8270
4-Chloro-3-methylphenol, mg/l	0.010	88 %	5.7 %	RB	8270
2,4-Dinitrophenol, mg/l	0.050	---	---	RB	8270
Pentachlorophenol, mg/l	0.050	64 %	1.5 %	RB	8270
2,4,5-Trichlorophenol, mg/l	0.010	---	---	RB	8270
Tetrachlorophenols, mg/l	0.050	---	---	RB	8270
Carbazole, mg/l	0.010	---	---	RB	8270

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Spartanburg, SC 29304

Project: Wilmington, NC
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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-23	Detection Limits
46595-24	Accuracy (mean % recovery)
46595-25	Precision (% RPD)
46595-26	Analyst Initials
46595-27	EPA Method Numbers

PARAMETER	46595-23	46595-24	46595-25	46595-26	46595-27
Volatiles by GC/MS					
Chloromethane, mg/l	0.010	---	---	TCS	8240
Bromomethane, mg/l	0.010	---	---	TCS	8240
Vinyl Chloride, mg/l	0.010	---	---	TCS	8240
Chloroethane, mg/l	0.010	---	---	TCS	8240
Methylene Chloride (Dichloromethane), mg/l	0.0050	---	---	TCS	8240
1,1-Dichloroethene, mg/l	0.0050	133 %	3.0 %	TCS	8240
1,1-Dichloroethane, mg/l	0.0050	---	---	TCS	8240
Trans-1,2-Dichloroethylene, mg/l	0.0050	---	---	TCS	8240
1,2-Dichloroethane, mg/l	0.0050	---	---	TCS	8240
1,1,1-Trichloroethane, mg/l	0.0050	---	---	TCS	8240
Carbon Tetrachloride, mg/l	0.0050	---	---	TCS	8240
Bromodichloromethane, mg/l	0.0050	---	---	TCS	8240
1,1,2,2-Tetrachloroethane, mg/l	0.0050	---	---	TCS	8240
1,2-Dichloropropane, mg/l	0.0050	---	---	TCS	8240
Trichloroethene, mg/l	0.0050	129 %	1.6 %	TCS	8240
Dibromochloromethane, mg/l	0.0050	---	---	TCS	8240
1,1,2-Trichloroethane, mg/l	0.0050	---	---	TCS	8240
Benzene, mg/l	0.0050	131 %	1.5 %	TCS	8240

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-23	Detection Limits
46595-24	Accuracy (mean % recovery)
46595-25	Precision (% RPD)
46595-26	Analyst Initials
46595-27	EPA Method Numbers

PARAMETER	46595-23	46595-24	46595-25	46595-26	46595-27
Cis-1,3-Dichloropropene, mg/l	0.0050	---	---	TCS	8240
2-Chloroethylvinyl Ether, mg/l	0.0050	---	---	TCS	8240
Toluene, mg/l	0.0050	130 %	0.77 %	TCS	8240
Chlorobenzene, mg/l	0.0050	132 %	0.76 %	TCS	8240
Ethylbenzene, mg/l	0.0050	---	---	TCS	8240
Dichlorodifluoromethane, mg/l	0.0050	---	---	TCS	8240
Methyl-Tert-Butyl-Ether (MTBE), mg/l	0.050	---	---	TCS	8240
1,2-Dibromomethane, mg/l	0.0050	---	---	TCS	8240
o-Xylene, mg/l	0.0050	---	---	TCS	8240
m&p-Xylene, mg/l	0.0050	---	---	TCS	8240
Fluorotrichloromethane, mg/l	0.0050	---	---	TCS	8240
Arsenic, mg/l	0.010	107 %	2.6 %	JS	7060
Arsenic (Dissolved), mg/l	0.010	91 %	2.6 %	JS	7060
Chromium, mg/l	0.010	93 %	0.34 %	AL	6010
Chromium (Dissolved), mg/l	0.010	93 %	0.34 %	AL	6010
Copper, mg/l	0.025	93 %	0.17 %	AL	6010
Copper (Dissolved), mg/l	0.025	93 %	0.17 %	AL	6010
Hydrocarbons (Modified 8015)					
Hydrocarbons as Gasoline, mg/l	0.050	94 %	2.1 %	SLG	8015

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-23	Detection Limits
46595-24	Accuracy (mean % recovery)
46595-25	Precision (% RPD)
46595-26	Analyst Initials
46595-27	EPA Method Numbers

PARAMETER	46595-23	46595-24	46595-25	46595-26	46595-27
Hydrocarbons (Modified 8015 - Ext.)					
Hydrocarbons as Kerosene, mg/l	0.30	---	---	LM	8015
Hydrocarbons as Heavy Oils, mg/l	1.0	---	---	LM	8015
Hydrocarbons as Mineral Spirits, mg/l	0.30	---	---	LM	8015
Hydrocarbons as Varsol, mg/l	0.30	---	---	LM	8015
Hydrocarbons as Fuel Oil/Diesel, mg/l	0.30	78 %	15 %	LM	8015

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-28	Date Extracted
46595-29	Date Analyzed

PARAMETER	46595-28	46595-29
Semivolatile Organics (8270)		
Bis(2-chloroisopropyl)ether	11.24.93	12.1/9.93
Naphthalene	11.24.93	12.1/9.93
Acenaphthene	11.24.93	12.1/9.93
Phenanthrene	11.24.93	12.1/9.93
Anthracene	11.24.93	12.1/9.93
Fluoranthene	11.24.93	12.1/9.93
Chrysene	11.24.93	12.1/9.93
Benzo(a)Anthracene	11.24.93	12.1/9.93
Benzo(b)fluoranthene	11.24.93	12.1/9.93
Benzo(k)fluoranthene	11.24.93	12.1/9.93
Benzo(a)pyrene	11.24.93	12.1/9.93
Indeno(1,2,3-cd)pyrene	11.24.93	12.1/9.93
Dibenz(a,h)anthracene	11.24.93	12.1/9.93
2-Chlorophenol	11.24.93	12.1/9.93
Phenol	11.24.93	12.1/9.93
2,4-Dimethylphenol	11.24.93	12.1/9.93
2,4,6-Trichlorophenol	11.24.93	12.1/9.93
4-Chloro-3-methylphenol	11.24.93	12.1/9.93
2,4-Dinitrophenol	11.24.93	12.1/9.93
Pentachlorophenol	11.24.93	12.1/9.93
2,4,5-Trichlorophenol	11.24.93	12.1/9.93
Tetrachlorophenols	11.24.93	12.1/9.93
Carbazole	11.24.93	12.1/9.93

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-28	Date Extracted
46595-29	Date Analyzed

PARAMETER	46595-28	46595-29
Volatiles by GC/MS		
Chloromethane	---	12.01.93
Bromomethane	---	12.01.93
Vinyl Chloride	---	12.01.93
Chloroethane	---	12.01.93
Methylene Chloride (Dichloromethane)	---	12.01.93
1,1-Dichloroethene	---	12.01.93
1,1-Dichloroethane	---	12.01.93
Trans-1,2-Dichloroethylene	---	12.01.93
1,2-Dichloroethane	---	12.01.93
1,1,1-Trichloroethane	---	12.01.93
Carbon Tetrachloride	---	12.01.93
Bromodichloromethane	---	12.01.93
1,1,2,2-Tetrachloroethane	---	12.01.93
1,2-Dichloropropane	---	12.01.93
Trichloroethene	---	12.01.93
Dibromochloromethane	---	12.01.93
1,1,2-Trichloroethane	---	12.01.93
Benzene	---	12.01.93
Cis-1,3-Dichloropropene	---	12.01.93
2-Chloroethylvinyl Ether	---	12.01.93
Toluene	---	12.01.93
Chlorobenzene	---	12.01.93

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

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LOG NO: S3-46595

RECEIVED JAN 03 1994 ENVIRON...

Received: 19 NOV 93

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-28	Date Extracted
46595-29	Date Analyzed

PARAMETER	46595-28	46595-29
Ethylbenzene	---	12.01.93
Dichlorodifluoromethane	---	12.01.93
Methyl-Tert-Butyl-Ether (MTBE)	---	12.01.93
1,2-Dibromomethane	---	12.01.93
o-Xylene	---	12.01.93
m&p-Xylene	---	12.01.93
Fluorotrichloromethane	---	12.01.93
rsenic	---	12.10.93
Arsenic (Dissolved)	---	12.08.93
Chromium	---	12.09.93
Chromium (Dissolved)	---	12.09.93
Copper	---	12.09.93
Copper (Dissolved)	---	12.09.93
Hydrocarbons (Modified 8015)		
Hydrocarbons as Gasoline	---	11.26.93
Hydrocarbons (Modified 8015 - Ext.)		
Hydrocarbons as Kerosene	11.23.93	12.05.93
Hydrocarbons as Heavy Oils	11.23.93	12.05.93
Hydrocarbons as Mineral Spirits	11.23.93	12.05.93
Hydrocarbons as Varsol	11.23.93	12.05.93
Hydrocarbons as Fuel Oil/Diesel	11.23.93	12.05.93

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& ENVIRONMENTAL SERVICES, INC.

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RECEIVED
JAN 03 1994
ENVIRONMENTAL

LOG NO: S3-46595
Received: 19 NOV 93

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
46595-30	Report Completion Date

PARAMETER	46595-30
Date Reported	12.22.93

Methods: EPA SW-846
ND = Not Detected

J. W. Andrews, Ph. D.

Final Page Of Report

05183

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

☒ 5102 LaRoche Avenue, Savannah, GA 31404 — Phone: (912) 3[illegible]58 — Fax (912) 352-0
☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 8[illegible]94 — Fax (904) 878-9
☐ 414 Southwest 12th Avenue, Deerfield Beach, FL 33442 — Phone: (305) 421-7400 — Fax (305) 421-2
☐ 900 Lakeside Drive, Mobile, AL 36693 — Phone: (205) 666-6633 — Fax (205) 666-6
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax (813) 885-7

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Wilmington Site Specific

P.O. NUMBER	PROJECT NUMBER	PROJECT NAME
	12-53015.00	SWP-Wil

CLIENT NAME	TELEPHONE/FAX NO.
Viro Group, Inc	803-957-6270 803-957-3845

CLIENT ADDRESS	CITY, STATE, ZIP CODE
1445 Pisgah Church Rd.	Lexington, SC 29072

SAMPLER(S) NAME(S)	CLIENT PROJECT MANAGER
Greg Kurtz James Leaphart	Greg Kurtz

PAGE 1 OF 2

☒ STANDARD TAT
☐ EXPEDITED TAT *

REPORT DUE DATE _____
* SUBJECT TO RUSH FEES

MATRIX TYPE: AQUEOUS MATRIX / NONAQUEOUS MATRIX / OIL MATRIX / AIR MATRIX

REQUIRED ANALYSES — NUMBER OF CONTAINERS SUBMITTED

SAMPLING DATE	SAMPLING TIME	SAMPLE IDENTIFICATION	AQUEOUS MATRIX	NONAQUEOUS MATRIX	OIL MATRIX	AIR MATRIX	SV	VOC	Total Metals	Cr Cu As	Dissolved Metals	Cr Cu As	TPH-Diesel	TPH-Gas + MTBE				
11-18-93	7:20	MW-29 SWP Log# 11484	X				2	3	1	1	~~2~~	~~3~~						
	7:40	MW-29A 11485																
	8:00	MW-30 11486																
	8:15	MW-25 11487																
	8:30	MW-20 11488																
	8:45	MW-11B 11489																
	9:10	MW-19A 11490																
	1:50	MW-28A 11491																
	2:05	MW-22A 11492																
	2:20	MW-15 11493																
	2:35	MW-27 11494										2	3					
	2:50	MW-19 11495																

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	11/11	12:00	[signature]	11.18	1618			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Gregory B. Kurtz	11/16/93	7:30	Gregory B. Kurtz	11/18/93	1618			

FOR SAVANNAH LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	S.L. LOG NO.	LABORATORY REMARKS
[signature]	11/19/93	10:12	☑ YES ☐ NO		46595	

RECEIVED JAN 03 1994 ENVIRONMENTAL

SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC. 05182

☒ 5102 LaRoche Avenue, Savannah, GA 31404 Phone: (912) [illegible] Fax (912) 352-[illegible]
☐ 2846 Industrial Plaza Drive, Tallahassee, FL 32301 Phone: (904) 8[illegible] Fax (904) 878-[illegible]
☐ 414 Southwest 12th Avenue, Deerfield Beach, FL 33442 Phone: (305) 421-7400 Fax (305) 421-[illegible]
☐ 900 Lakeside Drive, Mobile, AL 36693 Phone: (205) 666-6633 Fax (205) 666-[illegible]
☐ 6712 Benjamin Road, Suite 100, Tampa, FL 33634 Phone: (813) 885-7427 Fax (813) 885-[illegible]

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

P.O. NUMBER	PROJECT NUMBER	PROJECT NAME	MATRIX TYPE	REQUIRED ANALYSES	PAGE	OF
	12-53015.00	SWP-W.1		Wilmington Site Specific	2	2

CLIENT NAME	TELEPHONE/FAX NO.
ViroGroup, Inc.	803-957-6270 / 803-957-3845

CLIENT ADDRESS	CITY, STATE, ZIP CODE
1415 Pisgah Church Rd.	Lexington, SC 29072

SAMPLER(S) NAME(S)	CLIENT PROJECT MANAGER
Greg Kuntz, James Leaphart	Greg Kuntz

☒ STANDARD TAT
☐ EXPEDITED TAT *
REPORT DUE DATE:
* SUBJECT TO RUSH FEES

SAMPLING DATE	SAMPLING TIME	SAMPLE IDENTIFICATION	AQUEOUS MATRIX	NONAQUEOUS MATRIX	OIL MATRIX	AIR MATRIX	SV	VOC	Total Metal Cr Cu Ag	Dissolved Metals Cr Cu Ag	
		NUMBER OF CONTAINERS SUBMITTED									
11-18-93	3:05	MW-24 SWP Log# 11496	X				2	3	1	1	
	3:15	MW-11A 11497									
	3:25	MW-14A 11498									
	3:40	MW-28 11499									
	3:50	MW-12 ~~11~~ 11500									
	4:00	MW-13 11501									
	4:10	MW-17 11502									
	4:20	MW-16 11503									
	5:00	Field Blank									
		Trip Blank									

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	11/11	12:00	[signature]	11/12	1618			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RELINQUISHED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
Gregory B. Kuntz	11/16/93	7:30	Gregory B. Kuntz	11/17/93	1618			

FOR SAVANNAH LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	S.L. LOG NO.	LABORATORY REMARKS
[signature]	11-19-93	10:13 am	☑ YES ☐ NO		46595	

RECEIVED JAN 03 1994 ENVIRONMENTAL

Phase III Surface Water Sample Parameter Summary Table - Semi-Volatiles and Metals

PHASE III SURFACE WATER SAMPLE PARAMETER SUMMARY TABLE
SEMI–VOLATILES AND METALS
SOUTHERN WOOD PIEDMONT FACILITY
WILMINGTON, NORTH CAROLINA

	U.S. HIGHWAY #74 BRIDGE		OLD SLIP		GREENFIELD CREEK		STATE PORTS AUTHORITY	
	1/94		1/94		1/94		1/94	
SEMI–VOLATILES	RESULT	DL*	RESULT	DL*	RESULT	DL*	RESULT	DL*
Acenaphthene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Acenaphthylene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Anthracene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Anthracene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(a)Pyrene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Benzo(b,k)Fluoranthene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Carbazole	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2–Chlorophenol	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Chrysene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Dibenzo(a,h)Anthracene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4–Dimethylphenol	ND	0.010	ND	0.010	ND	0.010	ND	0.010
2,4–Dinitrophenol	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Fluoranthene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Indeno(1,2–cd)pyrene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Naphthalene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
p–chloro–m–cresol	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Pentachlorophenol	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Phenanthrene	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Phenol	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Tetrachlorophenols	ND	0.050	ND	0.050	ND	0.050	ND	0.050
Trichlorophenols	ND	0.010	ND	0.010	ND	0.010	ND	0.010
METALS								
Arsenic	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Chromium	ND	0.010	ND	0.010	ND	0.010	ND	0.010
Copper	ND	0.025	ND	0.025	ND	0.025	ND	0.025

NOTE: DL = Detection Limit
ND = Below Laboratory Detection Limit
All units in mg/l

Phase III Surface Water Sample Laboratory Analytical Data and QA/QC

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RECEIVED
FEB 28 1994
ENVIRONMENTAL AFFAIRS

LOG NO: S4-40324

Received: 20 JAN 94

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

CC: Greg Kuntz-ETE

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40324-1	States Port Authority C/F River Sample # 60 (# 11743)	01-18-94
40324-2	Greenfield Creek # 61 (# 11744)	01-18-94
40324-3	SWP Old Slip # 62 (# 11745)	01-18-94
40324-4	US #74 New Bridge #63 (# 11746)	01-18-94

PARAMETER	40324-1	40324-2	40324-3	40324-4
K001 (Method 8270)				
Chlorophenol, mg/l	ND	ND	ND	ND
Phenol, mg/l	ND	ND	ND	ND
2,4-Dimethylphenol, mg/l	ND	ND	ND	ND
Trichlorophenols, mg/l	ND	ND	ND	ND
p-Chloro-m-cresol, mg/l	ND	ND	ND	ND
Tetrachlorophenols, mg/l	ND	ND	ND	ND
2,4-Dinitrophenol, mg/l	ND	ND	ND	ND
Pentachlorophenol, mg/l	ND	ND	ND	ND
Naphthalene, mg/l	ND	ND	ND	ND
Acenaphthene, mg/l	ND	ND	ND	ND
Acenaphthylene, mg/l	ND	ND	ND	ND
Phenanthrene, mg/l	ND	ND	ND	ND
Anthracene, mg/l	ND	ND	ND	ND
Fluoranthene, mg/l	ND	ND	ND	ND
Chrysene, mg/l	ND	ND	ND	ND
Benzo(a)Anthracene, mg/l	ND	ND	ND	ND
Benzo(b,k)fluoranthene, mg/l	ND	ND	ND	ND
Benzo(a)pyrene, mg/l	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene, mg/l	ND	ND	ND	ND
Dibenzo(a,h)anthracene, mg/l	ND	ND	ND	ND
Carbazole, mg/l	ND	ND	ND	ND
Dilution factor	1	1	1	1

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& ENVIRONMENTAL SERVICES, INC.
5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

RECEIVED
FEB 28 1994
ENVIRONMENTAL

LOG NO: S4-40324

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Spartanburg, SC 29304

CC: Greg Kuntz-ETE

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40324-1	States Port Authority C/F River Sample # 60 (# 11743)	01-18-94
40324-2	Greenfield Creek # 61 (# 11744)	01-18-94
40324-3	SWP Old Slip # 62 (# 11745)	01-18-94
40324-4	US #74 New Bridge #63 (# 11746)	01-18-94

PARAMETER	40324-1	40324-2	40324-3	40324-4
Arsenic (7060), mg/l	ND	ND	ND	ND
Chromium (6010), mg/l	ND	ND	ND	ND
Copper (6010), mg/l	ND	ND	ND	ND

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RECEIVED
FEB 28 '94

LOG NO: S4-40324

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P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

CC: Greg Kuntz-ETE

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
40324-5	Detection Limits
40324-6	Accuracy (mean % recovery)
40324-7	Precision (% RPD)
40324-8	Analyst Initials
40324-9	EPA Method Numbers

PARAMETER	40324-5	40324-6	40324-7	40324-8	40324-9
KO01 (Method 8270)					
2-Chlorophenol, mg/l	0.010	108 %	4.6 %	ML	8270
Phenol, mg/l	0.010	110 %	0 %	ML	8270
2,4-Dimethylphenol, mg/l	0.010	120 %	0.83 %	ML	8270
Trichlorophenols, mg/l	0.010	72 %	4.2 %	ML	8270
p-Chloro-m-cresol, mg/l	0.010	116 %	0 %	ML	8270
Tetrachlorophenols, mg/l	0.050	73 %	5.5 %	ML	8270
2,4-Dinitrophenol, mg/l	0.050	102 %	2.9 %	ML	8270
Pentachlorophenol, mg/l	0.050	66 %	29 %	ML	8270
Naphthalene, mg/l	0.010	90 %	2.2 %	ML	8270
Acenaphthene, mg/l	0.010	77 %	7.8 %	ML	8270
Acenaphthylene, mg/l	0.010	88 %	3.4 %	ML	8270
Phenanthrene, mg/l	0.010	86 %	4.6 %	ML	8270
Anthracene, mg/l	0.010	94 %	5.3 %	ML	8270
Fluoranthene, mg/l	0.010	88 %	1.1 %	ML	8270
Chrysene, mg/l	0.010	94 %	3.2 %	ML	8270
Benzo(a)Anthracene, mg/l	0.010	106 %	2.8 %	ML	8270
Benzo(b,k)fluoranthene, mg/l	0.010	99 %	11 %	ML	8270
Benzo(a)pyrene, mg/l	0.010	98 %	10 %	ML	8270
Indeno(1,2,3-cd)pyrene, mg/l	0.010	106 %	4.7 %	ML	8270
Dibenzo(a,h)anthracene, mg/l	0.010	110 %	0.91 %	ML	8270
Carbazole, mg/l	0.010	60 %	12 %	ML	8270

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RECEIVED
FEB 28 1994
ENVIRONMENTAL AFFAIRS

LOG NO: S4-40324

Received: 20 JAN 94

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd.
Spartanburg, SC 29304

CC: Greg Kuntz-ETE

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
40324-5	Detection Limits
40324-6	Accuracy (mean % recovery)
40324-7	Precision (% RPD)
40324-8	Analyst Initials
40324-9	EPA Method Numbers

PARAMETER	40324-5	40324-6	40324-7	40324-8	40324-9
Arsenic (7060), mg/l	0.010	99 %	6.1 %	PG	7060
Chromium (6010), mg/l	0.010	100 %	3.0 %	JM	6010
Copper (6010), mg/l	0.025	100 %	3.0 %	JM	6010

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

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RECEIVED
FEB 28 1994
ENVIRONMENTAL [illegible]

LOG NO: S4-40324

Received: 20 JAN 94

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee Rd
Spartanburg, SC 29304

CC: Greg Kuntz-ETE

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
40324-10	Dates Extracted
40324-11	Dates Analyzed

PARAMETER	40324-10	40324-11
K001 (Method 8270)		
2-Chlorophenol	01.24.94	02.17.94
Phenol	01.24.94	02.17.94
2,4-Dimethylphenol	01.24.94	02.17.94
Trichlorophenols	01.24.94	02.17.94
-Chloro-m-cresol	01.24.94	02.17.94
Tetrachlorophenols	01.24.94	02.17.94
2,4-Dinitrophenol	01.24.94	02.17.94
Pentachlorophenol	01.24.94	02.17.94
Naphthalene	01.24.94	02.17.94
Acenaphthene	01.24.94	02.17.94
Acenaphthylene	01.24.94	02.17.94
Phenanthrene	01.24.94	02.17.94
Anthracene	01.24.94	02.17.94
Fluoranthene	01.24.94	02.17.94
Chrysene	01.24.94	02.17.94
Benzo(a)Anthracene	01.24.94	02.17.94
Benzo(b,k)fluoranthene	01.24.94	02.17.94
Benzo(a)pyrene	01.24.94	02.17.94
Indeno(1,2,3-cd)pyrene	01.24.94	02.17.94
Dibenzo(a,h)anthracene	01.24.94	02.17.94
Carbazole	01.24.94	02.17.94
Arsenic (7060)	---	01.21.94
Chromium (6010)	---	01.24.94
Copper (6010)	---	01.24.94

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& ENVIRONMENTAL SERVICES, INC.

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RECEIVED
FEB 28 1994
ENVIRONMENTAL AFFAIRS

LOG NO: S4-40324

Received: 20 JAN 94

Ms. Sandra Watson
Southern Wood Piedmont (WI)
P.O. Box 5477, I-85 and Sigsbee
Spartanburg, SC 29304

CC: Greg Kuntz-ETE

Project: Wilmington, NC
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
40324-12	Report Completion Date

PARAMETER	40324-12
Date Reported	02.23.94

Methods: EPA SW-846
ND = Not Detected

J. W. Andrews

J. W. Andrews, Ph. D.

Final Page Of Report

Southern Wood
Piedmont
Wilmington, NC

Ben Meadows
1-800-241-6401
FIELD BOOK
#107595

52014755

BVSPC

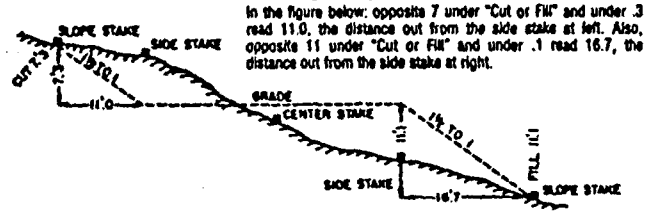
I
5/20/96 to
12/24/96

Reference 15

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	5.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

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Logbook 1 of 2

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CONTENTS

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	BVSPC Atlanta 1-800-350-6590	
	BVSPC FAX (770) 587-2930	
	Carol King (770) 643-2333	
	Bob Marbury (770) 643-2311	
	Eric Mosley (770) 643-2307	
	EPA - Cindy Gurley (404) ~~347-7791 Ext. 2031~~ 562-8817 RJM 10-16	
	Name: 770 993-7081 RJM 10-30-96	
	~~EPA - Bernie Hayes (404) 347-3555 Ext. 2018~~	
	Rita Coombs (913) 338-6627	
	Nardina Turner (404) 562-8650	
	Warehouse (404) 299-0281	
	City of Wilmington Tom Pollard (910) 341-7820	
	City of Wilmington Richard King (910) 341-7855	
	USEPA-ESD Allen Auwater (706) 546-2209	
	USEPA Lynn Wellman (404) 562-8647	
	BVSPC Warehouse - Doug Murson (404) 299-0281	

BVSPC Personnel: R. Mangum
Weather: Warm, Clear, Light breeze

RJM 5/20/96:

1300 Arrived at the site after flight and lunch. Lost baggage by airline caused delay.
1310 Began driving and walking the site with Bernie Hayes, Cindy Gurley, and Rolando Baslund of the EPA - Region IV. Bernie picked up the Keys to the site at City Hall.
1315 Began taking pictures of site features.
1320 Drove to near MW-20 & 20A. Took photographs of the onsite drainage ditch.
1345 Drove to near MW-25. Walked on toward the onsite drainage ditch. Land appears not exactly wetland, more like bottom land (dry).
1358 Walked to the confluence of the onsite drainage feature and Greenfield Creek (appears to be more a canal). Observed two to three dozen fish in Greenfield Creek, 1 crab/animal trap, insects. Some of the fish were 8" to 12" long. Took photographs of the area.
1410 Drove to the outfall of Greenfield Creek into the Cape Fear River. Observed a metal tidal gate blocking nearly all flow between the Creek and River. Water is leaking at ≅ several gallons per minute through the gate and the shellcaste limestone fragments used to stabilize the bulkheads on both sides. This

②RZM
5/20/96

structure appears to limit movement between water bodies, but not eliminate it. Took several more photographs.

1440 Drove back to the former boat slip to determine accessability for future sampling.

1458 Drove to landfarm area #1 + #2 to observe current site conditions.

1525 Left the site for the day. Drove to Greenfield Lake. It appears to contain small fish, ducks, etc.

1545 Robert drives to get a city map and drive the hospital route from the site.

RZM
5-20-96

BVSPC Personnel: R. Mangum

Weather: Humid, clear, warm.

③RZM
5/21/96

0700 Arrived at the North Carolina Dept. of Environment, Health and Natural Resources. They do not open until 8:00 A.M.

0715 Drove down town to the Soil Conservation office. They do not open until 8:00 A.M.

0750 Drove back to the NCDEHNR office to wait.

0805 Met w/ Diane Rossi - Hydrogeological Technician. Requested drilling permits and well completion reports. I explained why I need or may need these items. Diane stated that these wells are not required to have permits since the owner has given his ok to proceed. However, she said we may want to get permits since ownership and the PRP situation exist.

0835 Drove back to the Soil Conservation office to get a copy of New Hanover County Soil Survey.

0850 Drove to meet Cindy, Bernie, and Rolando for breakfast.

05 Drove to the NCDEHNR office for a short meeting with the State.

00 Met w/ Bill Meyer, Jack Butler, Stuart Parker, and Pat Williamson.

04 Meeting begins with the following discussions:
The 60 day period for negotiation of the AOC

ends on June 1, 1996. There is felt to be a need to establish a fixed time frame, budget, etc. in order to gain a timely agreement between EPA and SWP. The possibility of rewording an order to SWP in which the open-ended nature of the existing order is removed to expedite SWP agreeing to the order. The State indicated that the EPA should make it known that they want to do everything possible to help the Ports Authority and the City of Wilmington resolve this situation.

The EPA and SWP need to make known what each sees as data gaps in order to move forward. A request for the latest document produced should be made today to the PRP.

1140 Left the NCDEHNR office for lunch.

1300 Arrived at the State Ports Authority for our meeting. Present at the meeting were the following:

Glenn Dunn	Poyner + Spruill
Chuck Davis	SWP
Layton Bedsole	NC State Ports Authority
Terrell Freeman	NC State Ports Authority
Henry Phillips	SWP
Bennie Albritton	NC State Ports Authority
Steve Trudeau	Chem Risk
Mark Maritato	Chem Risk
David W. Crawford	Chem Risk
Raymond Knox	Viro Group
Greg Kuntz	Viro Group
Mary ?	City of Wilmington
Thomas Pollard	City of Wilmington
Dennis P. Myers	NC Attorney General's Office
Bill Meyer	NCDEHNR - Div. of Solid Waste
Stuart Parker	NCDEHNR - Div. of Solid Waste
Pat Williamson	NCDEHNR - Div. of Solid Waste
Jack Butler	NCDEHNR - Div. of Solid Waste
Rolando Baslund	EPA
Cindy Gurley	EPA
Bernie Hayes	EPA
Robert Mangum	Black + Veatch Special Projects
Erik Stromberg	NC State Ports Authority.

Bernie begins the meeting by stating EPA's desire to receive the previously submitted AOC from SWP in either approved form or with mark-ups. Bill Meyer states that NCDEHNR strongly desires to work with the City of Wilmington and Ports Authority to move forward in the disposition of this matter. The City says that the best use of this site is for port/industrial use. The property is zoned heavy industrial. There was a discussion

of long term use and ownership. All parties agreed that a deed restriction would be the best method of controlling future land use. The site will likely be capped and covered for use by the Ports Authority SWP commented that they want credit for the 2 million dollars spent to date. Bernie stated again that EPA will give them credit, but the AOC has not been signed and data gaps have not been addressed. Bernie repeatedly stated the desire to proceed, but the legal requirement of the AOC being signed prior to further work.

1420 Slide show of recent field sampling, including surface soil, subsurface soil, sediment, and surface water samples.

1435 Chemrisk presents overhead results of their risk assessment. They noted no fish in Greenfield Creek, they say it is a closed system from the River.

1515 Bernie comments on the need for the signed AOC. Bernie commits to an industrial use basis for risk assessment evaluation.

1540 Meeting takes a break. Robert excuses himself to prepare for the return flight.

RJM
5-21-96

0900 Departed office for Wilmington, NC.

1300 Stopped for gasoline in South Carolina. Andrew backed EPA Dualie 1374 (Beige) into a Red Honda 4 Door striking the right rear quarter panel. Andrew was the only person in the dualie, no one was in the Honda @ the time. Local police were called.

1410 Police respond. Accident report filled out. Red Honda is driveable.

1451 Report complete. Returning to the road.

1845 Arrive in Wilmington.

RJM
10-2-96

(8) RJM 10-3-96

BVSPC: R. Mangum, A. Grimmke, F. Jewell

Weather: Humid, Warm Fog

0750 Arrived at the site, gate is locked.

0755 Mr. Henry Phillips arrives on site and unlocks the gate.

0815 Raymond Knox arrives on site. He is PRPs consultant oversight (Envirogroup).

0820 Cindy Gurley (EPA) arrives on site.

0825 Robert, Frank, and Andrew tour the site. It is very wet. Groundwater is likely to be very shallow.

0845 MANGUM LEAVES SITE TO ACQUIRE STAKES AND SPEAK TO CITY ABOUT UTILIZING WATER SUPPLY ONSITE.

0930 GRIMMKE AND JEWELL LOOK OVER FSP AND HSP DOCUMENTS.

0950 MANGUM RETURNS WITH INFORMATION CONCERNING WATER SUPPLY FOR DRILLER, SHORTLY THEY ARRIVE. LEAVES TO PURCHASE STAKES.

0920 DRILLER ARRIVES.

1035 Robert back on site.

1100 Grimmke, Mangum + Jewell go to stake out location points for the New Monitoring wells. MW40s + MW-41 + MW-42 located North of existing MW09. Placed stake at location. (This location is in the former landfarming area.

1130 personnel scout out location for well cluster MW-34, 35, 36. personnel place stake at desired location.

(9) RJM 10-3-96

1145 personnel scout location for MW cluster -31, -32, -33. Personnel place stake at desired location.

1155 personnel leave site to scout location for offsite well cluster in Optimist Park, and to gain access permition for this location. Personnel place stake at desired location.

1200 Personnel depart for lunch

1330 personnel return to site.

1345 two drillers already onsite, ~~third driller arrives.~~ Mr. Hurley went to see City of Wilmington official to get permission to install wells at Optimist Park. Mangum proceeds to give health and safety meeting.

1400 Third Driller arrives on site. Safety meeting proceeds.

1415, Mangum + Jewell take Drillers to proposed well locations.

1430. Returned to staging area, to begin staging set-up of Decon Pad assembly. Turned logbook over to Grimmke.

1443 Drillers begin setting up decon. area.

1507 Empty drums arrive by freight truck. Stewart Parker w/ the State of North Carolina arrives on site.

1610 Continue installing decon. pad.

1708 Leaving the site for today.

(10) RJM 10-4-16

BVSPC: R. Mangum, F. Jewell, A. Grimmke

Weather: Clear, Light Breeze, 58°F

0720 Arrive on site.

0728 Drill crew arrives on site.

0739 Dioxin samples to be taken are as follows: SS-02, SS-06, SS-13, SS-14, SS-15, SS-17 and SS-19.

0742 Decon. of rig, augers, and equipment begins.

0845 Raymond Knox arrives on site.

0910 GRIMMKE INSTRUCTS DRILLERS ON DECON PROCEDURE. DRILLERS COMPLY AND RE-DECON MULTIPLE PIECES OF EQUIPMENT.

1450 MANGUM TRAVELS TO PROPOSED SAMPLE LOCATION SS/SB-02. LOCATION IS INUNDATED WITH WATER.

1020 MANGUM LEAVES SITE TO CALL BVSPC OFFICE. DRILLER EDDIE LEAVES SITE TO PURCHASE MATERIALS TO FIX BROKEN D-FREE H2O MACHINE.

1040 DRILLING SUPPLY VENDOR ARRIVES ONSITE WITH STEEL CASING MATERIAL.

1040 Robert called Carter. I told him to call Ben Keeler (Environmental Exploration) to discuss renting a backhoe to facilitate site activities. Carter is looking for someone to replace Paul on the second shift. Paul has been tasked to complete some work in the office.

1210 Leave site for lunch.

(11) RJM 10-4-16

1428 Drilling commences @ MW-42 location. Robert and Frank move to SS/SB-01 location to sample soil.

1451 Mangum begins collecting SS-01, located north of MW-40 and west of MW-06. VOC collected first, ≈ 4-6 inches BLS, ~~sample collected~~ remainder of sample collected 6-7 inches BLS mixed in bowl, distributed to 2 remaining containers. Soil med. brown fine grained sand.

1500 Mangum begins boring SP-SB-01 - encountered tan sand at ≈ 1 ft BLS. Encountered saturated zone @ ≈ 1.6 ft BLS. Clay encountered. SB-01 collected at ≈ 2.7 ft BLS. VOC collected first. Picture taken of Mangum mixing remaining sample.

1520 Personnel return to utility van to obtain more sampling equipment.

1620 Mangum & Jewell arrive at SS/SB-04. Mangum collects SS-04. VOC's collected first at 6-6 in. BLS.

1630 Mangum begins SB-04. Medium to dark gray sand - saturated with fine wood fragments. 1/2-1 inch diam. Collected ≈ 2 ft BLS. VOCs collected first. SB's collected @ 1640. Picture taken of Mangum boring.

1735 Drillers are cleaning their water tank out due to the

(12)
RJM
10-4-96

appearance of rusty water. They will clean the tank thoroughly before we begin rotary drilling. Raymond Knox left @ ≅ 1545. He will not return until possibly next week. Robert, Frank, and Andrew leave the site and ask the drillers to lock up behind themselves.

RJM
10-4-96

BVSPC: A. Grimmke, R. Mangum, F. Jewell

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RJM
10-5-96

Weather: Cold, clear, light breeze, mid 50's F

7:30 personnel arrive on site. Drillers arrive on site. Personnel prepare for SS/SB samples while drillers prepare for daily activities.

815 Mangum + Jewell drive around site to locate SS/SB locations.

855 Mangum + Jewell prepare to collect SS-17

900 Mangum collects SS-17, 0-6 in. BLS. VOA's collected first.

915 SB-19 collected - VOAs collected first. ≈ 2 ft BLS. Soil - brn, sand, also saturated

Sample collected at designated sample location depicted on sampling location map

950 Mangum + Jewell prepare to collect SS-15

955 Mangum collects SS-15, 0-6" BLS. Soil, ~~black~~, fine sand, light to medium grey. Moist. Contains small, fine pieces of root + biological matter. VOA collected first.

1010. SB-15 collected, ≈ 2 ft bls. Soil saturated. light brown to tan, well rounded fine-grained sand. VOA collected first.

1130. Mangum + Jewell prepare to collect SS-18 @ loc. designated on sample location Map. VOA's collected first 0-6 BLS @ 1135.

1150, SB-15, collected @ ≈ 2 ft BLS, Soil is light brown, sandy and saturated. VOA'S collected first.

1210 Personnel leave site for lunch.

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330 personell return to site.
Drillers onsite - ~~Mangum + Jewell~~
~~355 Mangum~~
330 Mangum + Jewell depart to find telephone.
340 Mangum calls to check messages. But gets no access
345 Jewell phones travel agency to book flight arrangements for 2nd, 10-Day Shift
1425 personnel return to site & prepare to collect soil samples.
1450 Personnel prepare to collect SSB-02. Location - east of railroad tracks. Marked location on map. Originally designated location is ~~[illegible]~~ inundated in water. Mangum collects SS-02, 0-6 inches BLS. VOC is collected first. Soil, fine grained sand, medium to dark gray, then turns tan, with greater depth (5-6 inches).
1500. Personnel begin augering SB-02. Soil - sand grading to Dark Brown
1505 SB-02 collected ~24 BLS. VOC collected first.
1520 Mangum + Jewell return to staging area. Mumimke washes off sampling equipment
1530 Mangum leaves site to shower prior to departing for Atlanta

10/5/96

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1540 GRIMMKE TAKES OVER LOGBOOK DESCRIBES DRILLING ACTIVITIES FOR 10/6/96.
0830 GRIMMKE, DRILLER EDDIE FULLER AND HELPERS AT HOLE SP-MW-42. DRILLER FILLS MUD TUB AND MAKES DRILLING FLUID WITH ECONOMY GEL PURE BENTONITE.
0900 RESUME DRILLING WITH 8.5" NOMINAL TRI-CONE BIT, MUD ROTARY.
0915 AT 15 FEET ATTEMPT SPOON. NO RECOVERY. GRIMMKE DIRECTS DRILLERS TO SET OUTER SURFACE CASING AT 17 FEET BASED ON EVIDENCE OF CLAY (PEAT ASC) LAYER AT 12-13 FEET TO UNKNOWN DEPTH IN SPOONS 1-4 AND IN CUTTINGS SEEN ON AUGERS 10/4.
0945 DRILLER REAMS HOLE WITH NOMINAL 14" TRI-CONE BIT TO 17' BLS. APPROX. 75 GALS. DRILLING FLUID USED DURING REAMING PROCESS.
1015 INSTALL 0.90' OD/0.86' ID CARBON STEEL SURFACE CASING AT 17.0 FEET BLS. MIX GROUT.
1025 GROUT COMPOSED/70 gms. WATER, 5.94 lb BAGS TYPE I PORTLAND CEMENT, 1/2 BAG BENTONITE. WEIGHT USING MUD SCALE = 15.1 lb/GALLON
1100 GROUTING COMPLETE.

10/5/96

1115 Clean Up Rig Area. Returns Tools to Decon. Drillers Go to Lunch. Grimmke Assist Jewell/Mangum.

1300 Grimmke Return from Lunch. Drillers onsite.

1330 Grimmke Speaks with Fuller Having Just Acquired a Welder, Fuller Leaves Helpers to Decon, Leaves Site to Acquire Welding Rods.

1540 Fuller Returns, Assists Helpers.

1620 Drillers Mob to SP-MW-41. Set up Mud Pan. Jewell Takes Mangum to the Airport.

1700 Begin Drilling SP-MW-41 with 0.50' Nominal Roller Cone Mud Rotary. Split Spoon Samples Are Collected at 0-2', 5-7', 10-12' and 15-17'.

1740 Grimmke Instructs Fuller to Set Surface Casing at 17' BLS. Driller Intend to Set Casing 10/6. Clean up and Organize.

1820 Depart Site for Day

10/6/96

0730 Arrive on Site - Grimmke/Jewell.

0735 Drillers Arrive on Site.

0740 Driller Fill Water Tanks, Set up to Install Surface Casing SP-MW-41, Drill SP-MW-40(S).

0830 Begin Reaming Hole SP-MW-41 to Set Surface Casing at 17' BLS.

1000 Set Surface Casing at 17' BLS in SP-MW-41. Grouted in Place. Grout Consisted of 4 94 lb Bags Type I Portland Cement, 3/4-50 lb Bag AB1 Pure Bentonite, 70 Gallons Water.

1030 Drillers Return to Decon and Decon Equipment.

1130 Set up at SP-MW-42 and Redrill to 17' BLS and on to 20'.

1230 Drillers and BV Go to Lunch.

1315 Return from Lunch.

1330 Drillers onsite. Continue Drilling and Spooning at SP-MW-42.

1430 Drilling Fluid Purged: Drummed from Mud Tub and Hole 150 Gallons of New Fluid Mixed.

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10/6/96

1510 LOST CIRCULATION AT 48' BLS APPROXIMATELY ~~120~~ 150 GALLONS OF DRILLING FLUID LOST.

1530 LOSS OF CIRCULATION SPECULATED TO BE CAUSED BY SALT WATER REDUCING VISCOSITY OF DRILLING FLUID.

1540 MIXED NEW DRILLING FLUID OF BENTONITE/ATTAPULGITE MIX TO REGAIN VISCOSITY IN SALT WATER ENVIRONMENT.

HOLE HAS COLLAPSED TO 25'. REDRILL WITH NEW MUD.

1700 BEDROCK AT 51' BLS. APPEARS TO CONSIST OF HIGHLY CEMENTED SHELL HASH.

1730 DRILLERS CLEAN UP AND ORGANIZE EQUIPMENT.

1830 DEPART SITE.

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10/7/96

0730 GRIMMKE AND JOWETT ARRIVE ON SITE. DRILLERS ARRIVE IMMEDIATELY. BEGIN SETUP FOR THE DAY.

0815 RESUME DRILLING, REAMING SPMW #2 WITH NOMINAL 10" TRI-CONE BIT TO 54' BLS, (EDDIE FULLER DIRECTED TO SET SECOND CASING AT 54' BLS BY GRIMMKE 10/6/96 1700.)

0845 LOST CIRCULATION AT 51' BLS AND APPROX. 150 GALLONS OF DRILLING FLUID.

0920 AT 54' BLS. NO CIRCULATION. DRILLERS DECON CASING MATERIAL AND PREPARE TO INSTALL CASING.

1030 DRILLERS BEGIN LOWERING SECTIONS OF SURFACE CASING INTO THE HOLE.

1150 CASING SECTIONS ARE WELDED CONSECUTIVELY AND FINAL ~~CASING~~ DEPTH FOR CASING 54.35 BLS

1230 CASING INSTALLATION COMPLETE. DRILLERS CLEAN-UP. BREAK FOR LUNCH.

1315 RETURN FROM LUNCH. CALL MANGUM OF BV CONCERNING DRILLER'S REQUEST FOR A BACKHOE.

10/7/96

~~1330~~ 1350 DRILLERS ONSITE. DRILLER EDDIE FULLER LEAVES SITE AGAIN TO ACQUIRE DRILLING MUD.

1400 DRILLERS CONTINUE TO DECON EQUIPMENT.

1430 GRIMMKE/JEWELL COMPLETE PACKING SAMPLES. PREPARE TO SHIP.

1515 BV PERSONNEL LEAVE SITE TO SHIP SAMPLES.

1530 ARRIVE AT FEDEX. SHIP SAMPLES

NOTE: WEATHER 10/7/96 AM COOL OVERCAST RAIN BEGUN 1330 STEADY DRIZZLE —

1545 RETURN TO SITE. FULLER NOT RETURNED. DRILLERS CONTINUE TO DECON.

1620 GRIMMKE SPEAKS WITH HELPERS. DECON COMPLETE. READY TO DRILL. FULLER NOT ON SITE.

1635 DRILLER EDDIE FULLER RETURNS TO SITE. STATES THAT HE NEEDS TO CALL A LOCKSMITH TO GET INTO THE RIG, AS HELPER LOCKED KEYS IN RIG. STATES, HE DOESNT EXPECT TO DRILL ANY MORE THIS DAY.

1640 GRIMMKE. JEWELL LEAVE SITE. END OF DAY.

10/8/96

0700 GRIMMKE SPEAKS WITH MANGUM @ BV FROM HOTEL ROOM. STATES WEATHER IS BAD, RAINING HEAVY, FLASH FLOOD WARNINGS, AND GALE FORCE WINDS, THE REMNANTS OF TROPICAL STORM JOSEPHENE. WILL WAIT AND SEE WHAT THE WEATHER DOES.

0730 ~~BY~~ GRIMMKE SPEAKS WITH DRILLER EDDIE FULLER ON THE PHONE FROM HOTEL ROOM. DECISION IS MADE TO SPEAK AGAIN AT 0900 CONCERNING WEATHER.

0900 WEATHER SEEMS TO BE CLEARING. STILL OVERCAST. STILL WINDY. GRIMMKE SPEAKS WITH FULLER AGAIN. AGREES TO MEET AT SITE ~~IN~~ NO AT 0930.

0930 GRIMMKE ARRIVES AT SITE. SITE IS FLOODED. GRIMMKE FEELS ITS UNSAFE TO ATTEMPT TO DRIVE ONTO SITE. APPROXIMATELY 2.0 FEET OF WATER COVERING SITE.

0935 FULLER ARRIVES. AGREES WORK IMPOSSIBLE AT PRESENT. GRIMMKE AND JEWELL PHOTOGRAPH SITE FROM ENTRANCE ROAD. ~~DEPARTURE~~ HOTEL.

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10/8/96

0940 GRIMMKE SPEAKS WITH MANGUM OF BVSPC FROM PAY PHONE NEAR SITE. EXPLAINS FLOODING. MANGUM TO DISCUSS WITH ESI PROJECT MANAGER AND EPA. GRIMMKE/JEWELL DEPART SITE FOR HOTEL.

1030 GRIMMKE SPEAKS WITH MANGUM AGAIN FROM HOTEL. MANGUM STATES HE SPOKE WITH HELM OF BVSPC AND LEFT MESSAGE WITH GURLEY OF EPA. NO DECISION YET MADE ON COURSE OF ACTION. MANGUM DIRECTS GRIMMKE TO WAIT AND CALL BACK ≈ 1400.

1330 GRIMMKE AND JEWELL VIEW THE SITE AGAIN. WATER HAS RECEDED APPROXIMATELY 1 FOOT. SITE STILL INACCESSIBLE.

1400 HOTEL ROOM. GRIMMKE SPEAKS TO MANGUM ON PHONE. MANGUM DIRECTS GRIMMKE TO BEGIN STEPS NECESSARY TO DEMOBILIZE FROM SWP SITE.

1410 GRIMMKE SPEAKS TO EDDIE FULLER ON PHONE, EXPLAINING NEED FOR DEMOBILIZATION.

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10/8/96

1700 GRIMMKE/JEWELL TRAVEL TO SITE TO SURVEY DAMAGE FROM FLOOD. MUCH OF SITE IS STILL FLOODED, BUT MAIN ENTRANCE ROAD IS ACCESSABLE BY TRUCK. FULLER MEETS BVSPC PERSONNEL. GRIMMKE PROVIDES FULLER WITH THE SITE KEY AND THE NAME/PHONE NUMBER OF RICHARD KING AT THE CITY WHO MIGHT HELP WITH A PLACE TO STORE EQUIPMENT. AN INVENTORY OF DRILLERS EQUIPMENT AFFECTED BY FLOOD:

DECON PAD
50 BAGS OF SAND
10 BAGS PORTLAND GROUT
20 BAGS GIANT CEMENT
10 BUCKETS PELLETS
} DESTROYED

WILLING PUMP
2 SPRAYERS (STAINLESS STEEL)
5 5 FT SCREENS (STAINLESS)
12 10 FT SCH 80 PVC RISERS
} CONTAMINATED BY FLOOD WATER

1730 GRIMMKE/JEWELL DEPART SITE

(24)

10/9/96

0700 GRUMMKE/JERSEK DEPART WILMINGTON

TBL STEP VAN/DUALIE FOR ATLANTA

1500 ARRIVE IN ATLANTA. NO DIFFICULTY EN ROUTE. DROP STEP VAN AT EPA WAREHOUSE.

BVSPC Personnel: R. Margum, J. Slykerman (25)

Weather: Cold, Clear, Light wind 11/4/96

0850 Joe and Robert arrive on site after picking up supplies and fuel.

0910 Raymond Knox (Envirogroup) is on site.

0912 Robert and Joe drive out to the creek to survey boat access.

0925 Robert and Joe leave the site for bait shop and then Greenfield Lake.

1130 Launch boat into Greenfield Lake (Joe and Robert) while Ray Knox photographs and observes.

1608 Removed boat from Greenfield Lake. No fish caught today. Ray Knox leaves as the Lake.

1640 Robert + Joe leave Greenfield Lake.

RZM 11-4-96

(26) RZM 11/5/96

BVSPC : R. Mangum, J. Slykerman

Weather: Cool, Overcast, Light Breeze

0825 Robert and Joe arrive at Greenfield Lake. Launch boat and begin fishing.

0905 Robert catches a small spot. Place fish on stringer and place in the lake, tied off. Fishing continues since fish does not appear to be ≥ 200 grams in size.

1340 Leaving the Lake for lunch..

1450 Robert and Joe arrive back at the lake. We Kept the fish alive in lake water on a stringer until 1340. Then double wrapped the fish in foil and double bagged with a custody seal.

1735 Daylight is fading, no additional fish have been caught dispite using different baits and techniques. We remove the boat from Greenfield Lake and prepare sample SP-BIO-09 (Background) for shipment.

1750 Leave site for Federal Express.

RZM 11/5/96

BVSPC Personnel: R. Mangum, J. Slykerman

Weather: Cool, clear, no breeze

(27) RZM 11/6/96

0810 Joe and Robert pick up supplies (worms, ice) and make a call to Nardina and Allen Auwater notifying them that SP-BIO-09 was shipped Fed Ex on wet ice last night to arrive today.

0825 Robert and Joe arrive on site (SWP) and proceed to fish from the creekbank for SP-BIO-06.

0930 Fish are not biting, we move to tidal gate at outfall of Greenfield Creek into the Cape Fear River and begin fishing.

1145 No fish biting. We leave the site for lunch.

1235 Return to the site and resume fishing at the tidal gate.

1710 No fish biting. We leave the site for the day.

RZM 11/6/96

(28) RJM 11/7/96

BVSPC Personnel: R. Mangum, J. Slykerman
Weather: Cool, foggy

0705 Joe and Robert arrive on site and proceed to fish at the Greenfield Creek tidal gate.
1000 Robert leaves the site for more bait and hooks. Henry Phillips w/ SWP is on site looking at our borings and taking pictures.
1040 Robert returns to the site. Henry Phillips is now at the tidal gate. He photographed me and my truck. Continue fishing.
1155 Leave the site for lunch.
1240 Return to the site and continue fishing. Two fish (≅100 grams each) are caught @ location SP-BIO-07. Moving to the Cape Fear boat launch.
1630 Caught (1) fish @ SP-BIO-08 location.
1710 Darkness is falling, leaving the river to prepare samples SP-BIO-07 & 08 for shipment to ESD via Federal Express.
1845 Leave Fed Ex for the motel.

RJM 11/7/96

BVSPC Personnel: R. Mangum, J. Slykerman
Weather: Partly Cloudy, Warm

(29) RJM 11/8/96

0700 Calling in our time sheets to the office and calling Nardina Turner and ESD to notify about biological samples we shipped last night.
0935 Sampling SP-SD-18 location as indicated on the site plan.
0940 Light rain begins, sprinkles.
0955: Collected sample SPSD19 at location shown on figure in S.P. Noted 2 small turtles near SP-SD-19 location, one large ≅ 10" long and one short ≅ 5" long.
1010 Preparing sample containers for SP-SD-17 location.
1016 Collected sample SPSD17 at location on figure. Photo taken.
1020 Location for SPSD-017 was actually SP-SD-16, changed jar labels to reflect SP-SD-16 @ 1016 at location shown on figure.
1038: Collected sample SPSD-15 @ location on figure. Photo taken, Evidence of a small footbridge near sample location.
1105 Collected sample SPSD17 @ location on figure.
1140 Robert + Joe leave the site for lunch.
1305 Back on site and driving to SP-SD-20 location.
1357 Collected sample SPSD-20 at

(30) 85

11/8/96

Location on figure.

1415 Driving to SP-SD-14 location. Wetland is too wet to physically move in and sample. Moving sample location closer to MW-26.

1429 Collected sample SPSD14 at above location

1450 Collected sample SPSD13 at location on figure

1500 Collected sample SPSD05 at location on figure

1535 Locked site gate and left site for the motel to do paperwork.

KJM 11/8/96

BVSPC Personnel: R. Mangum, J. Slykerman (31)
Weather: Cold, Clear, Light Wind

KJM 11/8/96

0800 Arrive on site after preparing equipment.

0830 Launch boat and paddles into the onsite drainage ditch.

0900 Reach SP-SW-04 location, begin taking surface water sample.

0901 Temp. 53.2°F, 6.64 pH, and 1.7 µS/cm conduct. Turbidity is 2.2 NTUs. Temp, pH, conductivity meter was calibrated prior to sampling.

0915 Taking SB-SD-07 using a stainless steel Ponar.

0935 Taking SP-SD-06.

1000 Moving boat out of onsite drainage ditch. Decontamination of Ponar Stainless Steel dredges performed. Dredges allowed to air dry on clean plastic in the sun.

1045 Paddling boat from tidal gate on Greenfield Creek.

1055 Sampling SP-SW-06 at location shown on figure. Temp. 64.6°F, pH 6.47, conductivity 22 µs/cm. Turbidity is 3.6 NTUs.

1105 Sampling SP-SD-09 at location on figure. Took (1) photograph looking downstream and ~~the~~ Also (1) photograph looking upstream while sitting at the SP-SD-09 location.

1120 Sampling SP-SW-05. Took photograph of

RZm 11/9/96

railroad bridge.

1122 Temp. is 64.7°F pH is 6.56, conductivity is 1.3 us/cm and turbidity is 4.8 NTU's.

1135 Taking sample SP-SD-08 using stainless steel Ponar dredge and new, nylon rope at each location.

1215 Left site for lunch.

1430 Returned to site w/ supplies and back in the boat paddling upstream to SP-SD-04.

1510 Sampling SP-SW-03. Temp. is 65.8°F pH is 7.04 conductivity 217 us/cm. Turbidity is 3.1 NTU's. Attempted to take SP-SD-04 at the location marked on the figure, no sediment present. Five unsuccessful attempts w/ the Ponar dredge and one attempt using a stainless steel spoon. This sample is unretrievable.

1645 Removed boat from Greenfield Creek. Boat trailer tongue is bent. Leaving site for the day to get trailer part and do paperwork

RZm 11/9/96

BVSPC Personnel: R. Mangum, J. Slykerman

Weather: Cold, Partly Cloudy, Clear, No Breeze

RZm 11/10/96

0938 Arrive on site, drive to fix boat trailer.

1000 Preparing to take SP-SW-07 and SP-SD-07. RZm 10 Nov

1005 Turbidity @ SP-SW-07 is 5.7 NTU's, temp. is 56.8°F, conductivity is 3,220 us/cm, pH is 6.84.

1015 Sampling SP-SD-10 at location shown on figure.

1115 Launched boat into the Cape Fear River beneath the bridge. Moving to sample location SP-SD-11 and SP-SW-08. Turbidity is 6.3, temperature is 63.0°F, 3,750 us/cm conductivity, 6.32 pH.

1135 Sampling SP-SW-08 @ location on figure.

1152 Drove boat to location for SP-SD-12 and SP-SW-09. Temp. is 62.4°F, 5,180 us/cm conductivity, ~~6.24~~ 6.11. Turbidity is 5.3 NTU's. RZm 11-10-96

1155 Taking SP-SW-09 sample @ location shown on the figure.

1210 Taking SP-SD-12 @ location on the figure.

1240 Removed boat from the Cape Fear River.

1315 Decontamination of the Ponar Dredges.

1345 Taking SP-SD-03 @ location on the figure.

1425 Drove to sample location SP-SW-01 / SP-SD-01. Taking a duplicate sample w/ SP-SW-01.

1440 Taking SP-SD-01.

1500 Sampling complete, leaving the site to do paperwork

RZm 11/10/96

(34) 11/13/96

1000 Jewell, Brown, Mosley and Mangum meet Louise Flores, with EPA, at the site. Mangum conducts Heshint Safety Briefing, personnel sign health & safety plan. Personnel discuss sampling strategy & prepare for days activities (Set up decon area, etc.) Temp. today is ≈ 40°F - Clear, Sunny, slight wind ≈ 10mph.

1125. Brown, Jewell & Flores arrive at MW-16 & MW-17. 1130 Uncapped MW16 & MW17. Brown calibrates conductivity meters. Mosley & Mangum leave to collect soil samples.

1200. Brown uses water level indicator to determine water level - 5.80 ft. Total well depth is 13.95 (Difference 8.15 x .17 = 1.39 gallons per column. Thus 4.46 to 6.95 gallons need to be purged.

1200 personnel prepare to pump water with the peristaltic pump.

~~1240~~	Temp °F	pH	cond.	Turbidity
1240	70.8°F	5.46	435 ms/cm	6.8
1255	69.6	5.73	417	4.7
1305	71.9°F	5.68	426	3.1
1315	68.8	5.64	424	2.4

≈ 6½ gallons purged.

Note @ 1245 Jewell left to decon water level indicator 1300 Jewell returns to MW16

1315 Begin collecting samples from MW-16. VOA's are collected first acc. to SOP outlined in field study plan. After VOA is collected vacuum cap is put on amber jug - run peristaltic pump to obtain remaining sample. 1330 While remaining MW-16 sample is being pumped into amber jug, Jewell & Brown determine water level for MW17 which is 5.8. Total well depth is 14.26, thus well column is 8.46 (x.17) = 1.44 gals. 3 times well column = 4.31 - 5 times well column = 7.2 gallons. 4.31 - 7.2 gallons should be purged from well.

1340 personnel prepare to ~~pump~~ purge water from MW-17

1345 personnel collect ~~remaining~~ more remaining sample (2-liters) from MW-16 (and refill amber) Sample MW-16 complete

1345 Began purging MW-17.

Time	Temp °F	pH	cond	Turbidity
1345	69.0	6.52	1350 ms/cm	6.7
1355	67.5	6.53	1230	5.4
1410	68.5	6.43	1160	2.4
1420	64.9	6.45	1090	2.6

≈ 7 gallons purged.

(435) (6.25 collected from MW-17.

waiting for provide bar pump to amber jug for Mr. Brown, preserve metals & cyanide sample bottles with hydrochloric acid & sodium hydroxide pellets, respectively.

1445 Brown + Jewell collect remaining water sample from MW17 sample completed.

1450. Jewell preserves metals (container) sample w/ hydrochloric acid and designated cyanide container w/ sodium hydroxide

1455 Brown decons water level indicators

1510 Brown + Jewell arrive @ MW-15. MW-15 collected in place of MW-13.

1545 Personnel take well measurements. Depth to water is 5.25 ft. Total well depth is 13.76. Well column is 8.51 (x 0.17 = 1.45 gals) need to purge between 4.34 and 7.25 gallons of water.

~~1545~~ 1550 Personnel prepare to purge well w/ peristaltic pump

1555 begin purging.

Time	Temp	pH	cond.	Turbidity
1555	63.8°F	6.30	2840	17.2
1605	62.6	6.64	2130	3.6
1615	62.0	6.66	1690	1.0
1640	59.9	6.63	1420	2.1

purged ≈ 6.5 gallons

1648 Begin collecting VOA samples for MW-15

1655 Collect remainder of sample. Brown preserves samples to be analyzed for metals + cyanide w/ HNO_3 + NaOH, respectively. Sample collection complete. Personnel begin loading up sampling equipment.

1730 Brown + Jewell depart site. Mosby + Hangum stay to collect more soil samples.

Jewell 11/13/96

11/14/90

700 Manzum + Mosley arrived onsite to continue soil sampling.

800 Brown + Sewell arrive onsite.

820 Brown uncaps Monitoring wells MW-8 + MW-8A. Weather: Cold + 39°F, Clear. Pr. predicted High, near 55°F. Wind comes from NE.

835: Brown determines water level for MW-8A @ 4.3 ft. Total well depth is 32.52 - thus well column is 28.22 (x 0.17 = 4.8 gal) Well volume to be purged is between 14.4 + 24 gallons)

840 Brown decons water level indicators.

Addendum - on previous monitoring wells, water level was measured from the notch in the casing.

845: Personnel measure water level for MW-8, from the Black Marked line on the casing. (On this MW, there is a large Notch in the casing + also a rectangular cut-out in the casing - Water level measured from Black Mark. Water level of MW-8 is 4.58 ft. Total well depth is 21.39 ft. Well column for MW-8 = 16.8. (x 0.17 = 2.86) Water to be purged from MW-8 is between 8.57 + 14.3 gallons)

Brown decons water level indicators

900 Brown checks calibration on pH/conductivity meter.

910 Began purging SP-MW-8 with the peristaltic pump

Prepare to purge MW-8A with the submersible pump

MW-8 Water Measurements

Time	Temp	pH	conductivity	turbidity
910	58.7	6.05	692	23.4
920	61.1	6.09	677	76.5
935	62.0	6.11	702	78.0
1000	63.4	6.09	662	19.4

Purged 9 gals. from MW-8

1015 Collected VOA for MW-8

1020 Collected remaining Samples from MW-8

MW-8A Water Measurements

Time	Temp	pH	conductivity	Turb
930	61.9°F	6.63	478	30.4
935	61.9°F	6.59	453	1.1
940	61.2	6.5	455	2.3

Purged ~30 gals. for MW-8A

950 Collected VOA samples from MW-8A using teflon tubing.

955. Used peristaltic pump to collect remainder of sample.

1005 Collected remaining sample from MW-8A

1015 Filtered preserved sample collected from MW-8A.

1540 Filtered preserved sample collected from MW-8

1125 Arrive at Locations for MW-20 + MW-20A.

1128 Uncapped wells.

Addendum: At ~11:10 Mosley + Mangum depart site to pick up Bowls + Spoons which were left-left to the hotel. Louis Hines arrived on site at 1130.

1130 Brown, Jewell and Submersible Pump Tries. Step at Monitoring Wells.

1145 Personnel determine water level in MW20 to be 4.22. Total depth of well is 14.32 ft. Well column is 10.10 (x .17 = 1.72) Gals 5.16 and 8.60 gallons should be purged from MW20. Brown decons water level indicator (Jewell was measured from notch in casing).

1155 Personnel determine water level for MW-20A. 2.8 ft. Total Depth is 32.71 ft. (measured from top/notch in well casing) Well column is 29.91 (X0.17 = 5.087 Gals 15.25 and 25.4 gallons should be purged.

1200 Personnel setup peristaltic pump to begin purging MW-20.

Measurements for MW-20 (Shallow)

Time	Temp	pH	Cond.	Turb.
1200	66.4	6.22	3600	25.6
1215	68.1	6.42	1297	12.4
1245	70.4	6.36	1276	5.1

1200 Personnel setup Submersible pump for MW20A.

Measurements for MW-20A (Intermediate)

Time	Temp	pH	Cond.	Turb.
1210	67.4°F	7.3	650	8.6
1215	67.6	7.14	425	0.4
1225	67.6	6.81	337	0.7

1230 Shut off Submersible pump for 20A. ≈20 gallons purged.

1245 VOA from MW-20A collected.

1247 Shut of peristaltic pump on MW-20. ≈ 7½ gallons purged.

1250 VOA collected from MW-20

1255 remaining sample from MW-20A

1:00 Jewell preserves Metals/Cyanide samples from MW-20A

1:10 Jewell preserves Metals/Cyanide samples collected from MW-20. Sample from MW-20 complete

Brown, Hines water level indicators.

1:35 Brown, Hines + Jewell depart for lunch. Mosley + Mangum remain to collect soil samples.

2:15 Brown, Hines and Jewell return from lunch. Brown and Mangum leave site to get empty drums which are stored down the street.

1505 ~~305~~ Mangum + Brown return to site

1515 Mangum + Mosley depart site to pick up sample stickers from the hotel.

1530 Brown + Jewell depart site for hotel to pack samples & do paper work, in order to ship samples via Federal Express (closes @ 1700pm)

1600 Personnell arrive at hotel, obtain stickers from Mangum + Mosley. Brown + Jewell prepare to pack + ship samples.

1830. Brown + Jewell depart hotel for Fed Ex.

1900. Brown + Jewell leave coolers at the Fed Ex. office, + depart for hotel.

Brown + Jewell initials

11/15/96 Sunny/Clear

800. Brown contacts office regarding timesheets + to speak to Mangum + Sikerman @ collecting more samples on case #, etc. Jewell telephones Nardina Turner who says we can probably send 3 additional samples on this case # today. But to check w/ Sno Carol Shaffer. Jewell contacts Shaffer who says 3 more samples on this case # will be fine, we will just subtract that # of samples from next weeks case load. Left message w/ ~~Bettey~~ Thass re. delays.

1000 Personnel depart hotel

Addendum: Prior to departing hotel Jewell contacts warehouse and asks for them to send 4 more large coolers so that we can ship samples.

1030 Personnel stop to buy ice

1045 Personnell arrive on site

1050 Personnel collect preservative blank

1100 Personnel uncap MW-11, MW-11a & MW-11B.

Addendum: Jones met personnel at site upon arrival

1115 Brown completes calibration of pH/conductivity meter.

1120 Personnel determine water level of MW-11 to be 6.57. Total well depth is 13.20. Thus well column is 6.63 (x 0.17 = 1.13) ~~well~~ amount of water to be purged from MW-11 is between 3.39 and 5.65 gals.)

Brown decons water level indicator.

1125 Personnel det. depth of water for 11A is 4.28. Total well depth is 95.92. Well column is 31.64. (x 0.17 = 5.38) water to be purged from 11A is bttw 16.14 and 26.9 gals.). Brown decons water level indicator. Jones + Jewell set up peristaltic pump @ 11

Water Measurements for MW-11

Time	Temp	pH	cond	turb
1140	56.9°F	6.16	996	106
1150	59.6	6.16	1110	357
1200	61.5°	6.27	1082	132
1210	61.9°	6.26	1050	91.5

1210 - Stopped purging MW-11. Purged 6 gallons.

1140. Personnel determine water level for MW11B to be 4.12. Total well depth is 43.79. Well column is 39.67 (x 0.17 = 6.74) Volume to be purged is bttw 20.22 gallons and 33.7 gallons.

Water Measurements for MW-11A

Time ~~1145~~	Temp	pH	cond	turb
1145	58.0°	6.11	277	30.1
1155	57.2°	6.05	359	7.39
1205	60.0°	6.87	359	6.04

1205 - Stopped purging well MW-11A. Purged ≈ 20 gallons.

1210 Collected VOC sample from MW-11

1220 Collected VOC sample from MW-11a

1230 Samp. 2.5P-MW-11 complete

1245 Sample SP-MW-11A complete. Begin purging MW-11B [Brow deemed submersible pump.]

Water measurements for MW-11B

Time	Temp	pH	cond	Turb.
1250	57.4	7.08	447	60.6
1257	56.8	6.90	362	4.61
1302	50.6	6.85	~~4.67~~ 352	1.29
1307	56.7	6.94	353	0.87

KB 11/15/96

1308 - Stopped purging MW-11B. Purged ≈ 28 gallons.

1310 - Collected VOC from MW-11B

Addendum @ 1100 Jewell preserved metals/cyanide samples for MW-11 + 11A.

1325 - Jewell preserved metals/cyanide sample from MW-11B. MW-11B sample complete.

1330 personnel load up truck and drive around site to locate difficult to find monitoring wells. 400 personnel locate MW-28 + 28A. located behind optimist park between the r.r. tracks + the drainage ditch onsite. Will probably need to speak w/ City officials to get access to optimist park.

1420. Personnel load equipment in truck, to depart site for hotel room to document/bag/pack samples collected today for shipment.
1425. Stewart from North Carolina dept. of Natural Resources stops at site to check status.
1445 personnel depart site for hotel
1535 Personnel arrive @ hotel + start preparing samples.
1630. Personnel depart hotel for Fed Ex.
1645. Personnel ~~[illegible]~~ drop samples off at Fedex office + depart for Hotel
1700 Personnel arrive @ Hotel
1705. Jewell calls SMO - Carol Schaffer's voice mail and leaved sample info + airbill #'s as directed by word this am.

Jennifer Jewell

11/16/96

830 Personnel depart for sight. weather = 38° Clear/sunny - winds 10-15 mph from NE. Expected High Mid 50's
900 Personnel stops to buy ice for coolers
910 Personnel arrive onsite. Personnel discover that there are only 2 clean Kevlar caps left and the warehouse did not include new clean ones with the bowl/spoon shipment which we received yesterday.
930. Personnel phone Carter Kelm @ home. Leave message on Carter's answering machine re. situation. Personnel look up Analytical Laboratory services in the yellow pgs and write down several #'s
940. personnel drive to one laboratory on 7th Street which is very close to the site. It is closed
955. Personnel go + lock up site + leave to go to another laboratory located on 17th Street.
1015 Stopped at Phoenix Enviro Corp on 17th Street (also Lab Corp Analytics) Spoke w/ John Folger who was in the office catching up on paper work. John was extremely helpful in offering telephone #'s, making calls + setting us up w/ a telephone close in order to call various labs +

Environmental Services in an effort to obtain vacuum caps. Personnel contact several (>20) places w/ no success in obtaining caps. 11:30 Brown contacts Carter Helmet home. Carter said he would obtain 4 vacuum caps or bailers in order for us to sample remaining wells.

11:45 Personnel arrive on site plan to sample 2 monitoring wells and collect remaining oil samples. Personnel decon water level indicators and 2 pump heads from ~~port~~ submersible pump.

1220 Personnel arrive at locations for MW-29 & 29A.

1225 unlocked MW29 & MW-29A

1240 Personnel determine water level for MW-29 to be 4.51 ft. Total Well Depth is 9.03 ft. Well column is 4.52 (x 0.17 = 0.77) Btw 2.3' and 3.85 gallons should be purged from MW-29.

1245 Brown Decons Water Level Indicators.

Personnel Determine Water Level in MW-29A to be 3.33 ft. Total Well Depth is 40.25 (well column is 36.92 x 0.17 = 6.28) Btw 18.84 and 31.4 gallons should be purged from MW-29A. Personnel set up peristaltic pump @ MW-29

Water Measurements for MW-29

Time	Temp.	pH	conductivity	turbidity
1258	59.4°	5.68	4,150	32.4
1305	61.5°	5.94	4,020	15.6
1310	61.6°	5.79	3,890	6.22

1313 - Stopped purging MW-29 after 2.5 gallons

1315 - Collected VOA from MW29

1325 - personnel waiting for well to recharge

1355 - personnel collect metals/cyanide portion of sample.

1400 - SP-MW-29 sample complete.

1405 - Personnel set up submersible pump at MW-29A

Water Measurements for MW-29A

Time	Temp.	pH	cond.	turb.
1405	61.1	6.82	704	2.86
1410	62.0	6.99	485	3.59
1420	61.9	6.95	472	1.70
1427	61.5	6.80	475	1.24

1429 - Stopped purging MW-29A after ≈ 30 gals.

1430 VOA sample collected from MW-29A

1435 personnel decon submersible pump hose and pump head. Hook up peristaltic to MW-29A.

1455 personnel collect cyanide/metals portion.

1500 Jewell preserves metals/cyanide portion of sample.

1500 Sample Complete.

Personnel load up equipment. Cap Purge water drum return to staging area.

Addendum. On 11/15/96, while purging + sampling MW-11 + MW-11A, purge water was oily - had a lot of green and smelled like petroleum products. The sample collected from MW-11 was dark gray, oily and also smelled like petroleum products. Also on 11/15/96, Mr. Philips from SWP stopped by to check on our status. Mr. Philips expressed concern about BNSPC leaving purge water/well development drums onsite. Philips asked Jewell if BNSPC would be taking away the drums when we left, this trip. Mr. Philips asked if we could put all of the drums in one spot. Jewell told Philips we would probably have to contract a waste hauler to remove the drums. Jewell told Philips we would take a total drum count and make sure all drums were labeled properly before ~~completing~~ leaving SWP.

1345 Personnel arrive at SB-55/SB-06 location + prepared to collect surface/subsurface soil sample, just south of what appears to be City Well #2.

1355 VOA collected first ≈ 1-3in below land surface (bls). remaining sample collected into glass bowl, mixed thoroughly + distributed into appropriate containers. We collect Dioxin sample at this location.

1405 Personnel begin boring for SB-06. Hit water at 28 ft. Remove auger + begin boring beside original hole. Fill other hole w/ dirt.

1610 Collect VOA @ SB-06 @ 7 ft bls. soil started out dark brown w/ gravel (first few inches + became light tan.

remaining sample collected into bowl, mixed + distributed into remaining containers.

1630 Personnel arrive at SB15/SB-14

1635 Personnel collect VOA first from ≈ 1-3 inches bls. Remainder of sample collected in bowl, mixed + distributed to appropriate containers. Dioxin collected at this location. Soil is dark brown fine sand. sample collected near proposed location for MW-10

1650 personnel collect VOA from SB-14 from the auger bucket directly into container

Remaining sample collected into bowl, mixed + distributed into appropriate containers. Sample collected from ≈ 2ft 2 inches BLS. Soil begins as dark gray/brown sand + becomes light tan. sandy soil.

1715 Personnel pack-up and depart site for hotel

Dennis J. Dwell 11/13/96

11/12/96

Personnel unable to collect samples today because of no vacuum caps

Dennis J. Dwell 11/12/96

11/18/96 ≈ 43°F Sunny, Clear 10-15 mph winds

~~0755~~ Personnel Stop for ice

810 Personnel arrive onsite

Environmental Separation Drillers waiting at gate to be let in

820 Brown + Jewell arrive at locations MW-24 + 24A.

Note on 11/15/96 Personnel attempted to locate MW-24R, But it could not be found. MW-24A will be collected instead.

820 Uncapped MW-24 + MW-24R.

Note: Drillers unload equipment. Driller Steve left for Florence to pick up drillers trailer which broke down

840 Grimmke assists Brown + Jewell with Groundwater Sampling

840 MW-24R - DEPTH TO GROUNDWATER IS 4.20 FEET BTOC. TOTAL DEPTH IS 15.20 FEET BTOC. 11 FEET × 0.17 = 1.87 GALLONS/WELL VOLUME × 3 VOLS. = 5.61 GALS.

1.87 × 5 = 9.35 GALS.

0900 MW-24A DEPTH TO WATER = 3.50 FEET BTOC

TO THE DEPTH = 36.37 FEET BTOC

WATER COLUMN = 32.87' × 0.17 GAL/FT = 5.59 GAL/VOLUME

5.59 × 3 = 16.76 5.59 · 5 = 27.95

0910 ~~0915~~ BEGIN PURGING MW-24R.

TIME	TEMP (°F)	PH	COND. (µmhos/cm)	TURB (NTU)
0910	63.5	5.96	1975	85.8
0920	64.6	6.06	1982	8.0
0930	64.4	6.11	1949	15.9
0940	64.7	6.10	1940	10.7
0950	64.6	6.02	1899	10.9

0915 BEGIN PURGING MW-24A.

TIME	TEMP (°F)	PH	COND (µmhos/cm)	TURB (NTU)
0915	62.3	5.8	385	3.63
0920	~~64~~ 63.1	5.78	386	1.18
0930	63.5	6.01	380	0.64
0935	62.6	5.98	374	0.43

0935 STOP PURGING MW-24A. 22 GALLONS PURGED.

0950 STOP PURGING ~~MW-24A~~ SP. MW-24 6.5 GALLONS PURGED.

0955 SAMPLE MW-24A COLLECTED.

1000 BEGIN COLLECTING ~~MW-24R~~ SP. MW-24

1015 MR. PHILLIPS OF SWP ARRIVES ONSITE AND SPEAKS WITH BV PERSONNEL ABOUT ONGOING ACTIVITIES ONSITE, UPCOMING DRILLING.

1030 MR. PHILLIPS DEPARTS SITE.

1035 BV PERSONNEL PACKING UP EQUIPMENT AT MW24 LOCATION.

1100 Personnel depart for lunch.

1140. Personnel arrive back on site. Drillers have returned

1145. Brown & Jewell arrive at MW-28 and MW-28-A. Begin mike with the drillers. Brown uncaps MW28 & MW28A. Begin mike arrives to assist w/ sampling while Drillers unload & decon equipment.

1205. Personnel determine water level to be 4.4ft. Total well depth is 14.91 thus well column is 10.51 (x 0.17 = 1.79) btw 5.36 and 8.95 gallons should be purged.

Water Measurements for MW-28

Time	Temp	pH	cond.	Turb
1215	66.2°F	6.36	3090	8.4
1220	70.2°	6.64	2860	12.6
1235	67.0°	6.45	2350	5.23
1250	67.1°	6.56	2170	3.93

1215. Personnel determine water level for MW28A to be 4.00. Total well depth is 27.32 Thus well column is 23.32 (x 0.17 = 3.96) btw 1.88 and 6.8 gallons should be purged. Personnel set up submersible pump to purge 28A

Water Measurements for 28A

Time	Temp	pH	cond.	Turb.
1225	67.5	6.52	206	16.2
1239	66.5	6.36	233	0.67
1245	66.3	6.15	246	0.34

Purged ~ 17 gallons from MW-28A

1245 VOA collected from 28A

A duplicate sample is collected from MW-28A and labelled SP-MW-28AD.

1255 VOA collected from MW-28

(purged ~ 7 gallons from MW-28)

1300 Collect metals/cyanide portions from MW28A (including MW28AD-Dups)

1305 Jewell preserves MW-28A + 28AD samples (metals/cyanide portion)

1310 Completed collection of MW-28A and secured well.

1319 Completed collection of MW-28 and secured well.

1156. Personnel arrive at decon + unload samples. Grimmke + Brown will go sample while Jewell stays at staging area to process samples.

1400 UNCAP MW-22A (BROWN AND GRIMMKE) AND UNLOAD TRUCK TO COLLECT GROUNDWATER SAMPLE.

1410 DEPTH TO GROUNDWATER 2.82' BTOC

TOTAL DEPTH OF MW 22A = 33.55' BTOC

WATER COLUMN = 30.73' × 0.17 GAL/FOOT = 5.22

THUS 3 WATER COLUMNS = 15.66 GAL / 5 = 26.10 GALS.

1415 BEGIN PURGING WELL.

TIME	TEMP (°F)	PH	COND (mS/cm)	TURB (NTU)
1415	70.4	6.23	306	9.01
1420	67.9	5.63	293	1.38
1430	68.0	5.70	310	0.50
1435	67.9	5.67	310	0.67

1435 DISCONTINUE PURGING MW22A.

21 GALLONS REMOVED.

1445 BEGIN COLLECTING SAMPLE.

1455 SAMPLE COLLECTION COMPLETE.

1515 - Grimmke goes to purchase vermiculite for packing samples. Brown + Jewell process samples.

1550 Jewell leaves site to contact Nardine Turner for the New Case # and new labs. Ms. Turner said to ship organic samples to SWOK and Inorganics to CHESPA - she said to also ship Dioxins to SWOK, but send them separately. There will be no case # for the Dioxins. But there will be a new project #. She said call her before shipping Dioxins. Nardine suggested me to collect an extra volume for water matrix Dup sample.

Mr. Jewell returns to site. Grimmke arrives at the site at the same time. Personnel pack up, to finish processing samples at the hotel due to rain. Grimmke leaves to take 2 drillers to their hotel.

1630. Brown + Jewell depart for Hotel.

1700. Personnel Arrive @ Hotel. Brown, Jewell, + Grimmke process samples + prepare for shipment.

1830. Personnel complete packing. Brown and Grimmke depart hotel for Fed-Ex office.

1850 Personnel (Brown + Grimmke) ship coolers at Fed Ex. End of Day.

Brian J. Jewell 11/19/96

11/19/96 Overcast, drizzly rain ≈ 58°F. Expected rain

745 Jewell Contacts Carol Schaffer at SMO and tells her how many samples were shipped yesterday (11/18/96) and the airbill #'s for organic + inorganic shipments. Jewell tells Schaffer they will ship 3 more groundwater samples today and personnel will contact her w/ airbill #'s, etc.

800. Brown checks out of hotel room. Jewell asks about reserving her room for late check out. Hotel staff said it would be OK to keep the room until 2:00pm. Personnel keep room in order to pack todays samples.

815 Brown and Jewell depart for site. [Grimmke left Lanier and arrived onsite at 630] Jewell to Grimmke, this mornings activities, which occurred prior to Brown + Jewells arrival will be recorded, consequentially, after Jewell + Brown depart + the logbook is handed over to Grimmke.

~~830~~ 830 Brown + Jewell arrive onsite

840 Brown decons water level indicators

855 Brown uncaps MW-27.

915 Personnel Determine Water Level to be 2.25 ftb/s Total Well Depth is 7.04; Thus well column is 4.84 (x0.17 = 0.82). B/tw 2.46 and 4.1 gallons should be purged from MW-27.

Water Measurements for MW-27

Time	Temp.	pH	conductivity	Turbidity
925	61.2°F	6.15	715	91.8
931	61.5°	6.22	704	40.9
945	61.5°	6.24	700	17.78

≈ 4 gallons purged.

945 VOA Collected first SP-MW-27

1000 Collected Metals/cyanide portion of sample

1005 Completed sample. Jewell preserves cyanide/metals portion.

1015 Personnel pack up equipment and return to staging area

1025 personnel arrive at SP-MW-25 and uncap the well

1045 Personnel determine water level to be 2.05 ftb/s total well depth is 14.9, thus well column is 12.85 (x0.17 = 2.18). B/tw 6.54 and 10.9 gallons should be purged from MW-25 [Note prior to measuring water level w/l's were deconned.]

Measurements for MW-25

Time	Temp.	pH	conductivity	turbidity
1050	61.7°F	5.78	1239	17.7
1105	63.6°	5.96	1292	28.3

1110. Purged ≈ 2½ gallons. Well Dry. Waiting for well to Recharge.

1120 Personnel lock well & depart for lunch while well recharges.

1230. Return to location, well only produces 2 quarts. Personnel lock well up to recharge & depart for hotel to get coolers & vermiculite & Check out of hotel. Grimmke remains onsite

~~1400 Brown~~ 1345. Brown & Jewell arrive at hotel and pick up coolers, vermiculite, luggage ~~& check out of room.~~

1415 Check out of room.

1445 stop & buy ice

1455 Arrive at MW-25 and prepare to collect ROD.

1500 Collect ROD. (Water level still looks low.)

1515 - Well dry again. Amber jug approx. ½ full. waiting to recharge.

1620 - Collected enough to fill 1 liter poly bottles for metals & cyanide. Waiting for well to recharge.

1815. Jewell departs to take inorganics to lodge. Still waiting for well to recharge to take extractable portion of sample.

1940 Sample complete. Personnel (Brown & Jewell) depart site for Red Ex to try & catch the 2000 pickup.

1955 Last Fedex pick up already left. Personnel depart hotel to leave logbook w/ Grimmke

2020 Personnel leave ~~all~~ logbook & site file material with Grimmke at hotel.

2030 Personnel decide to stay another night & leave in the morning. Personnel (Brown & Jewell) will ship samples (organics) in the morning. Jewell turns logbook over to Grimmke.

Chandler Jewell 11/19/96

11/19/96 A. GRIMMKE

ACTIVITIES OF DRILLING CREW 11/19/96

0630 GRIMMKE ARRIVES ONSITE OPENS GATE.

0640 DRILLERS ARRIVE. THE WEATHER IS COOL ≈ 45°F WITH DRIZZLE. DRILLERS PREPARE FOR TODAY'S WORK. FULLER AND GRIMMKE AGREE TO BEGIN AT SP-MW-40(S).

0655 RAIN HEAVY. DRILLERS SIT IN TRUCK (DRILLERS ARE: EDDIE FULLER (DRILLER) CHARLIE SCOTT AND MIKE BOSTON (HELPERS)).

0710 RAIN LIGHTENS. WORK RESUMES.

0730 DRILLERS WORKING ON/OFF DUE TO RAIN.

0830 JEWELL AND BROWN ARRIVE ONSITE. DRILLERS BEGIN INITIAL DECON OF ALL EQUIPMENT TO BEGIN DRILLING.

1000 DECON CONTINUES. MR PHILLIPS ONSITE.

1010 SET UP AT SP-MW-40 TO DRILL.

1030 BEGIN DRILLING SPMW-40 WITH 8¼" ID/12" OD HSA. SPT SAMPLES COLLECTED EVERY 5'.

1120 HOLE AT 14' BLS. GRIMMKE REQUESTS. DRILLERS STOP TO ALLOW A WATER LEVEL MEASUREMENT INSIDE AUGERS

11/19/96 A. GRIMMKE

1130 DRILLERS/BV PERSONNEL LEAVE FOR LUNCH TO ALLOW WATER LEVEL INSIDE AUGERS TO EQUILIBRATE.

1230 RETURN FROM LUNCH. WATER IN AUGERS AT APPROX 3.5' BLS.

1240 AT DIRECTION FROM GRIMMKE, WELL ADVANCED TO 15' BLS.

1300 WELL MATERIALS DECONNED, BROUGHT TO WELL LOCATION. DISCOVERED THAT SCREEN AND RISER ARE THREADED DIFFERENTLY. FULLER LEAVES SITE TO SPEAK TO DRILLING OFFICE.

1340 FULLER RETURNS, STATES THAT SUB CONNECTIONS WILL BE FIXED TOMORROW TO ARRIVE 7:00.

1400 MOVE RIG TO SP-MW-42 AND CLEAN OUT MUD TUB.

1430 DRILLERS ADVANCE BIT TO 41' AND ENCOUNTER SLOUGH. MIX 180 GALLONS MUD (1 BAG BENTONITE).

1530 DRILLERS ADVANCE HOLE TO 53' BLS AND MIX ANOTHER 180 GALLONS MUD (1.5 BAGS BENTONITE).

530 ADVANCED TO 57' BLS. LOST CIRCULATION. 90 GALLONS OF MUD LOST.

11

~~10~~/19/96 A. GRIMMKE

1545 MIX 3RD BATCH OF MUD PUMP BREAKS. FULLER WORKS ON IT.

1635 PUMP FIXED MUD MIXED (1.5 BAGS BENTONITE/180 GALLONS)

1645 HAS PROCEEDS TO 65.5' BGS AT GRIMMKE'S REQUEST.

1700 DRILLERS ORGANIZE MATERIAL AND PREPARE TO DEPART SITE.

1715 GRIMMKE AND DRILLERS DEPART SITE.

11/20/96 A. GRIMMKE

0800 GRIMMKE ARRIVES ONSITE.

0810 DRILLERS ARRIVE. SETUP. DECON WELL MATERIALS.

0900 DRILLERS LEAVE SITE FOR MORE ~~[illegible]~~ BENTONITE AND TO PICK UP SUB CONNECTIONS AT THEIR HOTEL.

~~[illegible]~~ 1000 MR. PHILLIPS ONSITE.

1045 ~~CONTRACTOR~~ SUPPLIER ARRIVES ONSITE AND DELIVERS BACKHOE. MR. PHILLIPS LEAVES.

1100 DRILLERS DECON SUB CONNECTOR AND 5 FOOT SCREEN FOR SP-MW-4Z

1115 GRIMMKE/DRILLERS GO TO LUNCH.

1200 GRIMMKE RETURN FROM LUNCH.

1210 DRILLERS RETURN LOAD UP TO INSTALL SP-MW-4C MOB TO WELL.

1230 DRILLERS MIX 180 GALLONS THIN MUD TO KEEP HOLE OPEN, ALLOW INSTALLATION OF SAND PACK ETC.

1300 GRIMMKE MEASURES WELL MATERIAL, CALCULATES NECESSARY STICK UP.

1310 WELL IN PLACE. SAND PACK TREMIE INTO PLACE 2' BENTONITE SEALER IN PLACE.

11/20/96 H. Grimmke

1345 Well installation complete.

1400 Drillers organize area around wells 40, 41, 42, stage drums from wells adjacent to decon.

1430 Driller set up over SP-MW-40 begin installation of well MW-40.

1545 Well installation complete sand pack installed, 1 foot bentonite seal installed.

1600 Drillers stage additional full drums from well area to drum staging area adjacent to decon.

1700 Grimmke / drillers depart site for day.

11/21/96 A. Grimmke

0630 Grimmke arrives onsite.

0640 Drillers arrive onsite.

0650 Drillers at well SP-MW-41 shovel out mud pan prepare drilling mud.

0710 Begin drilling at SP-MW-41. Continuous spoons collected to determine the top of lower sand.

0840 Top of lower sand determined at 28' BLS.

0900 TD = 39.5 feet BLS.

0915 Fresh thin drilling fluid mixed well materials decontaminated.

0930 ~~well~~ AG borehole flushed with new fluid. Well placed in hole. Sand tremied into place. Grimmke calculated stick-up from measured materials.

1000 Slurry of Cetco Pureflood mixed. 10.4 lb/gal, 5 foot seal installed.

1030 Well installation complete. Drillers transport drums to staging area w/ backhoe.

11/21/96 A. GRIMMKE

1045 MR. PHILLIPS ONSITE.

1100 MR PHILLIPS LEAVES SITE.

DRILLERS CLEAN OUT MUD PANS AT C.P. MW-41/42 LOCATIONS.

1205 GRIMMKE DRILLERS GO TO LUNCH.

1300 GRIMMKE ATTEMPTS TO CALL GARLEY OF EPA. NO ANSWER. LEAVES VOICE MAIL.

1305 GRIMMKE RETURNS TO SITE. DRILLERS DECONNING EQUIPMENT.

1310 JEFF WOOD OF AN ENGINEERING CO., A PORTS AUTHORITY CONTRACTOR ENTERS SITE TO INSPECT PORTS AUTHORITY PROPERTY. IS GREETED BY GRIMMKE.

1320 GRIMMKE DRIVES SITE IN SEARCH OF WELL STAKES, FINDS MW-31/32/33 LOCATION.

1350 GRIMMKE TAKES FULLER TO 31/32/33 TO CLEAR AREA WITH BACKHOE.

1400 JEFF WOOD LEAVES SITE.

1435 STUART PARKER OF NCDEHNR ONSITE, SPEAKS WITH GRIMMKE ABOUT SITE ACTIVITIES THIS WEEK.

11/21/96 A. GRIMMKE

1515 PARKER LEAVES SITE.

NOTE: 1430 - DRUM SUPPLIER ARRIVES ONSITE AND DELIVERS 50 CLEAN DRUMS.

1530 DRILLERS DECON AUGERS, DRILL STEM.

1630 FULLER MOBS. RIG TO MW-31/32/33 LOCATION.

1645 POTENTIAL CONSULTANTS FROM PORTS AUTHORITY (DAMES AND MOORE) VISIT SITE.

1715 GRIMMKE/DRILLERS DEPART SITE.

11/22/96 A. GRIMMKE

0630 GRIMMKE/DRILLERS ARRIVE ONSITE, PROCEED TO SP-MW-32 LOCATION.

0700 BEGIN DRILLING AT SPMW-32 SPLIT SPOON SAMPLES COLLECTED EVERY 5 FEET.

0745 PEAT LAYER ENCOUNTERED IN 20-22 FOOT SPOON. GRIMMKE DIRECTS DRILLERS TO SET SURFACE CASING AT 23' BLS.

0800 SURFACE CASING LENGTH TOO SHORT (22.5 FEET). FULLER LEAVES SITE TO CALL ABOUT WELDER.

WEATHER IS COLD (≈35°F, WINDY).

0900 FULLER RETURNS, WELDS 3' SECTION ONTO PIPE.

1100 WELDING COMPLETE, SURFACE CASING TRANSPORTED TO WELL LOCATION.

1120 DRILLERS BEGIN INSTALLING SP-MW-32 SURFACE CASING AT 23' BELOW LAND SURFACE.

1240 WELL INSTALLATION COMPLETE DRILLERS/GRIMMKE GOTO LUNCH.

11/22/96 A. GRIMMKE

1330 GRIMMKE/DRILLERS RETURN FROM LUNCH.

1400 AT LOCATION FOR SP-MW-33. DRILLERS COLLECT FIRST SPLIT SPOON, ATTEMPT TO DRILL, BUT BIT IS TOO BIG TO FIT THROUGH MUD TUB.

1500 FULLER LEAVES SITE TO GET 10" SURFACE CASING FROM CITY COMPOUND.

1515 FULLER AND HELPERS RETURN WITH CASING. FULLER LEAVES SITE FOR SAW TO CUT BIT TO SIZE FOR MUD PAN.

1550 FULLER RETURNS WITH SAW.

1630 BIT TRIMMED TO FIT MUD PAN. DRILLERS ORGANIZE AND ADD ANTI FREEZE TO STEAM CLEANER, EMPTY HOSES DUE TO EXPECTED FREEZE TONIGHT.

11/23/96 A. Grimmke

0630 Grimmke Arrives Onsite.

0640 Drillers Arrive Mob to SP-MW-33 Location.

0655 Begin Drilling at SP-MW-33 Location.

0800 Peat Layer Encountered at 17' BLS. Grimmke Instructs Drillers to Set Surface Casing at 20 Feet BLS.

Drillers Return to Decon for 10" Surface Casing.

0810 Drillers Mob to SP-MW-33 w/Casing.

Note: Driller Charlie Scott not on site/sick at Hotel.

0855 Surface Casing Installed at 20.2 Feet BLS.

1000 Casing Grouted in Place with Neat Cement/Bentonite (10.8 lb/gal).

1015 Drillers Leave Site to Acquire Antipulgous Drilling Mud. Check on Scott. Get Lunch.

1230 Drillers Return with Scott.

1300 Drillers Mob to SP-MW-31 Location.

1315 Drilling Begins at SP-MW-31.

11/23/96

1430 Borehole SP-MW-31 at 15' BLS. Grimmke Instructs Drillers to Install Well so that Bottom of Well at 14' BLS.

1450 Well Installation Begins at SP-MW-31.

1545 Well Installation Complete.

1600 Drillers Decon ~~and Cut 14~~ Bit ~~to~~ Ft. and Set Up at SP-MW-31 Location.

1700 Grimmke and Drillers Leave Site for Day.

11/24/96 A. GRIMMKE

0650 GRIMMKE ARRIVES AT SITE.

0640 DRILLERS ARRIVE, MOB TO SP-MW-32 LOCATION.

0700 DRILLERS MIX MUD, PREPARE TO DRILL.

0710 BEGIN DRILLING, HOLE COLLAPSE TO 15' BLS IN SPMW-32.

0800 BIT GRINDING FROM 25-27' BLS ON WOOD. AT 27' DRILLING CASES (SAND).

0930 BEDROCK AT 45' BLS. GRIMMKE WEIGHS DRILLERS TO SET WELL.

0950 RETURN TO DECON, DRILLERS DECON WELL MATERIALS. DISCOVER THAT 2' SUMP IS THREADED IMPROPERLY.

1020 FULLER ASKS GRIMMKE TO SPEAK TO MANGUM TO ASK IF A PVC SUMP WOULD BE ACCEPTABLE.

1050 GRIMMKE RETURNS FROM SPEAKING TO MANGUM TELLS DRILLER THAT STAINLESS STEEL SUMP IS NECESSARY.

1100 DRILLER CUTS THREADS OFF SUMP AND SCREEN AND WELDS SUMP ONTO SCREEN.

1120 DRILLERS DECON SCREEN AND WELL MATERIAL.

11/24/96

1140 GRIMMKE DRILLERS GO TO LUNCH.

1230 RETURN FROM LUNCH MOB TO SP-MW-32 WITH WELL MATERIALS.

1300 FULLER ATTEMPTS A SPLIT SPOON SAMPLE OF BEDROCK.

1415 WELL INSTALLATION COMPLETE. WELL SEALED WITH 5' CETCO PUREGOLD 10.1 lb/GALLON.

1430 DRILLERS STAGE DRUMS/DECON.

1500 DRILLERS SETTING UP AT SPMW-33 TO DRILL INTERMEDIATE SECTION FOR 6" CASING.

1615 10" BIT DOES NOT FIT SURFACE CASING, METAL SAW IS USED TO TRIM 10" BIT.

1700 BIT TRIMMING INCOMPLETE, DARK. GRIMMKE/DRILLERS LEAVE SITE FOR DAY

11/25/96 M. GRIMMKE

0630 GRIMMKE ARRIVES ONSITE, OPENS GATE.

0645 DRILLERS ARRIVE, MOB TO SP-MW-33/26 LOCATION.

0700 DRILLERS CUT EXCESS MATERIAL FROM 10" BIT.

0730 BIT CUTTING CONTINUES, WEATHER IS COOL ≈ 40°F PARTLY CLOUDY.

0815 BEGIN DRILLING @ SP-MW-33, REDRILL FROM 10' TO 20' BLS.

0945 BEDROCK AT 42' BLS IN MW-33, BEDROCK IS SOFT, BECOMES HARD AT 43' BLS.

1015 GRIMMKE CALLS OFFICE, SPEAKS TO HELM OF BUSPC, CALLS EPA LEAVES MESSAGE FOR GUDLEY.

1100 FULLER WELDS SECTIONS OF CASING FOR SP-MW-33.

1200 DRILLERS/GRIMMKE GO TO LUNCH.

1300 RETURN FROM LUNCH. DECON PIPE SECTION FOR SURFACE CASING FOR SP-MW-33.

1400 GRIMMKE CALLS HELM OF BUSPC ADMIN. DISCUSSES CONTINUING SCHEDULE OF ACTIVITIES.

11/25/96

1430 INSTALLATION OF SURFACE CASING BEGUN, FIRST SECTION LOWERED INTO HOLE.

1450 DRILLERS WELDING SECOND SECTION OF CASING TO FIRST.

1500 RAIN BEGINS.

1510 SOME DRIZZLE, RAIN BEGINS TO SLOW.

1515 RAIN ENDS FOR NOW. DRILLERS GROUT SURFACE CASING INTO PLACE.

1545 DRILLERS REMOVE ONE MUD PAN FROM AREA AND ALL OTHER EQUIPMENT/DEMOB FROM MW-31/32/33 AREA.

1600 DRILLERS DECON ALL EQUIPMENT.

1700 GRIMMKE/DRILLERS LEAVE SITE FOR DAY.

11/26/96 A. Grimmke

0630 Grimmke onsite.
0700 Drillers arrive.
0730 Drillers deconing.
0800 Fuller uses backhoe to move drums from SP-MW-33 to staging area.
~~0800~~ 0830 Decon continues. Fuller uses backhoe to move purge water drums from well locations to drum staging area.
0930 Fuller uses backhoe to clear area for wells 34, 35, 36 along Greenfield Creek.
1130 Fuller completes clearing area returns to depot. Grimmke lunch. Drillers lunch and to pick up supplies (Vasqueen) at Lowes.
1230 Grimmke returns from lunch.
1300 Drillers return.
1320 MOB to SP-MW-35 location. Setup to drill.
1345 Begin drilling SP-MW-35.
1430 Peat encountered at ≈15' BLS.

26
11/~~27~~/96 A. Grimmke

1450 Grimmke instructs drillers to set casing at 17½' BLS.
1545 Drillers install casing at 17½' BLS clean up and prepare to depart, casing grouted into place with 100 gallons water + 3 bags neat cement + 3% bar bentonite (10.8 lb/gallon).
1700 Grimmke departs site. Instructs drillers to lock gate.

12/2/96

0600 GRIMMKE LEAVES HOME WITH EPA VEHICLE EN ROUTE TO SITE.

1420 GRIMMKE ARRIVES AT SITE IN WILMINGTON, NC AND AWAITS DRILLERS.

1530 GRIMMKE CALLS INTO OFFICE, SPEAKS WITH MANGUM; MARBURY.

1700 DRILLERS HAVEN'T ARRIVED, GRIMMKE LEAVES SITE FOR DAY.

12/3/96 A. GRIMMKE

0620 GRIMMKE AND DRILLERS ARRIVE ONSITE. DRILLERS PICK UP EQUIPMENT AND PROCEED TO SP-MW-33 LOCATION. (AFTER DECONNING THE WELL AND SOME ADDITIONAL EQUIPMENT).

0800 DRILLERS RETURN TO DELON AND DELON MUD TUB / RETURN TO WELL LOCATION.

0900 RESUME DRILLING AT SP-MW-33. DRILLING BEGINS AT 32' BLS.

1015 DRILLING CONTINUES, DRILLERS TRIP OUT TO CLEAN CLOGGED BIT.

GRIMMKE DIRECTS DRILLERS THAT TD = 54' WHEN DRILLING COMPLETE.

1115 HOLE AT 54' BLS FULLER OVERDRILLS TO 55' AND TRIPS OUT. GRIMMKE MEASURES WELL MATERIAL.

1145 BOTTOM OF WELL SET AT 53.5' BLS SAND FILTER PLACED USING TREMIE PIPE.

1220 BENTONITE SEAL TREMIE GROUTED IN PLACE (CETCO PREGOLD SLURRY) BENTONITE SEAL = 102 lb/GALLONS.

1240 GRIMMKE DRILLERS GO TO LUNCH

A. Grimmke 12/3/96

1330 Grimmke Returns From Lunch

1340 Drillers Return, Decon Materials For SP-MW-34.

1445 Move To SP-MW-34 Location.

1500 Begin Drilling With Nominal 8" HSA.

1510 Water Encountered At ≈3" BLS.

1600 TD For SP-MW-34 = 15' BLS.

1630 Well Installed To 14' BLS. 3/8" Bentonite Seal Installed 1.8' To 12.8' BLS.

1700 Grimmke And Drillers Depart Site For Day.

12/4/96

0630 Grimmke And Drillers Arrive Onsite. Drillers Decon Mud Pan And Other Equipment.

0746 Mobs To SP-MW-36 Location Set-Up Rig At Hole Location.

0830 Begin Drilling With Nominal 14" Tri-Cone Roller Bit.

0945 Peat Layer Encountered At 12' BLS. Grimmke Instructs Fuller To Set Casing At 15' BLS.

0950 Fuller Returns To Decon With Helpers And Cuts And Decons 10" Casing.

1015 Drillers Return To Hole And Set Casing.

1050 Casing Grouted In Place w/ 40 Gal. Water 3 Bags Cement 1/3 Bag Bentonite.

1200 Grimmke And Drillers Go To Lunch.

1300 Return From Lunch.

12/4/95 A. GRIMMKE

1300 DRILLERS DECON REIG; MUD PAN AND RIG WITH TOOLS.

1430 MOB TO SP-MW-35.

1450 RESUME DRILLING AT SP-MW-35 WITH NOMINAL 6" TRICONE BIT.

1545 BASE OF PEAT AT 26 BLS.

1615 TD: 37' BLS.

1645 FULLER AND GRIMMKE AGREE TO INSTALL SP-MW-35 ~~AND~~ THE IN AM.

1700 DEPART SITE FOR DAY.

12/5/95 A. GRIMMKE

0730 GRIMMKE ARRIVES ONSITE.

0800 DRILLERS ARRIVE ONSITE AFTER PICKING UP WATER AT RENTAL PLACE.

0815 PICKUP DECONTAMED CASING AND MOB TO SP-MW-35.

0830 GRIMMKE MEASURES CASING, DRILLERS PREPARE HOLE WITH NEW/THIN DRILLING FLUID.

0930 WELL INSTALLATION BEGINS, SAND PLACED VIA TREMIE PIPE. BOTTOM OF WELL AT 36' BLS.

1010 MR. PHILLIPS ONSITE, SPEAKS WITH GRIMMKE ABOUT INVESTIGATION.

1045 WELL INSTALLATION COMPLETE, BENTONITE SLURRY INSTALLED FROM 23'-28' BLS. SLURRY WEIGHT = 10.7 lb/GALLON. MR. PHILLIPS LEAVES SITE.

1100 DRILLERS MOVE MUD PAN AND EQUIPMENT TO DECON.

1130 GRIMMKE AND DRILLERS LUNCH.

12/5/96 A. Grimmke

1220 Grimmke onsite.

1250 Drillers return from lunch with welder from rental supplier.

1300 Drillers decon drill rods, mud pan, and drilling equipment

1430 Proceed to SP-MW-36 with decomed equipment.

1450 Begin drilling at SP-MW-36. Resume at 8' BLS (grout and cave in)

1530 Base of fent encountered at 26' BLS.

1700 Getting dark, hold at 35' BLS. Grimmke/Drillers agree to resume in the morning.

17.5 man site for day.

12/6/96 A. Grimmke

0630 Grimmke arrives onsite

0640 Drillers arrive, proceed to SP-MW-36.

0700 Resume drilling at SP-MW-36.

0730 Bedrock encountered at SP-MW-36 at 37' below mud surface.

0745 TD = 40' BLS. Return to decon for casing.

0800 Drillers weld/decon casing, Grimmke calls office, speaks to Malcolm, calls EPA, ~~speaks to Gurley~~ asks leaves message for Gurley on voice mail.

1000 Mob to SRMW-36 w/decomed and welded surface casing.

1030 Mr. Phillips arrives onsite. 65 drums delivered.

1100 Two sections of surface casing, 22.6' + 21.4' welded together.

Drillers prepare grout.

1145 Casing grouted in place, grout = 4 bags Giant Cement + 1 bag Bentonite + 100 gallons water = 11.7 lb/gal

12/6/96 A. GRIMMKE

1200 GRIMMKE TO LUNCH, STOPS BY OFFICE DEPOT FOR PERMANENT MARKER TO WRITE ON WHITE DRUMS.

1300 RETURN FROM LUNCH.

1330 DRILLERS RETURN FROM LUNCH.

1400 DRILLERS SPEND THE AFTERNOON GROUTING WELLS WHICH HAVE BEEN INSTALLED, INCLUDING SP-MW-31, 32, 33, 40, 41, AND 42. HELPER MIKE BUSTON DETENS EQUIPMENT FOR OPTIMIST PARK LOCATIONS TO BE DONE TOMORROW.

1700 WELLS GROUTED, GRIMMKE AND DRILLERS LEAVE SITE FOR DAY.

12/7/96 A. GRIMMKE

0630 GRIMMKE ARRIVES ONSITE AFTER CHECKING OUT OF HOTEL.

0640 DRILLERS ARRIVE ONSITE, BEGIN DECONNING EQUIPMENT.

0820 MOB TO SP-MW-39 LOCATION (OPTIMIST PARK).

0930 AT 3' BLS DOBRIS PREVENTS USE OF ROLLER CONE BIT. FULLER INTENDS TO DRILL PILOTHOLE WITH 12" AUGERS AND REAM WITH 14" CONE BIT.

1100 PEAT ENCOUNTERED FROM 8' TO 16.5' BLS. GRIMMKE INSTRUCTS DRILLERS TO SET CASING AT 15'.

1130 DRILLERS RETURN TO DEPOT FOR CASING. DRILLERS LOAD CASING.

1200 GRIMMKE, DRILLERS GO TO LUNCH.

1230 RETURN FROM LUNCH.

1300 CASING SET AT 14.25' BLS.

1315 CASING GROUTED IN PLACE. GROUT = 3 BAGS CEMENT, 1/2 BAG BENTONITE + 5 GALLONS OF WATER, 12.5 lb/GALLON.

1335 MR. PHILLIPS ONSITE, CHATS WITH GRIMMKE.

1 12/7/96 C. Helm

1350 Mr. Phillips leaves. Driller Bustins Moss to decon with water truck and drilling equipment.

14:30 C. Helm arrives on site to relieve Grimmke as site geologist.

15:00 Meet Drillers, begin site tour with Andrew
Note: must re-lock padlock to site gate each morning
Occasionally white pick-up trucks on site, either Mr. Henry Phillips, (site custodian) or Ports Authority Security.

15:30 Grimmke begins drive to Atlanta
I continue logging MW-38 (in Port)

1605 Cut 6" carbon steel casing to 14.0' (2.0 stick up)
Drillers set casing to 12.0' bls per instruction from Grimmke. In point layer per FSP direction (3.0' in port)
Casing has been deconned and laid on plastic tarp cutting and inserting.

12/7/96 C. Helm

17:00 Drillers have flushed out borehole to 12.0' bls - between USA & 6" casing.
Grout mixed using 3 bags Portland (Type I) cement, bentonite powder = Quikseal.

17:15 Weigh grout with mud balance, 10.5 lb/gal.
Tremie grout to land surface, ~2' casing stick-up.

18:00 Clean up area, return equipment to Decon Area

18:20 Depart site.

C. Helm

12/8/96 C. Helm

6:15 Report Hotel
6:45 Arrive on site open gates
6:55 Drillers arrive, continue to decon equipment and well materials to prepare for MW-36 well installation
8:15 Rig truck decanned but water truck stuck in mud
9:00 Use backhoe to un-stick truck. Then clean water truck.
10:15 Set-up on MW-36, along Greenfield Creek. Seal on 40.0' 4" carbon steel casing in second.

Note: while moving full drums with backhoe one drum (from Cross) fell and broke open. Drillers helper - checks places contents into another drum ASAP.

10:50 Begin to mix drilling fluid in mud tub (sol). Place metal mesh in tub to help filter wood fragments.
6" roller bit used. Drillers
12:10 pump out old remaining fluid from borehole - drum fluid

12/8/96 C. Helm

14:40 Begin fresh drilling mud, drilling begins advance from 40' bls (bottom of 6" carbon casing).
15:34 At 52.0' bls fresh fluid is mixed - old fluid is drummed. Well materials measured (see well installation log). Casing & screen previously decanned & wrapped in plastic.
16:00 Well set at 49.0' bls. Transue sand pack w/ water per SOP (FSP). Approx 40 gal fluid lost.
17:15 Pure Gold bentonite slurry used as seal above sand pack. - Begin "cure" period of at least 24 hours.
18:00 Clean up area, depart site

C. Helm

12/9/96 C. Helm

6:30 Report Hotel for site
7:00 meet drillers on site.
Begin decon activities
8:00 Remobilize to Optimist Park to cut 6" casings. Drillers leave for supplys.

Note: Need to call Bill Justice 341-7854, 7840 for water/sewer clearance for shallow well mw-39 - to be drilled later this week.

9:10 Drillers return to begin to continue mw-39 sparging & drilling. Note: 10" casing installed to 14.25' b/s on 12/7/96. - See log of boring -

14:45 6" casing set at 41.0' b/s, approximately 3.1' into Limestone bedrock. Lost sparged fluid

15:30 Call and meet Bill Justice to mark of utilities near shallow well.

15:45 Fence Contractor - Seegars begin fence (FOW) installation Mr. Mike Rousse & Tom

12/9/96 C. Helm

Drillers weld 2 casings together 22.52' and 23.15' 41.0' b/s casing depth, 4.5' stick up

16:00 Mr. Phillips on site, introduced myself and give brief summary of activities.
Drillers stuck again - appears coming off mw-39

17:10 Get back hoe to remove water truck from Optimist park.

18:00 Clean-up / Decon, wrap water sp. x 15.

18:15 Depart site

12/10/96 C. Helm

6:30 Report HOW for site
7:00 Drillers begin Decon - problems with freezing water sprayer and water truck starter broke.
8:15 Eddie returns welder to Prime equipment county charles fixes truck, mike continues to decon
10:15 Set up at MW-38 (Internal)
10:35 mix fresh drilling mud begin drilling thru 12' casing Mr. Phillips on site and requests copy of FSP - I will check with EPA first.
- See Log-of-Boring & well installation LOG
Set MW-38 at 24.0' bls
11:30 Mr. Phillips departs site. MW-38 installed in fresh drilling mud. Sand pack
~13:00 and seal Placement complete Call C. Gorley (EPA) and BVSPC. While drillers decon equipment and well materials for MW-37 - Shallow well

12/10/96 C. Helm

13:25 Set up on MW-37 in Optimist Park. Refer to Log-of-boring & well installation Boring log.
14:05 Consult with Robert Mangum on collection of SP-SS-03 & SP-SB-03 at the MW-37 location. He says they have already collected these samples.
16:40 Drilled (HSA) and spooned to 17.0' bls, ream & flush out hole - sand pack base. Bottom of sump placed at 14.1' bls with 2.7' of casing "stick-up".
1700 Begin decon & leave from Optimist Park
1800 Report site for HOW

C. Helm

12/11/96 C Helm

6:30 Depart Hotel for site
7:00 meet drillers at decon
Drillers decon equipment
and well materials for
preparation to finish
MW-39
10:00 Set-up on MW-39 casing.
At Optimist Park.
Note: Bottom of 6" steel
casing is 41.0' bls.
Use tri-cone bit and
mud rotary to drill
Thru limestone bedrock
to 52' bls
1308 After hole is reamed,
flushed, new mud mixed
well installation begins.
Sand pack base of 2 feet
Bottom of sump at 50.0' bls
Screened interval is 43.0 - 47.7'
bls. 2.0' sand above screen
to 41.0' bls
Bentonite seal to 36.0' bls
(Seal thickness = 5.0')
Cure time begins

12/11/96 C Helm

14:30 After decon of rig
and mud tub, drillers
set up to grout
MW-38 at Optimist Park
15:05 Mr. Phillips stops by
to inform me of his desire
for a copy of the FSP
Still can not set a hold
of Cindy will try tonight or
early tomorrow - to give
Mr. Phillips a copy of FSP
before the weekend.
16:00 Grout for MW-38 is
weighed with mud balance
to 10.9 lb/gal - acceptable
Tremie grout from top of
bentonite seal (13.1') to
ground surface.
16:30 Drillers help me get
started on well development
at MW-41
Note: Seegars Fund
Subcontractor finishes
the I-94 fence - 50' x 50'
(Mike and Tom) grass

12/11/96 C Helm

For SWP well developing BV will consider both borehole and casing diameters when calculating development quantities:

For Deep and Intermediate well a multiplier of 1.469 (1.5) will be used to determine gallons per linear foot based on 6" diameter (of surface casing)

For Shallow wells, BV will use a multiplier of 2.611 to determine gallons per linear foot based upon a 8" diameter borehole - No surface casing HSA - OD dimensions

1500 Drillers & C. Helm test pumping equipment to begin development tomorrow

1900 After decontaminating all personnel depart site

12/12/96 C Helm

6:20 Depart Hotel for site

6:50 meet drillers on site. They finish decon while I call Cindy Gourley, EPA RPM/SAM

7:20 Cindy gives me permission to give Mr Phillips copies of the FSP.

8:00 Go to Copamatic of Wilmington make three copies of FSP for Mr Phillips when he stops by today.

10:15 Drillers have finished decon and have set up on MW-39 to grout from sand to land surface

11:00 weigh out grout on mud balance = 10.8 lb/gal

11:30 Drillers also "top-off" MW-37, MW-38 at Optimist Park.

1:15 Clean-up the Optimist Park well cluster area. Make sure all drums are sealed & labelled

12/12/96 C Helm

13:30 Drillers pack-up and depart site for 4-day off break. They will return to site early Tuesday AM, 12/17/96.

13:50 Since all wells are not yet complete with pad pro-tap, etc. I tour all 12 wells to make sure all are locked with Padlock and expandable caps - Purchased by BV if necessary.

No well will be open over-night - Always Secure per EPA's SOP.

14:30 Mr. Phillips arrives, I hand over 3 copies of the SWP FSP as directed by C. Gurley.

14:50 At intermediate well MW-41

Total Depth: 39.90' from TOC

Static H_2O level: 4.60' from TOC

35.30' H_2O column x 1.5 multiplier

∴ 52.95 gals x 3 volumes = 158.85 gallons minimum to develop.
1 volume

12/12/96 C Helm

Time EST	pH	conduct umhos	Temp °F	Turbid NTU's	cumul. gals purged
15:00	6.04	502	67.1	14.1	~25
15:15	6.52	391	64.5	8.1	~45
15:35	6.51	375	64.1	2.31	~70
15:48	6.39	346	63.2	1.15	~90
15:58	6.44	326	62.9	0.82	~110
16:10	6.51	300	62.5	2.80	~140
16:25	6.51	289	62.1	1.20	~180
16:40	6.47	292	61.9	0.74	~200
17:00	6.52	290	61.9	0.60	~250
17:15	6.51	289	61.9	0.62	~270

MW-41

17:45 All parameters stabilized and turbidity very low. All development water drummed.

18:00 C. Helm departs site

C Helm

12/13/96 C. Helm

7:00 C. Helm arrives on site to develop two new wells - MW-40, MW-42

For MW-42 - Recap:

After decoding pump and water level indicator,

Total Depth: 67.60' TOC

static WL level: 4.39' TOC

63.21' WL column

x 1.5

94.8 gal = 1 well col.

x 3 volumes minimum

= 284.4 gals to develop at a minimum.

7:30 Set-up on MW-42 Using the driller's "Arch pneumatic pump" to develop.

8:15 I take a trip to the hardware store to buy chain and lock for newly completed IDW fenced-in storage area.

9:00 Begin to develop MW-42

12/13/96 MW-42 C Helm

Time	pH	conductivity	Temp	Turbidity	cumulative gals pumped
9:15	7.28	434	64.5	>2000	~30
9:25	7.35	443	63.5	>2000	45
9:38	7.41	419	62.5	>1000	70
9:58	7.30	416	61.5	816	95
10:10	7.34	407	61.7	421	120
10:25	7.27	411	61.8	122	150
11:00	7.67	410	61.7	106	~190
11:25	7.64	411	61.6	101	~240
12:00	7.87	408	61.5	201	~290
12:30	7.62	409	61.4	70.2	~335
13:10	7.70	408	61.5	20.	~365
13:30	7.69	408	61.4	9.6	~375

3" total drawdown.

Note: MW 42 seemed to take a long time to develop due to cloudy, turbid water - perhaps due to drilling mud circulation losses during drilling.

14:10 Mr Phillips stops by with his comments on the FSP: "Very accurate, CCA began at site in August 1992 - the runs

12/13/96 C Hale

unsure if PCP method was used "after 1980" - he said it could of been earlier. He forwarded a copy to his boss in Spartanburg, S.C.

14:45 Mr Phillips departs site.

15:10 After decon of pump, new new tubing - each well and decon of pump, I set-up over mw-40

Total depth = 16.20' TOC

static H_2O level = 4.80' TOC

H_2O column = 11.4 feet

X 2.611 = 29.76 gal = 1 well col.

X3 = 89.3 gal minimum

Time	pH	Conductivity	Temp	Turbid	cum gals dev.
15:25	6.62	523	63.2	41.9	25
15:45	6.72	534	63.0	5.51	50
16:00	6.67	59[illegible]	62.9	4.54	70
16:20	6.64	535	62.9	3.11	100
16:40	6.68	534	62.8	2.79	120
17:00	6.67	534	62.7	2.45	150

A Total of 150 gal's of water developed

1800 Depart Site C Hale

12/14/96 C Hale

6:30 Depart Hotel for Site

7:00 Arrive on site, begin to decon pump and H_2O level indicator,

Set-up on mw-32 (Inter)

Total well depth = 45.85' TOC

static water level = 2.73' TOC

water column = 43.12' x 1.5

one well volume = 64.68 gal x3

minimum of 194 gals to develop

9:00 move drums (empty) to new location.

Time	pH	Conductivity	Temp	turbid	cum. gals dev.
8:45	7.32	412	58.8	310	25
9:00	7.11	409	59.5	274	45
9:15	7.14	389	57.6	261	65
9:35	7.20	388	56.7	245	100
9:45	7.17	386	57.1	251	115
10:05	7.19	389	57.2	207	35
10:20	7.20	385	57.1	164	150
10:45	7.20	385	57.3	220	190
11:15	7.20	386	57.2	11.4	215
12:00	7.19	385	57.4	7.44	240
12:30	7.20	384	57.5	4.26	270

12/14/96 C Helm

A total of approximately 270 gals were developed at MW-32 before turbidity was low

13:10 Decon pump and H2O level meter set-up on MW-31 (Shallow)
Total well depth = 16.31' TOC
static water level = 4.64' TOC
H2O column = 11.67' x 2.61 =
30.47 gal = 1 well vol x 3 =
91.41 gal minimum

time	pH	conduct	temp	turbidity	cumul gals dev
13:20	6.51	689	58.0	94.1	20
13:40	6.58	744	60.6	23.8	40
14:00	6.52	746	60.8	11.3	70
14:30	6.48	745	61.0	10.7	90
15:00	6.47	745	61.1	10.3	120
15:20	6.48	746	61.2	3.61	145

For MW-31

16:00 Decon equipment, pass out tubing, seal & label drums
18:30 Depart site

C Helm

12/15/96 C Helm

7:00 Report Hotel with F. Jewell and J. Slykerman to eat
8:30 Crew arrives on site, I escort the sampling team to the MW-40, 41, 42 well cluster to help set them up.
9:00 Return to MW-33 (Rep)
Total well depth = 55.64' TOC
static water level = 2.46' TOC
water column = 53.18' x 1.5 = 79.77 gal (one well volume), so I must develop at least 240 gal.
9:50 More more empty drums for me and sampling team.

time	pH	conduct	temp	turbidity	cum gal devel
10:10	7.19	519	68.3	563	25
10:25	7.52	528	63.6	401	45
11:00	7.52	536	69.1	309	60
11:25	8.08	580	63.9	69.3	85
12:00	8.12	575	63.8	22.6	115
12:30	8.19	576	62.1	19.0	145
13:00	8.21	578	61.9	9.65	190
13:45	8.20	580	61.9	1.82	230
14:00	8.21	579	62.0	1.91	250

MW-33 Developed.

12/15/96 C Helm

14:30 Sampling Team arrives
Since done developing
MW-33, They wish to
begin purge on dry well
(MW-33) check SOP -
OK - just recommended
24 hour wait - we decide
OK - due to clarity of well.

15:00 After decon of pump and
equipment - set up on MW-36
total well depth 51.32
static water level 5.49
water column = 45.83'
x 1.5 = 68.745 gal per well volume
x 3 = 206 min gals to develop

time	pH	conduct	temp	turbid	cum gal disc
15:15	8.07	538	59.1	213	~25
15:30	8.32	438	57.3	109	~55
15:50	8.09	408	57.2	20.0	~75
16:05	8.1	399	57.2	8.99	~110
16:20	8.10	404	57.1	15.2	~150
16:40	8.09	403	57.0	7.92	~180
16:55	8.06	407	56.9	6.55	~205
17:30	8.05	404	56.9	4.12	~240
18:00	8.06	399	57.0	3.99	~265

MW-36 developed!

12/16/96 C Helm

0730 Repair Hotel for site
0800 Arrive on site, begin to set-up
0830 Mr Phillips arrives on site
Sampling Team goes to finish
31/32/33 well cluster
0900 Helm goes to MW-34, 35
MW-35 total depth 38.58' TOC
static water level = 5.32' TOC
water column = 33.26' x 1.5
49.89 gal = 1 well volume x 3
149.67 gal minimum to develop.

time	pH	cond	temp	turb	cum. gal disc
10:05	6.87	611	63.7	344	~20
10:25	6.80	566	62.7	142	45
10:45	6.68	543	62.4	65.2	65
11:00	6.77	560	62.7	41.7	80
11:20	6.76	543	61.9	28.1	105
11:40	6.72	530	62.1	15.9	135
12:00	6.61	540	62.2	9.61	150
12:30	6.70	533	62.1	4.06	~180

MW-35 developed!!

12:05 New empty drums arrive
from Viking Freight Cars

12/16/96 C Helm

13:50 Sampling Team has caught up with development team, so - F. Jewell leaves site to get supplies,

1400 Helm and Slyhuman remain to develop MW-34

total depth = 16.53' TOC
static water = 7.37' TOC
H_2O column 9.16' x 2.611
= 23.92 gal (= 1 well vol) x 3
= 71.75 gal minimum to develop.

time	pH	conduct.	temp	turbid	cum gal
1420	6.13	921	61.8	102	20
1440	6.06	913	61.2	22.7	40
15:00	5.99	911	60.9	21.0	65
15:30	6.06	919	60.9	8.41	85
16:00	6.04	921	60.8	7.29	120
16:30	6.03	920	60.7	6.41	~145

MW-34 Developed.

17:15 Clean-up, prepare samples
17:35 Leave site for Fed Ex
18:30 Arrive at Hotel

C Helm

12/17/96 C Helm

7:00 Depart Hotel for site
7:30 Arrive on site, Sampling Team decons, Team will begin sampling clusters MW-34, 35, 36
C. Helm will develop wells at Optimist Park.

Note C. Helm has been using pH/cond/Temp meter # 690814, A 59794688 and turbidity meter 2100P Serial 908740, S/N 94120000657?
Drillers on site also to begin well pads and bumper posts.

8:20 At MW-39
Total well depth = 52.35' TOC
static water level = 00.18' TOC
H_2O column = 52.17'
x 1.5 = 78.1 gal for 1 well volume x 3
a minimum of 222 gallons needs to be developed.

C Helm

12/17/96 C Hely

For mw-39 (Deep)

time	pH	conduct	Temp	Turb	cum gal dev
8:30	6.80	513	67.3	183	25
9:00	6.99	511	67.0	161	55
9:25	7.48	473	66.9	52	75
9:45	7.44	467	67.8	142	105
10:00	7.59	464	67.2	89.1	125
10:35	7.70	466	70.1	65.3	160
11:00	7.79	465	70.1	35.9	190
11:30	7.89	461	71.1	24.2	210
12:00	7.90	464	70.5	11.5	240
12:30	7.91	465	71.2	6.93	275
13:00	7.90	462	71.2	5.99	300

mw-39 Developed.

Note: Pump problems, and sampling team's speed required J. Sykemon to join C. Helm in development. Jewell also joins in development. Optimist Park well will be sampled tomorrow - Today we will develop only.

For mw-37 (Shallow)

total well depth = 16.82' TOC

static water level = 4.78' TOC

water column = 12.04'

x2.611 = 31.44 gal (one vol) x3 = 94.31 gal/min

12/17/96 C Hely

time	pH	conduct	Temp	Turb	cum gal dev.
13:50	6.57	645	69.2	328	~25
14:10	6.39	651	69.4	102	45
14:30	6.41	651	68.5	36.5	70
14:45	6.39	649	68.5	18.1	90
15:05	6.40	650	68.6	3.30	~110
15:20	6.40	649	68.5	8.77	~145

mw-37 Developed.

For mw-38 (Intermediate well)

Total depth = 26.82' TOC

static water level = 4.19' TOC

water column = 22.63' x 1.5 = 33.95 = 1 well vol x3 = 101.84 gal/min to develop.

time	pH	cond	Temp	Turbid	cum. gal develop.
15:45	6.24	549	67.7	122	~25
16:00	6.25	521	67.2	22.5	~50
16:15	6.15	495	67.1	8.55	~70
16:30	6.14	494	66.9	3.37	~90
16:50	6.16	495	67.0	2.48	~110
17:15	6.15	494	67.0	1.99	~140

17:45 Well developed - clean-up & well depard site.

C Hely

12/18/96 C Helm

7:00 Depart Hotel for site

7:30 Arrive on site, Drillers decontaminating their equipment. We decon sampling pumps

Note! C. Helm joins/helps Sampling team - see Vol. 2 Logbook "

" "

12:00 F. Jewell & J. Slykerman depart site for Atlanta

13:00 C. Helm joins drillers in Pad construction (forms) and bumper post digging/placement (4 per well)

14:00 - 17:00 Label and seal all drums on site & Optimist Park. Light Rain all afternoon.

18:00 Depart site for Fed Ex Deliver samples

18:30 Arrive at Hotel

C Helm

12/19/96 C Helm

0700 Depart Hotel for site

0720 Arrive on site, Drillers begin to clean-up the decon area.

0910 Rain begins to fall

1040 Drillers continue to clean-up Rig, drain hoses, etc.

12:00 Rain is falling too hard. Send drillers home.

No fieldwork today too wet for vehicles etc.

13:45 Visit Nina Cain, City of Wilmington Parks and Recreation dept. She instructs me on procedures to re-seed and level Optimist Park, which has been destroyed & rutted with heavy equipment usage. Plus time table to finish.

16:10 Back at Hotel

C Helm

12/20/96 C Helm

7:10 Depart Hotel for site.

7:35 Arrive at site, light rain continues to pour but not severe - site activities may continue.

8:15 Drillers continue to finish well construction with protective top installation, pad forms + cement, etc.

9:20 Call Robert Mangum, at BV office for well pad instructions. He directs us to "sink" the 6" of "height" into the ground ie, pad will be flush with the ground. Drillers wanted 2" above, 4" below - They will dig deeper to correct well pad forms already placed.

11:15 All pad (wood) forms are in place - flush with the ground also all

12/20/96 C. Helm

bumper posts are post-hole dug and placed 4-6" off of well pad form corners per FSP/BV direction.

11:45 Cement mixing truck arrives on site - drillers begin to pour cement in pad and bumper posts using truck (cement) chute.

Note: Cement truck is parked 10 to 20 feet away from walls to prevent possible well damage due to weight of truck.

MW-40, 41, 42 are first to be poured.

12:10 C. Helm will gather target information today since drillers are just pouring pads/posts.

Note: Brass survey markers will be installed in pad. 12 Brass markers total - one per well.

12:30 Travel to Navassa, NC

See topo map.

12/20/96 C Helm

14:00 Travel to Leland, Woodburn & Clairmont N.C. to speak to City water departments

15:30 Brunswick County water department
- See topo map for details.

18:00 Arrive at Hotel

C Helm

12/21/96 C Helm

07:00 Report Hotel

07:30 Arrive on site
Help drillers re-locate full drums, ensure all drums are labelled.

10:00 Wayne Holden on site to collect concrete rubble for personal use
- He has PRP permission

15:00 Wayne departs

18:00 All drums are now placed on wood pallets in locked - fenced in area.

18:15 Depart site

C Helm

12/22/96 C Mdeh

0700 Report Hotel
0720 Arrive on site.
08:30 Place blue tarps (plastic) over stored drums
Tie & weigh down plastic. Plant grass in Optimist Park.
1330 Engrave and install well ID plates for all 12 new wells
1700 Finish painting bumper posts. Pack equipment for demobilization.
18:10 Report site

12/22/96 C Mdeh

A Sample well Tag:

DATE INSTALLED

LICENSE #

WELL DEPTH

CASING DEPTH

SCREEN FOOTAGE

STATIC H_2O LEVEL

DISTRICT

PERMIT #

Atlantic Drilling Supply, Inc.
Largo, Florida
1-800-752-9416

12/23/96 C Wolch

0700 Report / check-out of Hotel.

0715 Arrive on site wait for Drillers.

0830 Mr. Phillips on site for final inspection - He said all is OK!

0930 City of Wilmington water department stops by for the under water on hydrants.

10:00 Drillers come by to pick up remaining equipment

11:15 Report site, drive to Atlanta

18:00 Arrive in Atlanta

C Wolch

12/24/96 C Wolch

0800 Depart Home for EPA

0900 Arrive EPA, speak to Cindy Gurley & Dorothy Ray Field. Release site key and well key to Cindy Gurley, EPA SAM.

10:00 Depart EPA for office.

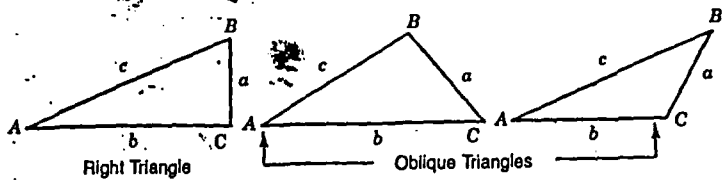
C Wolch

Robert Mangum
(770) 924-6469

HENRY PHILLIPS
791-2706

CINDY GURLEY
(404) 562-8817

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

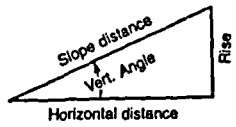
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B,\ c = \sqrt{a^2+b^2} = a\sqrt{1+\frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B,\ b = \sqrt{(c+a)(c-a)} = c\sqrt{1-\frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A,$

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a},\ C = 180° - (A+B),\ c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C,\ \tan \frac{1}{2}(A-B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b},$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2},\ \sin \frac{1}{2} A = \sqrt{\frac{(s-b)(s-c)}{b\,c}},$ $\sin \frac{1}{2} B = \sqrt{\frac{(s-a)(s-c)}{a\,c}},\ C = 180° - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2},\ \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{b\,c \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. From Table, Page IX. cos 5° 10′ = .9959. Horizontal distance = 319.4 × .9959 = 318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 – cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ = .9959. 1 – .9959 = .0041. 319.4 × .0041 = 1.31. 319.4 – 1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately: – the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance $= 302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.

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