NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT

# First Superfund Five-Year Review Report Cape Fear Wood Preserving Site Fayetteville, Cumberland County, North Carolina US EPA ID: NCD 003188828

Prepared for
US EPA Region 4
September 2006

# FIRST FIVE-YEAR REVIEW REPORT
# CAPE FEAR WOOD PRESERVING SITE
# US EPA ID: NCD 003188828

Prepared for the
US Environmental Protection Agency
Region 4

Prepared by the
State of North Carolina
Department of Environment & Natural Resources

NCDENR
North Carolina Department of
Environment and Natural Resources

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**Attachments**

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# List of Acronyms

| | |
|---|---|
| A&RR | Aberdeen and Rockfish Railroad |
| AGST | Above-Ground Storage Tank |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| CAP | Capacity Assurance Plan |
| CAR-PAH | Carcinogenic PAH |
| CCA | Copper-Chromium-Arsenic |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CLP | Contract Laboratory Program |
| COC | Contaminants of Concern |
| CWA | Clean Water Act |
| DNAPL | Dense Non-Aqueous Phase Liquid |
| DO | Dissolved Oxygen |
| EISOPQAM | Environmental Investigation Standard Operating Procedure and Quality Assurance Manual |
| ERH | Electrical Resistance Heating |
| ESD | Explanation of Significant Difference |
| ESI | Expanded Site Inspection |
| FD | French Drain |
| ICs | Institutional Controls |
| IG | Infiltration Galleries |
| MCL | Maximum Contaminant Level |
| MNA | Monitored Natural Attenuation |
| MPE | Multi-Phase Extraction |
| MW | Monitoring Well |
| NCAC | North Carolina Administrative Code |
| NC DENR | North Carolina Department of Environment and Natural Resources |
| NCDWA | North Carolina Drinking Water Act |
| NCAR-PAH | Non-carcinogenic PAHs |
| NCR | National Contingency Plan |
| NCSWQS | North Carolina Surface Water Quality Standards |
| NCWPCR | North Carolina Pollution Control Regulation |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priority List |
| O&M | Operation and Maintenance |
| OHM | OHM Remediation Services |
| ORP | Oxidation-Reduction Potential |
| PAH | Polynuclear Aromatic Hydrocarbons |
| PCOR | Preliminary Close-Out Report |
| POTW | Publicly Owned Treatment Works |
| ppm | Parts per million |
| ppb | Parts per billion |
| PRP | Potentially Responsible Party |

| | |
|---|---|
| QA/QC | Quality Assurance/Quality Control |
| RA | Remedial Action |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| RD | Remedial Design |
| RFP | Request for Proposal |
| RG | Remediation Goals |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| ROS | Reduction-Oxidation and Stabilization |
| RPM | Remedial Project Manager |
| RSE | Remedial System Evaluation Report |
| RW | Recovery Well |
| SARA | Superfund Amendments and Reauthorization Act |
| SDWA | Safe Drinking Water Act |
| SOW | Statement of Work |
| SVE | Soil Vapor Extraction |
| SVOC | Semi-Volatile Organic Compound |
| µg/l | Micrograms per liter |
| US EPA | United States Environmental Protection Agency |
| USC | Universal Standard Code |
| VOC | Volatile Organic Compound |
| WESI | Williams Environmental Services, Inc. |
| $yd^3$ | Cubic yard |

# Executive Summary

The Cape Fear Wood Preserving Site is located in Cumberland County, North Carolina, on the western side of Fayetteville near Highway 401. Of the approximate 41 acres comprising the site, less than 10 acres were developed by the facility. The property is adjacent to other industrial/commercial establishments, as well as private residences. The Cape Fear Wood Preserving Site consists of one operable unit, encompassing both the soil and groundwater remedies at the Site. Site related contaminants associated with the groundwater are currently being remediated. This is a policy review and is the first Five-Year Review for the Cape Fear Wood Preserving Site.

Cape Fear Wood Preserving began operations at the Site in 1953 and continued until 1983. The facility produced creosote-treated wood from 1953 until 1978 when demand for creosote-treated products declined. Wastes from the creosote process were pumped into a concrete sump north of the treatment unit. As liquid separated from the sludge, it was pumped into a drainage ditch that lies southeast of the developed portion of the Site and discharged into a diked pond. Storm water run-off from the treatment yard also drained to this ditch. Waste from the treatment process was pumped into an unlined lagoon north of the dry kiln and allowed to percolate into the ground.

In 1977, the Site was determined to be contaminated with constituents of coal tar and coal tar creosote. The US EPA conducted a site reconnaissance and a site investigation in October 1984. Surface water, groundwater, soil, and sediment samples were collected from the Site. PAHs and the Chromium, Copper and Arsenic (CCA) metals were detected in all samples. As a result, the US EPA conducted an emergency removal action at the Site during January and February 1985. In May and October 1985, a Site Investigation was conducted, and analytical results again indicated that samples were contaminated with creosote-related organic compounds as well as chromium, copper, and arsenic. In September 1986, US EPA conducted a second emergency response action, when site visits revealed that vandals had shot holes in a creosote storage tank, spilling approximately 500 gallons of creosote on the ground. The Site was subsequently evaluated and included on the NPL on July 22, 1987. In 1988, the US EPA's contractor conducted a Remedial Investigation/Feasibility Study (RI/FS). On June 30, 1989, the Record of Decision (ROD) was signed for the Cape Fear Wood Preserving Site.

The remedies stated in the ROD dated June 30, 1989 provide for the remediation of contaminated soil and groundwater. The major components of the selected remedy, as stated in the ROD, include: Remediation of hazardous materials, tanks, and piping; Source control (remediation of contaminated soils through soil washing/flushing technique and excavation); and Migration control (remediation of contaminated groundwater through groundwater extraction, recovery, and treatment).

The ROD was modified by an Explanation of Significant Difference (ESD) signed on September 24, 1991. The first ESD accomplished the following: Selected soil washing over low thermal desorption as the primary technology to address soil contamination; Stipulated that the organic contaminants attached to the clay/silts in the slurry generated by the soil washing process would be bio-degraded using indigenous micro-organisms in the on-site bioreactor; Acknowledge the potential need to solidify some soil using a cement/fly ash mixture to address

the elevated concentrations of the metals; Selected activated carbon adsorption as the primary treatment technology for treating groundwater; Recognized the potential need for pretreatment of the contaminated water stream to remove suspended solids and oxidized iron prior to activated carbon filtration; and Selected Bones Creek as the discharge point for the treated water.

The ROD was modified by a second ESD signed on August 14, 1995. This ESD was required in order to discharge treated water into the drainage ditch on the southeast side of the Site as activities conducted during the early phase of the RA generated small amounts of contaminated water.

The ROD was modified by a third ESD signed on May 31, 1996. This modification accomplished the following: Eliminated the bio-treatment step of the slurry from the soil remediation process, and changed the point of discharge of the treated water to the local POTW.

The ROD was modified with a ROD Amendment signed on March 23, 2001. This ROD Amendment modified the groundwater remediation alternative specified on the 1989 ROD and the 1990 RD. The ROD Amendment made the following fundamental changes to the groundwater alternative. The groundwater RA now includes: Extract contaminated groundwater and dense non-aqueous phase liquid (DNAPL) through recovery (extraction) wells and the French Drain located within the boundaries of the plume; Treat extracted groundwater to levels necessary for discharge; Amend treated water with nutrients to promote in-situ biodegradation of contaminants; Discharge amended water back into the aquifer through infiltration galleries located within and at the boundaries of the plume and if necessary discharge treated groundwater to the local POTW; Inject ambient air (air sparging) into saturated soils through air-sparge wells distributed throughout the dissolved phase of the plume; Install additional monitoring wells; and Monitor natural attenuation in the shallow and deeper aquifers.

The RA Work Assignment was issued in September 1994, and the remediation action was divided into four phases. Phase I was to clear and secure the Site, empty, clean, and dispose of storage tanks and piping, treat contaminated water, and remove/transport/dispose of debris/hazardous waste material. Phase II was to temporarily relocate the existing railroad track, restore the railroad track following remediation of the underlying contaminated soils, and removal of the spur. Phase III was to excavate and treat contaminated soils, treat and discharge contaminated water, and backfill and restore disturbed areas. Phase IV was to install groundwater extraction wells, monitoring wells, and piezometers, construct a groundwater treatment plant, install a groundwater discharge system, and operate and maintain the groundwater treatment plant.

Phase I work began in July 1995 and was completed in September 1995. Phase II began in December 1995 and was completed by February 1996. Phase III was divided into two phases; Phase IIIA and Phase IIIB. Phase IIIA involved implementing a soil washing technology which began in June 1996. After implementation of this technology, it was determined that soil washing was not achieving the ROD soil performance standards. Therefore, the US EPA initiated low-thermal desorption for contaminated soils, Phase IIIB. Phase IIIB, the low-thermal desorption treatment, began in June 1998 and was completed in May 1999. Phase IV, groundwater remediation, began in April 2001, and by August 2001 the groundwater remedy was operational and functional.

This is the first Five-Year Review for the Cape Fear Wood Preserving Site. The purpose of this Five-Year Review is to evaluate the remedy at the Site and to determine if the action remains protective of public health and the environment.

The remedy is functioning as intended by the decision documents, ROD, ESDs, and ROD Amendment. The exposure assumptions, toxicity data, clean-up levels, and remedial action objectives used at the time of the remedy are still valid. No other information has come to light that could call into question the protectiveness of the remedy; however, there are six issues/ recommendations that have been identified during this five-year review effort:

1. Institutional controls have not been identified.
2. Institutional controls have not been implemented.
3. Install well(s) downgradient from monitoring well MW-161 to complete the delineation of the plume in the intermediate zone of the aquifer.
4. Optimization of dense non-aqueous phase liquid (DNAPL) removal. Several options have been reviewed already, including a pilot study on electrical resistance heating (ERH); however, further evaluation is needed.
5. Evaluate existing data, collect additional data, if needed, and determine if arsenic should be included as a COC and evaluate the potential impact of arsenic on the treatment system.
6. Continue the collection of monitored natural attenuation (MNA) parameters for data and trend analysis to determine if MNA can be considered as a remedial alternative for the plume peripheries.

The remedy at the Site currently protects human health and the environment in the short-term because the main source of contamination was remediated through source removal. Currently, no human or ecological exposure pathways exist to contaminated groundwater or soil. As stated in the 1989 ROD and/or 2001 ROD Amendment, the goal of the Cape Fear remedial action is to reduce on-site levels of contamination as to allow for unlimited use and unrestricted exposure. However, as there is a dense non-aqueous phase liquid (DNAPL) present, this goal will not be achieved for a long time. Therefore, to insure long-term protection during this interim, the Agency has decided to implement institutional controls at the Site.

# Five-Year Review Summary Form

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site name** ***(from WasteLAN)***: Cape Fear Wood Preserving Site | | |
| **US EPA ID** ***(from WasteLAN)***: NCD 003188828 | | |
| **Region:** 4 | **State:** NC | **City/County:** Fayetteville, Cumberland County |
| **SITE STATUS** | | |
| **NPL status:** ☒ Final ☐ Deleted ☐ Other (specify) | | |
| **Remediation status** (choose all that apply): ☐ Under Construction ☒ Operating ☒ Complete | | |
| **Multiple OUs?** ☐YES ☒ NO | | **Construction completion date:** 9 / 25 / 2001 |
| **Has site been put into reuse?** ☐ YES ☒ NO | | |
| **REVIEW STATUS** | | |
| **Lead agency:** ☒ US EPA ☐ State ☐ Tribe ☐ Other | | |
| **Author(s) name:** Nile Testerman / Stephanie Grubbs | | |
| **Author(s) title:** Engineer/Hydrogeologist | | **Author(s) affiliation:** NC DENR |
| **Review period:** 1 / 1 / 2006 to 9 / 25 / 2006 | | |
| **Date(s) of site inspection:** 5 / 22 / 2006 | | |
| **Type of review:** Policy | | |
| **Review number:** ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other | | |
| Triggering Action:<br>☐ Actual RA Onsite Construction at OU #____ ☐Actual RA Start<br>☒Construction Completion ☐ Previous Five-Year Review Report<br>☐Other | | |
| **Triggering action date** ***(from WasteLAN)***: 9 / 25 / 2001 | | |
| **Due date** ***(five years after triggering action date)***: 9 / 25 / 2006 | | |

## Five-Year Review Summary Form, cont'd

**Issues:**

1. Institutional controls have not been identified.
2. Institutional controls have not been implemented.
3. Install well(s) downgradient from monitoring well MW-16i to complete the delineation of the plume in the intermediate zone of the aquifer.
4. Optimization of dense non-aqueous phase liquid (DNAPL) removal. Several options have been reviewed already, including a pilot study on electrical resistance heating (ERH); however, further evaluation is needed.
5. Evaluate existing data, collect additional data, if needed, and determine if arsenic should be included as a COC and evaluate the potential impact of arsenic on the treatment system.
6. Continue the collection of monitored natural attenuation (MNA) parameters for data and trend analysis to determine if MNA can be considered as a remedial alternative for the plume peripheries.

**Recommendations and Follow-up Actions**:

Major recommendations: Identify and implement institutional controls; Install additional monitoring well(s); Continue to optimize the groundwater remediation system; evaluate existing data, collect additional data, if needed, and determine if arsenic should be included as a COC and evaluate the potential impact of arsenic on the treatment system; and Continue to collect of MNA parameters for future evaluation of remedial options.

**Protectiveness Statement**:

The remedy at the Site currently protects human health and the environment in the short-term because the main source of contamination was remediated through source removal. Currently, no human or ecological exposure pathways exist to contaminated groundwater or soil. As stated in the 1989 ROD and/or 2001 ROD Amendment, the goal of the Cape Fear remedial action is to reduce on-site levels of contamination as to allow for unlimited use and unrestricted exposure. However, as there is a dense non-aqueous phase liquid (DNAPL) present, this goal will not be achieved for a long time. Therefore, to insure long-term protection during this interim, the Agency has decided to implement institutional controls at the Site.

# 1.0 Introduction

The purpose of conducting a Five-Year Review is to determine whether the remedy implemented at a Site is protective of human health and the environment. The methods, findings, and conclusions of this review are documented in the Five-Year Review report. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The North Carolina Department of Environment and Natural Resources (NC DENR), Division of Waste Management, Superfund Section, on behalf of the United States Environmental Protection Agency (US EPA), Region IV, has conducted a Five-Year Review of the remedial actions implemented at the Cape Fear Wood Preserving Superfund Site (Site) (US EPA ID#NCD 003 188 828). The Site is located off Reilly Road on the western side of Fayetteville, Cumberland County, North Carolina. This review was conducted from January 2006 through September 2006 and the results of this review are documented in this report. This review was conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121 and the National Contingency Plan (NCP). CERCLA § 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The US EPA interpreted this requirement further in the National Oil and Hazardous Substance Pollution Contingency Plan (NCP); 4.0 CFR § 300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The methods, findings, conclusions, and significant issues found during the review are documented in this Five-Year Review report. This Five Year Review was performed in a manner consistent with the latest US EPA Comprehensive Five-Year Review Guidance (US EPA, 2001).

The Cape Fear Wood Preserving Site consists of one operable unit, encompassing both the soil and groundwater remedies at the Site. Site related contaminants associated with the groundwater are currently being remediated. This is a policy review and is the first Five-Year Review for the Cape Fear Wood Preserving Site. The triggering action for this review is September 25, 2001, five years from the signing date of the Preliminary Close-Out Report (PCOR). A policy review is conducted when a "remedial action that, upon completion, will not leave hazardous substances, pollutants, or contaminants remain on Site above levels that allow for unlimited use and unrestricted exposure, but requires five years or more to complete" (US EPA Comprehensive Five-Year Review Guidance, June 2001). As stated in the 1989 ROD and/or 2001 ROD Amendment, the goal of the Cape Fear remedial action is to reduce on-site levels of contamination as to allow for unlimited use and unrestricted exposure. However, as there is a dense non-aqueous phase liquid (DNAPL) present, this goal will not be achieved for a long time. Therefore, to insure long-term protection during this interim, the Agency has decided to implement institutional controls (ICs) at the Site.

The purpose of this Five-Year Review is to evaluate the remedy at the Cape Fear Site in Fayetteville, North Carolina and to determine if the action remains protective of public health and the environment. More specifically, the purpose is:

- To confirm that the remedy as specified in the June 1989 Record of Decision (ROD), September 1991 Explanation of Significant Difference (ESD), August 1995 ESD, May 1996 ESD, March 2001 ROD Amendment, September 1990 Remedial Design (RD), and/or August 2000 Groundwater Design Report, remains effective at protecting human health and the environment (i.e., the remedy is operating and functioning as designed, and

- To evaluate whether the cleanup levels specified in the ROD/ROD Amendment remain protective of human health and the environment.

## 2.0. Site Chronology

Table 1 lists the Site chronology for selected events for the Cape Fear Wood Preserving Site.

**Table 1 - Chronology of Site Events**

| Event | Date |
|---|---|
| The Cape Fear Wood Preserving facility became operational and produced creosote-treated wood. | 1953-1978 |
| State authorities determined the Site to be contaminated with constituents of coal tar and coal-tar creosote. | Summer 1977 |
| The owners/operators changed operations to limit further releases, installed a new potable water well for a neighbor, and removed 900 cubic yards of creosote-contaminated soil. | January-March 1985 |
| A closed circuit copper-chromium-arsenic (CCA) process plant was installed and the old creosote and CCA facility was decommissioned. | 1979-1980 |
| The new CCA plant was regulated under the Resource Conservation and Recovery Act (RCRA) as a small generator until the company went out of business. | 1980-1983 |
| Site reconnaissance and Site Investigation was conducted by US EPA. | October 1984 |

| Event | Date |
|---|---|
| US EPA issued Special Notice Letters to the Potentially Responsible Parties (PRPs) informing them of US EPA's intention to conduct CERCLA remedial activities unless they chose to conduct remedial activities themselves. | December 14, 1984 |
| US EPA conducted an emergency removal action at the Site. | January-March 1985 |
| Hazard Ranking System (HRS) package completed. | July 31, 1985 |
| Site proposed for listing on the National Priority List (NPL). | June 10, 1986 |
| Site Investigation report completed. | June 13, 1986 |
| US EPA conducted a second emergency response. | September 1986 |
| Preliminary Assessment completed. | October 10, 1986 |
| Final listing on NPL. | July 22, 1987 |
| Since the close of operations in 1983, the Site was abandoned and purchased by SECo, Investment, Inc. | Summer 1988 |
| PRPs were sent notice letters informing them that US EPA was planning on spending fund monies to clean-up the Site. | June 5, 1989 |
| Combined Remedial Investigation (RI) and Feasibility Study (FS) complete. | June 30, 1989 |
| Record of Decision (ROD) signed. | June 30, 1989 |
| Remedial Design report completed. | September 20, 1991 |
| ROD was modified with an ESD. This ESD selected soil washing over low thermal desorption, organic slurry generated by the soil washing to be bio-degraded using indigenous microorganisms, potential need to solidify some soil, selected activate carbon adsorption for groundwater treatment, potential need for pretreatment technology for groundwater, and selected discharge point for treated water. | September 24, 1991 |
| Phase 1 work began on Site. Phase 1 consisted of clearing, installing a fence, disposal of storage tanks, treatment of contaminated water, and removing hazardous material (CCA crystals/solidified creosote/asbestos). | July 25 through September 5, 1995 |
| The ROD was modified with a second ESD. This modification was needed in order to discharge treated water into an on-site drainage ditch. | August 25, 1995 |
| Phase II began on site. Temporary relocation of the existing railroad tracks and then restoration of the tracks following remediation of the underlying contaminated soil and removal of the spur. | December 1995 through February 1996 |

| Event | Date |
|---|---|
| The ROD was modified with a third ESD. This modification was issued to eliminate the biotreatment step from the soil remediation process and change the point of discharge of the treated water to the local Publicly Owned Treatment Works (POTW). | May 31, 1996 |
| Following the submittal of the Soil Washing Demonstration Test Report, the Agency concluded that the soil washing process did not achieve the ROD's soil performance standards. Consequently, the Agency initiated low-thermal desorption which was the contingency remedy for soils specified in the 1989 ROD. | September through October 1996 |
| Phase III was initiated on site. Phase III was the soil remediation phase of the RA. | June 1996 through September 1999 |
| Remedial Action Completion Report was completed. | September 1999 |
| The ROD was modified with a ROD Amendment. This modification was to fundamentally change the groundwater alternative. The groundwater RA changed to extraction and treatment of groundwater, amend treated groundwater to promote biodegradation, discharge amended water back to aquifer, if needed, discharge treated groundwater to POTW, air sparging, install additional monitoring wells, and monitor natural attenuation. | March 23, 2001 |
| Phase IV was initiated on site. Phase IV was the groundwater remediation phase of the RA. Installation of extraction and monitoring wells, construction of groundwater treatment plant, installation of discharge system, and operation and maintenance of groundwater treatment plant. | April 2001 through present |
| Preliminary Close-Out Report (PCOR) completed for groundwater and soil remedies. | September 25, 2001 |
| Remedial Action (RA) report was completed. | June 24, 2002 |
| Construction activities begin on the Electrical Resistance Heating (ERH) Pilot Study. | July 27, 2004 |
| Completion of the Remedial Site Evaluation (RSE) Report. | February 1, 2005 |
| Initiated the Five-Year Review effort. | January 2006 |
| ERH Pilot Study Report submitted to US EPA from WRS Infrastructure & Environment, Inc. | May 17, 2006 |

# 3.0 Background

## 3.1 Site Description

The Cape Fear Wood Preserving Site is located in Cumberland County, North Carolina, on the western side of Fayetteville near Highway 401, near the intersection of 35˚02' 57" North latitude and 79˚01' 17" West longitude. Of the approximate 41 acres comprising the site, less than 10 acres were developed by the facility. The property is adjacent to other industrial/

commercial establishments, as well as private residences. Four homes are located near the Site and a subdivision is located approximately 0.25 miles south of the Site. Figure 1 shows the Site location and topographic map of the area. Figure 2 shows the historical layout of the Site.

## 3.2 Site Topography, Geology, and Hydrogeology

The Site is situated on a 41-acre tract of land. Of the 41-acres, 10-acres were developed by the facility and the remainder of the property is heavily wooded with conifer trees, and a small swampy area northeast of the developed area. The swampy area consists of a seasonally flooded wetland dominated by rushes. The upland section of the Site is sandy and well drained. No endangered plant or animal species were identified during the Remedial Investigation (RI).

The terrain at the Cape Fear Site is predominantly flat with its drainage provided by the swampy area on the northeastern side of the Site and a man-made ditch along the southern portion that extends eastward to the former location of the diked pond. Currently the man-made ditch continued off-site, flowing east.

The Site is underlain by two aquifers of concern, and these aquifers are separated by an aquitard. At the Site, flow in the lower aquifer is generally southwestward and flow in the upper shallow aquifer is radial. Flow also occurs downward through the aquitard from the upper to the lower aquifer.

## 3.3 Land and Resource Use

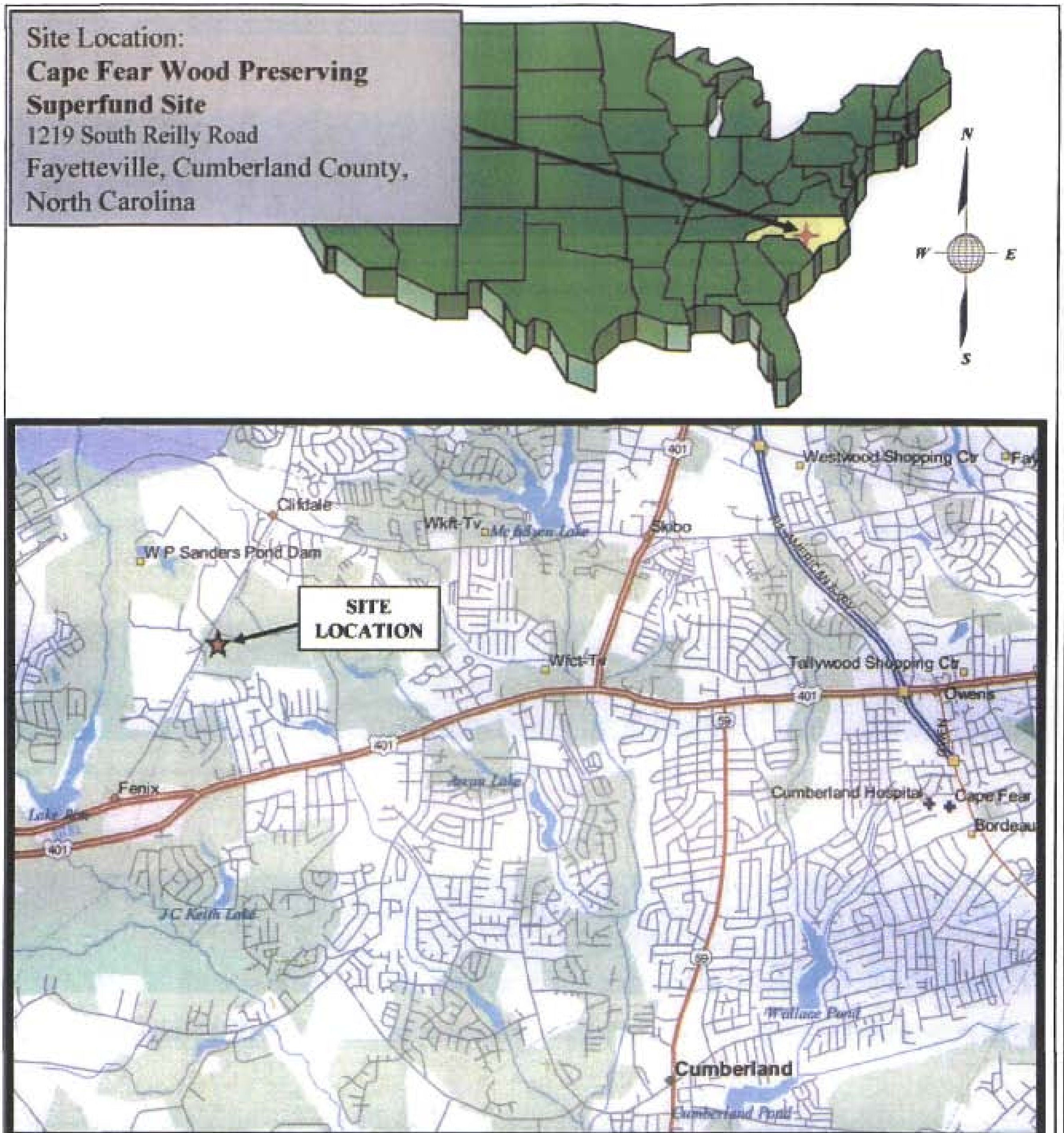
Land use is varied around the Site. The properties north and east include an undisturbed pine forest; to the west is farmland and residences; and a concrete plant and the Southgate subdivision lie to the south.

## 3.4 History of Contamination

Cape Fear Wood Preserving began operations at the Site in 1953 and continued until 1983. The facility produced creosote-treated wood from 1953 until 1978 when demand for creosote-treated products declined. Wood was then treated by a wolmanizing process using salts containing sodium dichromate, copper sulfate, and arsenic pentoxide. This treatment process is known as the copper-chromium-arsenic (CCA) process. The date the CCA process was initiated is unknown, as is whether the creosote and CCA process occurred simultaneously or in succession.

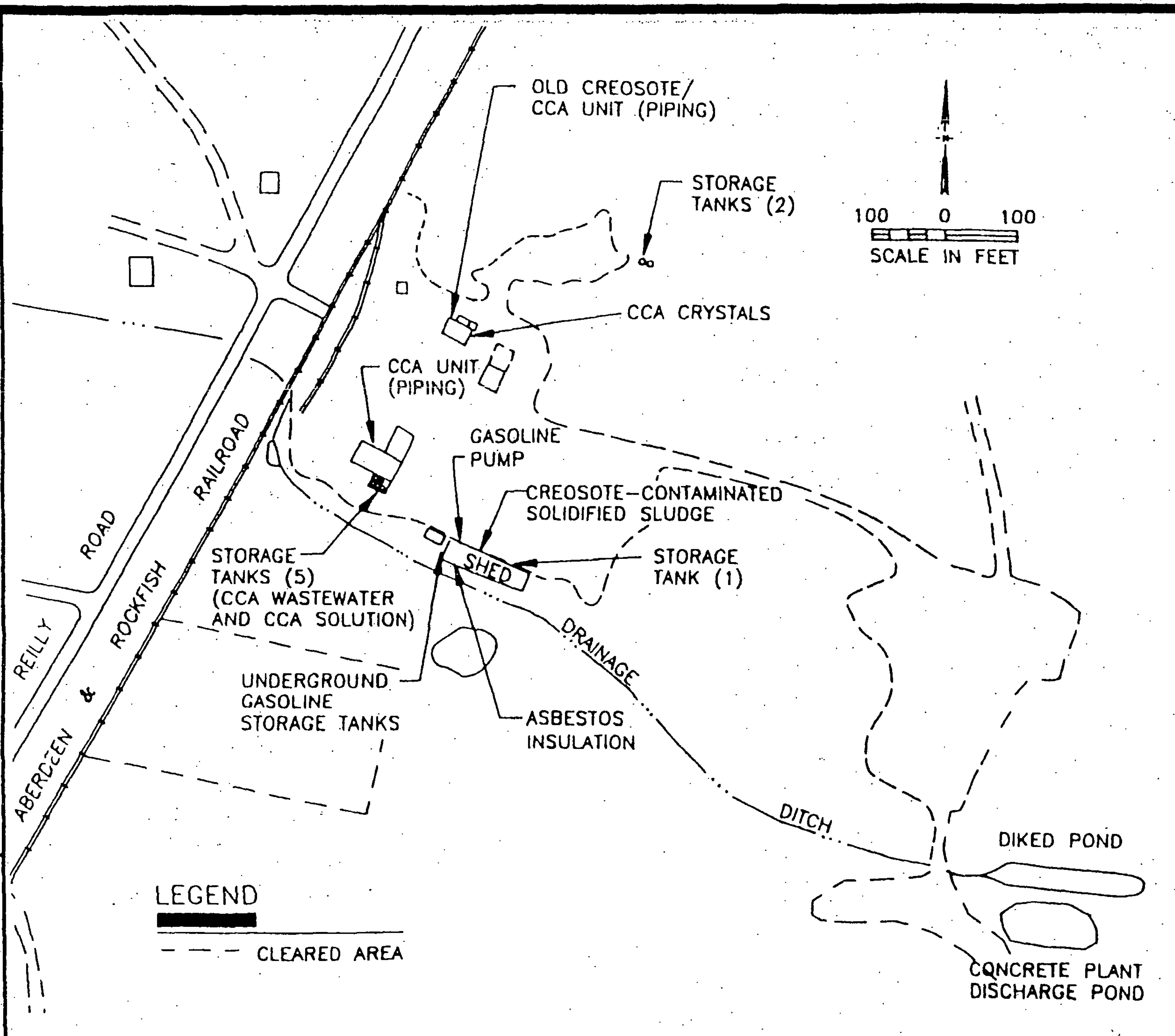
Both liquid and sludge wastes were generated by these two treatment processes. Wastes from the creosote process were pumped into a concrete sump north of the treatment unit. As liquid separated from the sludge, it was pumped into a drainage ditch that lies southeast of the developed portion of the Site and discharged into a diked pond. Storm water run-off from the treatment yard also drained to this ditch. Waste from the CCA treatment process was pumped into an unlined lagoon north of the dry kiln and allowed to percolate into the ground.

During the summer of 1977, the Site was determined to be contaminated with constituents of coal tar and coal tar creosote. In response to orders from the State of North




SITE LOCATION MAP
CAPE FEAR WOOD PRESERVING
FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA

FIGURE
1




HISTORICAL LAY-OUT OF FACILITY

FIGURE NO. 2

Carolina, the owner/operators altered the operations of the facility to comply with North Carolina law by limiting further releases, installing a new potable water well for a neighboring residence west of the Site, and removing creosote contaminated soil from the treatment yard and the drainage ditch running parallel to the railroad right-of-way. The contaminated soil was transported for land spreading to a leased property approximately 2.5 miles south of the Site. Soil sampling on this property, as part of the RI, revealed low levels of polycyclic aromatic hydrocarbons (PAHs).

Sometime between 1979 and 1980, a new closed-circuit CCA treatment was installed, and the old creosote and CCA facilities were decommissioned. The new CCA plant was regulated under Resource Conservation and Recovery Act (RCRA) as a small generator until 1983, when the company was abandoned. The Site has remained unused since 1988, when SECo Investments, Inc. purchased the property.

The US EPA conducted a site reconnaissance and a site investigation in October 1984. Surface water, groundwater, soil, and sediment samples were collected from the northeast swamp, diked pond, lagoon, drainage ditch, and a domestic well west of the Site. PAHs and the CCA metals were detected in all samples. As a result, the US EPA conducted an emergency removal action at the Site during January and February 1985. This action included: removal of creosote sludge from the creosote concrete sump; removal of sludge from the lagoon to a depth of 7 feet and solidification of the sludge with fly ash; pumping of lagoon water into storage tanks south of the new CCA unit; removal of contaminated soil from the drainage ditch parallel to the railroad tracks and at an intersecting culvert; removal of contaminated soil from a portion of the northeast swamp and stained areas in the treatment yard; and backfilling of excavation with clean, sandy soil. All contaminated soils and sludges were transported to a hazardous waste landfill in Pinewood, South Carolina.

In May and October 1985, US EPA contractor, NUS Corporation, collected soil, sediment, surface water and groundwater samples for the site investigation. Analytical results again indicated that samples were contaminated with creosote-related organic compounds as well as chromium, copper, and arsenic. In September 1986, US EPA conducted a second emergency response action, when site visits revealed that vandals had shot holes in a 3,000 gallon creosote storage tank, spilling approximately 500 gallons of creosote on the ground. The clean-up action included: removal, solidification, and transport of approximately 10 cubic yards of creosote-contaminated sludge to an on-site metal shed east of the new CCA unit; removal and transport of the creosote storage tanks to the on-site metal shed; excavation and grading of the area where the release had occurred; pumping of approximately 15,000 gallons of the CCA waste water from the CCA recovery sump into the on-site storage tanks south of the new CCA unit; and containment of the CCA recovery sump within an earthen dike. The Site was subsequently evaluated and included on the NPL on July 22, 1987.

During the fall 1988, at the direction of the Cumberland County building/construction inspector, the owner (Seco Investments) retrenched most of the drainage ditch, dug several new drainage trenches, and breached the diked pond. The ditch, sediments in the ditch, the diked pond, and the sediments in the diked pond were to be remediated.

In 1988, US EPA contractor, Camp, Dresser, and McGee, Inc., conducted a Remedial Investigation/Feasibility Study (RI/FS). On June 30, 1989, the ROD was signed for the Cape Fear Wood Preserving Site.

# 4.0 Remedial Actions

## 4.1 Basis for Taking Remedial Action

The purpose of the remedial action as stated in the 1989 ROD is to minimize, if not mitigate contamination in the soils, groundwater, and surface waters and sediment and to reduce, if not eliminate, potential risks to human health and the environment. The following clean-up objectives were determined based on regulatory requirements and levels of contaminants found at the Site:

- To Protect the public health and the environment from exposure to contaminated on-site soils through inhalation, direct contact, and erosion of soils into surface water and wetlands;
- To prevent off-site movement of contaminated groundwater; and,
- To restore contaminated groundwater to levels protective of human health and the environment.

## 4.2 Remedy Selection

***June 1989 Record of Decision***

The remedies stated in the Record of Decision (ROD) dated June 30, 1989 provide for remediation of contaminated soil and groundwater. Although the ROD indicates that ICs are to be implemented at the Site, the ROD does not specify what ICs are to be implemented nor does the ROD specify the use of ICs as a major component of the remedy. The major components of the selected remedy, as stated in the ROD, include:

*Remediation of Hazardous Materials, Tanks, and Piping*:

- Sodium dichromate-copper sulfate-arsenic pentoxide (CCA) salt crystals, the solidified creosote, and asbestos-containing pipe insulation will be disposed of off site. The CCA crystals and solidified creosote will be disposed of at a RCRA permitted landfill. The asbestos-containing pipe insulation will be disposed of at the Cumberland County Solid Waste Facility pursuant to the facilities specifications.
- The tanks and associated piping, above and below ground, will be emptied, flushed and cleaned until non-hazardous. The metal will be cut and sold or either taken to the Cumberland County Solid Waste Facility pursuant to the facilities specifications. For all other material deemed hazardous, will be transported to a RCRA permitted landfill for disposal.

- The contents of the tanks and associated piping contains approximately 50,000 gallon of 3 percent CCA solution and 15,000 gallons of CCA contaminated wastewater. The 3 percent solution will go out for bid to purchase and if no buyer is interested, the 3 percent solution and the wastewater will be treated on site through the water treatment system set up for treating the pumped surface water and extracted groundwater.

*Source Control (Remediation of Contaminated Soils):*

- The preferred alternative for the remediation of contaminated soils/sediment is a soil washing/flushing technique. The alternate source control alternative is a low temperature process to remove the organic contaminates followed by either a soil washing/flushing technique or soil fixation/solidification/stabilization process to address the inorganics. The decision will be based on data generated by the soil washing/flushing treatability study conducted during the remedial design (RD) phase.
- Contaminated soil/sediment will be excavated, treated and placed back in the excavation. All wastewater will either be reused or treated on site.

Table 2 lists the 1989 ROD Specified Clean-Up Goals for Soil/Sediment.

*Migration Control (Remediation of Contaminated Groundwater)*:

- Groundwater extraction will be accomplished through the use of well points in the upper (surficial) aquifer. Recovery will be conducted in 10,000 square foot subareas at a time, and the well points will be removed to adjacent areas for sub sequential dewatering.
- Due to local contamination of the lower aquifer, the lower aquifer will be pumped following remediation of the overlying upper aquifer in this area.
- A water treatment system will be established on site. The system's influent will include contents of the tanks and piping, all wastewater generated due to remedial actions, pumped surface water, and extracted groundwater. The discharge location of the treated water will either be the local publicly owned treatment works (POTW) or a surface stream. This decision of point of discharge will occur during the RD phase. All effluents will meet all applicable and relevant or appropriate requirements (ARARs).

***<u>September 1991 First Explanation of Significant Difference</u>***

The ROD was modified by an Explanation of Significant Difference (ESD) signed on September 24, 1991. As part of the findings from the two treatability studies conducted as part of the 1989-1990 RD, the first ESD accomplished the following:

- Selected soil washing over low thermal desorption as the primary technology to address soil contamination at the Site;
- Stipulated that the organic contaminants attached to the clay/silts in the slurry generated by the soil washing process would be bio-degraded using indigenous micro-organisms in the on-site bioreactor;
- Acknowledge the potential need to solidify some soil using a cement/fly ash mixture to address the elevated concentrations of the metals (arsenic and chromium);

- Selected activated carbon adsorption as the primary treatment technology for treating groundwater;
- Recognized the potential need for pretreatment of the contaminated water stream to remove suspended solids and oxidized iron prior to activated carbon filtration; and
- Selected Bones Creek as the discharge point for the treated water.

**Table 2: 1989 ROD Specified Clean-Up Goals for Soil/Sediment:**

| CONTAMINANT | Soil Remediation Level (Clean-up Goal) mg/kg | Rationale for clean-up Level |
|---|---|---|
| **Soil** | | |
| Arsenic | 94 | a&b |
| Benzene (leachate case) | 0.005 | c |
| Chromium (leachate case) | 88 | d |
| PAHs | 2.5 | a&e |
| Total PAHs | 100 | f |
| **Sediment** | | |
| Arsenic | 94 | g |
| Chromium (leachate case) | 88 | g |
| Total PAHs | 3 | h |

a - The value derived using reverse risk assessment techniques.
b - The future use worker scenario is used since this is the more likely land use and arsenic is not posing a significant risk under current use conditions.
c - The Contract Laboratory Required Quantitation Limit is proposed since the calculated risk assessment value is below analytical detection limits. Should this limit be reduced with time as analytical procedures improve, the newer (lower) limit would become the cleanup goal,
d - The value represents Site background conditions since the calculated risk assessment value is below background levels,
e - The value listed represents a current use scenario since this is more conservative than the levels derived for the future use worker scenario,
f - The value is based on typical background concentrations (from the literature) since the calculated level necessary to prevent future leachate from exceeding a hazard index of 1 in the groundwater (60 mg/kg) is less than representative background conditions.
g - The same value proposed for soils is applied due to a similar human exposure route and low expected impact to surface water on a volumetric basis,
h - Concentration researched by US EPA to be protective of aquatic biota.

mg/kg - milligrams per kilogram or parts per million

***August 1995 Second Explanation of Significant Difference***

The ROD was modified by a second ESD signed on August 14, 1995. This ESD was required in order to discharge treated water into the drainage ditch on the southeast side of the Site as activities conducted during the early phase of the RA generated small amounts of contaminated water. Since the discharge pipeline would not be installed until later into the Remedial Action (RA), the contaminated water generated was treated and discharged on site. The water discharged on site was treated using activated carbon to meet the substantive requirements of a National Pollutant Discharge Elimination System (NPDES) permit.

***May 1996 Third Explanation of Significant Difference***

The ROD was modified by a third ESD signed on May 31, 1996. This modification accomplished the following:

- Eliminated the biotreatment step of the slurry from the soil remediation process, and
- Changed the point of discharge of the treated water from Bones Creek to the local POTW.

***March 2001 Record of Decision Amendment***

The ROD was modified with a ROD Amendment signed on March 23, 2001. This ROD Amendment modified the groundwater remediation alternative specified on the 1989 ROD and the 1990 RD. The ROD Amendment made the flowing fundamental changes to the groundwater alternative. The groundwater RA now includes:

- Extract contaminated groundwater and dense nonaqueous phase liquid (DNAPL) through recovery (extraction) wells and the French Drain located within the boundaries of the plume.
- Treat extracted groundwater to levels necessary for discharge.
- Amend treated water with nutrients to promote in-situ biodegradation of contaminants.
- Discharge amended water back into the aquifer through infiltration galleries located within and at the boundaries of the plume and if necessary, discharge treated groundwater to the local POTW.
- Inject ambient air (air sparging) into saturated soils through air sparge wells distributed throughout the dissolved phase of the plume.
- Install additional monitoring wells.
- Monitor natural attenuation in the shallow and deeper aquifers.

The groundwater clean-up goals were also updated to reflect new North Carolina groundwater requirements. None of the soil clean-up levels were modified during the 2001 ROD Amendment. Table 3 is the new groundwater performance standards as presented in the ROD Amendment.

**Table 3: Specified Clean-Up Goals for Groundwater as Stated on the 2001 ROD Amendment**:

| CONTAMINANT | Performance Clean-Up Standard (μg/l) | Basis for Standard |
|---|---|---|
| **Volatile Organic Compounds (VOCs)** | | |
| Benzene | 1 | 15ANCAC2L |
| **Carcinogenic Polycyclic Aromatic Hydrocarbon (PAHs)** | | |
| Benzo(a) anthracene | 0.05 | 15ANCAC2L |
| Benzo(b) fluoranthene | 0.047 | 15ANCAC2L |
| Benzo(k) fluoranthene | 0.47 | 15ANCAC2L |
| Benzo(a) pyrene | 0.0047 | 15ANCAC2L |
| Chrysene | 5 | 15ANCAC2L |
| Dibenzo(a, h) anthracene | 0.0047 | 15ANCAC2L |
| Indeno(1 ,2,3-cd) pyrene | 0.47 | 15ANCAC2L |
| **Non-Carcinogenic Polycyclic Aromatic Hyrdocarbon (PAHs)** | | |
| Acenaphthene | 80 | 15ANCAC2L |
| Acenaphthylene | 210 | 15ANCAC2L |
| Anthracene | 2,100 | 15ANCAC2L |
| Fluorene | 280 | 15ANCAC2L |
| Fluoranthene | 280 | 15ANCAC2L |
| Naphthalene | 21 | 15ANCAC2L |
| Phenanthrene | 210 | 15ANCAC2L |
| Pyrene | 210 | 15ANCAC2L |

## 4.3 Remedy Implementation

Following the approval of the RD in September 1990, the project became dormant for four years as the State of North Carolina had difficulty in resolving its capacity assurance issue. Section 104(c)(4) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires each State to have a capacity assurance plan (CAP) that assures the State will have adequate capacity for the destruction, treatment, or secure disposition of all hazardous wastes that are reasonably expected to be generated within the State during the next two decades. US EPA cannot spend remedial action money in a State that is not in compliance with this section of CERCLA. The capacity assurance issue was rectified in the summer of 1994. The RA Work Assignment was issued in September 1994.

During discussion with US EPA's RA contractor, it was decided to divide the RA into four phases. The four phases are as follows:

> Phase I - Clear the Site; install an access control fence around the entire Site; empty, flush, clean, and dispose of nine storage tanks and associated piping; treat contaminated water (surface water, storage tank liquids, rinse water, water from dewatering excavation, etc.) by means of a temporary treatment facility; and remove/transport/dispose of debris/ hazardous waste material [CCA crystals and solidified creosote] and asbestos-containing insulation to either a municipal landfill or a RCRA-permitted hazardous waste landfill (as appropriate).
>
> Phase II - Temporarily relocate the existing railroad track and then restore the railroad track following remediation of the underlying contaminated soils and removal of the spur.
>
> Phase III - Install the discharge pipeline to the POTW; dismantle/demolish and dispose of building structures; excavate and treat contaminated soils; treat and discharge contaminated water; and backfill and restore disturbed areas.
>
> Phase IV - Install groundwater extraction wells, monitoring wells, and piezometers; construct groundwater treatment plant; install groundwater discharge system; and operate and maintain groundwater treatment plant.

Phase I work began the week of July 25, 1995 and was completed the week of September 5, 1995 with the exception of disposing of the solidified creosote and sludge from the tanks. This material was stored in roll-offs and was shipped to a RCRA-permitted hazardous waste facility for final disposal at a later date. Phase II began the week of December 1, 1995 and was completed the week of February 12, 1996. Following the relocation of the existing railroad track and the removal of the underlying contaminated soils, the excavation was backfilled with clean soil brought from an off-site source and the railroad track was restored along its original route.

The soil remediation phase was subdivided into two (2) phases: Phase IIIA and Phase IIIB. Phase MIA involved implementing a soil washing technology. Mobilization of equipment to the Site to conduct the soil washing demonstration test began on June 11,1996. The actual demonstration test was completed on September 23, 1996. Following the submittal of the Soil Washing Demonstration Test Report on October 5, 1996, the Agency concluded that the soil washing process did not achieve the ROD'S soil performance standards. Consequently, the Agency initiated low-thermal desorption which was the contingency remedy for soils specified in the 1989 ROD. A December 1996 fact sheet informed the public that the soil washing demonstration test failed to achieve the soil performance standards, and therefore, the Agency abandoned the soil washing remedy and would implement the contingent remedy, low-thermal desorption to remediate the soils.

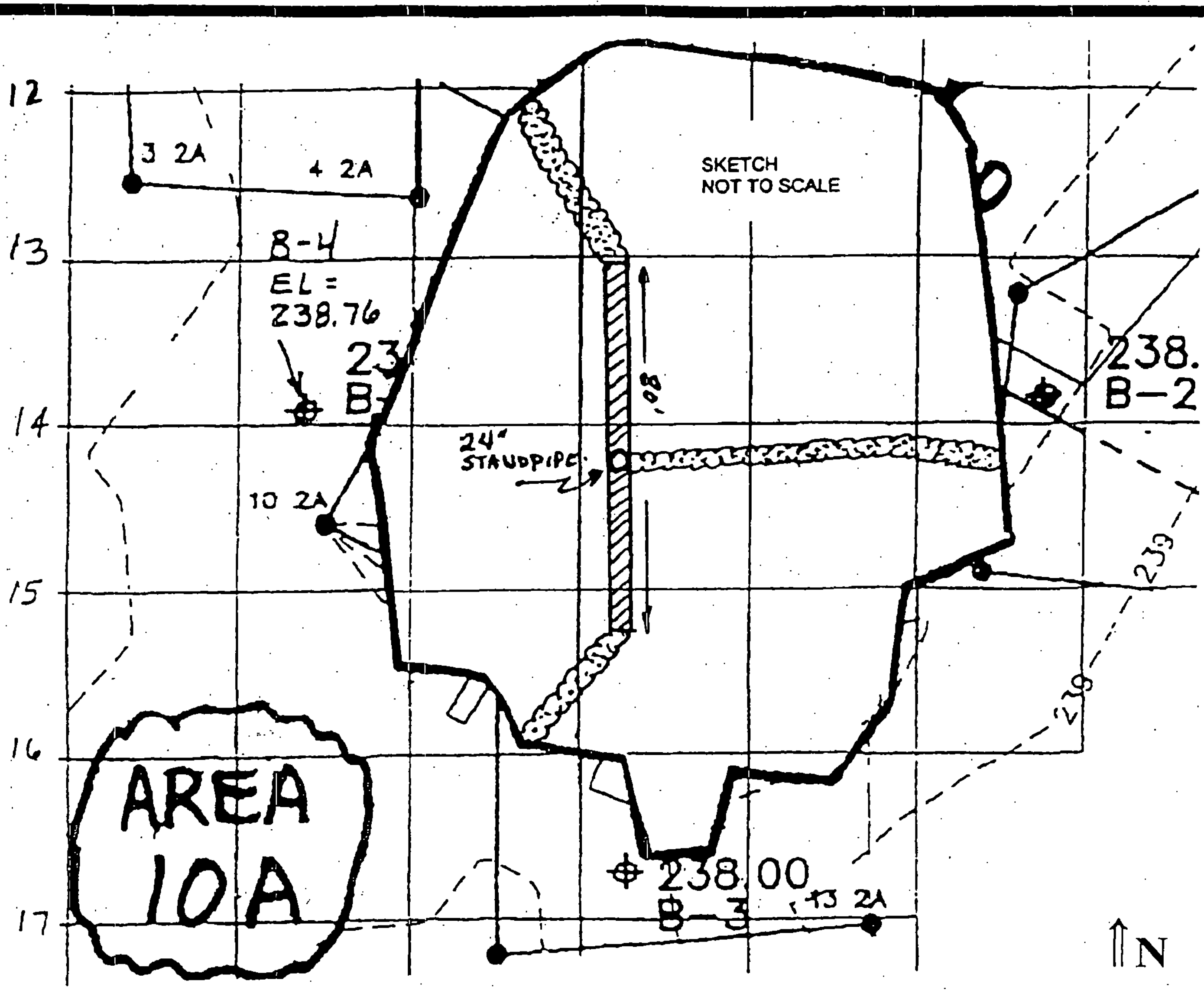
The treatment of the soils via low-thermal desorption was designated as Phase IIIB. The low-thermal desorption subcontractor began mobilization to the Site on June 12, 1998. Typically, the thermal treatment system operated 24 hours/day, 7 days/week with occasional shutdowns for preventative, corrective, and emergency maintenance work. Treatment of contaminated soil began on July 8, 1998 and was completed on May 1, 1999. A stack test for emissions was not required as the low-thermal desorption subcontractor was able to establish to the regulators satisfaction that the system constructed on site had met clean air standards at other sites treating the same type of contaminants. No soils were solidified as all the treated soils were below the performance standards for arsenic and chromium.

The 1989 ROD originally estimated 24,000 cubic yards on soil requiring treatment. In the Request for Proposal (RFP) package, this volume was increase to 50,000 cubic yards. Approximately 113,000 cubic yards of contaminated soils were eventually excavated, thermally treated, backfilled, graded, and re-vegetated. The final inspection for Phase IIIB was conducted on June 1, 1999. NCDENR/Land Quality Section accepted the final regrading/re-vegetation/ erosion control on September 2, 1999.

In the bottom of the largest excavation in the middle of the Site, a groundwater extraction trench or French Drain was installed prior to backfilling this excavation with treated soils. The drain itself is 80 feet long approximately 25 feet below grade. Three fingers extend from the French Drain, one at each end of the drain and one emanating from the standpipe. These fingers were added to the French Drain to increase its influence in the underlying subsurface environment. Figure 3 provides a schematic of this French Drain. The two primary goals for installing this drain were to enhance the removal of DNAPL emanating from the west-northwest and the west-southwest side walls of the excavation and allow the elimination of a significant number of extraction wells called for in the 1990 RD. The soil remediation phase did not pursue removing this DNAPL as it was below the water table and the Agency elected to deal with the DNAPL along with groundwater.

A Statement of Work (SOW) to reassess the groundwater RD was issued in September 1999. This evaluation was documented in the August 2000 Groundwater Design Report. This report recommended abandoning the original groundwater extraction system and implementing a more traditional groundwater extraction approach using permanent extraction wells. In August 2000, the SOW to implement the revised groundwater (Phase IV) RD was issued. The Phase IV RFP was issued on October 13, 2000 and the contract to build and operate the system for 30 months was executed on March 21, 2001.

The Phase IV subcontractor began mobilizing equipment and personnel to the Site the week of April 30, 2001. The groundwater remediation system included seven recovery wells, the French Drain, twelve air sparging wells, ten infiltration galleries, 35 monitoring wells, and the treatment building. Inside the treatment building is an oil-water separator, a 10,000 gallon equalization tank, bag filters, two granular activated carbon filters, two air compressors, and all the controls for these systems. Three of the recovery wells and the French Drain have two pumps, one to remove contaminated groundwater and establish hydraulic control and one to capture DNAPL. All pumps are pneumatic. The three-day start-up test on the entire system began on August 13, 2001. The five-day field performance test began on August 16, 2001. The system ran successfully for 24-hours per day for the five days. The Phase IV subcontractor




**STANDPIPE**: 24-inch diameter schedule 40 steel pipe. The bottom 10-foot section covered with ½-inch holes. The bottom is a solid steel plate without holes. Upon installation, the standpipe was modified to limit the bottom section to six-feet by applying two layers of heavy polyethylene liner over the upper four-feet of holes. The two layers of polyethylene were secured by stainless steel bands.

**FINGERS**: The 80-foot long trench is supplemented with three (3) extensions to provide a preferential pathway for the migration of contaminated groundwater from areas away from the trench location. Two fingers extend diagonally from the ends of the trench to the SW and NW corners of the excavation. One finger extends northeasterly from the standpipe to the far side of the excavation. These fingers were constructed with materials listed below. The fingers were installed in shallow (12-18 inch) deep trenches, 3-4 foot wide. All fingers were rock filled and completely covered with geotextile (top to bottom).

SUBSURFACE GROUNDWATER EXTRACTION TRENCH

**Length** -- 80 feet (not including finger extensions)
**Depth** -- 6-8 feet (6-feet deep at ends, 8-foot deep in the middle)
**Fabric** -- TG700 (8-Oz.) 15-foot wide x 300-foot wide 1½ rolls

**Width** -- 36-inches
**Fill** -- No. 4 rock - 175 tons

ORIENTATION AND LOCATION OF FRENCH DRAIN

FIGURE NO.
3

demobilized from the Site the week of August 27, 2001. On July 1, 2002, the US EPA and NC DENR concurred that the groundwater remedy was operational and functional.

In July 2004, construction activities for the Electrical Resistance Heating (ERH) Pilot study were underway. The study objectives were: design, construct, and operate (for four months) a pilot scale DNAPL recovery and treatment system utilizing the Electro-Thermal Dynamic Stripping Process™ technology; and, evaluate the effectiveness (comparing pre- and post-pilot analytical data and percent removal of PAHs and total DNAPL mass removed) and efficiency (comparing the engineered system's performance to the engineered design specifications) of recovering DNAPL from the most heavily impacted areas of the Site.

The Electro-Thermal Dynamic Stripping Process™ utilizes ERH to heat the subsurface soils and aquifer matrix. This is accomplished by passing an electrical current between electrodes installed in the subsurface. As the current passes through the soil matrix, heat is generated due to the electrical resistivity of the soil matrix. The heat generated facilitates mobilization of the contaminant mass. Once mobilized, the contaminant mass is removed through proven extraction methods (i.e., Soil Vapor Extraction (SVE), dual phase extraction, groundwater extraction, etc.). The primary goal of effective in-situ thermal ERH remediation is to increase contaminant mass recovery rates by mobilizing contaminants and increasing their concentration in extracted media.

Based on the four month pilot study, a total of 4,629 pounds of contaminant mass was recovered in the dissolved, vapor, and free phases. The percent mass recovered in the liquid and vapor phases was 60.2% and 39.8%, respectively. From the data gained from the pilot study, thermally-enhanced treatment significantly increased the contaminant mass removal rate and mobilized through mechanisms such as reduced viscosity, increased volatility and aqueous solubility, and secondary permeability. However, it should be noted that the increased cost for this treatment technology is currently being evaluated for it's potential as an alternative treatment for DNAPL removal.

In February 2005, a Streamline System Evaluation Report (RSE-Lite) was submitted to the US EPA. The US EPA funded the work and preparation of the document by GeoTrans, Inc., under US EPA contract to Dynamac Corp., Ada, Oklahoma. The RSE-Lite involves a team of expert hydrogeologists and engineers, independent of the Site, conducting a third-party evaluation of Site operations. The RSE-Lite process considers the goals of the remedy, Site conceptual model, above-ground and subsurface performance, and Site exit strategies. Several observation and recommendations were made regarding effectiveness, cost reduction, technical improvement, and Site closeout. Recommendations for effectiveness focused primarily on plume delineation and construction of potentiometric surface maps. Recommendations for cost reduction include changing to a local contractor for operation and maintenance (O&M) services and groundwater sampling, and reducing the groundwater sampling locations and frequency. The technical improvement recommendations include considering an alternative to using a sequestering agent, reducing frequency of water level measurements, and discontinuing dissolved oxygen monitoring. The recommendations for Site close-out, documents the RSE-Lite team's suggestions regarding evaluating various current remedy components by running them independently and suggestions regarding potential scale-up issues associated with the thermal pilot study. Table 4 is a summary table of the recommendation from the RSE-Lite report, including estimated costs and/or savings associated with these recommendation.

## 4.4 System Operation/Operation and Maintenance

The cost estimates to implement the RA at the Cape Fear Wood Preserving Site as described in the 1989 ROD, the 1990 RD, and the 2001 ROD Amendment are presented in Table 5.

Black & Veatch, with the assistance of the previous subcontractor WRS Environmental and Infrastructure, constructed the system and initiated O&M activities at the Site starting in August 2001. Proterra Consulting, Inc., initiated O&M activities at the Site in June 2005 for Black & Veatch. Monthly reports are provided with a summary of the O&M status and analytical data for the groundwater treatment system.

Phases I, II, and III of the RA have been successfully completed. Therefore, there are no O&M issues or costs associated with the soils at the Site. In February 2005, the final RSE-Lite report was published by the US EPA. The RSE Site Team recommended reducing the sampling frequency from quarterly to annually. The sampling frequency had already been reduced in 2004 when the Site team recommended reducing the sampling frequency to semi-annually by eliminating two sampling events. The 2005 RSE report concluded that the annual sampling would adequately monitor the progress toward restoration and evaluate the attenuation of contaminants at the plume boundaries. It was also concluded that the new monitoring schedule would reduce groundwater monitoring cost from $50,000 per year to approximately $15,000 per year. Currently, groundwater samples are collected and analyzed on a semiannual or annual basis, based on the well. See Table 6 for the monitoring well sampling schedule dated February 14, 2005.

In accordance with the ROD and ESDs, dissolved oxygen (DO) levels have been recorded on a monthly basis since the system start-up. Oxygen reduction potential (ORP) measurements were conducted on an annual basis as part of the monitored natural attenuation (MNA) program. The 2005 RSE report, recommended reducing water level measurements from monthly to quarterly and discontinue collecting DO measurements. The collection of water levels measurements have been reduced in frequency to the recommended schedule in the RSE report. However, the DO measurements are still being collected, although at a reduced monitoring schedule from monthly to quarterly, and ORP is collected annually. The RSE report also recommended that the semi-monthly water level measurements from the recovery wells, French drain, and infiltration galleries should continue at that frequency.

O&M costs include monthly site visits for routine equipment checks, non-scheduled maintenance of equipment, groundwater monitoring events as scheduled by the US EPA and NC DENR, and the assemblage of all the monthly data and activities into an O&M Monthly Report. Based on the 2005 RSE report, several modifications were made regarding the sampling frequency (as stated in the previous paragraph) and O&M labor. The report recommended that the current O&M contractor, Black & Veatch, should hire a local contractor to oversee the monthly O&M services so that additional costs associated with travel, approximately $60,000 per year, could be eliminated. As of June 1, 2005, Proterra Consulting, P.C. was subcontracted to perform the routine O&M activities with a one-year contract, with two one-year option periods.

## Table 4: Cost Summary Table

| Recommendations | Reason | Additional Capital Costs ($) | Estimated Change in Annual Costs ($/yr.) | Estimated Change in Life-Cycle costs ($) * | Estimated Change in Life Cycle Costs ($) ** | Status of Implementing Recommended Action |
|---|---|---|---|---|---|---|
| 6.1.1 Install and sample a monitoring well downgradient of MW-16 | Effectiveness | $15,000 | negligible | $15,000 | $15,000 | Still needs to be completed |
| 6.1.2 Sample outer monitoring well annually | Effectiveness | negligible | $4000 | $120,000 | $65,000 | Has been implemented |
| 6.1.3 Do not use water levels from operating recovery wells or infiltration galleries when generating potentiometric surface maps | Effectiveness | $0 | $0 | $0 | $0 | Has been implemented |
| 6.2.1 Contract O&M services and groundwater sampling to a local contractor | Cost Reduction | negligible | ($85,000) | ($2,550,000) | ($1,372,000) | Current O&M contractor is local |
| 6.2.2 Eliminate select monitoring wells from groundwater monitoring program and reduce sampling (and associated reporting) frequency from quarterly to annually | Cost Reduction | negligible | ($35,000) | ($1,050,000) | ($565,000) | Has been implemented |
| 6.3.1 Consider alternatives before adding a sequestering agent | Technical Improvement | Not quantified | Not quantified | Not quantified | Not quantified | Air sparging wells have been terminated |
| 6.3.2 Reduce frequency of water level measurements from monitoring wells, discontinue DO monitoring, and simplify monthly O&M reports | Technical Improvement | Included in 6.2.1 | Included in 6.2.1 | Included in 6.2.1 | Included in 6.2.1 | Has been implemented |
| 6.3.3 Ass a suffix to well labels to indicate shallow and deep wells | Technical Improvement | $0 | $0 | $0 | $0 | Has been implemented |
| 6.4.1 Evaluate effectiveness of various remedy components | Site closeout | Not quantified | Not quantified | Not quantified | Not quantified | Has been implemented |
| 6.4.2 Considerations for evaluating the thermal pilot study | Site closeout | $0 | $0 | $0 | $0 | Has been implemented |

Costs in parenthesis imply cost reductions.
* assumes 30 years of operation with a discount rate of 0% (i.e. no discount)
** assumes 30 years of operation with a discount rate of 5% and no discounting in the first year

## Table 5: Summary of Remediation Costs and Projected O&M

| Remedial Action | 1989 ROD (present worth) | 1990 RD | 2001 ROD Amendment | Actual Costs |
|---|---|---|---|---|
| **Phase I - General Site Clean-Up** | | | | |
| Phase I | $258,900 | $486,600 | | Subcontractor $498,700<br>Oversight $341,800 |
| **Phase II – Remediating Contaminated Soils Beneath Railroad Track** | | | | |
| Phase II | Not Specified | $164,800 | | Subcontractor $300,700<br>Oversight $270,100 |
| Phase IIIA – Soil Washing | | | | |
| Phase IIIA (including solidification of some of the soils) | $9,951,100 | $10,644,400 | | Subcontractor $1,768,800<br>Request for EAS* $1,650,000<br>Oversight $549,900 |
| **Phase IIIB – Thermal Treatment of Soils** | | | | |
| Phase IIIB | $14,030,000 | | | Subcontractor & Oversight $13,288,800 |
| **Phase IV – Groundwater Remediation** | | | | |
| Construction + 30 yrs O&M | $4,700,000 | | | |
| Construction +5 yrs O&M | | $1,584,900 | | |
| Construction +8 yrs O&M | | | $5,128,300 | |
| Subcontractor & Oversight | | | | $2,207,800 |
| Estimated Cost with 30 months of O&M costs | | | | $537,700 |
| **Entire Remedy** | | | | |
| Total Present Worth for Remedy (soil washing + 30 yrs GW O&M) | $14,910,000 | | | |
| Total Present Worth for Remedy (soil washing + 5yrs of GW O&M) | | $16,965,300 | | |
| Total Present Worth for Revised Groundwater Remedy (10 yrs O&M) | | | $5,318,000 | |
| Total Present Worth for Remedy (including 8 yrs GW O&M) | | | | $20,568,700 |

**Table 6**
**Proposed Monitoring Well Sampling Schedule**
**February 14, 2005**
**Cape Fear Wood Preserving Superfund Site**
**Fayetteville, North Carolina**

| Monitoring Well ID | Total Depth (ft bls) | Semi-Annual Sampling (Feb/Aug) | Annual Sampling (August) | Rationale |
|---|---|---|---|---|
| CF-MW-01I | 52.00 | | | Perimeter intermediate well; non-detect since 2002 |
| CF-MW02S | NR | | X | Western perimeter sentinel well; non-detect since 2002 |
| CF-MW03S | NR | X | X | Low level contamination. Downgradient of DNAPL plume. |
| CF-MW04I | 72.00 | | X | Intermediate well; non-detect since 2002 |
| CF-MW05S | NR | | X | DNAPL source well |
| CF-MW06I | 67.00 | | X | Monitor vertical extent in source area |
| CF-MW07S | NR | | X | Low levels; steady |
| CF-MW08I | 62.00 | | | Perimeter intermediate well; non-detect since 2002 |
| CF-MW11S | NR | | | Eastern perimeter sentinel well; non-detect since 2002 |
| CF-MW12I | 47.00 | | | Eastern perimeter sentinel well; non-detect since 2002 |
| CF-MW15S | 22.00 | | | Eastern perimeter sentinel well; non-detect since 2002 |
| CF-MW16I | 57.00 | X | X | Monitor intermediate zone contamination |
| CF-MW17S | 28.50 | | | Northwest perimeter sentinel well; non-detect since 2002 |
| CF-MW18S | 30.50 | | X | Monitor plume northeast extent |
| CF-MW19S | 27.00 | | X | Monitor plume southern extent |
| CF-MW20S | 32.00 | | X | Monitor plume southern extent |
| CF-MW22S | NR | | X | Low levels; steady |
| CF-MW23S | NR | X | X | Contaminated (western flank of plume) |
| CF-MW24S | 28.00 | | X | Southwest perimeter sentinel well; non-detect since 2002 |
| CF-MW25S | 24.00 | X | X | Contaminated; downgradient of source |
| CF-MW26S | 23.00 | X | X | Contaminated; downgradient of source |
| CF-MW27S | 28.00 | | X | Monitor plume eastern extent |
| CF-MW28S | 24.00 | | X | Monitor plume northeast extent; non-detect since 2002 |
| CF-MW29S | 25.50 | | X | DNAPL source area |
| CF-MW30S | 18.00 | | X | DNAPL source area |
| CF-MW31S | 28.00 | | X | Moderate contamination; steady |
| CF-MW32S | 24.00 | | X | DNAPL source area |
| CF-MW33S | 25.00 | X | X | Monitor plume southern extent |
| CF-MW34S | NR | | X | Southeast perimeter sentinel well; very low detections since 2002 |
| CF-MW35S | NR | X | X | Southeast perimeter sentenial well |
| *CF-MW36I** | *57.00* | *X* | *X* | *Monitor intermediate zone contamination; down gradient of MW16I* |
| CF-RW-01 | | X | X | Active Recovery Well |
| CF-RW-02 | | X | X | Active Recovery Well |
| CF-RW-03 | | X | X | Active Recovery Well |
| CF-RW-04 | | X | X | Active Recovery Well |
| CF-RW-05 | | X | X | Active Recovery Well |
| CF-RW-06 | | X | X | Active Recovery Well |
| CF-RW-07 | | X | X | Active Recovery Well |
| CF-RW-08** | | X | X | Proposed New Recovery Well |
| CF-RW-09** | | X | X | Proposed New Recovery Well |
| MPE-1 | | X | X | Pilot Study Multi-Phase Extraction Well |
| MPE-2 | | X | X | Pilot Study Multi-Phase Extraction Well |
| MPE-3 | | X | X | Pilot Study Multi-Phase Extraction Well |
| MPE-4 | | X | X | Pilot Study Multi-Phase Extraction Well |
| EW-1 | | | | Old Inactive deep recovery well |
| EW-2 | | | | Old Inactive deep recovery well |
| | | | | |
| *TOTALS* | | *19* | *38* | |

Notes:
ft bls = feet below land surface
ft msl = feet above mean sea level
MW = Monitor Well
NR = Not Recorded
N/A = Not Available

# 5.0 Progress Since Last Five-Year Review

Since this is the first Five-Year Review Report, no other report is available.

# 6.0 Five-Year Review Process

## 6.1 Administrative Components

The five-year review process for the Cape Fear Wood Preserving Site was performed by the NC DENR, Superfund Section. Nile Testerman (Environmental Engineer) and Stephanie Grubbs (Hydrogeologist) from NC DENR were responsible for gathering and reviewing data for this review. Telephone and/or email discussions/interviews with Jon Bornholm, US EPA Remedial Project Manager (RPM), Ed Hicks, Project Coordinator for Black & Veatch, and Beau Hodges, Proterra Consulting, Inc., O&M subcontractor to Black & Veatch, were conducted. Other activities conducted for this review include document review (see Attachment 1), completion of a Site Inspection Checklist (see Attachment 2), community interview documentation (see Attachment 3), and the Five-Year Review Report preparation.

## 6.2 Community Involvement

All community involvement activities regarding the remedial activities for the Site were conducted by the US EPA. The community was notified via a public notice in the local newspaper, Fayetteville Observer Times, regarding the five-year review process at the Site. A public notice was placed in the Fayetteville Observer Times on March 8, 2006. A copy of the public notice is included in Attachment 3. Several community interviews were also conducted. See Section 6.7 of this report for a summary of the interviews conducted and Attachment 3 for a complete list of the comments/issues voiced by the community.

After the five-year review has been approved by US EPA, a notice will be placed in the Fayetteville Observer Times informing the community that the complete Five-Year Review report will be available at the US EPA Record Center, 11th Floor, 61 Forsyth Street, SW, Atlanta, GA 30303; the Cumberland County Public Library and Information Center, 300 Maiden Lane, Fayetteville, NC; and, on the US EPA website (http://www.epa.gov/superfund/index.htm).

## 6.3 Document Review

This Five-Year Review consisted of a review of relevant documents including the signed ROD, ESDs, ROD Amendments, RI Report, Remedial Action Reports, Monthly O&M Reports, 2005 RSE Report, and Semiannual Sampling Event Reports. Applicable soil and groundwater clean-up standards and other ARARs, as listed in the ROD, ESDs, and ROD Amendments, were also reviewed and checked for updates. See Attachment 1 for a complete list of documents reviewed.

## 6.4 ARAR Review

In performing the Five-Year Review for compliance with applicable or relevant and appropriate requirements (ARARs), only those ARARs addressing risk posed to human health and the environment (i.e., addressing the protectiveness of the remedy) were reviewed. This is in keeping with current US EPA guidance on five-year reviews.

### 6.4.1 Original ARARs from the 1989 ROD

*Federal ARARs*

- 40 CFR Parts 257-271 promulgated under the authority of the RCRA and RCRA as amended (42 USC Section 6921-6939)
- Clean Water Act (CWA 33 USC Sections 1251-1376, 40 CFR Parts 121, 122, 125, and 131)
- Occupational Safety and Health Administration (29 USC Section 651 et seq. and 29 CFR 1910 and 1090)
- Safe Drinking Water Act (42 USC Section 1412, 40 CFR Part 141)
- Clean Water Act, Dredge and Fill Requirements (40 CFR 230)
- CWA Pretreatment Standards (33 USC Section 1317); 40 CFR 403
- Department of Transportation Hazardous Material Transportation Act (49 USC Sections 1801-1812; 49 CFR Parts 100-199)
- Clean Air Act (42 USC 109; 40 CFR Part 50)
- Fish and Wildlife Coordination Act (16 USC 661-666)
- Endangered Species Act (Section 7(c))
- Floodplain Management Executive Act (Executive Order 11988; 40 CFR 6, Subpart A)

*State ARARs*

- North Carolina Solid Waste Disposal Regulations (North Carolina Administrative Code (NCAC), Title 15A, Chapter 13B)
- Regulations for the Management of Hazardous Waste promulgated under the authority of the NC Waste Management Act (NCAC Title 15A, Chapter 13A)
- NC Drinking Water and Groundwater Standards; Groundwater Classifications and Standards (NCAC Title 15 Chapter 2L)
- NC Surface Water Quality Standards (NCSWQS) Classification and Water Quality Standards (NCAC Title 15A Chapter 2B)
- NCSWQS Technology-Based Effluent Limitations (NCAC Title 15A Chapter 2, Subschapter 2B. 0400)
- NC Drinking Water Act (NCDWA) (General Statutes Chapter 130A, NCAC 311-327)
- NC Air Pollution Control Regulations (NCAC Title 15A Chapter 2D and 2Q)
- NC Sedimentation Control Rules (NCAC Title 15A Subchapter4)

The list of ARARs pertaining to the soil remediation at the Site are no longer applicable. The soil remediation at the Cape Fear Wood Preserving Site has been completed and all remediation goals for the soil remedy were achieved.

### 6.4.2 Current Applicable ARARs

Site specific ARARs are identified as follows: Maximum contaminant levels (MCLs) and groundwater standards specified in NCAC 2L are ARARs for site groundwater. Both the original alternative and the amended alternative are designed to obtain ARARs throughout the entire Site. Construction of the groundwater recovery, treatment, and discharge system for both alternatives will satisfy action-specific ARARs. The disposal of any sludge or spent activated carbon generated by either system would also comply with ARARs. The only location-specific ARAR, construction of the groundwater treatment system within a 100-year flood plain, pertains to both alternatives. The chemical quality of the effluent and the location of the infiltration galleries will be in accordance with North Carolina regulations.

## 6.5 Data Review

*Phase I*

Phase I of the remediation began on June 13, 1995. OHM Remediation Services (OHM) was awarded the subcontract for this phase of remediation. Phase I work involved excavating contaminated soil from the western side of grid 2E along the railroad right-of-way and then backfilling with clean material to relocate the railroad track bypass. Analytical results of excavation confirmation samples revealed additional contaminated soil in some sections of the excavated area. When those sections were excavated, an area of black muddy soil was found under the railroad railbed. Data from these borings were used to produce a backfill design appropriate for constructing a roadbed for the relocated railroad track. Soil excavated from the railroad right-of-way was stockpiled on site for future treatment. The excavations were backfilled with soil from an off-site source that was sampled and verified to be "clean" before transported to the Site.

Phase I also consisted of clearing and fencing the Site. Structures were left intact, but asbestos-containing material (including pipe insulation) was removed from one building and disposed in accordance with regulatory requirements. Steel underground gasoline storage tanks were found intact and no leaking was detected. CCA solution was emptied from one above ground storage tank (AGST) and transported to another wood-preserving company for recycling. Nine steel AGST were drained, cleaned, cut-up, and transported off-site for recycling. Solidified creosote material piled under a pole barn on site was excavated and placed into roll-off containers for disposal.

Excavated grids were sampled using the established sampling protocol and in accordance with US EPA Region IV Environmental Investigation Standard Operating Procedure and Quality Assurance Manual (EISOPQAM). If the excavation sample results showed that the contaminant levels exceeded the Site clean-up goals, excavation proceeded in 1- or 2-foot intervals until a depth of 6 feet or uncontaminated soil was encountered. Figure 4 is a map the grid area. Table 2 shows the ROD specified clean-up goals for soil.

*Phase II*

Phase II involved relocating a portion of active track belonging to Aberdeen and Rockfish Railroad (A&RR). The track was relocated to the newly remediated area west of the original location. The railroad work performed during Phase II was originally planned to encompass all contamination below the railroad right-of-way. However, analytical results from confirmation sampling of the excavated areas during Phase IIIA indicated contamination north of the Site. As a result, a 600-foot section of railroad right-of-way north of the was remediated during the later Phase IIIB.

*Phase IIIA*

Phase IIIA comprised the major soil remediation at the Site. The 1989 ROD specified soil washing as the preferred remedial action alternative for soils, based on a study conducted during the RD. Bechtel Environmental Inc. was retained by US EPA to develop a remedial design to address the Site conditions. Bechtel was to perform the remedial action in September 1994, in accordance with the SOW stipulating soil washing as the technology to be used for source control. Soil washing equipment was mobilized to the Site in June 1996, but the soil washing demonstration test completed in September 1996, indicated that the system failed to achieve the Site clean-up goals.

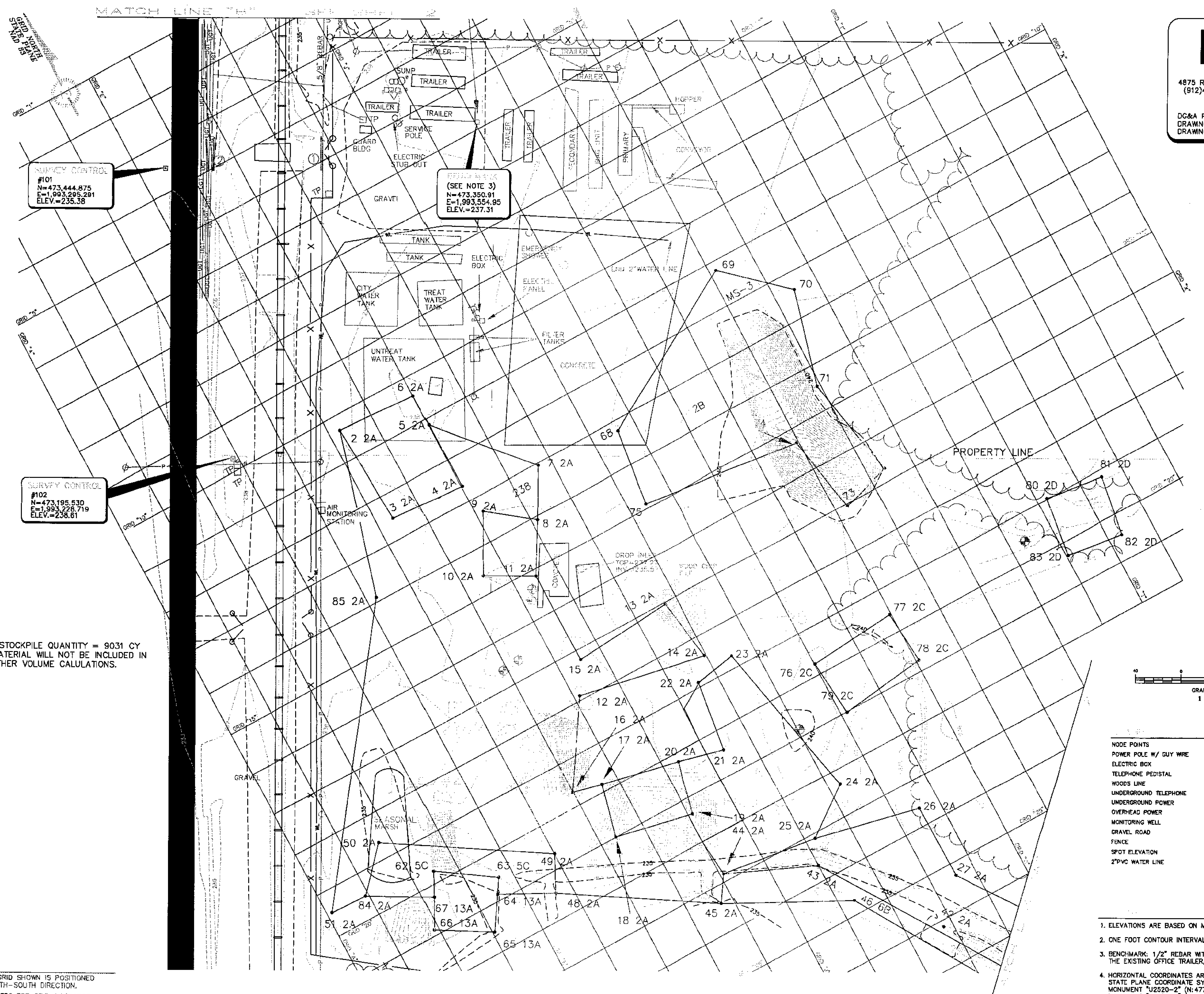
*Phase IIIB*

Low-temperature thermal desorption treatment was specified in the ROD as the alternative treatment technology to soil washing. In July 1997, US EPA developed the Final Draft Request for Proposal for Thermal Treatment Services and in February 1998, Williams Environmental Services, Inc. (WESI) was awarded the subcontract to begin Phase IIIB, Thermal Treatment. The low-temperature thermal desorption process (or thermal treatment) uses three basic components; a rotary kiln, baghouse, and combustion chamber. Each component is connected by a large diameter piping that conveys the off-gas from the rotary kiln through the bag house, the combustion chamber, and, finally, out of the stack.

All treated and excavated soils were analyzed to assure that the remediation goals were achieved. The major sampling activities during Phase IIIB were treated soil sampling and confirmation sampling following excavation:

- Treated soil sampling consisted of sampling each 320 cubic yard ($yd^3$) of treated soil as it left the treatment system. The sample was analyzed for the contaminants of concern (COCs) and was required to meet all the Site clean-up goals before the soil could be used for backfill for site excavation.
- Confirmation sampling of excavations consisted of sampling each excavated grid bottom and deep sidewall to ensure that all contaminated soil was excavated. If a confirmation sample showed that adjacent soils met the Site clean-up goals, that section of the excavation would stop and the excavation could be backfilled. If the sampled failed to meet the Site clean-up goals, excavation was resumed over the sample area and was resampled.

After contamination was found below grids that formerly met criteria, the practice of excavating and sampling grids from the surface downwards was revised. The revised method involved excavating a grid to its final depth, than sampling the sidewalls of adjacent grids. This method exposed a profile view of the grid sidewall so a sidewall evaluation could determine the most probable location of contamination. Typically, these were areas of stained soil. As a result of the revised sampling procedure, grids were usually sampled near the bottom of the sidewall. This procedure reduced the number of samples required and detected contaminated soil that otherwise would have been hidden.




TOTAL STOCKPILE QUANTITY = 9031 CY
THIS MATERIAL WILL NOT BE INCLUDED IN ANY OTHER VOLUME CALULATIONS.

NOTE:
THE 40' GRID SHOWN IS POSITIONED IN A NORTH-SOUTH DIRECTION.
COORDINATES FOR GRID INTERSECTION A,1
N 473545.21
E 1993112.98

GRAPHIC SCALE IN FEET
1 inch = 40 ft.

| | |
|---|---|
| NODE POINTS | ● |
| POWER POLE W/ GUY WIRE | Ø |
| ELECTRIC BOX | ☐ EB |
| TELEPHONE PEDISTAL | ☐ TP |
| WOODS LINE | |
| UNDERGROUND TELEPHONE | UGT |
| UNDERGROUND POWER | UGP |
| OVERHEAD POWER | P |
| MONITORING WELL | |
| GRAVEL ROAD | |
| FENCE | X |
| SPOT ELEVATION | + 236.71 |
| 2"PVC WATER LINE | WL |

1. ELEVATIONS ARE BASED ON MEAN SEA LEVEL DATUM.
2. ONE FOOT CONTOUR INTERVALS SHOWN.
3. BENCHMARK: 1/2" REBAR WITH CAP AT THE SOUTHEAST CORNER OF THE EXISTING OFFICE TRAILER, ELEV. 237.31.
4. HORIZONTAL COORDINATES ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM AND ARE REFERENCED TO NCDOT MONUMENT "U2520-2" (N:477,403.148, E:1,995,519.876) AND NCDOT MONUMENT "U2520-3" (N:475,904.297, E:1,994,693.825).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DG&A PROJ. No. 6549-001-N1
DRAWING No.
DRAWING NAME: N70EXG.DWG

WILLIAMS ENVIRONMENTAL SERVICES
2075 WEST PARK PLACE, STONE MOUNTAIN, GA. 30087
770/879-4107 (fax) 770/879-4831

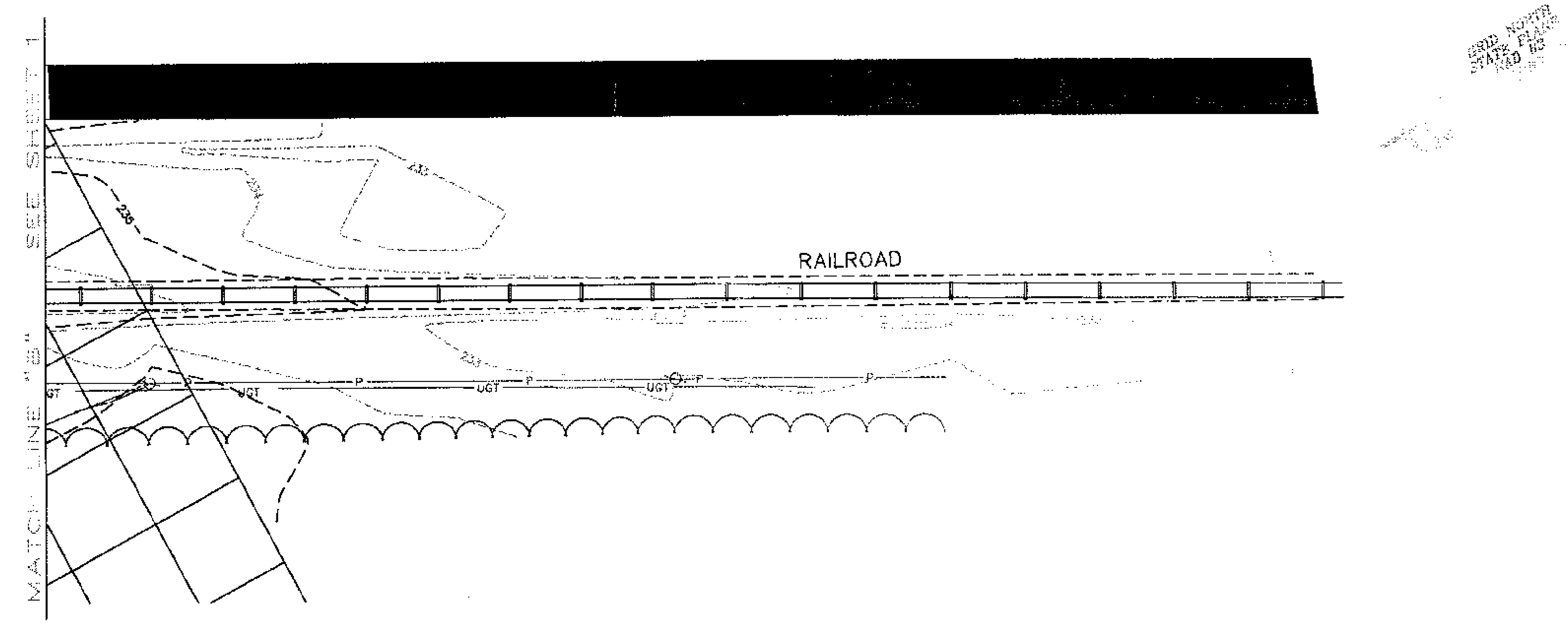
DRAWN BY: DG&A
CHK'D BY: DG&A
APP'D BY: DG&A
SCALE: 1" = 40'
PROJ. NO. 03920100
DATE: JUNE 20, 1999

# TOPOGRAPHIC SURVEY
# CAPE FEAR WOOD PRESERVING SITE
## CAPE FEAR, NORTH CAROLINA

REVISIONS: | BY: | DATE:

EXISTING CONDITIONS

SHEET 1 OF 6




| | |
|---|---|
| NODE POINTS | ● |
| POWER POLE W/ GUY WIRE | |
| ELECTRIC BOX | EB |
| TELEPHONE PEDISTAL | TP |
| WOODS LINE | |
| UNDERGROUND TELEPHONE | UGT |
| UNDERGROUND POWER | UGP |
| OVERHEAD POWER | P |
| MONITORING WELL | |
| GRAVEL ROAD | |
| FENCE | X |
| SPOT ELEVATION | + 236.71 |
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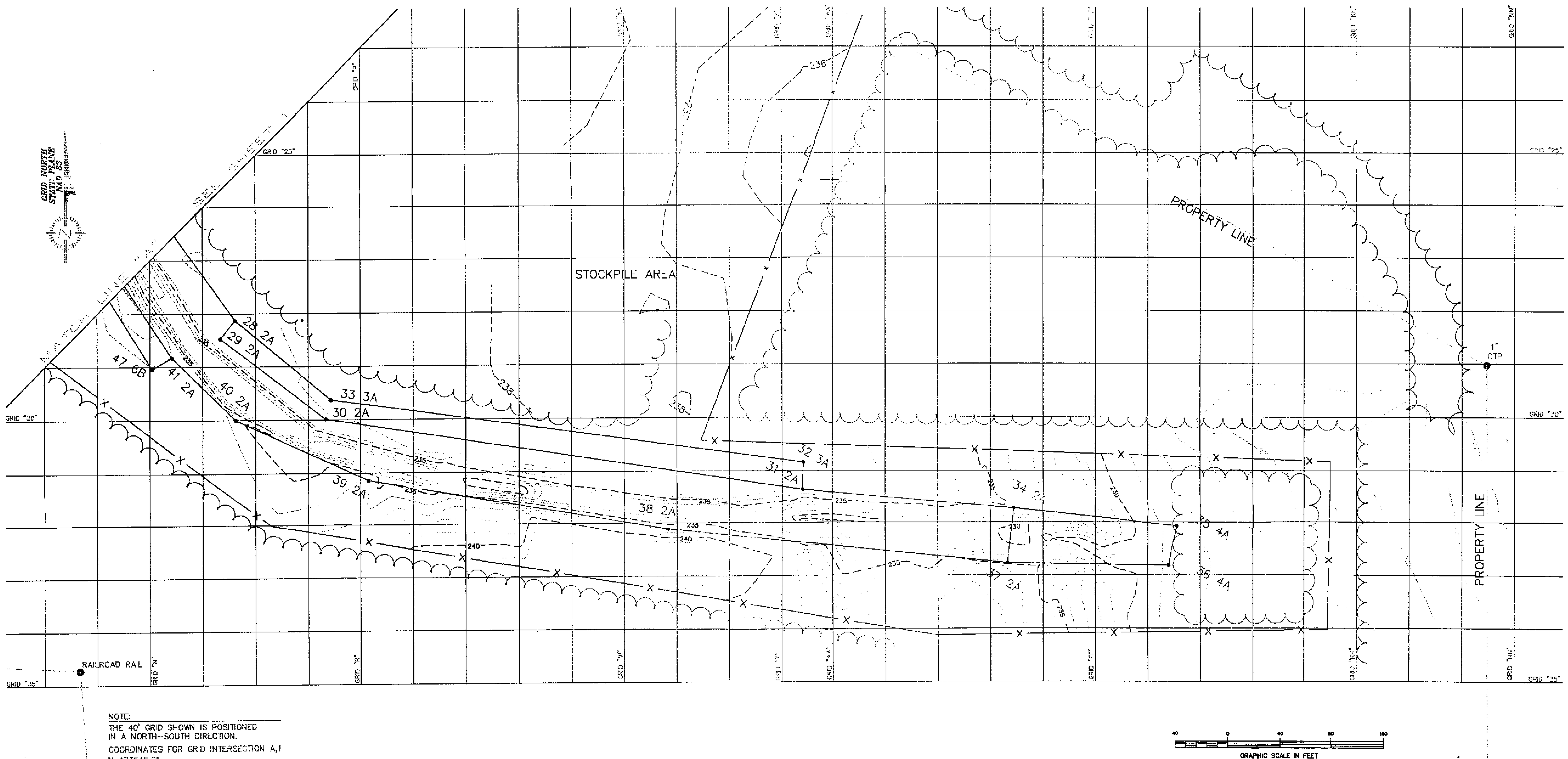


NOTE:
THE 40' GRID SHOWN IS POSITIONED IN A NORTH-SOUTH DIRECTION.
COORDINATES FOR GRID INTERSECTION A,1
N 473545.21
E 1993112.98

WILLIAMS ENVIRONMENTAL SERVICES
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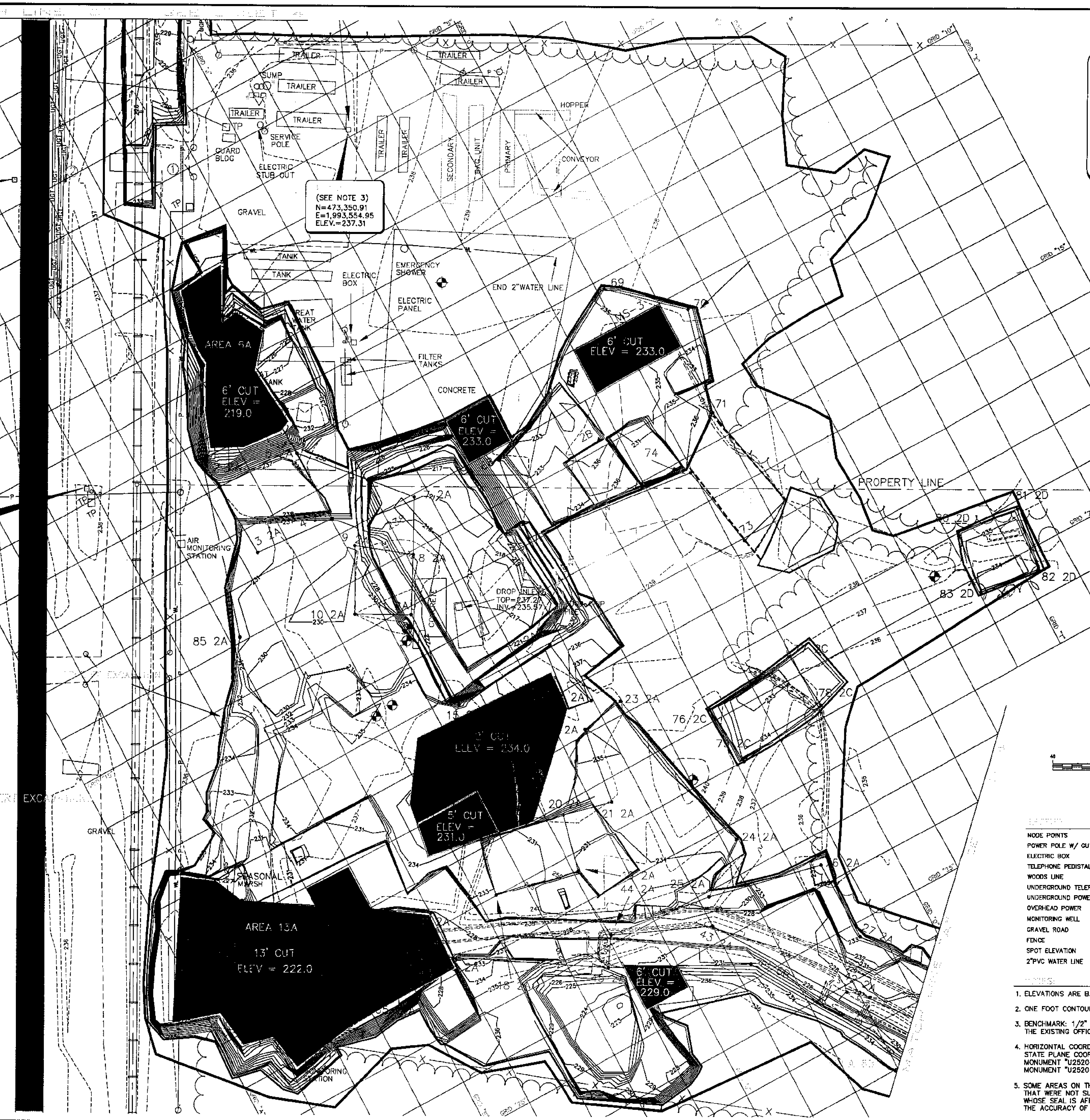
| | | |
|---|---|---|
| DRAWN BY: DG&A | APP'D BY: DG&A | PROJ. NO. 03920100 |
| CHK'D BY: DG&A | SCALE: 1" = 40' | DATE: JUNE 20, 1999 |

# TOPOGRAPHIC SURVEY
# CAPE FEAR WOOD PRESERVING SITE
CAPE FEAR, NORTH CAROLINA

| DATE: | BY: | REVISIONS: |
|---|---|---|
| | | |

EXISTING CONDITIONS

SHEET 2 OF 6




TWO EXCAVATION AREAS NOT SHOWN. 355 CY EACH AS DETERMINED BY WILLIAMS ENVIRONMENTAL.

ADDITIONAL EXCAVATION ALONG RAILROAD NOT SHOWN. INCLUDES 143 CY AS DETERMINED FROM SKETCH BY WILLIAMS ENVIRONMENTAL.

TOTAL QUANTITES NOT SHOWN = 853 CY

STOCKPILE QUANTITY = 11,516 CY

SITE EXCAVATION QUANTITY = 100,130 CY

TOTAL OTHER QUANTITIES SHOWN:

| | |
|---|---|
| AREA @ GRID P,16 | 297 CY |
| AREA @ GRID MM,35 | 355 CY |
| CULVERT EXCAVATIONS | 25 CY |
| TOTAL | 677 CY |

**113,176 CUBIC YARDS**

THE QUANTITIES SHOWN ABOVE REPRESENT THE AMOUNT OF MATERIAL REMOVED BELOW THE PRE-EXISTING CONTOURS AS SHOWN ON SHEETS 1 & 2.

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E 1993112.98

EXCAVATION CONTOURS SHOWN REPRESENT ELEVATION OF DEEPEST EXCAVATION.

WILLIAMS ENVIRONMENTAL CLAIMED THAT THE EXCAVATION DEPTH WAS DEEPER THAN THE SURVEY DATA INDICATED IN SOME AREAS. THESE AREAS ARE SHADED.

GRAPHIC SCALE IN FEET
1 inch = 40 ft.

| | |
|---|---|
| NODE POINTS | ● |
| POWER POLE W/ GUY WIRE | Ø |
| ELECTRIC BOX | ☐ EB |
| TELEPHONE PEDISTAL | ☐ TP |
| WOODS LINE | |
| UNDERGROUND TELEPHONE | UGT |
| UNDERGROUND POWER | UGP |
| OVERHEAD POWER | P |
| MONITORING WELL | |
| GRAVEL ROAD | |
| FENCE | X |
| SPOT ELEVATION | + 236.71 |
| 2"PVC WATER LINE | WL |

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5. SOME AREAS ON THESE DRAWINGS INDICATE EXCAVATION QUANTITES THAT WERE NOT SURVEYED BY DG&A. DG&A AND THE LAND SURVEYOR WHOSE SEAL IS AFFIXED HERON DOES NOT, IN ANY WAY, CERTIFY TO THE ACCURACY OF THE QUANTITIES NOT SURVEYED BY DG&A.

WILLIAMS ENVIRONMENTAL SERVICES
2075 WEST PARK PLACE, STONE MOUNTAIN, GA. 30087
770/879-4107 (fax) 770/879-4831

| | | | |
|---|---|---|---|
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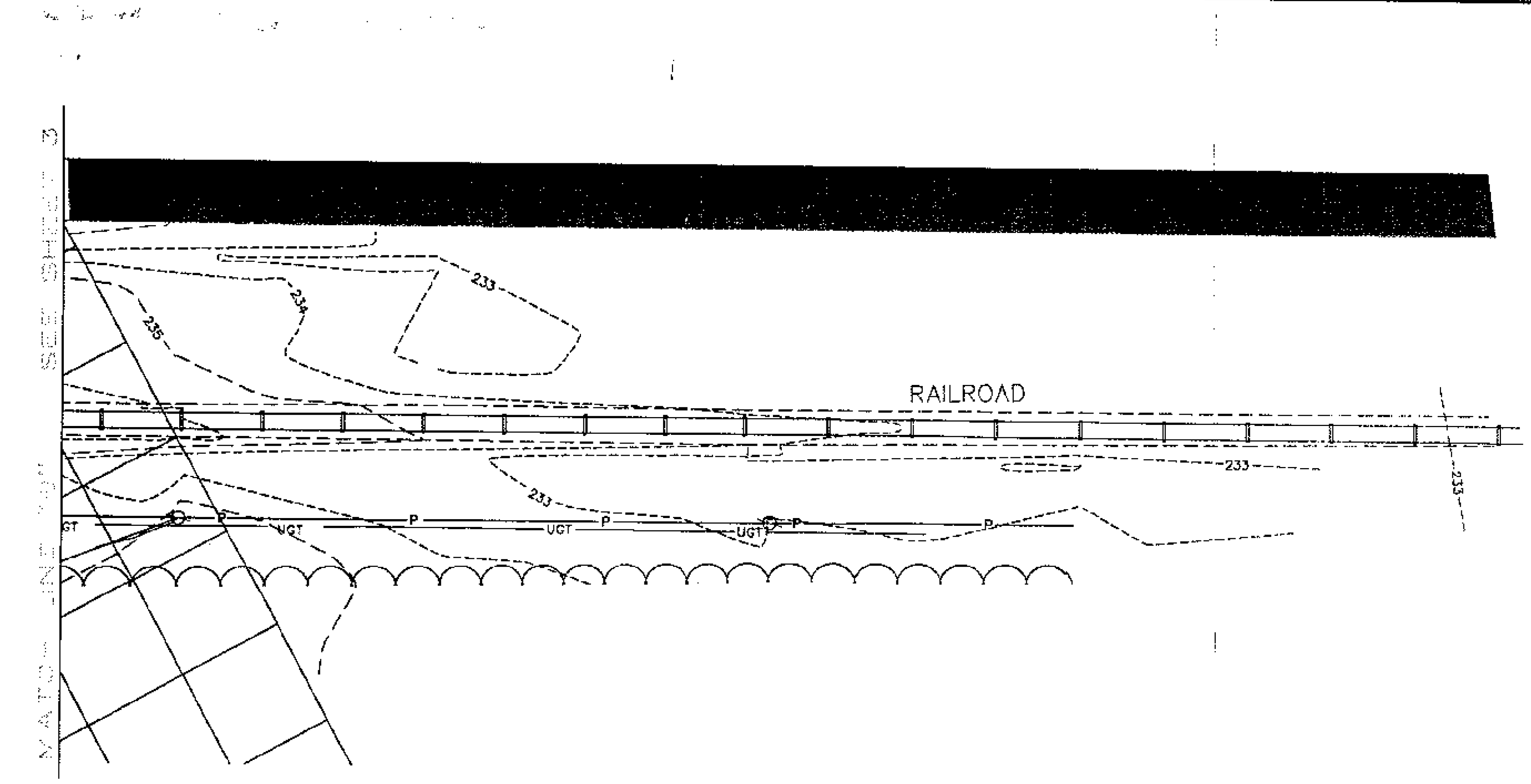
| CHK'D BY: DG&A | SCALE: 1" = 40' | DATE: | JUNE 20, 1999 |

EXCAVATION SURVEY
# CAPE FEAR WOOD PRESERVING SITE
CAPE FEAR, NORTH CAROLINA

REVISIONS: BY: DATE:

BOTTOM OF EXCAVATIONS

SHEET 3 OF 6




EXCAVATION CONTOURS SHOWN
REPRESENT ELEVATION OF DEEPEST
EXCAVATION.

| | |
|---|---|
| NODE POINTS | ● |
| POWER POLE W/ GUY WIRE | Ø |
| ELECTRIC BOX | ☐ EB |
| TELEPHONE PEDISTAL | ☐ TP |
| WOODS LINE | |
| UNDERGROUND TELEPHONE | UGT |
| UNDERGROUND POWER | UGP |
| OVERHEAD POWER | P |
| MONITORING WELL | |
| GRAVEL ROAD | |
| FENCE | X |
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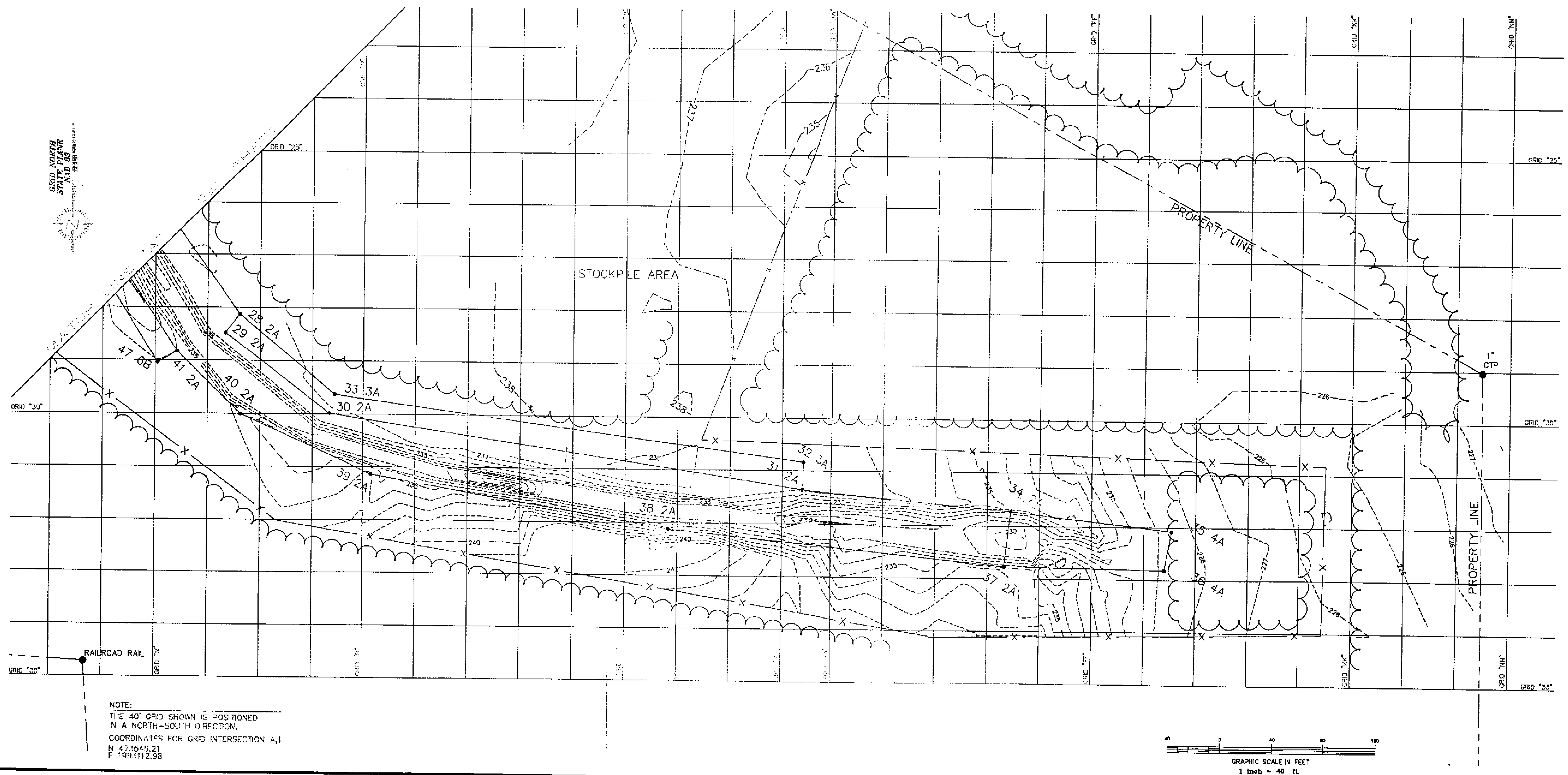


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N 473545.21
E 1993112.98

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770/879-4107 (fax) 770/879-4831

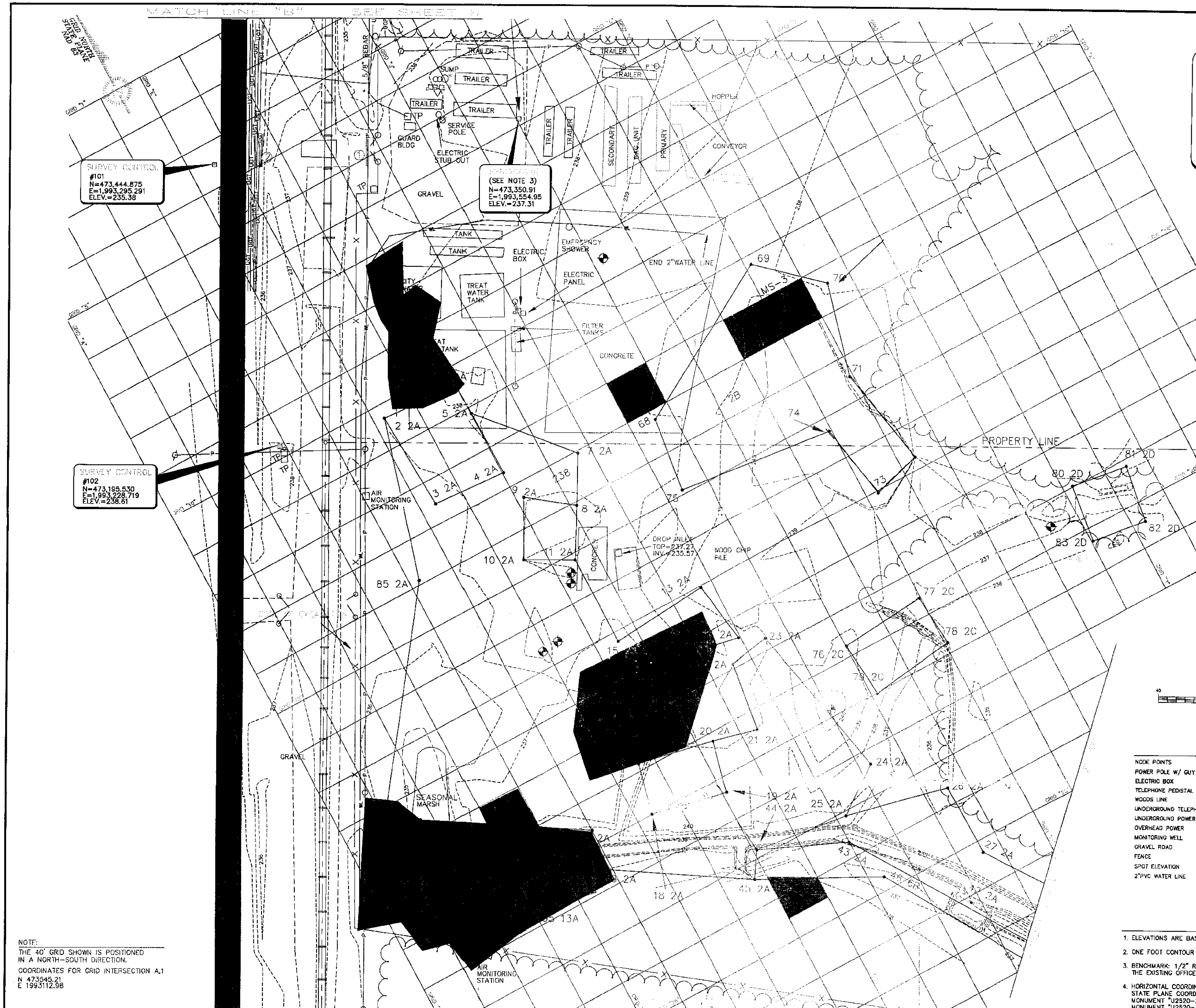
| | | |
|---|---|---|
| DRAWN BY: DG&A | APP'D BY: DG&A | PROJ. NO. 03920100 |
| CHK'D BY: DG&A | SCALE: 1" = 40' | DATE: JUNE 20, 1999 |

EXCAVATION SURVEY
# CAPE FEAR WOOD PRESERVING SITE
CAPE FEAR, NORTH CAROLINA

| REVISIONS: | BY: | DATE: |
|---|---|---|

*BOTTOM OF EXCAVATIONS*

SHEET 4 OF 6




NOTE:
THE 40' GRID SHOWN IS POSITIONED IN A NORTH-SOUTH DIRECTION.
COORDINATES FOR GRID INTERSECTION A,1
N 473545.21
E 1993112.98

NUMBERS REPRESENT DEPTH OF MATERIAL REMOVED FROM EXISTING GRADE TO BOTTOM OF DEEPEST EXCAVATION.

WILLIAMS ENVIRONMENTAL CLAIMED THAT THE EXCAVATION DEPTH WAS DEEPER THAN THE SURVEY DATA INDICATED IN SOME AREAS. THESE AREAS ARE SHADED.

GRAPHIC SCALE IN FEET
1 inch = 40 ft.

| | |
|---|---|
| NODE POINTS | ● |
| POWER POLE W/ GUY WIRE | |
| ELECTRIC BOX | EB |
| TELEPHONE PEDISTAL | TP |
| WOODS LINE | |
| UNDERGROUND TELEPHONE | UGT |
| UNDERGROUND POWER | UGP |
| OVERHEAD POWER | P |
| MONITORING WELL | |
| GRAVEL ROAD | |
| FENCE | X |
| SPOT ELEVATION | + 236.71 |
| 2"PVC WATER LINE | WL |

1. ELEVATIONS ARE BASED ON MEAN SEA LEVEL DATUM.
2. ONE FOOT CONTOUR INTERVALS SHOWN.
3. BENCHMARK: 1/2" REBAR WITH CAP AT THE SOUTHEAST CORNER OF THE EXISTING OFFICE TRAILER, ELEV. 237.31.
4. HORIZONTAL COORDINATES ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM AND ARE REFERENCED TO NCDOT MONUMENT "U2520-2" (N:477,403.148, E:1,995,519.876) AND NCDOT MONUMENT "U2520-3" (N:475,904.297, E:1,994,693.825).

PREPARED BY:


DONALDSON, GARRETT, & ASSOCIATES, INC.
MACON = CHARLOTTE
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(912)474-5350 Fax: (912) 477-2534
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DG&A PROJ. No. 6549-001-N1
DRAWING No.
DRAWING NAME: N70EXG.DWG


WILLIAMS ENVIRONMENTAL SERVICES
2075 WEST PARK PLACE, STONE MOUNTAIN, GA. 30087
770/879-4107 (fax) 770/879-4831

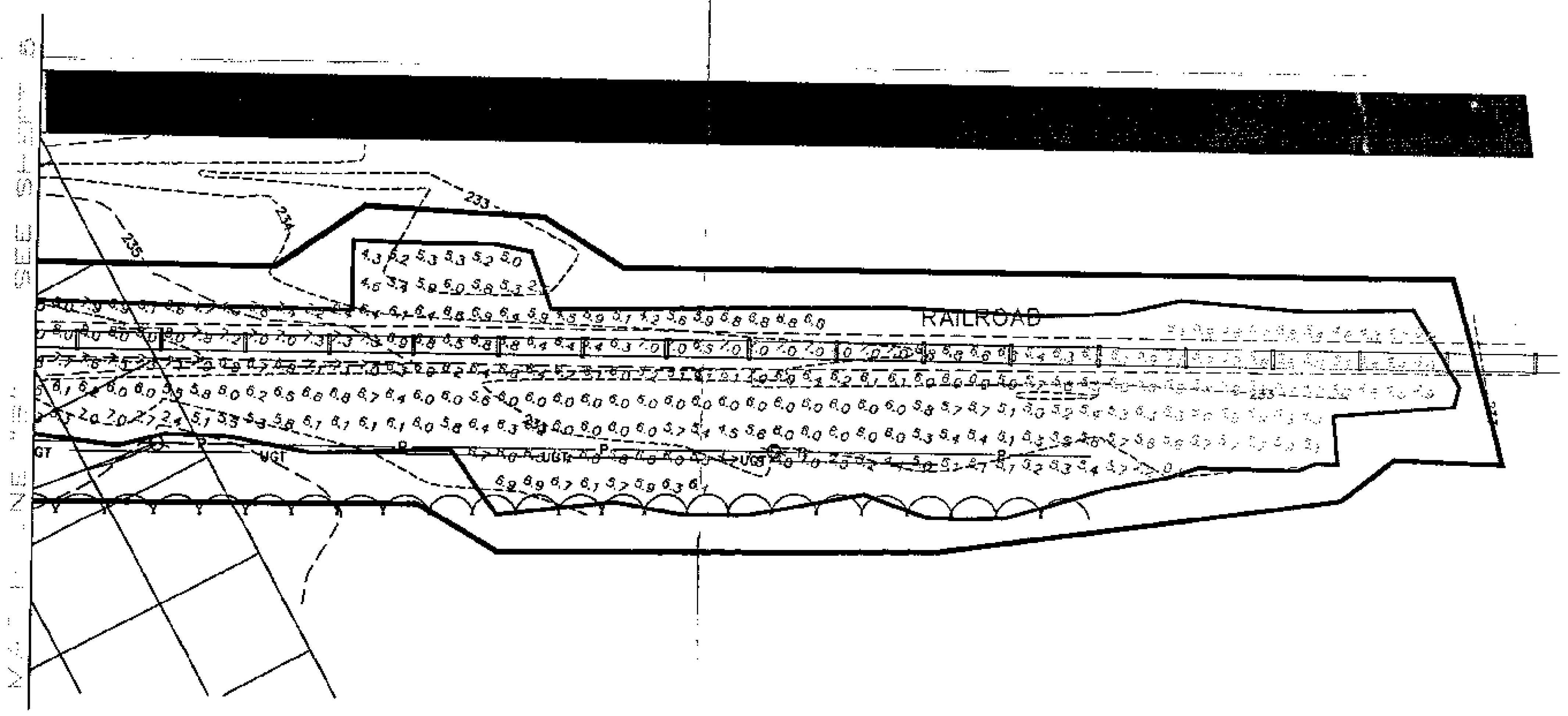

DRAWN BY: DG&A | CHK'D BY: DG&A | APP'D BY: DG&A | SCALE: 1" = 40' | PROJ. NO. 03920100 | DATE: JUNE 20, 1999

EXCAVATION SURVEY
# CAPE FEAR WOOD PRESERVING SITE
CAPE FEAR, NORTH CAROLINA

REVISIONS: | BY: | DATE:

EXCAVATION DEPTHS

SHEET 5 OF 6




NODE POINTS
POWER POLE W/ GUY WIRE
ELECTRIC BOX
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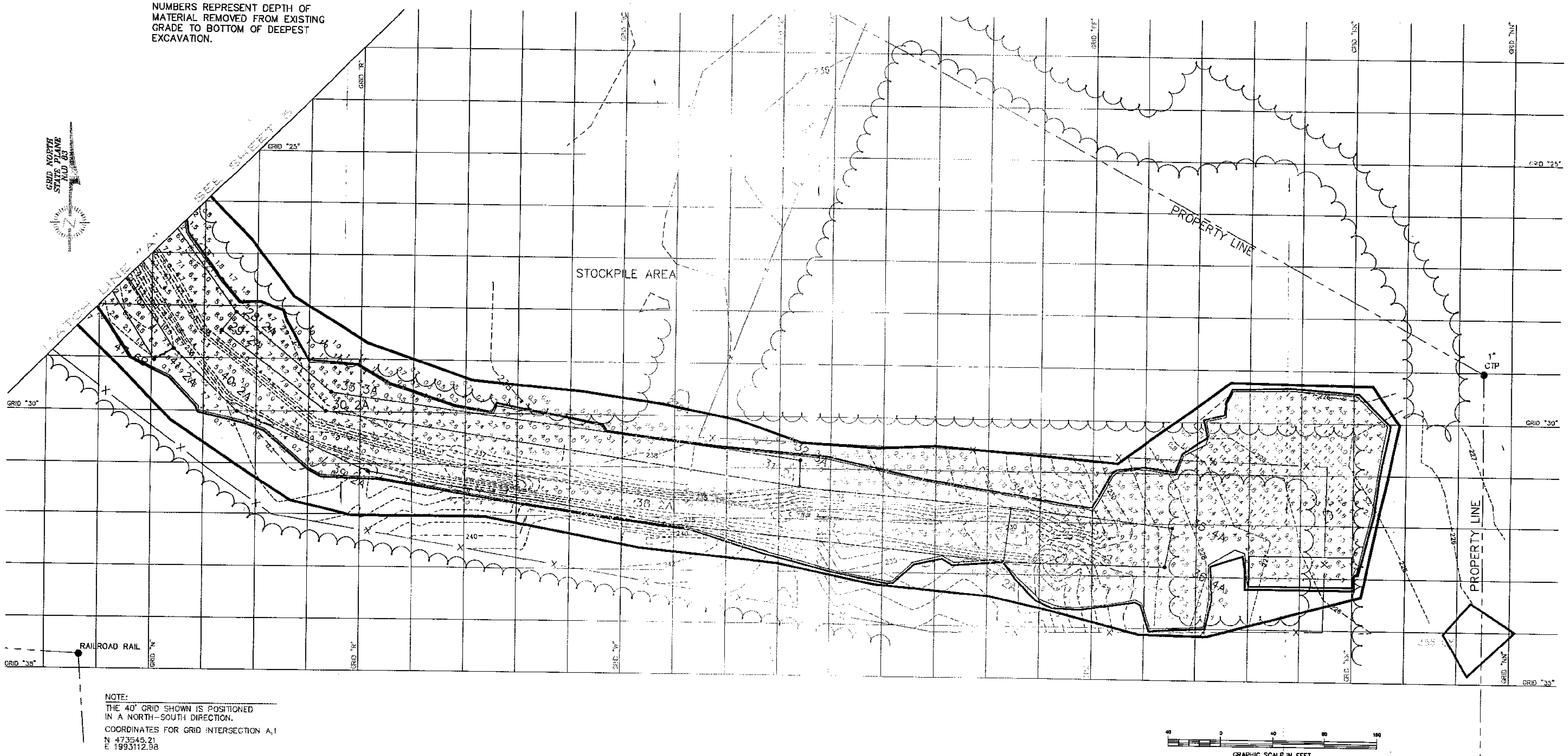
DRAWN BY: DG&A | APP'D BY: DG&A | PROJ. NO. 03920100
CHK'D BY: DG&A | SCALE: 1" = 40' | DATE: JUNE 20, 1999

NUMBERS REPRESENT DEPTH OF MATERIAL REMOVED FROM EXISTING GRADE TO BOTTOM OF DEEPEST EXCAVATION.




NOTE:
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COORDINATES FOR GRID INTERSECTION A,1
N 473545.21
E 1993112.98

EXCAVATION SURVEY
# CAPE FEAR WOOD PRESERVING SITE
CAPE FEAR, NORTH CAROLINA

REVISIONS: | BY: | DATE:

EXCAVATION DEPTHS

SHEET 6 OF 6

The volume of soil excavated and treated during Phase IIIB greatly exceeded the projected quantity of 50,000 $yd^3$; the final excavation volume totaled approximately 110,000 $yd^3$. Several major excavation areas were expanded in depth of the excavation and the areas of contamination expanded well beyond the limits set by the RI and the RD. These areas (see Figure 4 for the area locations) include:

- Area 2B, excavation of surface soils to 2 feet revealed wide areas of creosote-stained soil. This area received special attention and involved excavations well beyond the planned 6 foot depth, to a depth of 20 feet.
- Area 13A, in the southwestern corner of the Site, was found to expand laterally in all directions at the 10 to 13 foot depth. Fortunately, this area was underlain by a layer of clay that appeared to stop the spread of the creosote.
- Area 4A, at the eastern end of the south ditch, expanded vertically to a depth of approximately 10 feet over the 9 grids. According to the RI/RD, the south ditch had been intermittently dammed to hold back creosote during the former wood preserving operations. This area was underlain by clay as well and limited the spread of the contaminants to approximately 10 feet in depth.
- Area 6A, located in the northwestern section of the Site, became known as the Water Treatment Area because it extended beyond the originally defined limits into the grids beneath the subcontractor's water treatment area. In addition, the area expanded to approximately six grids north of the original 6A area.
- Area 10A, the central area of the Site, was originally a 60-foot square next to a concrete slab. After the initial excavation, a 36-foot square by 10 feet deep concrete sump was discovered. Extremely high VOCs were detected. The area was assumed to be the sump which had probably been filled with fly ash during one of the earlier emergency response actions. Excavation of this sump allowed the full magnitude of contamination to be realized. Large quantities of DNAPL and light non-aqueous phase liquids (LNAPL) were seeping from the bottom and sidewalls of the excavation. Eventually, this area was excavated to a depth of 20 feet over approximately 8 grids. Deeper excavating required engineered design to determine the proper excavation side and slope angles. From the sidewalls of this excavation at the groundwater interface, DNAPL discharged into the excavation along with groundwater. This was the first time that a DNAPL was encountered at the Site. A decision was made by the US EPA with NCDENR to construct a subsurface groundwater extraction trench or French Drain across the bottom of the excavation. The trench would capture the contaminated groundwater coming from the west and any remaining product from the aquifer. The groundwater extraction trench extends 80 feet along a north-south orientation and is supplemented by three shallow extensions of rock-filled fabric that provide a preferential pathway from the corners of excavation. See Figure 3 for a sketch of the groundwater extraction trench.
- Railroad area excavation was performed during this phase without constructing a temporary bypass for the active track. Instead, A&RR allowed the track to be taken off-line for a short period of time. Excavation of the railroad area revealed that contamination was present to the north and west of the excavated area. This required an additional excavation of the railroad area to 60 feet wide and 6 feet deep for 600 feet north of the Site.

Wastewater generated during the Phase IIIB included stormwater and groundwater pumped from excavations and water used for decontaminating equipment. All wastewater was treated by an on-site treatment system operated by the subcontractor. Prior to being discharged to an on-site drainage ditch, the wastewater was sampled to verify that it met Site clean-up goals.

Air monitoring was conducted as part of the Phase IIIB sampling strategy. The project monitoring strategy for detecting potential airborne Site contaminants consisted of four measures to address specific sets of hazardous operations regularly occurring on site. The four elements of the air analysis program were: Site perimeter air monitoring; Continuous monitoring of the thermal treatment stack; Real-time excavation area or work area sampling and analysis; and Personnel air sampling. The monitoring results indicated that contamination did not leave the Site as airborne emissions.

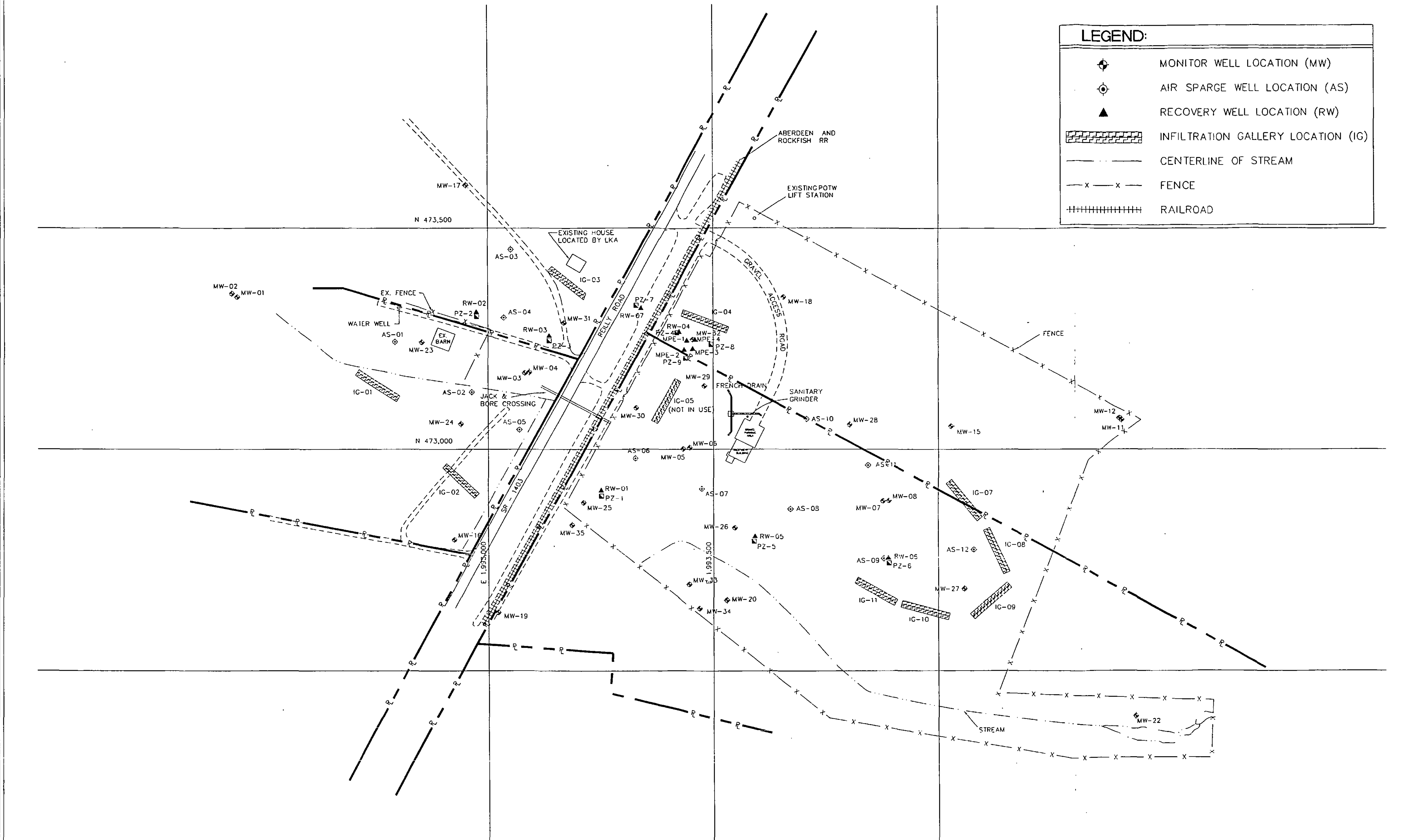
*Phase IV*

The data review for the groundwater monitoring data set consisted of an evaluation of the initial data collected during the system start-up from the Baseline (Data Evaluation) Report dated December 2001 and data collected from the start-up of the remediation system through the most current document from the Semi-Annual Report for the Groundwater Extraction and Treatment Facility dated October 1, 2005 through March 31, 2006, submitted to the US EPA in June 2006 by Black & Veatch Special Projects Corp.

Phase IV subcontractor began mobilizing equipment and personnel to the Site during the week of April 30, 2001. The groundwater remediation system at the time of start-up included seven recovery wells (RW 1 through RW7), the groundwater extraction trench or French Drain (FD), twelve air sparging wells, ten infiltration galleries, 35 monitoring wells, and the treatment building. Figure 5 is a map of the on-site structures and well locations. Inside the treatment building is an oil-water separator, equalization tank, bag filters, granular activated carbon filters, air compressors, and all the controls for the system. Three recovery wells and the French Drain have two pumps, one for hydraulic control and one to capture DNAPL. The three-day start-up test on the entire system began on August 13, 2001. The five-day performance test began on August 16, 2001.

The Baseline Report was completed on December 20, 2001. The purpose of the baseline report was to identify and describe baseline conditions at the Site prior to the system start-up of the groundwater extraction and treatment system. Based on observations made during construction of the groundwater remedy for the Site, the significant expansions of the groundwater monitoring network (addition of 13 new monitoring wells, 7 recovery wells, and 12 air sparging wells), and analytical results obtained during the baseline sampling event, several conclusions were reached:

- A significant more wide-spread free-phase DNAPL plume was present. The plume was discovered in the central portion of the Site (RW-01, RW-04, RW-07, and the French Drain), along and to the east of the railroad track corridor.
- Non-carcinogenic PAH compounds (naphthalene, most prevalent) exceeding the groundwater clean-up standard for the Site extend further to the west, south, and east than previously known. Monitoring wells MW-23s (300 feet west of Reilly Road), and MW-07 (300 feet east of the treatment plant), each had exceedences for 1 or more non-carcinogenic PAH compounds.




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 2 | 10/31/02 | AS-BUILT | | | | | |
| 1 | 08/30/00 | FINAL DESIGN | JS | EH | SH | | |
| 0 | 06/08/00 | PREFINAL DESIGN | JS | EH | SH | | |
| NO | DATE | REVISIONS AND RECORD OF ISSUE | BY | CK | APP | | |

BLACK & VEATCH

ENGINEER EH | DRAWN JPS | CHECKED SH | DATE 10/22/03

GROUNDWATER EXTRACTION
AND TREATMENT SYSTEM
CAPE FEAR WOOD PRESERVING SITE
FAYETTEVILLE, NORTH CAROLINA

AS-BUILT SITE LAYOUT

PROJECT 48328.0147 | DRAWING NUMBER 5 | REV 3 | CODE | AREA

ACAD 2000i
48328/QUARTERLY/2ND QTR 2003

10/22/03

- MW-22s (located on the extreme eastern end and in a topographically low are of the Site) was reported to have exceedences for 1 non-carcinogenic PAH compounds (naphthalene, 67 parts per billion (µg/l)).
- Although heavy metals were not considered COCs for the Site groundwater remedy, the presence of arsenic, cadmium, and chromium were potentially an issue with the on-site re-injection or off-site discharge of treated waters for the City of Fayetteville's POTW. Arsenic levels ranged from 18 to 24 µg/l within the system influent and from 48 to155 µg/l within the effluent. The maximum allowable arsenic levels for discharge to the on-site infiltration galleries was 50 µg/l (NCDENR 2L Standard). Beginning on day 3 and continuing through day 8 of start-up and testing, arsenic levels in effluent samples declined below the 50 µg/l threshold and remained steady thereafter within the 8 to 26 µg/l range. The French Drain and the recovery wells were also sampled for arsenic and these fell below the 50 µg/l threshold. It was concluded that the initial levels of arsenic were an anomaly related to break-in of the carbon units and the arsenic levels within the influent and effluent should remain well below the threshold range of 50 µg/l. However, as of January 2001, the new MCL for arsenic is 10 µg/l. Cadmium and chromium levels are not above the appropriate ARARs (NCAC 2L Groundwater Standard); therefore, we do not have to evaluate for these metals as COCs.
- The most heavily impacted wells on site were the 7 recovery wells and the French Drain. This indicated that the final field selected locations were optimized and the DNAPL investigation was highly effective.
- MW-23s and MW-26s, two of the heavily impacted wells, should be within the radii of influence of the nearby recovery wells.

Tables 7 through 11 are summary tables for the influent/effluent, recovery wells, and monitoring wells since system start-up.

The remediation goals for the Cape Fear Wood Preserving Site are to achieve the NC DENR 2L Groundwater Standards throughout the entire plume. The NC DENR 2L Groundwater Standards are included in Table 7 because the groundwater treatment system must treat the influent to reduce contaminants to an acceptable level (achieving effluent containing a 95% reduction from the influent contaminant concentrations) or effluent contaminant concentrations below the NC 2L Groundwater Standard. As of the 2006 Semi-Annual Report, the following are the most current results for the Treatment System Monitoring (Influent/Effluent monitoring), Groundwater Elevation monitoring, and Groundwater Monitoring wells data.

*<u>Influent/Effluent Monitoring Results</u>*

Treatment system influent and effluent samples are currently being sampled monthly. Table 7 is a summary of these results since the September 2005 sampling event. As seen from this table, the influent data shows no significant changes in contaminant concentration levels over the reporting period. The highest PAH concentrations were detected in the December 2005 sample. The effluent data presented in Table 7 documents the efficiency of the treatment in removing the contaminants from the groundwater. There were no detections of contaminants in the effluent during the reporting period.

Table 7
System Influent, Between Carbon, and Effluent Analytical Summary
September 2005 - March 2006
Cape Fear Wood Preserving Site

| Compound | 2L Standard | Influent | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sep-05 | Oct-05 | Nov-05 | Dec-05 | Jan-06 | Feb-06 | Mar-06 |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | |
| Benzene | 1 | **18** | **15U** | **18** | **29** | **3UD** | **23.1D** | 1.0UD |
| Toluene | 1000 | 43 | 43 | 39 | 48 | 3UD | 23.6D | 4.4UD |
| Ethyl Benzene | 29 | **37** | **69** | **52** | **63** | 2UD | 1.5D | 0.5UD |
| Total Xylenes | 530 | 175 | 292 | 165 | 164 | 19JD | 37.0JD | 5.6JD |
| **Non-Carcinogenic (NCAR) PAHS** | | | | | | | | |
| Acenaphthene | 80 | **430** | **580** | **540** | **590** | **438D** | **414D** | 55 |
| Acenaphthylene | 210 | 50U | 50U | 50U | 50U | 25JD | 30.2JD | 1.7J |
| Anthracene | 2100 | 50U | 50U | 50U | 50U | 17JD | 14.6JD | 2.8J |
| Fluoranthene | 280 | 50U | 110 | 58 | 58 | 44JD | 44.6JD | 15.9 |
| Fluorene | 280 | 230 | **320** | 250 | 250 | 233D | 225D | 21.1 |
| 1-Methylnaphthalene | NE | 290 | 350 | 320 | 360 | 216D | 235D | 16 |
| 2-Methylnaphthalene | NE | 540 | 600 | 670 | 660 | 412D | 388D | 2.0U |
| Naphthalene | 21 | **3,200** | **4,100** | **4,400** | **5,300** | **1600D** | **1,460D** | 2.1U |
| Phenanthrene | 210 | **290** | **480** | **340** | **300** | **303D** | **271D** | 0.9U |
| Pryene | 210 | 50U | 67 | 50U | 50U | 23JD | 26.6JD | 9.7J |
| Carbazole(diphenylamine) | 5* | **240** | **310** | **270** | **350** | **218D** | **200D** | **19.0** |
| **Carcinogenic (CAR) PAHs** | | | | | | | | |
| Benzo(a)anthracene | 0.05 | 50U | 50U | 50U | 50U | 5UD | 5.0UD | 1.0U |
| Benzo(a)pyrene | 0.0047 | 50U | 50U | 50U | 50U | 6UD | 5.5UD | 1.1U |
| Benzo(b)flouranthene | 0.0047 | 50U | 50U | 50U | 50U | 4UD | 3.5UD | 0.7U |
| Benzo(k)fluoranthene | 0.47 | 50U | 50U | 50U | 50U | 9UD | 9.0UD | 1.8U |
| Ideno(1,2,3-cd)pyrene | 0.047 | 50U | 50U | 50U | 50U | 6UD | 5.5UD | 1.1U |
| Dibenzo(a,h)anthracene | 0.0047 | 50U | 50U | 50U | 50U | 5UD | 5.0UD | 1.0U |
| Benzo(g,h,i)perylene | NE | 50U | 50U | 50U | 50U | 6UD | 6.0JD | 1.3U |
| Chrysene | 5 | 50U | 50U | 50U | 50U | 5UD | 5.0UD | 1.0U |

Notes:
U = Compound was analyzed but not detected to the concetration shown.
J = Indicates an estimated value.
D = Indicates that the sample was diluted.
NS = Not sampled due to failure of carbon diffusers
NE - Not established
* - Based on Region 9 Preliminary Remediation Goals
**Bold** - Indicates concentrations above NC 2L. The NC DENR 2L Groundwater Standards are included because the groundwater treatment system must treat the influent to reduce contaminants to an acceptable level (achieving effluent containing a 95% reduction from the influent contaminant concentrations) or effluent contaminant concentrations below the NC 2L Groundwater Standard.

## Table 7
**System Influent, Between Carbon, and Effluent Analytical Summary**
**September 2005 - March 2006**
**Cape Fear Wood Preserving Site**

| Compound | 2L Standard | In Between Carbon Vessels | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sep-05 | Oct-05 | Nov-05 | Dec-05 | Jan-06 | Feb-06 | Mar-06 |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | |
| Benzene | 1 | 1.0U | 1.0 U | 1 | 2 | 1 | **6.1** | NS |
| Toluene | 1000 | 1.0U | 2 | 2 | 2 | 2 | 5.5 | NS |
| Ethyl Benzene | 29 | 1.0U | 2 | 3 | 2 | 1 | 3.0 | NS |
| Total Xylenes | 530 | 3.0U | 9 | 9 | 7 | 5 | 9.2 | NS |
| **Non-Carcinogenic (NCAR) PAHS** | | | | | | | | |
| Acenaphthene | 80 | 10U | 10 | 22 | 35 | 55 | **81.6** | NS |
| Acenaphthylene | 210 | 10U | 10U | 10U | 10U | 3J | 3.1J | NS |
| Anthracene | 2100 | 10U | 10U | 10U | 10U | 3J | 3.6J | NS |
| Fluoranthene | 280 | 10U | 10U | 10U | 10U | 9J | 12.8 | NS |
| Fluorene | 280 | 10U | 10U | 11 | 14 | 32 | 44.7 | NS |
| 1-Methylnaphthalene | NE | 10U | 10U | 14 | 22 | 26 | 29.3 | NS |
| 2-Methylnaphthalene | NE | 10U | 10U | 18 | 36 | 44 | 2.0U | NS |
| Naphthalene | 21 | 10U | 10U | **66** | **200** | **156D** | 2.1U | NS |
| Phenanthrene | 210 | 10U | 10U | 15 | 14 | 46 | 42.5 | NS |
| Pryene | 210 | 10U | 10U | 10U | 10U | 5J | 7.4J | NS |
| Carbazole(diphenylamine) | 5* | 10U | 10U | **12** | **21** | **35** | **40.5** | NS |
| **Carcinogenic (CAR) PAHs** | | | | | | | | |
| Benzo(a)anthracene | 0.05 | 10U | 10U | 10U | 10U | 1U | 1.0U | NS |
| Benzo(a)pyrene | 0.0047 | 10U | 10U | 10U | 10U | 1U | 1.1U | NS |
| Benzo(b)flouranthene | 0.0047 | 10U | 10U | 10U | 10U | 0.7U | 0.7U | NS |
| Benzo(k)fluoranthene | 0.47 | 10U | 10U | 10U | 10U | 2U | 1.8U | NS |
| Ideno(1,2,3-cd)pyrene | 0.047 | 10U | 10U | 10U | 10U | 1U | 1.1U | NS |
| Dibenzo(a,h)anthracene | 0.0047 | 10U | 10U | 10U | 10U | 1U | 1.0U | NS |
| Benzo(g,h,i)perylene | NE | 10U | 10U | 10U | 10U | 1U | 1.3U | NS |
| Chrysene | 5 | 10U | 10U | 10U | 10U | 1U | 1.0U | NS |

Notes:
U = Compound was analyzed but not detected to the concetration shown.
J = Indicates an estimated value.
D = Indicates that the sample was diluted.
NS = Not sampled due to failure of carbon diffusers
NE - Not established
* - Based on Region 9 Preliminary Remediation Goals
**Bold** - Indicates concentrations above NC 2L.     The NC DENR 2L Groundwater Standards are included because the groundwater treatment system must treat the influent to reduce contaminants to an acceptable level (achieving effluent containing a 95% reduction from the influent contaminant concentrations) or effluent contaminant concentrations below the NC 2L Groundwater Standard.

Table 7
System Influent, Between Carbon, and Effluent Analytical Summary
September 2005 - March 2006
Cape Fear Wood Preserving Site

| Compound | 2L Standard | Effluent | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sep-05 | Oct-05 | Nov-05 | Dec-05 | Jan-06 | Feb-06 | Mar-06 |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | |
| Benzene | 1 | 1.0U | 1.0U | 1.0U | 1.0U | 0.2U | 0.2U | 0.2U |
| Toluene | 1000 | 1.0U | 1.0U | 1.0U | 1.0U | 0.2U | 0.2U | 0.2U |
| Ethyl Benzene | 29 | 1.0U | 1.0U | 1.0U | 1.0U | 0.1U | 0.1U | 0.1U |
| Total Xylenes | 530 | 3.0U | 3.0U | 3.0U | 3.0U | 0.5U | 0.5U | 0.5U |
| **Non-Carcinogenic (NCAR) PAHS** | | | | | | | | |
| Acenaphthene | 80 | 10U | 10U | 10U | 10U | 1U | 1.4U | 1.4U |
| Acenaphthylene | 210 | 10U | 10U | 10U | 10U | 1U | 1.4U | 1.4U |
| Anthracene | 2100 | 10U | 10U | 10U | 10U | 0.9U | 0.9U | 0.9U |
| Fluoranthene | 280 | 10U | 10U | 10U | 10U | 0.9U | 0.9U | 0.9U |
| Fluorene | 280 | 10U | 10U | 10U | 10U | 1U | 1.1U | 1.1U |
| 1-Methylnaphthalene | NE | 10U | 10U | 10U | 10U | 2U | 1.8U | 1.8U |
| 2-Methylnaphthalene | NE | 10U | 10U | 10U | 10U | 2U | 2.0U | 2.0U |
| Naphthalene | 21 | 10U | 10U | 10U | 10U | 2U | 2.1U | 2.1U |
| Phenanthrene | 210 | 10U | 10U | 10U | 10U | 0.9U | 0.9U | 0.9U |
| Pryene | 210 | 10U | 10U | 10U | 10U | 0.9U | 0.9U | 0.9U |
| Carbazole(diphenylamine) | 5* | 10U | 10U | 10U | 10U | 0.8U | 0.8U | 0.8U |
| **Carcinogenic (CAR) PAHs** | | | | | | | | |
| Benzo(a)anthracene | 0.05 | 10U | 10U | 10U | 10U | 1U | 1.0U | 1.0U |
| Benzo(a)pyrene | 0.0047 | 10U | 10U | 10U | 10U | 1U | 1.1U | 1.1U |
| Benzo(b)flouranthene | 0.0047 | 10U | 10U | 10U | 10U | 0.7U | 0.7U | 0.7U |
| Benzo(k)fluoranthene | 0.47 | 10U | 10U | 10U | 10U | 2U | 1.8U | 1.8U |
| Ideno(1,2,3-cd)pyrene | 0.047 | 10U | 10U | 10U | 10U | 1U | 1.1U | 1.1U |
| Dibenzo(a,h)anthracene | 0.0047 | 10U | 10U | 10U | 10U | 1U | 1.0U | 1.0U |
| Benzo(g,h,I)perylene | NE | 10U | 10U | 10U | 10U | 1U | 1.3U | 1.3U |
| Chrysene | 5 | 10U | 10U | 10U | 10U | 1U | 1.0U | 1.0U |

Notes:
U = Compound was analyzed but not detected to the concetration shown.
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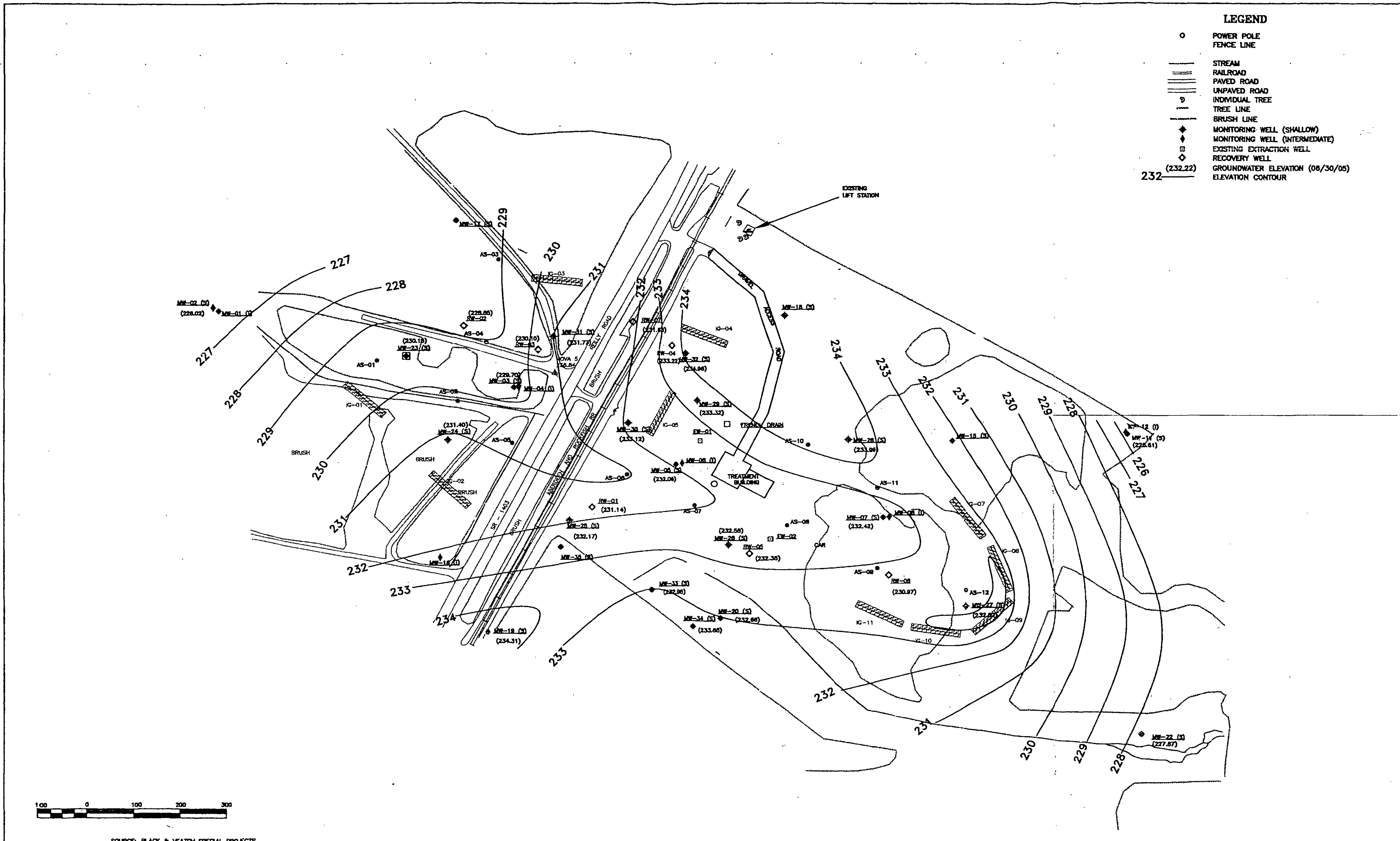


| No | DATE | REVISIONS AND RECORD OF ISSUE | BY | CK | APP | No | DATE | REVISIONS AND RECORD OF ISSUE | BY | CK | APP |
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PROTERRA CONSULTING, PC

ENGINEER: BH | DRAWN: BH | CHECKED: DP | DATE: 07/11/05

GROUNDWATER EXTRACTION AND TREATMENT SYSTEM
SHALLOW WELL GROUNDWATER
CONTOUR MAP (06/30/05)
CAPE FEAR WOOD PRESERVING SITE
FAYETTEVILLE, NORTH CAROLINA

/B&V/CFWP/DRAWINGS/REPORTS/FIGURES

REV 0

FIGURE 6

*Groundwater Elevation Monitoring*

Groundwater level measurements are collected quarterly from all MWs and monthly from all Infiltration Gallery (IG) piezometers and RWs. These historical data are tabulated in the Quarterly O&M Reports. Groundwater table elevations were calculated and potentiometric surface maps were generated based on these data. Figure 6 is the most current potentiometric surface map, June 2005.

In general, the groundwater elevations decreased from June 2005 to September 2005 by an average of 2.5 feet and increased from September 2005 to December 2005 by an average of 2.9 feet. These fluctuations are considered to be normal seasonal variation due to precipitation.

*Groundwater Monitoring Results*

Black & Veatch and Proterra personnel performed the annual groundwater sampling during the week of March 13, 2006. This is the most current groundwater monitoring data available. Groundwater samples were collected from 7 MWs (MW-03S, MW-161, MW-23S, MW-25S, MW-26S, MW-33S, and MW-35S), two multi-phase extraction (MPE) wells (MPE-2 and MPE 3), and five extraction points (RW2, RWS, RWS, RW6, and FD). Five other wells (RW1, RW4, RW7, MPE-1, and MPE-4) all detected DNAPL; therefore, they were not sampled. All of the samples were delivered to a US EPA Contract Laboratory Program (CLP) laboratory for analyses by US EPA Method 8260 for volatile organic compounds (VOCs) and by Method 8270 for PAHs, plus carbazole. None of the MWs were sampled for natural attenuation parameters or heterotrophic plate count during this sampling event.

Table 8 is a summary table for the groundwater data collected from the monitoring wells from September 2002 to present. During this most recent sampling event, March 2006, the following wells had COCs above the remediation levels for groundwater:

*VOCs (µg/l - micrograms per liter)*

Benzene

| | |
|---|---|
| MW-03S (12 µg/l) | MW-25S (1.3 µg/l) |
| MW-161(81 µg/l) | MW-26S (1.2 µg/l) |

Figure 7 is a groundwater concentration plume map that shows the VOC concentration exceedences of the 2L Standards from the monitoring wells. The VOC exceedence plume is approximately 650 feet long by 300 feet wide. The maximum benzene and ethyl benzene concentrations in the shallow aquifer were detected in MW-3S, which is located in the DNAPL plume area. The maximum benzene and ethyl benzene concentrations detected in the intermediate aquifer were detected in MW-161, an intermediate depth well located on the edge of the dissolved plume. With no other immediate depth wells in the vicinity of MW-161, the extent of the VOC contamination in this area of the plume is unknown. There were attempts made in 2005 to secure a site access agreement with the property owner to allow the installation of another intermediate well down gradient of MW-161; however, those attempts have been unsuccessful to date. The areal extent of the shallow VOC plume is encompassed by the RWs and is being effectively captured by the extraction system.

The following is a list of the PAH compounds and the corresponding MWs that detected concentrations above the Site remediation levels:

*Non-carcinogenic (NCAR) PAHs: (J - estimated value)*:

Naphthalene

MW-16l (340J µg/L)
MW-25S (530 µg/L)
MW-35S (24 µg/L)

Acenaphthene

MW-25S (190 µg/l)

Figure 8 is a concentration plume map showing the NCAR PAH exceedances of the Site remediation goals. Naphthalene, acenaphthene, and carbazole comprise the compounds in the shallow aquifer plume. The estimated PAH exceedances plume is about 400 feet long by 350 feet wide. The plume is delineated on four sides and is apparently being hydraulically controlled by the extraction system. The maximum concentrations of naphthalene, acenaphthene, and carbazole were detected in the sample collected from MW-5S at 530, 190, and 61 µg/L, respectively. This MW is located in the area of the DNAPL plume.

The groundwater sample collected from MW-161 is the only intermediate depth well that detected any NCAR PAH compounds (naphthalene at 340 J µg/L and carbazole at 33 J µg/L). With no other immediate depth wells in the vicinity of MW-161, the extent of the NCAR PAH contamination in this zone of the plume is unknown.

*Extraction Point Sampling Results*

During the March 2006 sampling event, groundwater samples from seven extraction points (RW-2, RW-3, RW-5, RW-6, MPE-2, MPE-3, and the French Drain (FD)) were collected and analyzed for VOCs and PAHs, plus carbazole. The other extraction points (RW-1, RW-4, RW-7, MPE-1, and MPE-4) were not sampled due the presence of DNAPL (Free Product) in the wells. The extraction point historical analytical data are summarized in Table 9 (2005 4-5). The following is a list of the compounds and the corresponding extraction point samples that detected concentrations above the remediation levels:

*VOCs*:

Benzene

| | |
|---|---|
| RW-3 (4.8 µg/L) | MPE-2 (1.3 µg/L) |
| RW-5 (1.8 µg/L) | MPE-3 (2.0 µg/L) |
| RW-6 (1.0 µg/L) | FD (6.5 µg/l) |

*NCAR PAHs*:

Naphthalene

| | |
|---|---|
| RW-3 (360 µg/L) | RW-6 (150 µg/L) |
| MPE-2 (230 µg/L) | RW-5 (60 µg/L) |
| MPE-3 (1200 µg/l) | FD (2400 µg/L) |

Acenaphthene

MPE-2 (110 µg/L)
MPE-3 (210J µg/l)
FD(170J µg/L)

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goal * | CF-MW-01I Sep-02 | CF-MW-01I Dec-02 | CF-MW-01I Mar-03 | CF-MW-01I Jun-03 | CF-MW-01I Oct-03 | CF-MW-01I Dec-03 | CF-MW-01I Jul-04 | CF-MW-01I Mar-05 | CF-MW-01I Sep-05 | CF-MW-01I Mar-06 | CF-MW-02S Sep-02 | CF-MW-02S Dec-02 | CF-MW-02S Mar-03 | CF-MW-02S Jun-03 | CF-MW-02S Sep-03 | CF-MW-02S Dec-03 | CF-MW-02S Jul-04 | CF-MW-02S Mar-05 | CF-MW-02S Sep-05 | CF-MW-02S Mar-06 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | **0.05** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Chrysene | **5** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Benzo(b)Fluoranthene | **0.0047** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Benzo-a-Pyrene | **0.0047** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Indeno (1,2,3-cd) Pyrene | **0.047** | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 UJ | NS | NS | NS | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 UJ | NS | 10UJ | NS |
| Dibenzo(a,h)Anthracene | **0.0047** | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Benzo(k)Fluoranthene | **0.47** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | **21** | 10 U | 5 U | 10 U | 10 U | 1 J | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Acenaphthylene | **210** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Acenaphthene | **80** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Fluorene | **280** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Phenanthrene | **210** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Anthracene | **2100** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Fluoranthene | **280** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Pyrene | **210** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 1 J | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| Carbazole | **NCOC** | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10UJ | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | | | | | | | | | | | |
| Benzene | **1** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Chloromethane | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Acetone | **NCOC** | 10 UJ | 5 U | 5 U | 5 U | 5 U | NS | 5 U | NS | NS | NS | 10 UJ | 5 U | 5 U | 5 U | 5 U | NS | 5 U | NS | 10UJ | NS |
| Chloroform | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| 1,2-Dichloroethane | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.19 J | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Tetrachloroethene | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Toluene | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Ethyl Benzene | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Xylenes (total) | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Styrene | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |
| Isopropylbenzene | **NCOC** | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10U | NS |

NOTES:
NCOC - Not a Site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
**Boldface indicates compounds above site action levels.**

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| | Remediation | CF-MW-03S | | | | | | | | | | CF-MW-04I | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte (µg/L) | Goal * | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic (CAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 2 J | NS | 10 UJ | NS |
| Chrysene | 5 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 2 J | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 UJ | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Non-carcinogenic (NCAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | 32 | 78 J | 30 | 41 | 13 | 11 | 8 J | 18 | 10 J | 12 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Acenaphthylene | 210 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Acenaphthene | 80 | 65 | 71 J | 92 | 190 | 91 | 110 | 64 | 85 | 71 J | 52 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Fluorene | 280 | 31 | 30 J | 38 | 46 | 42 | 40 | 22 J | 34 | 28 J | 23 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Phenanthrene | 210 | 29 | 23 J | 28 | 33 | 35 | 26 | 22 J | 31 | 23 J | 21 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Anthracene | 2100 | 2 J | 5 UJ | 1 J | 10 U | 2 J | 10 U | 10 U | 1 J | 1 J | 10U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Fluoranthene | 280 | 1 J | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 4 J | NS | 10 UJ | NS |
| Pyrene | 210 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 4 J | NS | 10 UJ | NS |
| Carbazole | NCOC | 47 | 57 J | 83 | 78 | 80 | 68 | 80 J | 89 | 78 J | 52 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 12 | 15 | 16 | 17 | 1.2 | 23 | 18 | 18 | 18 | 12 | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.16 J | 0.5 U | 0.5 U | 1 U | 10 U | 10 U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Acetone | NCOC | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 UJ | 10 U | 10 UJ | 10 U | 5 U | 5 U | 5 U | 5 U | NS | 5 U | NS | 10 UJ | NS |
| Chloroform | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 U | 10U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| 1,2-Dichloroethene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.42 J | 10 U | 10 U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Tetrachloroethene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.38 J | 0.5 U | 0.5 U | 1 U | 10 U | 10 U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Toluene | NCOC | 2 J | 4.9 | 1.5 | 1.3 | 0.5 U | 1.9 | 1.2 | 2.4 | 10 U | 10 U | 10 U | 0.27 J | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Ethyl Benzene | NCOC | 7 J | 12 | 12 | 11 | 0.71 | 16 | 9.5 | 15 | 15 | 10U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Xylenes (total) | NCOC | 12 | 25 | 14 | 16 | 1 | 21 | 15 | 16.6 | 15 | 8J | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Styrene | NCOC | 10 U | 0.89 | 0.5 U | 0.5 U | 0.5 U | 0.8 | 0.5 U | 0.52 J | 10 U | 10U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Isopropylbenzene | NCOC | 10 U | 1 | 1 | 1 | 0.5 U | 1.7 | 0.78 | 1.3 | 10 U | 10 U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |

NOTES:
NCOC - Not a Site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples.
**Boldface indicates compounds above site action levels.**

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goal * | CF-MW-05S | | | | | | | | | | CF-MW-06 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 2600 UJ | 10 U | 10 U | 200 U | 1000 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 1 J | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Chrysene | 5 | 10 U | 2600 UJ | 10 U | 10 U | 200 U | 1000 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 2 J | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0947 | 10 U | 2500 UJ | 10 U | 10 U | 200 U | 1000 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 UJ | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 2500 UJ | 10 U | 10 U | 200 U | 1000 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Indene (1,2,3-cd) Pyrene | 0.047 | 10 U | 2600 UJ | 10 UJ | 10 U | 200 U | 1000 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 2600 UJ | 10 UJ | 10 U | 200 U | 1000 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 2500 UJ | 10 U | 10 U | 200 U | 1000 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | **2600** | **16000 J** | **8900** | **7100** | **810** | **7900** | **13000** | NS | **9900 J** | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Acenaphthylene | 210 | 7 J | 2500 UJ | 11 | 10 U | 200 U | 1000 U | 14 | NS | 10 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Acenaphthene | 80 | **290 J** | **260 J** | **370** | **360** | 36 J | **320 J** | **370 J** | NS | **330 J** | NS | 10 U | 5 UJ | 10 U | 2 J | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Fluorene | 280 | 70 | 2600 UJ | 140 | 100 J | 200 U | 120 J | 3000 U | NS | 88 J | NS | 10 U | 5 UJ | 10 U | 2 J | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Phenanthrene | 210 | 68 | 2500 UJ | 120 | 87 J | 200 U | 110 J | 3000 U | NS | 87 J | NS | 10 U | 5 UJ | 10 U | 8 J | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Anthracene | 2100 | 8 J | 2600 UJ | 9 J | 17 | 200 U | 1000 U | 15 | NS | 10 J | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Fluoranthene | 280 | 7 J | 2600 UJ | 7 J | 8 J | 200 U | 1000 U | 19 | NS | 8 J | NS | 10 U | 5 UJ | 10 U | 6 J | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Pyrene | 210 | 4 J | 2500 UJ | 4 J | 5 J | 200 U | 1000 U | 6 J | NS | 5 J | NS | 10 U | 5 UJ | 10 U | 4 J | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Carbazole | NCOC | 150 J | 2500 UJ | 300 | 230 | 30 J | 200 J | 330 J | NS | 210 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | **9 J** | **52** | **40** | **41** | **11** | **45** | **57** | NS | **29** | NS | 10 U | 0.84 | 0.5 U | 0.84 | 0.27 J | 0.17 J | 0.41 J | NS | NA | NS |
| Chloromethane | NCOC | 10 U | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | 0.5 U | NS | NA | NS |
| Acetone | NCOC | 11 U | 10 J | 32 | 10 U | 10 U | 10 UJ | 10 U | NS | 10 U | NS | 10 UJ | 5 U | 5 U | 19 | 5 UJ | 5 U | 5 U | NS | NA | NS |
| Chloroform | NCOC | 10 U | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | NA | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | 0.5 U | NS | NA | NS |
| Tetrachloroethene | NCOC | 10 U | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 U | 0.5 U | 0.6 U | 0.6 U | 0.5 U | 0.5 U | 0.5 U | NS | NA | NS |
| Toluene | NCOC | 21 | 180 | 170 | 180 | 41 | 160 | 240 | NS | 120 | NS | 10 U | 0.24 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.6 U | NS | NA | NS |
| Ethyl Benzene | NCOC | 28 | 200 | 150 | 180 | 37 | 150 | 220 | NS | 140 | NS | 10 U | 0.21 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | NA | NS |
| Xylenes (total) | NCOC | 120 | 600 | 570 | 660 | 120 | 560 | 810 | NS | 510 | NS | 10 U | 0.47 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | NA | NS |
| Styrene | NCOC | 16 | 90 | 80 | 77 | 18 J | 77 | 150 | NS | 82 | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | NA | NS |
| Isopropylbenzene | NCOC | 10 U | 20 | 16 | 17 | 10 U | 18 | 26 | NS | 13 | NS | 10 U | 0.5 U | 0.6 U | 0.5 U | 0.6 U | 0.6 U | 0.5 U | NS | NA | NS |

NOTES:
NCOC - Not a Site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
**Boldface indicates compounds above site action levels.**

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goal[1] | CF-MW-07S | | | | | | | | | | CF-MW-08I | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Chrysene | 5 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 UJ | NS | NS | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | 10 U | **26 J** | **60** | **110** | **310** | 10 U | **650** | NS | 10 UJ | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Acenaphthylene | 210 | 10 U | 6.6 J | 3 J | 10 U | 10 U | 10 U | 4 J | NS | 7 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Acenaphthene | 80 | 64 | **120 J** | **100** | 70 | **160 J** | **170** | **120 J** | NS | 62 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Fluorene | 280 | 44 | 62 J | 66 | 47 | 73 | 77 | 66 J | NS | 62 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Phenanthrene | 210 | 42 | 64 J | 70 | 49 | 78 | 62 | 64 J | NS | 28 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Anthracene | 2100 | 9 J | 9.8 J | 9 J | 10 | 12 | 11 | 10 | NS | 6 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Fluoranthene | 280 | 11 | 11 J | 8 J | 8 J | 12 | 12 | 9 J | NS | 12 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Pyrene | 210 | 6 J | 6.8 J | 5 J | 5 J | 6 J | 6 J | 5 J | NS | 4 J | NS | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Carbazole | NCOC | 10 U | 32 J | 33 | 26 | 40 | 36 | 44 | NS | 36 J | NS | 10 U | 5 UJ | 10 U | 10 U | 1 J | NS | 10 U | NS | NS | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Acetone | NCOC | 10 UJ | 5 U | 5 U | 25 U | 5 U | 5 U | 5 U | NS | 10 U | NS | 10 UJ | 5 U | 5 U | 5 U | 5 U | NS | 5 U | NS | NS | NS |
| Chloroform | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Tetrachloroethene | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Toluene | NCOC | 1 J | 0.84 | 0.32 J | 2.5 U | 0.65 | 0.76 | 0.6 | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Ethyl Benzene | NCOC | 3 J | 1.7 | 0.89 | 1 J | 1.8 | 2.3 | 1.5 | NS | 3 J | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Xylenes (total) | NCOC | 8 J | 8.1 | 2.9 | 3.2 | 7.2 | 8.1 | 5 | NS | 10 | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Styrene | NCOC | 10 U | 0.66 | 0.5 U | 2.5 U | 0.87 | 0.6 | 0.82 | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Isopropylbenzene | NCOC | 10 U | 0.18 J | 0.5 U | 2.5 U | 0.16 J | 0.29 J | 0.5 U | NS | 10 U | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |

NOTES:
NCOC - Not a Site COC
[1] - Based on 15A NCAC 2L
J - Estimated Value   NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed. Lab froze samples
Boldface indicates compounds above site action levels.

Table 8
Monitoring Well Analytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goal* | CF-MW-15S Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Chrysene | 5 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | NS | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | |
| Naphthalene | 21 | 10 U | 5 U | 10 U | 10 U | 2 J | NS | 10 U | NS | NS | NS |
| Acenaphthylene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Acenaphthene | 80 | 10 U | 5 U | 10 U | 10 U | 4 J | NS | 10 U | NS | NS | NS |
| Fluorene | 280 | 10 U | 5 U | 10 U | 10 U | 3 J | NS | 10 U | NS | NS | NS |
| Phenanthrene | 210 | 10 U | 5 U | 10 U | 10 U | 9 J | NS | 10 U | NS | NS | NS |
| Anthracene | 2100 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Fluoranthene | 280 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| Pyrene | 210 | 10 U | 5 U | 10 U | 10 U | 3 J | NS | 10 U | NS | NS | NS |
| Carbazole | NCOC | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | |
| Benzene | 1 | 10 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.6 U | NS | NS | NS |
| Acetone | NCOC | 10 UJ | 5 U | 5 U | 5 U | 7.5 J | NS | 5 U | NS | NS | NS |
| Chloroform | NCOC | 10 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.6 U | NS | NS | NS |
| Tetrachloroethene | NCOC | 10 U | 0.6 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.6 U | NS | NS | NS |
| Toluene | NCOC | 10 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Ethyl Benzene | NCOC | 10 U | 0.6 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.6 U | NS | NS | NS |
| Xylenes (total) | NCOC | 10 U | 0.6 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.6 U | NS | NS | NS |
| Styrene | NCOC | 10 U | 0.6 U | 0.6 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |
| Isopropylbenzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS |

| Analyte (µg/L) | CF-MW-16I Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | |
| Benzo(a)Anthracene | 10 U | 500 U | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Chrysene | 10 U | 500 U | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Benzo(b)Fluoranthene | 10 U | 500 U | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Benzo-a-Pyrene | 10 U | 500 U | 10 UJ | 10 U | 50 U | 10 U | 10 UJ | 10 U | 10 UJ | 10U |
| Indeno (1,2,3-cd) Pyrene | 10 U | 500 UJ | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Dibenzo(a,h)Anthracene | 10 U | 500 U | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Benzo(k)Fluoranthene | 10 U | 500 U | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | |
| Naphthalene | **1400** | **1600** | **400 J** | **290** | **260** | **360** | **570** | **530** | **310 J** | **340** |
| Acenaphthylene | 2 J | 500 U | 10 UJ | 10 U | 50 U | 10 U | 1 J | 2 J | 1 J | 10U |
| Acenaphthene | 48 | 500 U | 19 J | 34 | 32 J | 34 | 33 | 60 | 34 J | 42 |
| Fluorene | 11 | 500 U | 4 J | 8 J | 50 U | 7 J | 4 J | 9 J | 5 J | 6J |
| Phenanthrene | 10 U | 500 U | 10 UJ | 4 J | 50 U | 10 U | 2 J | 10 U | 10 UJ | 10U |
| Anthracene | 10 U | 500 U | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Fluoranthene | 10 U | 500 U | 10 UJ | 2 J | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Pyrene | 10 U | 500 U | 10 UJ | 1 J | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Carbazole | 32 | 500 U | 16 J | 24 | 19 J | 26 | 29 | 52 | 21 J | 33 |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| Benzene | **85** | **30 J** | **58** | **63** | **65** | **58** | **71** | **75** | **66** | **81** |
| Chloromethane | 10 U | 10 UJ | 10 U | 10 UJ | 10 U | 10 U | 10 U | 5 U | 10 U | 10U |
| Acetone | 10 UJ | 10 UJ | 10 U | 10 U | 12 | 10 UJ | 10 U | 25 UJ | 10 U | 10UJ |
| Chloroform | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 U | 10U |
| 1,2-Dichloroethane | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 1.8 J | 10 U | 10U |
| Tetrachloroethene | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 U | 10U |
| Toluene | 45 | 44 J | 32 | 37 | 29 | 28 | 33 | 36 | 36 | 37 |
| Ethyl Benzene | 118 | 130 J | 88 | 80 | 58 | 48 | 55 | 53 | 54 | 50 |
| Xylenes (total) | 110 | 97 J | 66 | 69 | 64 | 64 | 72 | 76 | 65 | 62 |
| Styrene | 5 J | 10 UJ | 3 J | 4 J | 1 R | 2 J | 10 U | 4 J | 5 J | 10U |
| Isopropylbenzene | 10 | 9 J | 6 J | 7 J | 6 J | 4 J | 6 J | 8.3 | 7 J | 97J |

NOTES:
NCOC - Not a Site COC
* - Based on 15A NCAC 2L
J - Estimated Value    NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
Boldface indicates compounds above site action levels.

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goal * | CF-MW-17S | | | | | | | | | | CF-MW-18S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 U | 10 J | NS | 10 U | NS | 10 UJ | NS |
| Chrysene | 5 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 U | 10 J | NS | 10 U | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 U | 10 J | NS | 10 UJ | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 UJ | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 U | 10 J | NS | 10 U | NS | 10 UJ | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 UJ | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 5 UJ | 10 UJ | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 UJ | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Acenaphthylene | 210 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Acenaphthene | 80 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Fluorene | 280 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Phenanthrene | 210 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Anthracene | 2100 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Fluoranthene | 280 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Pyrene | 210 | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Carbazole | NCOC | 10 U | 5 UJ | 10 U | 10 U | 10 U | NS | 10 U | NS | NS | NS | 10 U | 5 UJ | 10 U | 10 J | 10 U | NS | 10 U | NS | 10 UJ | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 J | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 J | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Acetone | NCOC | 10 UJ | 5 U | 5 U | 5 U | 5 U | NS | 5 U | NS | NS | NS | 10 U | 5 U | 5 U | 5 U | 5 U | NS | 5 U | NS | 10 U | NS |
| Chloroform | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 J | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 J | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Tetrachloroethene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 J | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Toluene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.2 J | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Ethyl Benzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Xylenes (total) | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Styrene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Isopropylbenzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | NS | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |

NOTES:
NCOC - Not a Site COC
* - Based on 15A NCAC 2L
J - Estimated Value    NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
Boldface indicates compounds above site action levels.

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| | Remediation | CF-MW-19S | | | | | | | | | | CF-MW-20S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte (µg/L) | Goal * | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic (CAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Chrysene | 5 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Non-carcinogenic (NCAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | 10 U | 5 U | 10 U | 2 J | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 8.3 | 7 J | 2 J | 12 | 9 J | 10 U | NS | 2 J | NS |
| Acenaphthylene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Acenaphthene | 80 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Fluorene | 280 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Phenanthrene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Anthracene | 2100 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Fluoranthene | 280 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Pyrene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Carbazole | NCOC | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 10 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | NS | 0.5 U | NS | 10 UJ | NS | 1 J | 0.5 U | 0.5 U | 0.5 U | 0.23 J | 0.5 U | 0.5 U | NS | 10 U | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| Acetone | NCOC | 10 UJ | 8.8 J | 5 U | 5 U | 5 U | NS | 5 U | NS | 10 UJ | NS | 11 UJ | 5.5 J | 5 U | 5 U | 5 U | 5 U | 5 U | NS | 10 U | NS |
| Chloroform | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 UJ | 0.5 U | 0.5 J | 0.5 J | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.19 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| Tetrachloroethene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 J | 0.5 J | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| Toluene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| Ethyl Benzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 J | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| Xylenes (total) | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| Styrene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |
| Isopropylbenzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 U | NS |

NOTES:
NCOC - Not a Site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed, Lab froze samples
Boldface indicates compounds above site action levels.

Table 8
Monitoring Well Analytical Summary
Cape Fear Wood Preserving Site
March 2006

| | Remediation | CF-MW-22S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte (µg/L) | Goals* | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Chrysene | 5 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | |
| Naphthalene | 21 | **120** | **120** | **110** | **71** | **84** | **89** | **80** | NS | 27 J | NS |
| Acenaphthylene | 210 | 3 J | 3 J | 3 J | 3 J | 4 J | 10U | 4 J | NS | 3 J | NS |
| Acenaphthene | 80 | **120** | **150 J** | **120** | **100** | **84** | **99** | **130** | NS | **110** | NS |
| Fluorene | 280 | 58 | 80 | 74 | 56 | 62 | 63 | 81 | NS | 54 J | NS |
| Phenanthrene | 210 | 72 | 120 | 110 | 74 | 81 | 72 | 120 | NS | 72 J | NS |
| Anthracene | 2100 | 3 J | 2 J | 2 J | 10U | 4 J | 2 J | 4 J | NS | 4 J | NS |
| Fluoranthene | 280 | 2 J | 10U | 10U | 2 J | 2 J | 2 J | 2 J | NS | 2 J | NS |
| Pyrene | 210 | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| Carbazole | NCOC | 15 | 17 | 16 | 18 | 18 | 16 | 20 | NS | 11 J | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | |
| Benzene | 1 | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| Chloromethane | NCOC | 10U | 10U | 10U | 10 UJ | 10U | 10U | 10U | NS | 10 UJ | NS |
| Acetone | NCOC | 10 UJ | 10U | 10U | 10U | 10U | 10 UJ | 10U | NS | 10 UJ | NS |
| Chloroform | NCOC | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| 1,2-Dichloroethane | NCOC | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| Tetrachloroethene | NCOC | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| Toluene | NCOC | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| Ethyl Benzene | NCOC | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| Xylenes (total) | NCOC | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |
| Styrene | NCOC | 10U | 10U | 10U | 10U | 10 R | 10U | 10U | NS | 10 UJ | NS |
| Isopropylbenzene | NCOC | 10U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10 UJ | NS |

| | CF-MW-23S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Analyte (µg/L) | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | |
| Benzo(a)Anthracene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10U | 10U | 10 UJ | 10U |
| Chrysene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10U | 10U | 10 UJ | 10U |
| Benzo(b)Fluoranthene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10U | 10U | 10 UJ | 10U |
| Benzo-a-Pyrene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10U | 10U | 10 UJ | 10U |
| Indeno (1,2,3-cd) Pyrene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10 UJ | 10U | 10 UJ | 10U |
| Dibenzo(a,h)Anthracene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10U | 10U | 10 UJ | 10U |
| Benzo(k)Fluoranthene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10U | 10U | 10 UJ | 10U |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | |
| Naphthalene | **590** | **330 J** | **550 J** | **610** | **260** | **200** | **190** | **140** | 10 UJ | 11 |
| Acenaphthylene | 10 U | 50 UJ | 3 J | 1 J | 50 U | 10 U | 10U | 10U | 10 UJ | 10U |
| Acenaphthene | 13 | 5 J | 10 J | 16 | 5 J | 5 J | 1 J | 1 U | 10 UJ | 10U |
| Fluorene | 3 J | 50 UJ | 2 J | 4 J | 50 U | 1 J | 10U | 10U | 10 UJ | 10U |
| Phenanthrene | 16 | 50 UJ | 12 J | 18 | 6 J | 6 J | 2 J | 2 J | 10 UJ | 10U |
| Anthracene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Fluoranthene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Pyrene | 10 U | 50 UJ | 10 UJ | 10 U | 50 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Carbazole | 20 | 11 J | 23 J | 26 | 9 J | 10 | 5 J | 5 J | 10 UJ | 10U |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| Benzene | **7 J** | **2 J** | **4 J** | **5 J** | **3 J** | **2 J** | 10 U | 0.72 J | 10 UJ | 0.50U |
| Chloromethane | 10 U | 10U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 1 U | 10 UJ | 0.50U |
| Acetone | 10 UJ | 10U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 5 U | 10 UJ | 5.0U |
| Chloroform | 10 U | 10U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 U | 10 UJ | 0.50U |
| 1,2-Dichloroethane | 10 U | 10U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 U | 10 UJ | 0.50U |
| Tetrachloroethene | 10 U | 10U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 U | 10 UJ | 0.50U |
| Toluene | 2 J | 10U | 1 J | 1 J | 10 U | 10 U | 10 U | 0.14 J | 10 UJ | 0.50U |
| Ethyl Benzene | 9 J | 3 J | 6 J | 8 J | 3 J | 2 J | 10 U | 0.9 J | 10 UJ | 0.50U |
| Xylenes (total) | 22 | 7 J | 15 | 18 | 7 J | 5 J | 1 J | 2.24 J | 10 UJ | 0.50U |
| Styrene | 10 U | 10U | 10 U | 10 U | 10 U | 10 U | 10 U | 0.082 J | 10 UJ | 0.50U |
| Isopropylbenzene | 10 U | 10U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 U | 10 UJ | 0.50U |

NOTES:
NCOC - Not a site COC
* - Based on 15A NCAC 2L
J - Estimated Value   NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
**Boldface indicates compounds above site action levels.**

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goals* | CF-MW-24S | | | | | | | | | | CF-MW-25S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic (CAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 100 U | 10 U | 10 U | 400 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Chrysene | 5 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 100 U | 10 U | 10 U | 400 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 100 U | 10 U | 10 U | 400 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 100 U | 10 U | 10 U | 400 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 UJ | NS | 10 UJ | NS | 10 U | 100 UJ | 10 UJ | 10 U | 400 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Dibenz(a,h)Anthracene | 0.0047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 100 U | 10 UJ | 10 U | 400 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 100 U | 10 U | 10 U | 400 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Non-carcinogenic (NCAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 2500 | 440 | 1400 | 1200 | 1800 | 1100 | 1200 | 1200 | 69 | 330 |
| Acenaphthylene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 23 | 100 U | 9 J | 15 | 400 U | 13 | 10 | 13 | 4 | 7J |
| Acenaphthene | 80 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 520 | 200 J | 250 | 330 | 320 J | 240 | 210 | 230 J | 100 | 190 |
| Fluorene | 280 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 63 | 98 J | 120 | 150 | 160 J | 120 J | 90 J | 120 J | 54 | 100J |
| Phenanthrene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 71 | 140 | 150 | 170 | 200 J | 130 J | 120 J | 140 J | 37 | 110J |
| Anthracene | 2100 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 18 | 100 U | 6 J | 8 J | 400 U | 6 J | 5 J | 8 J | 3 J | 5J |
| Fluoranthene | 280 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 32 | 100 U | 18 | 21 | 400 U | 20 | 16 | 19 | 9 J | 12 |
| Pyrene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 16 | 100 U | 10 | 12 | 400 U | 10 | 8 J | 7 J | 4 J | 6J |
| Carbazole | NCOC | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS | 69 | 61 J | 89 | 130 | 130 J | 87 J | 200 J | 90 J | 12 | 61 |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 2 J | 1 J | 1 J | 2 J | 2 J | 2 J | 10 U | 1 J | 10 UJ | 1.3 |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 10 UJ | 10 U | 10 UJ | 10 U | 10 U | 10 U | 5 U | 10 UJ | 0.50U |
| Acetone | NCOC | 10 U | 6.4 J | 5 U | 5 U | 5 UJ | NS | 5 U | NS | 10 UJ | NS | 10 UJ | 10 UJ | 15 | 10 U | 10 U | 10 UJ | 10 U | 25 UJ | 10 UJ | 5.0U |
| Chloroform | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 UJ | 0.50U |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 UJ | 0.50UJ |
| Tetrachloroethene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 UJ | 0.50U |
| Toluene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 7 J | 3 J | 3 J | 7 J | 7 J | 4 J | 2 J | 1.8 J | 10 UJ | 1.9 |
| Ethyl Benzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 11 | 5 J | 6 J | 13 | 12 | 7 J | 5 J | 3.7 J | 10 UJ | 6.1 |
| Xylenes (total) | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 30 | 10 J | 13 | 30 | 29 | 17 | 11 | 7.6 | 10 UJ | 11 |
| Styrene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 7 J | 2 J | 2 J | 5 J | 6 R | 3 J | 2 J | 1.2 J | 10 UJ | 0.50U |
| Isopropylbenzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 UJ | NS | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 UJ | 0.46J |

NOTES:
NCOC - Not a site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
**Boldface indicates compounds above site action levels.**

Table 8
Monitoring Well Analytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goals* | CF-MW-26S | | | | | | | | | | CF-MW-27S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic (CAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 100 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Chrysene | 5 | 100 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0047 | 100 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 100 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 100 U | 5 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 100 U | 5 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 L | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 100 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Non-carcinogenic (NCAR) PAHs | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | 400 | 350 | 390 | 470 | 980 | 900 | 2400 | 2 J | 10 UJ | 9J | 10 U | 5 U | 45 | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Acenaphthylene | 210 | 100 U | 5 U | 10 U | 10 U | 10 U | 10 U | 12 | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Acenaphthene | 80 | 37 J | 18 | 22 | 48 | 69 | 69 | 280 | 10 U | 21 J | 3J | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Fluorene | 280 | 15 J | 9.7 | 10 | 23 | 40 | 37 | 140 | 10 U | 11 J | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Phenanthrene | 210 | 15 J | 11 | 10 | 22 | 37 | 31 | 140 | 10 U | 12 J | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Anthracene | 2100 | 100 U | 1.2 J | 10 U | 10 U | 5 J | 2 J | 7 J | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Fluoranthene | 280 | 100 U | 1.8 J | 10 U | 1 J | 5 J | 3 J | 9 J | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Pyrene | 210 | 100 U | 5 U | 10 U | 10 U | 1 J | 1 J | 4 J | 10 U | 10 UJ | 10U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Carbazole | NCOC | 21 J | 17 | 16 | 25 | 40 | 44 | 120 | 10 U | 13 J | 10 U | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 16 | 11 | 8.8 | 3.3 | 16 | 14 | 20 | 0.35 J | 10 UJ | 1 J | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 J | 0.44 J | 0.5 U | 1 U | 10 UJ | 0.50UJ | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| Acetone | NCOC | 10 U | 5 U | 5 U | 25 U | 5 U | 5 U | 5 U | 5 UJ | 10 UJ | 5.0UJ | 10 UJ | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | NS | 10 UJ | NS |
| Chloroform | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 J | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 J | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50UJ | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 UJ | 0.5 U | NS | 10 UJ | NS |
| Tetrachloroethane | NCOC | 10 U | 0.5 U | 0.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| Toluene | NCOC | 4 J | 2.6 | 2.9 | 1.3 J | 4.6 | 4.1 | 21 | 1 U | 10 UJ | 0.50U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| Ethyl Benzene | NCOC | 32 | 24 | 20 | 6.6 | 32 | 28 | 44 | 0.087 J | 10 UJ | 1.0 | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| Xylenes (total) | NCOC | 22 | 17 | 15 | 6.5 | 28 | 23 | 72 | 2 U | 10 UJ | 0.89 | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| Styrene | NCOC | 10 U | 0.46 J | 0.5 U | 2.5 J | 0.59 | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |
| Isopropylbenzene | NCOC | 2 J | 1.3 | 1.4 | 2.5 J | 2.3 | 2.3 | 3.2 | 1 U | 10 UJ | 0.11 J | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 10 UJ | NS |

NOTES:
NCOC - Not a site COC
* - Based on 15A NCAC 2L
J - Estimated Value    NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
**Boldface indicates compounds above site action levels.**

Table 8
Monitoring Well Analytical Summary
Cape Fear Wood Preserving Site
March 2006

| | Remediation | CF-MW-28S | | | | | | | | | | CF-MW-29S | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte (µg/L) | Goals* | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Jan-05 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic (CAR) PAHs | | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5000 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 1000 U | 5 J | 100 U | NS |
| Chrysene | 5 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5000 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 1000 U | 4 J | 100 U | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5000 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 1000 U | 10 U | 100 U | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5000 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 1000 U | 10 U | 100 U | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5000 UJ | 100 UJ | 10 U | 100 U | 10 U | 10 U | 1000 U | 10 U | 100 U | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5000 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 1000 U | 10 U | 100 U | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 5000 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 1000 U | 10 U | 100 U | NS |
| Non-carcinogenic (NCAR) PAHs | | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | 10 U | 5 U | NS | NS | 10 U | NS | 1 J | NS | 10 UJ | NS | **12000** | **14000** | **11000 J** | **11000** | **13000** | **15000** | **11000** | **11000** | **15000** | **14000** | NS |
| Acenaphthylene | 210 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 25 | 5000 U | 23 J | 28 | 31 J | 29 | 27 | 1000 U | 25 | 33 J | NS |
| Acenaphthene | 80 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | **700 J** | **820 J** | **500 J** | **850** | **580** | **800 J** | **480 J** | **580 J** | **650 J** | **680** | NS |
| Fluorene | 280 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 150 J | 5000 U | 210 J | **320** | 260 | **310 J** | 4000 U | 220 J | 270 J | 240 | NS |
| Phenanthrene | 210 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 140 J | 5000 U | 170 J | **240** | **230** | 3000 U | 4000 U | **240 J** | **390 J** | **250** | NS |
| Anthracene | 2100 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 23 | 5000 U | 17 J | 10 U | 21 J | 22 | 21 | 1000 U | 29 | 34 J | NS |
| Fluoranthene | 280 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 14 | 5000 U | 100 UJ | 18 | 20 J | 19 | 15 | 1000 U | 45 | 30J | NS |
| Pyrene | 210 | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 7 J | 5000 U | 100 UJ | 9 J | 11 J | 11 | 7 J | 1000J | 25 | 19 J | NS |
| Carbazole | NCOC | 10 U | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | **400 J** | 5000 U | **410 J** | **540** | **390** | **480 J** | 4000 U | **320 J** | **550 J** | **460** | NS |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | **61** | **32** | **24** | **33** | **39** | **19** | **16** | **15 J** | **38** | NA | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 20 U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 20 U | 10 U | NA | NS |
| Acetone | NCOC | 10 UJ | 5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 45 U | 20 U | 10 U | 12 | 13 | 10 UJ | 10 U | 20 U | 31 J | NA | NS |
| Chloroform | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 20 U | 10 U | 10 U | 10 U | 10 U | 2 J | 20 U | 10 U | NA | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 20 U | 10 U | 10 U | 10 U | 10 U | 10 U | 20 U | 10 U | NA | NS |
| Tetrachloroethene | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 20 U | 10 U | 10 U | 10 U | 10 U | 1 J | 20 U | 10 U | NA | NS |
| Toluene | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 160 | 130 | 110 | 160 | 120 | **88** | 93 | 110 | 140 | NA | NS |
| Ethyl Benzene | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | **240** | **200** | **170** | **220** | **160** | 140 | **160** | **180** | **190** | NA | NS |
| Xylenes (total) | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | **830** | **640** | **550** | **680** | 430 | 420 | **540** | **620** | **650** | NA | NS |
| Styrene | NCOC | 10 U | 0.5 U | NS | NS | 10 R | NS | 10 U | NS | 10 UJ | NS | **100** | **130** | **110** | **140** | **180 J** | **98** | **120** | 90 | 140 J | NA | NS |
| Isopropylbenzene | NCOC | 10 U | 0.5 U | NS | NS | 10 U | NS | 10 U | NS | 10 UJ | NS | 10 U | 15 J | 18 | 10 U | 10 U | 15 | 14 | 16 J | 19 | NA | NS |

NOTES:
NCOC - Not a site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
Boldface indicates compounds above site action levels.

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2008

| Analyte (µg/L) | Remediation Goals* | CF-MW-30S | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Jan-05 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic (CAR) PAHs | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 500 U | 100 UJ | 10 U | 1000 U | 10 U | 10 U | 200 U | 10 U | 10 U | NS |
| Chrysene | 5 | 10 U | 500 U | 100 UJ | 10 U | 1000 U | 10 U | 10 U | 200 U | 10 U | 10 U | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 500 U | 100 UJ | 10 U | 1000 U | 10 U | 10 U | 200 U | 10 U | 10 U | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 500 U | 100 UJ | 10 U | 1000 U | 10 U | 10 U | 200 U | 10 U | 10 U | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 500 UJ | 100 UJ | 10 U | 1000 U | 10 U | 10 U | 200 U | 10 U | 10 U | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 500 U | 100 UJ | 10 U | 1000 U | 10 U | 10 U | 200 U | 10 U | 10 U | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 500 U | 100 UJ | 10 U | 1000 U | 10 U | 10 U | 200 U | 10 U | 10 U | NS |
| Non-carcinogenic (NCAR) PAHs | | | | | | | | | | | | |
| Naphthalene | 21 | **2100** | **3300** | **1600 J** | **1800** | **3200** | **2200** | **3600** | **2000** | **670** | **1500** | NS |
| Acenaphthylene | 210 | 13 | 500 U | 100 UJ | 11 | 1000 U | 12 | 11 | 200 U | 5 J | 7 J | NS |
| Acenaphthene | 80 | **480 J** | **340 J** | **170 J** | **250** | **300 J** | **280** | **210 J** | **280** | **120 J** | **180 J** | NS |
| Fluorene | 280 | 210 J | 170 J | 78 J | 110 | 130 J | 120 J | 100 J | 140 J | 66 | 110 J | NS |
| Phenanthrene | 210 | 180 J | 160 J | 66 J | 77 | 140 J | 78 | 90 J | 130 J | 74 | 110 J | NS |
| Anthracene | 2100 | 11 | 500 U | 100 UJ | 6 J | 1000 U | 6 J | 7 J | 200 U | 4 J | 8 J | NS |
| Fluoranthene | 280 | 15 | 500 U | 100 UJ | 8 J | 1000 U | 10 | 9 J | 200 U | 12 | 12 | NS |
| Pyrene | 210 | 7 J | 500 U | 100 UJ | 4 J | 1000 U | 5 J | 4 J | 200 U | 7 J | 5 J | NS |
| Carbazole | NCOC | **200 J** | **170 J** | **84 J** | **120** | **140 J** | **120** | **130 J** | **120 J** | **83** | **88 J** | NS |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | |
| Benzene | 1 | **14** | **9 J** | **3 J** | **4 J** | 17 | **5 J** | **3 J** | **3 J** | **2 J** | **3 J** | NS |
| Chloromethane | NCOC | 10 U | 10UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 10 U | NS |
| Acetone | NCOC | 11 U | 10UJ | 10 U | 10 U | 10 U | 10 UJ | 10 | 10 UJ | 10 U | 10 UJ | NS |
| Chloroform | NCOC | 10 U | 10UJ | 10 U | 10 U | 10 U | 10 U | 2 J | 10 U | 10 U | 10 U | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 10UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS |
| Tetrachloroethene | NCOC | 10 U | 10UJ | 10 U | 10 U | 10 U | 10 U | 1 J | 10 U | 10 U | 10 U | NS |
| Toluene | NCOC | 25 | 19 J | 8 J | 13 | 34 | 9 J | 6 J | 5 J | 3 J | 5 J | NS |
| Ethyl Benzene | NCOC | 38 | 26 J | 14 | 20 | 45 | 16 | 15 | 11 | 4 J | 11 | NS |
| Xylenes (total) | NCOC | 88 | 80 J | 35 | 51 | 110 | 41 | 34 | 24 | 8 J | 21 | NS |
| Styrene | NCOC | 15 | 11 J | 4 J | 8 J | 16 J | 6 J | 6 J | 3 J | 2 J | 4 J | NS |
| Isopropylbenzene | NCOC | 10 U | 1 J | 10 U | 10 U | 10 U | 18 | 10 U | 10 U | 10 U | 10 U | NS |

| Analyte (µg/L) | Remediation Goals* | CF-MW-31S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic (CAR) PAHs | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Chrysene | 5 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 250 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 UJ | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 250 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Non-carcinogenic (NCAR) PAHs | | | | | | | | | | | |
| Naphthalene | 21 | **890** | **1600 J** | **970** | **730** | **1200** | **1700** | **2500** | NS | **2000** | NS |
| Acenaphthylene | 210 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 1 J | 1 J | NS | 3 J | NS |
| Acenaphthene | 80 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 12 | NS | 14 J | NS |
| Fluorene | 280 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 1 J | 4 J | NS | 6 J | NS |
| Phenanthrene | 210 | 10 | 250 UJ | 8 J | 10 | 15 | 19 | 37 J | NS | 33 J | NS |
| Anthracene | 2100 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Fluoranthene | 280 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Pyrene | 210 | 10 U | 250 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | NS |
| Carbazole | NCOC | 3 J | 250 UJ | 5 J | 7 J | 12 | 15 | 40 J | NS | 43 J | NS |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | |
| Benzene | 1 | **6 J** | **6 J** | **5 J** | **8 J** | **12** | **9 J** | **12** | NS | **13** | NS |
| Chloromethane | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS |
| Acetone | NCOC | 10 UJ | 10 U | 13 | 10 U | 10 U | 10 UJ | 10 U | NS | 10 U | NS |
| Chloroform | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS |
| Tetrachloroethene | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS |
| Toluene | NCOC | 10 U | 10 U | 10 U | 1 J | 10 U | 10 U | 1 J | NS | 2 J | NS |
| Ethyl Benzene | NCOC | 10 U | 10 U | 10 U | 2 J | 10 U | 10 U | 3 J | NS | 8 J | NS |
| Xylenes (total) | NCOC | 8 J | 12 | 10 | 20 | 26 | 18 | 27 | NS | 38 | NS |
| Styrene | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | NS |
| Isopropylbenzene | NCOC | 10 U | 10 U | 10 U | 10 U | 1 J | 10 U | 10 U | NS | 10 U | NS |

NOTES:
NCOC - Not a site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
**Boldface indicates compounds above site action levels.**

Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goals* | CP-MW-32S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 250 U | 10 U | 10 U | 200 U | 10 U | 10 U | 18 | 3 J | NS |
| Chrysene | 5 | 10 U | 250 U | 10 U | 10 U | 200 U | 10 U | 10 U | 17 | 3 J | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 250 U | 10 U | 10 U | 200 U | 10 U | 10 U | 3 J | 10 U | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 250 U | 10 U | 10 U | 200 U | 10 U | 10 U | 3 J | 10 U | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 250 UJ | 10 UJ | 10 U | 200 U | 10 U | 10 U | 10 U | 10 U | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 250 U | 10 UJ | 10 U | 200 U | 10 U | 10 U | 10 U | 10 U | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 250 U | 10 U | 10 U | 200 U | 10 U | 10 U | 2 J | 10 U | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | |
| Naphthalene | 21 | 510 | 1300 | 810 | 1600 | 960 | 420 | 740 | 4200 | 220 | NS |
| Acenaphthylene | 210 | 8 J | 250 U | 8 J | 14 | 200 U | 10 U | 7 J | 13 | 10 U | NS |
| Acenaphthene | 80 | 150 | 210 J | 130 | 270 | 170 J | 73 | 130 J | 1200 | 130 | NS |
| Fluorene | 280 | 67 | 110 J | 68 | 120 | 83 J | 43 | 69 | 920 J | 63 | NS |
| Phenanthrene | 210 | 100 | 190 J | 80 | 150 | 120 J | 55 | 90 J | 2800 | 310 | NS |
| Anthracene | 2100 | 8 J | 250 U | 4 J | 10 U | 200 U | 4 J | 7 J | 260 J | 18 | NS |
| Fluoranthene | 280 | 16 | 250 U | 10 | 13 | 200 U | 11 | 16 | 510 J | 67 | NS |
| Pyrene | 210 | 9 J | 250 U | 8 J | 10 | 200 U | 6 J | 8 J | 310 J | 32 | NS |
| Carbazole | NCOC | 32 | 58 J | 31 | 78 | 44 J | 22 | 47 | 1100 | 28 | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | |
| Benzene | 1 | 2 J | 10 U | 1 J | 1 J | 3 J | 10 U | 10 U | 3 J | 10 U | NS |
| Chloromethane | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS |
| Acetone | NCOC | 10 U | 10 U | 14 | 10 U | 10 U | 10 UJ | 10 U | 30 J | 10 U | NS |
| Chloroform | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 J | 10 U | 10 U | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS |
| Tetrachloroethene | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS |
| Toluene | NCOC | 10 U | 10 U | 4 J | 5 J | 4 J | 10 U | 3 J | 18 | 10 U | NS |
| Ethyl Benzene | NCOC | 2 J | 3 J | 8 J | 7 J | 8 J | 10 U | 7 J | 13 | 10 U | NS |
| Xylenes (total) | NCOC | 6 J | 6 J | 20 | 18 | 18 | 10 U | 2 J | 37 | 10 U | NS |
| Styrene | NCOC | 10 U | 1 J | 5 J | 5 J | 5 R | 10 U | 10 U | 17 J | 10 U | NS |
| Isopropylbenzene | NCOC | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS |

| Analyte (µg/L) | CP-MW-33S | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | |
| Benzo(a)Anthracene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Chrysene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo(b)Fluoranthene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo-a-Pyrene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Indeno (1,2,3-cd) Pyrene | 10 U | 5 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Dibenzo(a,h)Anthracene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| Benzo(k)Fluoranthene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | |
| Naphthalene | 24 | 9.4 | 41 | 22 | 27 | 29 | 43 | 13 | 2 J | 4J |
| Acenaphthylene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 1 J | 10 U | 10 UJ | 10U |
| Acenaphthene | 1 J | 1.7 J | 1 J | 1 J | 10 U | 1 J | 3 J | 10 U | 10 UJ | 10U |
| Fluorene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Phenanthrene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Anthracene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Fluoranthene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Pyrene | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| Carbazole | 10 U | 1.1 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10U |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| Benzene | 10 U | 0.35 J | 1.4 | 0.5 U | 0.16 J | 0.21 J | 0.5 U | 0.1 J | 2 J | 0.50U |
| Chloromethane | 10 U | 0.34 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 U | 0.50UJ |
| Acetone | 10 UJ | 6 J | 5 U | 5 U | 5 U | 5 U | 5 U | 5 UJ | 10 U | 5.4UJ |
| Chloroform | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 U | 0.50U |
| 1,2-Dichloroethane | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 U | 0.50UJ |
| Tetrachloroethene | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 U | 0.50U |
| Toluene | 10 U | 0.39 J | 0.5 U | 0.5 U | 0.5 U | 0.18 J | 0.5 U | 0.077 J | 3 J | 0.50U |
| Ethyl Benzene | 10 U | 0.28 J | 0.21 J | 0.5 U | 0.5 U | 0.15 J | 0.5 U | 0.059 J | 7 J | 0.11J |
| Xylenes (total) | 10 U | 0.49 J | 2.3 | 0.5 U | 0.5 U | 0.28 J | 0.5 U | 0.177 J | 13 | 0.36J |
| Styrene | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 2 J | 0.50U |
| Isopropylbenzene | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 U | 0.50U |

NOTES:
NCOC - Not a site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab froze samples
Boldface indicates compounds above site action levels.

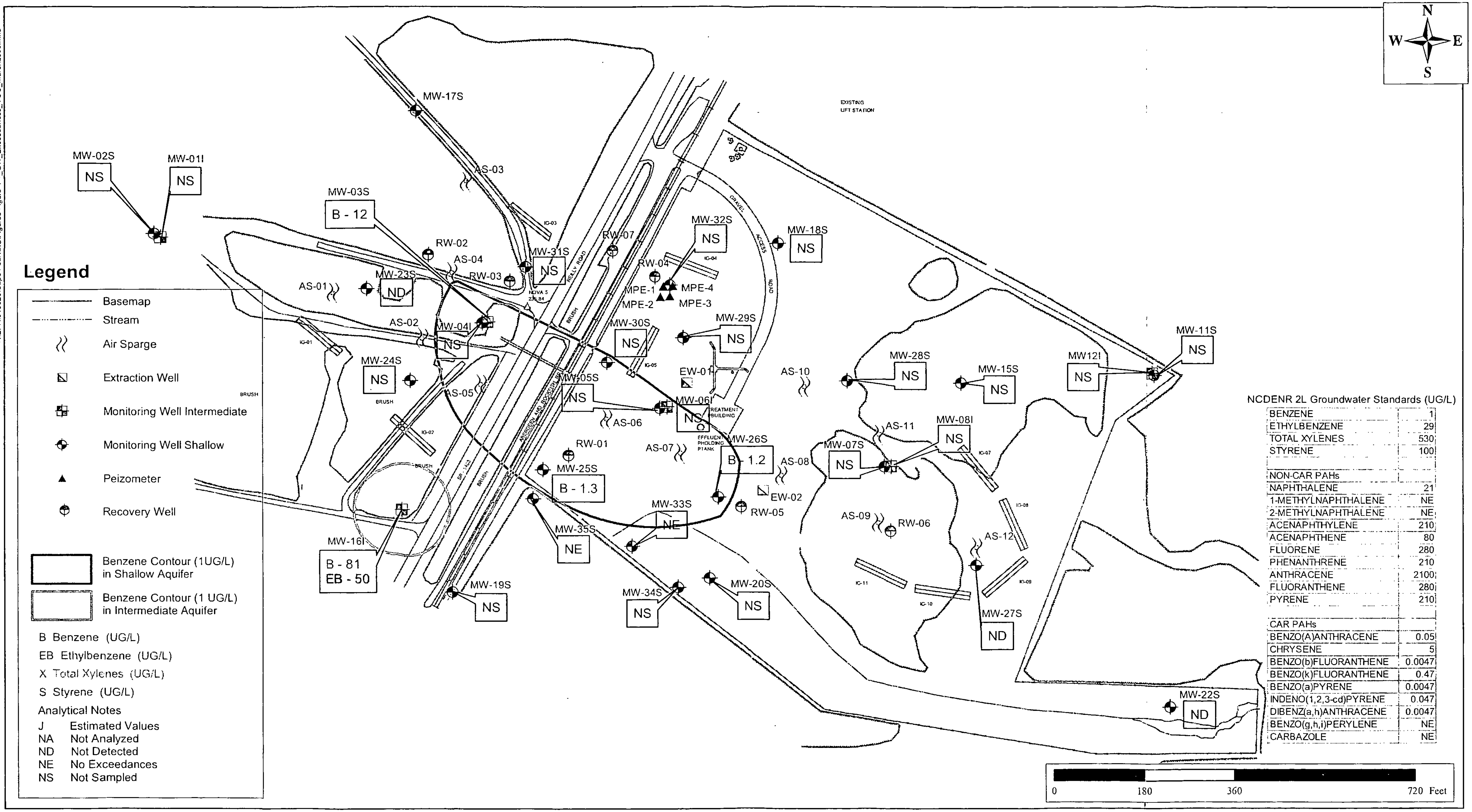
Table 8
Monitoring Well Anaytical Summary
Cape Fear Wood Preserving Site
March 2006

| Analyte (µg/L) | Remediation Goals* | CF-MW-34S Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Chrysene | 5 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Benzo-a-Pyrene | 0.0047 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Indeno (1,2,3-cd) Pyrene | 0.047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 5 U | 10 UJ | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | | |
| Naphthalene | 21 | 3 J | 4.3 J | 10 U | 10 U | 2 J | NS | 3 J | NS | 1 J | NS |
| Acenaphthylene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Acenaphthene | 80 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Fluorene | 280 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Phenanthrene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Anthracene | 2100 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Fluoranthene | 280 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Pyrene | 210 | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| Carbazole | NCOC | 10 U | 5 U | 10 U | 10 U | 10 U | NS | 10 U | NS | 10 UJ | NS |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | |
| Benzene | 1 | 10 U | 0.16 J | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Chloromethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Acetone | NCOC | 10 UJ | 5 U | 5 U | 5 U | 5 U | NS | 5 U | NS | 10 U | NS |
| Chloroform | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| 1,2-Dichloroethane | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Tetrachloroethene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Toluene | NCOC | 10 U | 0.16 J | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Ethyl Benzene | NCOC | 10 U | 0.37 J | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Xylenes (total) | NCOC | 10 U | 0.48 J | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Styrene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |
| Isopropylbenzene | NCOC | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | NS | 0.5 U | NS | 10 U | NS |

| Analyte (µg/L) | CF-MW-35S Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | |
| Benzo(a)Anthracene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Chrysene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Benzo(b)Fluoranthene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Benzo-a-Pyrene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Indeno (1,2,3-cd) Pyrene | 10 U | 10 UJ | 10 UJ | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Dibenzo(a,h)Anthracene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Benzo(k)Fluoranthene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| **Non-carcinogenic (NCAR) PAHs** | | | | | | | | | | |
| Naphthalene | 200 | 10 U | 10 U | 10 U | 10 U | 28 | 55 | NS | 18 J | 24 |
| Acenaphthylene | 1 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Acenaphthene | 20 | 10 U | 10 U | 2 J | 3 J | 7 J | 14 | NS | 5 J | 8J |
| Fluorene | 11 | 10 U | 10 U | 10 U | 1 J | 3 J | 6 J | NS | 2 J | 3J |
| Phenanthrene | 8 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Anthracene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Fluoranthene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Pyrene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 UJ | 10U |
| Carbazole | 14 | 10 U | 10 U | 10 U | 2 J | 3 J | 8 J | NS | 2 J | 4J |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| Benzene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.26J |
| Chloromethane | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.50U |
| Acetone | 10 UJ | 10 U | 10 U | 10 U | 12 | 10 UJ | 10 U | NS | 10 UJ | 5.0U |
| Chloroform | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 J | NS | 10 U | 0.50U |
| 1,2-Dichloroethane | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.50U |
| Tetrachloroethene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.50U |
| Toluene | 2 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.29J |
| Ethyl Benzene | 1 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.56 |
| Xylenes (total) | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.75 |
| Styrene | 10 U | 10 U | 10 U | 10 U | 10 R | 10 U | 10 U | NS | 10 U | 0.50U |
| Isopropylbenzene | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | NS | 10 U | 0.50U |

NOTES:
NCOC - Not a site COC
* - Based on 15A NCAC 2L
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NS - Not Sampled by decision
NA - Not Analyzed; Lab Form samples
Boldface indicates compounds above site action levels.

Date: June 6, 2006
Y:\EPA048328\Cape Fear\GIS\Figures Figure 4-1_GW_Exceedances_VOC_March2006.mxd




NCDENR 2L Groundwater Standards (UG/L)

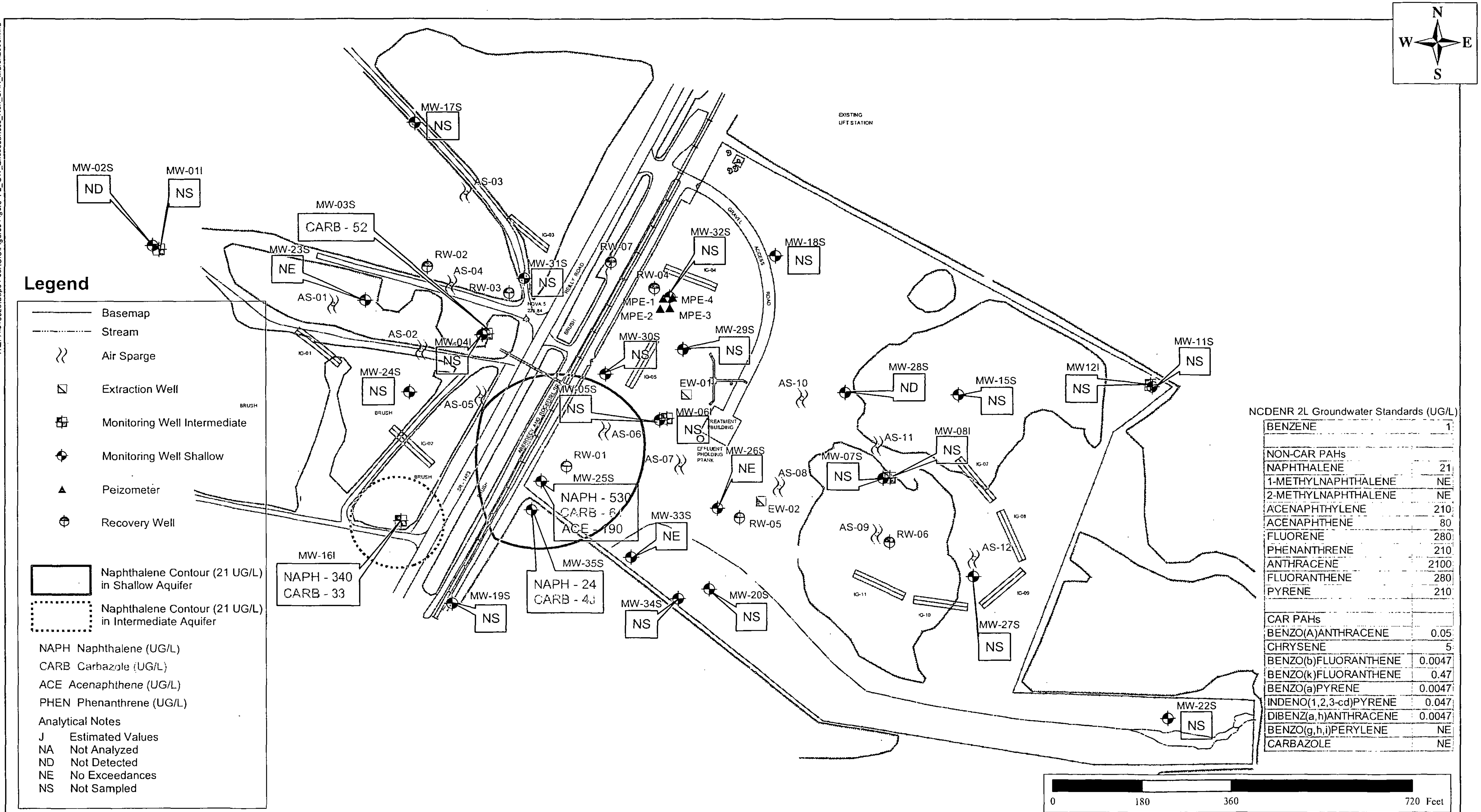
| | |
|---|---|
| BENZENE | 1 |
| ETHYLBENZENE | 29 |
| TOTAL XYLENES | 530 |
| STYRENE | 100 |
| | |
| NON-CAR PAHs | |
| NAPHTHALENE | 21 |
| 1-METHYLNAPHTHALENE | NE |
| 2-METHYLNAPHTHALENE | NE |
| ACENAPHTHYLENE | 210 |
| ACENAPHTHENE | 80 |
| FLUORENE | 280 |
| PHENANTHRENE | 210 |
| ANTHRACENE | 2100 |
| FLUORANTHENE | 280 |
| PYRENE | 210 |
| | |
| CAR PAHs | |
| BENZO(A)ANTHRACENE | 0.05 |
| CHRYSENE | 5 |
| BENZO(b)FLUORANTHENE | 0.0047 |
| BENZO(k)FLUORANTHENE | 0.47 |
| BENZO(a)PYRENE | 0.0047 |
| INDENO(1,2,3-cd)PYRENE | 0.047 |
| DIBENZ(a,h)ANTHRACENE | 0.0047 |
| BENZO(g,h,i)PERYLENE | NE |
| CARBAZOLE | NE |

**Groundwater Extraction and Treatment System**
**Cape Fear Wood Preserving Site**
**Fayetteville, North Carolina**

Groundwater VOC Exceedances
in Monitoring Wells
March 2006

Figure
7

Date: June 6, 2006
Y:\EPA\048328\Cape Fear\GIS\Figures Figure 4-2_GW_Exceedances_Non_CAR_March2006.mxd




NCDENR 2L Groundwater Standards (UG/L)

| | |
|---|---|
| BENZENE | 1 |
| NON-CAR PAHs | |
| NAPHTHALENE | 21 |
| 1-METHYLNAPHTHALENE | NE |
| 2-METHYLNAPHTHALENE | NE |
| ACENAPHTHYLENE | 210 |
| ACENAPHTHENE | 80 |
| FLUORENE | 280 |
| PHENANTHRENE | 210 |
| ANTHRACENE | 2100 |
| FLUORANTHENE | 280 |
| PYRENE | 210 |
| CAR PAHs | |
| BENZO(A)ANTHRACENE | 0.05 |
| CHRYSENE | 5 |
| BENZO(b)FLUORANTHENE | 0.0047 |
| BENZO(k)FLUORANTHENE | 0.47 |
| BENZO(a)PYRENE | 0.0047 |
| INDENO(1,2,3-cd)PYRENE | 0.047 |
| DIBENZ(a,h)ANTHRACENE | 0.0047 |
| BENZO(g,h,i)PERYLENE | NE |
| CARBAZOLE | NE |

**Groundwater Extraction and Treatment System**
**Cape Fear Wood Preserving Site**
**Fayetteville, North Carolina**

Groundwater Non-Carcinogenic PAH Exceedances in Monitoring Wells
March 2006

Figure 8

**Table 9**
**Extraction Point Analytical Summary**
**Cape Fear Wood Preserving Site**
**March 2006**

| Analyte (ug/L) | Remediation Goal* | CF-RW-1 | | | | | | | | | | CF-RW-2 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Jan-05 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic (CAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 1000 U | 10 J | 10 J | 1000 U | 30 J | 10 U | 250 U | 10 U | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 0.63 J | 10 U | 10 U |
| Chrysene | 5 | 1000 U | 10 J | 10 J | 1000 U | 23 J | 10 U | 250 U | 10 U | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 U | 10 U | 10 U |
| Benzo(b)Fluoranthene | 0.0047 | 1000 U | 10 J | 10 J | 1000 U | 200 U | 10 UJ | 250 U | 10 U | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 U | 10 U |
| Benzo(a) Pyrene | 0.0047 | 1000 U | 10 J | 10 J | 1000 U | 200 U | 10 UJ | 250 U | 10 U | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 U | 10 U | 10 U |
| Indeno(1,2,3-cd) Pyrene | 0.047 | 1000 UJ | 10 UJ | 10 J | 1000 U | 200 U | 10 UJ | 250 U | 10 U | FP | FP | 10 U | 5 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 1 U | 10 U | 10 U |
| Dibenzo(a,h)Anthracene | 0.0047 | 1000 U | 10 J | 10 U | 1000 U | 200 U | 10 UJ | 250 U | 10 U | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 1 U | 10 U | 10 U |
| Benzo(k)Fluoranthene | 0.47 | 1000 U | 10 J | 10 U | 1000 U | 200 U | 10 UJ | 250 U | 10 U | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 1 U | 10 U | 10 U |
| **Non-Carcinogenic (NCAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | **5200** | **2900** | **2200** | **3600** | **960** | **3500** | **3000** | **2900** | FP | FP | **32** | **220** | **68** | 10 U | **56** | 10 U | 10 U | 0.38 J | 10 U | 10 U |
| Acenaphthylene | 210 | 1000 U | 17 | 23 | 1000 U | 200 U | 13 | 250 U | 30 | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 1 J | 10 U | 1 U | 10 U | 10 U |
| Acenaphthene | 80 | **320 J** | **310** | **480** | **420 J** | **510** | **230 J** | **410** | **380 J** | FP | FP | 19 | 17 | 4 J | 1 J | 8 J | 4 J | 3 J | 1 U | 10 U | 10 U |
| Fluorene | 280 | 240 J | 140 | 230 U | 190 J | 280 | 120 J | 200 J | 180 J | FP | FP | 7 J | 6.9 | 10 U | 10 U | 2 J | 1 J | 10 U | 10 U | 10 U | 10 U |
| Phenanthrene | 210 | **250 J** | 150 | **230** | 210 J | **390** | 150 J | 210 J | 160 J | FP | FP | 6 J | 5.8 | 10 U | 10 U | 3 J | 10 U | 10 U | 10 U | 10 U | 10 U |
| Anthracene | 2100 | 1000 U | 7 J | 14 | 1000 U | 31 J | 16 | 250 U | 11 | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Fluoranthene | 280 | 1000 U | 16 | 23 | 1000 U | 160 J | 23 | 250 U | 18 | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Pyrene | 210 | 1000 U | 8 J | 13 | 1000 U | 110 J | 11 | 250 U | 10 | FP | FP | 10 U | 5 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 10 U | 10 U |
| Carbazole | NCOC | **250 J** | **140** | **240** | **190 J** | **210** | **110 J** | **280 J** | **190 J** | FP | FP | **16** | **18** | 4 J | **10 U** | **7 J** | **10 U** | 1 J | 10 U | 10 U | 10 U |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 10 J | **7 J** | **8 J** | **13** | **8 J** | **8 J** | **8 J** | **6 J** | FP | FP | **5 J** | **4.2** | 0.5 U | 0.67 | **1.8** | **1.8** | **1.6** | 0.63 J | 10 UJ | 0.61 |
| Chloromethane | NCOC | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | FP | FP | 10 U | 0.5 U | 0.6 U | 0.6 U | 0.6 U | 0.69 | 0.5 U | 1 U | 10 UJ | 0.50UJ |
| Acetone | NCOC | 10 J | 10 U | 10 U | 8 J | 10 UJ | 10 U | 10 UJ | 10 U | FP | FP | 10 UJ | 5 U | 5 U | 6 | 5 U | 5 U | 5 U | 5 U | 10 UJ | 5.0UJ |
| Chloroform | NCOC | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | FP | FP | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.6 U | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U |
| 1,2-Dichloroethane | NCOC | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | FP | FP | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.6 U | 0.5 UJ | 0.5 U | 1 U | 10 UJ | 0.50U |
| Tetrachloroethane | NCOC | 10 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | FP | FP | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U |
| Toluene | NCOC | 17 | 14 | 15 | 21 | 14 | 13 | 11 | 12 | FP | FP | 10 U | 0.45 J | 0.24 J | 0.29 J | 0.6 U | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U |
| Ethylbenzene | NCOC | 17 | 14 | 15 | 20 | 13 | 14 | 12 | 13 | FP | FP | 10 U | 0.52 | 0.29 J | 0.38 J | 0.6 U | 0.17 J | 0.5 U | 1 U | 10 UJ | 0.50U |
| Xylenes (total) | NCOC | 51 | 43 | 45 | 59 | 43 | 43 | 37 | 42 | FP | FP | 5 J | 5.4 | 0.6 | 0.91 | 1.9 | 2.2 | 0.5 | 0.38 J | 10 UJ | 0.16J |
| Styrene | NCOC | 13 | 9 J | 11 | 14 J | 8 J | 12 | 6 J | 12 J | FP | FP | 10 U | 0.35 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U |
| Isopropylbenzene | NCOC | 10 U | 1 J | 10 U | 10 U | 10 U | 10 U | 10 U | 1 J | FP | FP | 10 U | 0.18 J | 0.5 U | 0.6 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 10 UJ | 0.50U |

NOTES:
NCOC - Not a site Contaminant of Concern
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NA - Not Analyzed
Boldface represents compounds above site remediation goals
RW - Recovery Well
FD - French Drain
INF - Influent
EFF - Effluent
CARB - Between Carbon
FP = Free Product (DNAPL)
NS - Not Sampled by decision
* Basis for remediation goal is NCAC 2L Groundwater Standard and Table 3 of 2001 ROD Amendment

## Table 9
## Extraction Point Analytical Summary
## Cape Fear Wood Preserving Site
## March 2006

| Analyte (µg/L) | Remediation Goal* | CF-RW-3 | | | | | | | | | | CF-RW-4 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Jan-05 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic(CAR) PAHs** | | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10 U | 500 U | 10 U | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 50 U | 2500 U | 100 UJ | 69 | 100 U | 500 U | 19 | 500 U | 4 J | FP | FP |
| Chrysene | 5 | 10 U | 500 U | 10 U | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 50 U | 2500 U | 100 UJ | 66 | 100 U | 500 U | 14 | 500 U | 4 J | FP | FP |
| Benzo(b)Fluoranthene | 0.0047 | 10 U | 500 U | 10 U | 10 U | 100 U | 10 UJ | 10 U | 10 U | 10 UJ | 10 U | 50 U | 2500 U | 100 UJ | 29 | 100 U | 500 U | 7 J | 500 U | 10 U | FP | FP |
| Benzo(a) Pyrene | 0.0047 | 10 U | 500 U | 10 U | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 50 U | 2500 U | 100 UJ | 23 | 100 U | 500 U | 4 J | 500 U | 10 U | FP | FP |
| Indeno(1,2,3-cd) Pyrene | 0.047 | 10 U | 500 UJ | 10 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 50 U | 2500 UJ | 100 UJ | 7 J | 100 U | 500 U | 1 J | 500 U | 10 U | FP | FP |
| Dibenzo(a,h)Anthracene | 0.0047 | 10 U | 500 U | 10 U | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 50 U | 2500 U | 100 UJ | 3 J | 100 U | 500 U | 10 UJ | 500 U | 10 U | FP | FP |
| Benzo(k)Fluoranthene | 0.47 | 10 U | 500 U | 10 U | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | 50 U | 2500 U | 100 UJ | 27 | 100 U | 500 U | 3 J | 500 U | 10 U | FP | FP |
| **Non-Carcinogenic (NCAR) PAHs** | | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | **1500** | **2300** | **740** | **330** | **460** | **460** | **630** | **550** | **630** | **380** | **4200** | **11000** | **6400 J** | **5200** | **5300** | **6600** | **3700** | **9900** | **8800** | FP | FP |
| Acenaphthylene | 210 | 5 J | 500 U | 2 J | 1 J | 100 U | 10 U | 1 J | 2 J | 1 J | 10U | 51 | 2500 U | 45 J | 45 | 48 J | 500 U | 47 | 500 U | 61 | FP | FP |
| Acenaphthene | 80 | 44 | 69 J | 25 | 17 | 12 J | 10 U | 21 | 37 | 22 J | 18 | **720 J** | **890 J** | **900 J** | **1000** | **580** | **700** | **440 J** | **810** | **780 J** | FP | FP |
| Fluorene | 280 | 24 | 500 U | 10 | 7 J | 100 U | 5 J | 8 J | 12 | 10 J | 8J | 220 | 2500 U | 250 J | **580** | 280 | **310 J** | 210 J | **320 J** | **320 J** | FP | FP |
| Phenanthrene | 210 | 18 | 500 U | 13 | 8 J | 100 U | 7 J | 14 J | 15 | 10 J | 8J | **230** | 2500 U | **250 J** | **1400** | **330** | **340 J** | **350 J** | **390 J** | **350 J** | FP | FP |
| Anthracene | 2100 | 1 J | 500 U | 10 U | 10 U | 100 U | 10 U | 10 UJ | 10 U | 10 UJ | 10U | 25 J | 2500 U | 22 J | 10 U | 30 J | 500 U | 31 | 500 U | 28 | FP | FP |
| Fluoranthene | 280 | 2 J | 500 U | 10 U | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 26 J | 2500 U | 26 J | 620 | 63 J | 500 U | 110 J | 72 J | 55 | FP | FP |
| Pyrene | 210 | 10 U | 500 U | 10 U | 10 U | 100 U | 10 U | 10 U | 10 U | 10 UJ | 10U | 14 J | 2500 U | 17 J | 450 | 40 J | 500 U | 1000 U | 500 U | 20 | FP | FP |
| Carbazole | NCOC | 40 | 500 U | 23 | 14 | 11 J | 13 | 27 J | 33 | 22J | 14 | 310 | 460 J | 360 J | 400 | 400 | 34 J | 290 J | 470 J | 430 J | FP | FP |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | **17** | **17 J** | **7 J** | **3 J** | **5 J** | **3 J** | **5 J** | **4.8 J** | NA | **4.8** | **17** | **17** | **18** | **14** | **21** | **15** | **8 J** | **8 J** | **11** | FP | FP |
| Chloromethane | NCOC | 10 U | 10 UJ | 10 U | 20 U | 10 U | 10 U | 10 U | 5 U | NA | 0.50UJ | 2 J | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 UJ | 10 U | FP | FP |
| Acetone | NCOC | 10 UJ | 10 UJ | 10 U | 20 UJ | 10 U | 10 UJ | 10 U | 25 U | NA | 5.0UJ | 10 U | 10 U | 11 | 10 U | 14 | 10 UJ | 10 U | 10 UJ | 15 J | FP | FP |
| Chloroform | NCOC | 10 U | 10 UJ | 10 U | 20 U | 10 U | 10 U | 10 U | 5 U | NA | 0.50UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | FP | FP |
| 1,2-Dichloroethane | NCOC | 10 U | 10 UJ | 10 U | 20 U | 10 U | 10 U | 10 U | 5 U | NA | 0.50UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | FP | FP |
| Tetrachloroethene | NCOC | 10 U | 10 UJ | 10 U | 20 U | 10 U | 10 U | 10 U | 5 U | NA | 0.50UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | FP | FP |
| Toluene | NCOC | 7 J | 6 J | 3 J | 20 U | 2 J | 1 J | 3 J | 3.4 J | NA | 4.3 | 66 | 63 | 55 | 40 | 61 | 45 | 14 | 24 | 34 | FP | FP |
| Ethylbenzene | NCOC | 6 J | 8 J | 3 J | 20 U | 2 J | 10 U | 2 J | 2.2 J | NA | 3.1 | 56 | 52 | 43 | 32 | 52 | 37 | 15 | 38 | 40 | FP | FP |
| Xylenes (total) | NCOC | 22 | 29 J | 11 | 2 J | 7 J | 3 J | 6 J | 6.9 J | NA | 9.1 | 140 | 134 | 120 | 67 | 130 | 100 | 46 | 97 | 110 | FP | FP |
| Styrene | NCOC | 10 U | 10 UJ | 10 U | 20 U | 10 R | 10 U | 10 U | 0.57 J | NA | 0.50UJ | 72 | 72 | 69 | 42 | 64 J | 52 | 15 | 38 | 64 J | FP | FP |
| Isopropylbenzene | NCOC | 10 U | 10 UJ | 10 U | 20 U | 10 U | 10 U | 10 U | 5 U | NA | 0.25J | 10 U | 2 J | 2 J | 10 U | 10 U | 1 J | 10 U | 10 U | 2 J | FP | FP |

NOTES:
NCOC - Not a site Contaminant of Concern
J - Estimated Value  NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NA - Not Analyzed
**Boldface** represents compounds above site remediation goals
RW - Recovery Well
FD - French Drain
INF - Influent
EFF - Effluent
CARB - Between Carbon
FP = Free Product (DNAPL)
NS - Not Sampled by decision
* Basis for remediation goal is NCAC 2L Groundwater Standard a

# Table 9
## Extraction Point Analytical Summary
## Cape Fear Wood Preserving Site
## March 2006

| Analyte (µg/L) | Remediation Goal* | CF-RW-5 | | | | | | | | | | CF-RW-6 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| **Carcinogenic(CAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | 10U | 5U | 10U | 10U | 10U | 10J | 10J | 10U | NS | 10U | 10U | 5U | 10U | 10U | 10J | 10U | 10U | 10U | 10UJ | 10U |
| Chrysene | 5 | 10U | 5U | 10U | 10U | 10U | 10J | 10J | 10U | NS | 10U | 10U | 5U | 10U | 10U | 10J | 10U | 10U | 10U | 10UJ | 10U |
| Benzo(b)Fluoranthene | 0.0047 | 10U | 5U | 10U | 10U | 10U | 10UJ | 10U | 10U | NS | 10U | 10U | 5U | 10U | 10U | 10J | 10U | 10U | 10U | 10UJ | 10U |
| Benzo(a) Pyrene | 0.0047 | 10U | 5U | 10U | 10U | 10U | 10J | 10U | 10U | NS | 10U | 10U | 5U | 10U | 10U | 10J | 10U | 10U | 10U | 10UJ | 10U |
| Indeno(1,2,3-cd) Pyrene | 0.047 | 10U | 5U | 10UJ | 10U | 10U | 10J | 10U | 10U | NS | 10U | 10U | 5U | 10UJ | 10U | 10J | 10U | 10U | 10U | 10UJ | 10U |
| Dibenzo(a,h)Anthracene | 0.0047 | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10U | 10U | 5U | 10U | 10U | 10U | 10U | 10UJ | 10U | 10UJ | 10U |
| Benzo(k)Fluoranthene | 0.47 | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | NS | 10U | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | 10UJ | 10U |
| **Non-Carcinogenic (NCAR) PAHs** | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | **72** | **64** | **170** | 10U | **240** | **180** | **430** | **140** | NS | **60** | 10U | 5U | 4J | 10U | 2J | 10U | 2J | 10U | 10UJ | **150** |
| Acenaphthylene | 210 | 1J | 5U | 10U | 10U | 10U | 10U | 2J | 2J | NS | 10U | 10U | 5U | 10U | 10U | 10J | 10U | 10U | 10U | 10UJ | 4J |
| Acenaphthene | 80 | 32 | 25 | 18 | 30 | 29 | 27 | 52J | 51 | NS | 18 | 10U | 2.8J | 10U | 10U | 3J | 10U | 10U | 2J | 3J | 42 |
| Fluorene | 280 | 15 | 12 | 6J | 19 | 16 | 14 | 33J | 28 | NS | 11 | 10U | 1.4J | 10U | 10U | 1J | 10U | 10U | 1J | 10UJ | 15 |
| Phenanthrene | 210 | 15 | 12 | 8J | 23 | 16 | 15 | 30J | 28 | NS | 11 | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | 1J | 5J |
| Anthracene | 2100 | 10U | 5U | 10U | 1J | 1J | 10U | 1J | 1J | NS | 10U | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | 10UJ | 10U |
| Fluoranthene | 280 | 2J | 1.3J | 10U | 3J | 1J | 10U | 2J | 2J | NS | 10U | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | 10UJ | 10U |
| Pyrene | 210 | 1J | 5U | 10U | 2J | 10U | 10U | 10U | 10U | NS | 10U | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | 10UJ | 10U |
| Carbazole | NCOC | 10U | 5U | 5J | 1J | 12 | 7J | 25J | 13 | NS | 6J | 10U | 5U | 10U | 10U | 10U | 10U | 10U | 10U | 10UJ | 10U |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | **7J** | **4.9** | **4.8** | **1.9** | **5.1** | **5.2** | **6.4** | **1.6** | NS | **1.8** | 10U | 0.17J | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.056J | 10U | **1.8** |
| Chloromethane | NCOC | 10U | 0.5U | 0.5U | 0.21J | 0.5U | 0.5U | 0.5U | 1U | NS | 0.50UJ | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 1U | 10U | 0.50UJ |
| Acetone | NCOC | 10UJ | 5U | 5U | 33 | 5U | 5U | 5U | 5U | NS | 5.0UJ | 10UJ | 54 | 5U | 5U | 37J | 5U | 5UJ | 5U | 10U | 12UJ |
| Chloroform | NCOC | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 1U | NS | 0.50U | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 1U | 10U | 0.50U |
| 1,2-Dichloroethane | NCOC | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5UJ | 0.5UJ | 1U | NS | 0.50U | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5UJ | 0.5U | 1U | 10U | 0.50U |
| Tetrachloroethene | NCOC | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 1U | NS | 0.50U | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 1U | 10U | 0.50U |
| Toluene | NCOC | 4J | 2.7 | 1.8 | 1 | 2.2 | 1.9 | 3 | 0.94J | NS | 0.44J | 10U | 0.42J | 0.5U | 0.5U | 0.32J | 0.5U | 0.5U | 0.25J | 10U | 4.3 |
| Ethylbenzene | NCOC | 11 | 8.4 | 8.8 | 4 | 11 | 8.5 | 12 | 1.9 | NS | 0.86 | 10U | 0.53 | 0.5U | 0.5U | 0.39J | 0.5U | 0.5U | 0.29J | 10U | 6.5 |
| Xylenes (total) | NCOC | 12 | 11 | 7.4 | 4.3 | 10 | 9 | 13 | 2.03J | NS | 1 | 10U | 1.3 | 0.5U | 0.5U | 0.71 | 0.5U | 0.5U | 0.45J | 10U | 16 |
| Styrene | NCOC | 10U | 0.37J | 0.5U | 0.5U | 0.27J | 0.5U | 0.55 | 0.087J | NS | 0.50U | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 1U | 10U | 0.50U |
| Isopropylbenzene | NCOC | 10U | 0.46J | 0.62 | 0.21J | 0.6 | 0.68 | 0.51 | 0.21J | NS | 0.11J | 10U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 0.5U | 1U | 10U | 0.38J |

NOTES:

NCOC - Not a site Contaminant of Concern

J - Estimated Value NS - Not Sampled (by decision)

N - Presumptive Evidence of Presence of Material

U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.

NA - Not Analyzed

**Boldface** represents compounds above site remediation goals

RW - Recovery Well

FD - French Drain

INF - Influent

EFF - Effluent

CARB - Between Carbon

FP = Free Product (DNAPL)

NS - Not Sampled by decision

* Basis for remediation goal is NCAC 2L Groundwater Standard s

## Table 9
## Extraction Point Analytical Summary
## Cape Fear Wood Preserving Site
## March 2006

| Analyte (µg/L) | Remediation Goal* | CF-RW-7 | | | | | | | | | CF-MPE-2 | | CF-MPE-3 | CF-FD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 | Sep-05 | Mar-06 | Mar-06 | Sep-02 | Dec-02 | Mar-03 | Jun-03 | Sep-03 | Dec-03 | Jul-04 | Mar-05 | Sep-05 | Mar-06 |
| Carcinogenic(CAR) PAHs | | | | | | | | | | | | | | | | | | | | | | | |
| Benzo(a)Anthracene | 0.05 | NS | 100 UJ | 23 J | 250 J | 500 U | 8700 | 1000 U | FP | FP | 2 J | 10U | 10U | 20 U | 1500 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 100 UJ | 2J |
| Chrysene | 5 | NS | 100 UJ | 22 J | 250 J | 500 U | 6800 | 1000 U | FP | FP | 2 J | 10U | 10U | 20 U | 1500 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 100 UJ | 3J |
| Benzo(b)Fluoranthene | 0.0047 | NS | 100 UJ | 100 U | 250 J | 500 U | 4000 | 1000 U | FP | FP | 10 U | 10U | 10U | 20 U | 1500 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 100 UJ | 10U |
| Benzo(a) Pyrene | 0.0047 | NS | 100 UJ | 100 U | 250 J | 500 U | 2400 | 1000 U | FP | FP | 10 U | 10U | 10U | 20 U | 1500 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 100 UJ | 10U |
| Indeno(1,2,3-cd) Pyrene | 0.047 | NS | 100 UJ | 100 U | 250 J | 500 U | 580 J | 1000 U | FP | FP | 10 U | 10U | 10U | 20 U | 1500 UJ | 100 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 100 UJ | 10U |
| Dibenzo(a,h)Anthracene | 0.0047 | NS | 100 UJ | 100 U | 250 J | 500 U | 210 J | 1000 U | FP | FP | 10 U | 10U | 10U | 20 U | 1500 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 100 UJ | 10U |
| Benzo(k)Fluoranthene | 0.47 | NS | 100 UJ | 100 U | 250 J | 500 U | 1800 J | 1000 U | FP | FP | 10 U | 10U | 10U | 20 U | 1500 U | 100 UJ | 10 U | 100 U | 10 U | 10 U | 10 U | 100 UJ | 10U |
| Non-Carcinogenic (NCAR) PAHs | | | | | | | | | | | | | | | | | | | | | | | |
| Naphthalene | 21 | NS | 5000 J | 3400 | 6200 | 6300 | 96000 | 1000 U | FP | FP | 520 | 230 | 1200 | 3200 | 6300 | 4800 J | 2100 | 730 | 4800 | 2600 | 3400 | 5800 J | 2400 |
| Acenaphthylene | 210 | NS | 43 J | 44 J | 69 J | 500 U | 3900 | 350 J | FP | FP | 1 J | 10U | 2J | 13 J | 1500 U | 11 J | 10 U | 100 U | 15 | 30 | 11 | 11 J | 6J |
| Acenaphthene | 80 | NS | 380 J | 310 | 470 | 780 | 52000 | 3600 | FP | FP | 200 | 110 | 210J | 470 J | 340 J | 260 J | 140 | 240 | 340 J | 370 J | 240 | 280 J | 170J |
| Fluorene | 280 | NS | 140 J | 150 | 180 J | 340 J | 35000 | 630 J | FP | FP | 50 | 17 | 100U | 120 | 1500 U | 130 J | 60 | 140 | 160 J | 180 J | 110 J | 130 J | 72J |
| Phenanthrene | 210 | NS | 130 J | 190 | 190 J | 300 | 120000 | 1000 U | FP | FP | 140 | 43 | 170J | 120 | 1500 U | 130 J | 65 | 140 | 150 J | 190 J | 150 J | 180 J | 78J |
| Anthracene | 2100 | NS | 13 J | 100 U | 250 U | 500 U | 10000 | 240 J | FP | FP | 9 J | 4J | 10 | 17 J | 1500 U | 14 J | 8 J | 17 J | 14 | 11 | 19 | 26 J | 7J |
| Fluoranthene | 280 | NS | 100 UJ | 85 J | 250 U | 180 J | 58000 | 1000 U | FP | FP | 26 | 11 | 30 | 20 | 1500 U | 15 J | 11 | 23 J | 14 | 22 | 24 | 22 J | 20 |
| Pyrene | 210 | NS | 100 UJ | 60 J | 250 U | 110 J | 42000 | 1000 U | FP | FP | 14 | 8J | 16 | 12 J | 1500 U | 130 UJ | 6 J | 13 J | 9 J | 10 | 12 | 14 J | 12 |
| Carbazole | NCOC | NS | 280 J | 290 | 390 | 390 J | 9500 | 1000 U | FP | FP | 64 | 23 | 73 | 130 | 1500 U | 160 J | 78 | 130 | 170 J | 230 J | 240 J | 180 J | 78J |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | NS | 54 J | 200 | 310 | 190 | 380 | 190 | FP | FP | NA | 1.3 | 2.4 | 27 | 22 J | 15 | 12 | 18 | 15 | 18 | 8.2 | 18 | 6.5 |
| Chloromethane | NCOC | NS | 10 U | 20 U | 10 U | 10 J | 10 U | 20 U | FP | FP | NA | 0.50UJ | 0.50UJ | 10 U | 10 UJ | 10 U | 10 UJ | 10 U | 10 U | 10 U | 5 U | 10 U | 0.50UJ |
| Acetone | NCOC | NS | 14 J | 51 J | 49 | 19 UJ | 47 | 100 U | FP | FP | NA | 5.0UJ | 5.0UJ | 10 UJ | 10 UJ | 19 | 10 U | 30 UJ | 10 UJ | 12 | 25 UJ | 10 U | 7.9UJ |
| Chloroform | NCOC | NS | 10 U | 20 U | 10 U | 10 J | 10 U | 20 U | FP | FP | NA | 0.50U | 0.50U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 U | 0.50U |
| 1,2-Dichloroethane | NCOC | NS | 10 U | 20 U | 10 U | 10 J | 8 J | 20 U | FP | FP | NA | 0.50U | 0.50U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 1 J | 10 U | 5 U | 10 U | 0.50UJ |
| Tetrachloroethene | NCOC | NS | 10 U | 20 U | 10 U | 10 J | 10 U | 20 U | FP | FP | NA | 0.50U | 0.50U | 10 U | 10 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 5 U | 10 U | 0.50U |
| Toluene | NCOC | NS | 83 J | 140 | 240 | 160 | 300 | 180 | FP | FP | NA | 0.57 | 8.1 | 84 | 83 J | 47 | 62 | 60 | 67 | 60 | 29 | 66 | 33 |
| Ethylbenzene | NCOC | NS | 35 J | 48 | 100 | 70 | 100 | 70 | FP | FP | NA | 4.4 | 9.0 | 110 | 120 J | 59 | 110 | 82 | 89 | 67 | 47 | 110 | 82 |
| Xylenes (total) | NCOC | NS | 100 J | 140 | 280 | 210 | 260 | 206 | FP | FP | NA | 2.8 | 18 | 330 | 350 J | 170 | 350 | 240 | 270 | 210 | 143 | 360 | 201 |
| Styrene | NCOC | NS | 52 J | 59 | 150 J | 130 | 200 | 110 | FP | FP | NA | 0.50U | 64 | 61 | 60 J | 43 | 61 | 44 | 62 | 46 | 26 | 10 U | 30 |
| Isopropylbenzene | NCOC | NS | 2 J | 20 U | 10 U | 2 J | 3 J | 3.2 J | FP | FP | NA | 0.37J | 0.39J | 10 U | 10 J | 4 J | 8 J | 10 U | 8 J | 5 J | 5.5 | 10 U | 7.5 |

NOTES:
NCOC - Not a site Contaminant of Concern
J - Estimated Value NS - Not Sampled (by decision)
N - Presumptive Evidence of Presence of Material
U - Material was analyzed for, but not detected. The number is the minimum quantitation limit.
NA - Not Analyzed
Boldface represents compounds above site remediation goals
RW - Recovery Well
FD - French Drain
INF - Influent
EFF - Effluent
CARB - Between Carbon
FP = Free Product (DNAPL)
NS - Not Sampled by decision
* Basis for remediation goal is NCAC 2L Groundwater Standard s

CAR PAHS:

The FD was the only extraction point that detected any CAR PAH compounds above the laboratory reporting limit and above the remediation levels (benzo(a) pyrene at 2J µg/L).

RW-6 was the only well that had a significant increase in concentrations of the NCAR PAHs compared to the previous events. All the other compounds remained fairly constant in all the extraction points. Since no samples were collected from the extraction points that detected DNAPL present (labeled as FP), no significant trends can be deduced from these data. Currently, RW-2 and RW-6 are off-line. During this semi-annual sampling event, naphthalene was detected in RW-6 after the well had been turned off in March 2006. These well have been turned off and the pumps in these wells have been placed in the MPE wells. MPE-1, MPE-2, MPE-3, and MPE-4 (from the pilot study) have been placed on-line and the recovery wells that had two pumps have been changed to utilize only one pump which will be a bottom loading pump.

*Air Sparging Monitoring*

Dissolved Oxygen (DO) levels are routinely measured in groundwater at the select MW locations as an indicator of the air sparging system's area of influence. The DO levels were recorded from select MW in January 2005. As part of the Thermal Injection Pilot Study performed from September through December 2004, the air sparging system was taken off-line. The system is anticipated to remain off-line indefinitely; therefore, DO levels measurements have not been recorded for the purpose of the air sparging system.

However, DO and ORP levels are being measured in groundwater at select MW locations as an indicator of natural attenuation processes present in the subsurface. The DO levels are measured in all MWs quarterly. The measurements are summarized in the Quarterly O&M Reports (June and September 2005). ORP measurements were measured in all MWs in June 2005. These data are summarized in Table 10 from the September O&M Report. A review of the data shows that there is no obvious trend in the DO data that supports bringing the air sparging system back online to increase the DO levels in the subsurface. There has been no decrease in DO levels measured in the last two quarters as compared to the measurements collected prior to September 2004 when the air sparging system was turned off. With only one set of ORP data, no interpretation of the data can be made at this time.

Since operation of the groundwater remediation system began, a total of 16.5 million gallons of contaminated groundwater has been extracted, treated, and re-injected into the on-site infiltration galleries. As of March 2006, 11,766 gallons of DNAPL have been recovered from the subsurface since system start-up. Cumulative total DNAPL mass removal calculations estimate a volume of 107,201 pounds of DNAPL mass have been removed since system start-up. Table 11 is a summary of DNAPL recovery since September 2001. The groundwater treatment system has been performing as anticipated and has been effective in treating the impacted groundwater.

Based on the most recent Semi-Annual Report (October 2005 through March 2006), the groundwater remediation system is working as designed. The cumulative dissolved-phase mass removal volume since system start-up, is estimated at approximately 5,638 pounds. An estimated 4,629 pounds of dissolved mass were removed during the pilot study conducted from October 2004 - February 2005. This total was not reported by individual compound, so the percentage of mass removed by each compound cannot be calculated. It is assumed that naphthalene comprises the majority of the mass removed.

# Table 10
## Quarterly Historic Dissolved Oxygen & Oxygen Reduction Potential Measurements
## Cape Fear Wood Preserving Superfund Site
## Fayetteville, North Carolina

| Monitor Well ID | Date | Dissolved Oxygen (mg/L) | Oxygen Reduction Potential (mV) |
|---|---|---|---|
| MW-1I | N/A | NM | |
| | 7/26/2004 | 6.46 | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | NM | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | NM | |
| | 6/30/2005 | 6.08 | -30.3 |
| MW-2S | 6/29/2004 | 5.03 | |
| | 7/26/2004 | 6.96 | |
| | 10/7/2004 | 4.97 | |
| | 11/3/2004 | 5.64 | |
| | 1/25/2005 | 6.49 | |
| | 4/27/2005 | 6.47 | |
| | 6/30/2005 | 5.02 | 128.6 |
| MW-3S | 6/29/2004 | 1.90 | |
| | 7/26/2004 | 0.87 | |
| | 10/7/2004 | 3.98 | |
| | 11/3/2004 | 3.81 | |
| | 1/25/2005 | 2.08 | |
| | 4/27/2005 | 2.53 | |
| | 6/30/2005 | 2.36 | 33.1 |
| MW-4I | N/A | NM | |
| | 7/26/2004 | 0.18 | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | NM | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | NM | |
| | 6/30/2005 | 2.37 | -31.4 |
| MW-5S | 6/29/2004 | 1.90 | |
| | 7/27/2004 | 1.12 | |
| | 10/7/2004 | 0.80 | |
| | 11/3/2004 | 2.64 | |
| | 1/25/2005 | 1.06 | |
| | 4/27/2005 | 0.61 | |
| | 6/30/2005 | 1.20 | 48.1 |
| MW-6I | N/A | NM | |
| | 7/27/2004 | 0.88 | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | NM | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | NM | |
| | 6/30/2005 | 1.48 | 33.6 |

See notes at end of table.

## Table 10
## Quarterly Historic Dissolved Oxygen & Oxygen Reduction Potential Measurements
## Cape Fear Wood Preserving Superfund Site
## Fayetteville, North Carolina

| Monitor Well ID | Sample Date | Dissolved Oxygen (mg/L) | Oxygen Reduction Potential (mV) |
|---|---|---|---|
| MW-7S | 6/29/2004 | 1.01 | |
| | 7/27/2004 | 0.22 | |
| | 10/7/2004 | 2.33 | |
| | 11/3/2004 | 0.65 | |
| | 1/25/2005 | 0.64 | |
| | 4/27/2005 | 0.57 | |
| | 6/30/2005 | 0.78 | 8.5 |
| MW-8I | NA | NM | |
| | 7/27/2004 | 0.15 | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | NM | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | NM | |
| | 6/30/2005 | 1.62 | 91.1 |
| MW-11S | 6/29/2004 | 1.01 | |
| | N/A | NM | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | 1.30 | |
| | 1/25/2005 | 1.48 | |
| | 4/27/2005 | 1.33 | |
| | 6/30/2005 | 1.83 | 94.6 |
| MW-12I | 6/29/2004 | NM | |
| | N/A | NM | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | NM | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | NM | |
| | 6/30/2005 | NM | Well Obstructed |
| MW-15S | 6/29/2004 | 2.90 | |
| | 7/27/2004 | 0.86 | |
| | 10/7/2004 | 1.50 | |
| | 11/3/2204 | 7.60 | |
| | 1/25/2005 | 2.63 | |
| | 4/27/2005 | 3.84 | |
| | 6/30/2005 | 0.84 | -76.0 |
| MW-16I | N/A | NM | |
| | 7/26/2004 | 0.12 | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | NM | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | NM | |
| | 6/30/2005 | 4.72 | -64.9 |

See notes at end of table.

## Table 10
## Quarterly Historic Dissolved Oxygen & Oxygen Reduction Potential Measurements
## Cape Fear Wood Preserving Superfund Site
## Fayetteville, North Carolina

| Monitor Well ID | Date | Dissolved Oxygen (mg/L) | Oxygen Reduction Potential (mV) |
|---|---|---|---|
| MW-17S | 6/29/2004 | 4.35 | |
| | 7/26/2004 | 1.88 | |
| | 10/7/2004 | 2.54 | |
| | 11/3/2004 | 3.08 | |
| | 1/25/2005 | 3.79 | |
| | 4/27/2005 | 0.81 | |
| | 6/30/2005 | 3.40 | 95.0 |
| MW-18S | 6/29/2004 | 4.96 | |
| | 7/27/2004 | 5.03 | |
| | 10/7/2004 | 3.50 | |
| | 11/3/2004 | 5.99 | |
| | 1/25/2005 | 6.58 | |
| | 4/27/2005 | 5.71 | |
| | 6/30/2005 | 4.45 | 87.0 |
| MW-19S | 6/29/2004 | 3.37 | |
| | 7/26/2004 | 0.32 | |
| | 10/7/2004 | 3.65 | |
| | 11/3/2004 | 5.16 | |
| | 1/25/2005 | 5.32 | |
| | 4/27/2005 | 3.41 | |
| | 6/30/2005 | 2.25 | 135.0 |
| MW-20S | 6/29/2004 | 2.98 | |
| | 7/27/2004 | 0.38 | |
| | 10/7/2004 | 0.80 | |
| | 11/3/2004 | 2.39 | |
| | 1/25/2005 | 1.20 | |
| | 4/27/2005 | 1.63 | |
| | 6/30/2005 | 0.62 | 75.0 |
| MW-22S | 6/29/2004 | 1.87 | |
| | 7/27/2004 | 0.36 | |
| | 10/7/2004 | 2.30 | |
| | 11/3/2004 | 0.58 | |
| | 1/25/2005 | 1.30 | |
| | 4/27/2005 | 5.05 | |
| | 6/30/2005 | 0.95 | 47.3 |
| MW-23S | N/A | NM | |
| | 7/26/2004 | 0.37 | |
| | 10/7/2004 | 1.40 | |
| | 11/3/2004 | 3.01 | |
| | 1/25/2005 | 3.32 | |
| | 4/27/2005 | 3.49 | |
| | 6/30/2005 | 6.4 | 64.2 |

See notes at end of table.

## Table 10
### Quarterly Historic Dissolved Oxygen & Oxygen Reduction Potential Measurements
### Cape Fear Wood Preserving Superfund Site
### Fayetteville, North Carolina

| Monitor Well ID | Date | Dissolved Oxygen (mg/L) | Oxygen Reduction Potential (mV) |
|---|---|---|---|
| MW-24S | 6/29/2004 | 0.17 | |
| | 7/26/2004 | 0.99 | |
| | 10/7/2004 | 0.73 | |
| | 11/3/2004 | 3.94 | |
| | 1/25/2005 | 1.78 | |
| | 4/27/2005 | 4.80 | |
| | 6/30/2005 | 3.11 | 73.2 |
| MW-25S | 6/29/2004 | 0.99 | |
| | 7/28/2004 | 0.68 | |
| | 10/7/2004 | 2.60 | |
| | 11/3/2004 | 4.10 | |
| | 1/25/2005 | 1.17 | |
| | 4/27/2005 | 2.11 | |
| | 6/30/2005 | 1.38 | -6.8 |
| MW-26S | 6/29/2004 | 4.07 | |
| | 7/27/2004 | 0.70 | |
| | 10/7/2004 | 3.01 | |
| | 11/3/2004 | 4.20 | |
| | 1/25/2005 | 0.89 | |
| | 4/27/2005 | 5.22 | |
| | 6/30/2005 | 2.16 | 60.7 |
| MW-27S | 6/29/2004 | 2.96 | |
| | 7/26/2004 | 1.74 | |
| | 10/7/2004 | 3.10 | |
| | 11/3/2004 | 1.49 | |
| | 1/25/2005 | 1.83 | |
| | 4/27/2005 | 0.98 | |
| | 6/30/2005 | 1.00 | 46.5 |
| MW-28S | 6/29/2004 | 2.00 | |
| | 7/26/2004 | 1.58 | |
| | 10/7/2004 | 2.36 | |
| | 11/3/2004 | 2.32 | |
| | 1/25/2005 | 2.42 | |
| | 4/27/2005 | 2.49 | |
| | 6/30/2005 | 1.17 | 78.1 |
| MW-29S | 6/29/2004 | 1.72 | |
| | 7/28/2004 | 0.74 | |
| | 10/7/2004 | 1.40 | |
| | 11/3/2004 | 0.40 | |
| | 1/25/2005 | 2.10 | |
| | 4/27/2005 | 1.23 | |
| | 6/30/2005 | 0.37 | 29.8 |

See notes at end of table.

## Table 10
## Quarterly Historic Dissolved Oxygen & Oxygen Reduction Potential Measurements
## Cape Fear Wood Preserving Superfund Site
## Fayetteville, North Carolina

| Monitor Well ID | Date | Dissolved Oxygen (mg/L) | Oxygen Reduction Potential (mV) |
|---|---|---|---|
| MW-30S | 6/29/2004 | 3.16 | |
| | 7/28/2004 | 0.53 | |
| | 10/7/2004 | 3.17 | |
| | 11/3/2004 | 0.11 | |
| | 1/25/2005 | 0.94 | |
| | 4/27/2005 | 0.74 | |
| | 6/30/2005 | 0.77 | 42.6 |
| MW-31S | 6/29/2004 | 1.98 | |
| | 7/26/2004 | 1.43 | |
| | 10/7/2004 | 2.20 | |
| | 11/3/2004 | 8.53 | |
| | 1/25/2005 | 1.44 | |
| | 4/27/2005 | 7.59 | |
| | 6/30/2005 | 2.85 | 101.6 |
| MW-32S | 6/29/2004 | 2.96 | |
| | 7/28/2004 | 0.36 | |
| | 10/7/2004 | 1.08 | |
| | 11/3/2004 | 0.32 | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | 0.36 | |
| | 6/30/2005 | 0.43 | -31.5 |
| MW-33S | 6/29/2004 | 2.94 | |
| | 7/27/2004 | 0.85 | |
| | 10/7/2004 | 2.94 | |
| | 11/3/2004 | 3.48 | |
| | 1/25/2005 | 0.99 | |
| | 4/27/2005 | 4.75 | |
| | 6/30/2005 | 1.66 | 4.9 |
| MW-34S | 6/29/2004 | 1.61 | |
| | 7/27/2004 | 0.22 | |
| | 10/7/2004 | 0.90 | |
| | 11/3/2004 | 1.07 | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | 3.62 | |
| | 6/30/2005 | 1.47 | 54.5 |

See notes at end of table.

**Table 10**

**Quarterly Historic Dissolved Oxygen & Oxygen Reduction Potential Measurements**

**Cape Fear Wood Preserving Superfund Site**
**Fayetteville, North Carolina**

| Monitor Well ID | Date | Dissolved Oxygen (mg/L) | Oxygen Reduction Potential (mV) |
|---|---|---|---|
| MW-35S | N/A | NM | |
| | 7/28/2004 | 0.26 | |
| | 10/7/2004 | NM | |
| | 11/3/2004 | NM | |
| | 1/25/2005 | NM | |
| | 4/27/2005 | NM | |
| | 6/30/1935 | NM | NM |

Notes: See June 2004 O & M Report for recorded historic data from August 2001 to June 2004.
NM = Not measured  MW = Monitor Well
mg/L = milligram per liter
ID = Identification
Cont. = Continued

**Table 11**
**Summary of DNAPL Recovery**
**Cape Fear Wood Preserving Site**
**March 2006**

| Date | Gallons Recovered | Cumulative Gallons Recovered | Annual Total Gallons Recovered | Total Mass Recovered (pounds) | Cumulative Mass Recovered (pounds) | Annual Total Mass Recovered (pounds) |
|---|---|---|---|---|---|---|
| Sep-01 | 3,960 | 3,960 | | 36,080 | 36,080 | |
| Oct-01 | 220 | 4,180 | | 2,004 | 38,084 | |
| Nov-01 | 55 | 4,235 | | 501 | 38,585 | |
| Dec-01 | 0 | 4,235 | | 0 | 38,585 | |
| Jan-02 | 0 | 4,235 | | 0 | 38,585 | |
| Feb-02 | 5 | 4,240 | | 46 | 38,631 | |
| Mar-02 | 460 | 4,700 | | 4,191 | 42,822 | |
| Apr-02 | 175 | 4,875 | | 1,594 | 44,416 | |
| May-02 | 550 | 5,425 | | 5,011 | 49,428 | |
| Jun-02 | 850 | 6,275 | | 7,744 | 57,172 | |
| Jul-02 | 440 | 6,715 | | 4,009 | 61,181 | |
| Aug-02 | 225 | 6,940 | | 2,050 | 63,231 | |
| Sep-02 | 55 | 6,995 | 6,995 | 501 | 63,732 | 63,732 |
| Oct-02 | 400 | 7,395 | | 3,644 | 67,376 | |
| Nov-02 | 475 | 7,870 | | 4,328 | 71,704 | |
| Dec-02 | 325 | 8,195 | | 2,961 | 74,665 | |
| Jan-03 | 300 | 8,495 | | 2,733 | 77,398 | |
| Feb-03 | 175 | 8,670 | | 1,594 | 78,993 | |
| Mar-03 | 125 | 8,795 | | 1,139 | 80,132 | |
| Apr-03 | 0 | 8,795 | | 0 | 80,132 | |
| May-03 | 0 | 8,795 | | 0 | 80,132 | |
| Jun-03 | 0 | 8,795 | | 0 | 80,132 | |
| Jul-03 | 0 | 8,795 | | 0 | 80,132 | |
| Aug-03 | 0 | 8,795 | | 0 | 80,132 | |
| Sep-03 | 0 | 8,795 | 1,800 | 0 | 80,132 | 16,400 |
| Oct-03 | 100 | 8,895 | | 911 | 81,043 | |
| Nov-03 | 175 | 9,070 | | 1,594 | 82,637 | |
| Dec-03 | 150 | 9,220 | | 1,367 | 84,004 | |
| Jan-04 | 175 | 9,395 | | 1,594 | 85,598 | |
| Feb-04 | 65 | 9,460 | | 592 | 86,191 | |
| Mar-04 | 45 | 9,505 | | 410 | 86,601 | |
| Apr-04 | 165 | 9,670 | | 1,503 | 88,104 | |
| May-04 | 25 | 9,695 | | 228 | 88,332 | |
| Jun-04 | 25 | 9,720 | | 228 | 88,559 | |
| Jul-04 | 150 | 9,870 | | 1,367 | 89,926 | |
| Aug-04 | 25 | 9,895 | | 228 | 90,154 | |
| Sep-04 | 25 | 9,920 | 1,125 | 228 | 90,382 | 10,250 |

**Table 11**
**Summary of DNAPL Recovery**
**Cape Fear Wood Preserving Site**
**March 2006**

| Date | Gallons Recovered | Cumulative Gallons Recovered | Annual Total Gallons Recovered | Total Mass Recovered (pounds) | Cumulative Mass Recovered (pounds) | Annual Total Mass Recovered (pounds) |
|---|---|---|---|---|---|---|
| Oct-04 | 25 | 9,945 | | 228 | 90,609 | |
| Nov-04 | 50 | 9,995 | | 456 | 91,065 | |
| Dec-04 | 50 | 10,045 | | 456 | 91,520 | |
| Jan-05 | 25 | 10,070 | | 228 | 91,748 | |
| Feb-05 | 138 | 10,208 | | 1,257 | 93,006 | |
| ***Pilot Study*** | ***213*** | ***10,421*** | | ***1,941*** | 94,946 | |
| Mar-05 | 0 | 10,421 | | 0 | 94,946 | |
| Apr-05 | 25 | 10,446 | | 228 | 95,174 | |
| May-06 | 0 | 10,446 | | 0 | 95,174 | |
| Jun-05 | 895 | 11,341 | | 8,154 | 103,328 | |
| Jul-05 | 50 | 11,391 | | 456 | 103,784 | |
| Aug-05 | 70 | 11,461 | | 638 | 104,422 | |
| Sep-05 | 45 | 11,506 | 1,586 | 410 | 104,832 | 14,450 |
| Oct-05 | 40 | 11,546 | | 364 | 105,196 | |
| Nov-05 | 110 | 11,656 | | 1,002 | 106,198 | |
| Dec-05 | 0 | 11,656 | | 0 | 106,198 | |
| Jan-06 | 70 | 11,726 | | 638 | 106,836 | |
| Feb-06 | 40 | 11,766 | | 364 | 107,201 | |
| Mar-06 | 0 | 11,766 | | 0 | 107,201 | |

Notes:
* - Total removed during Pilot Study
DNAPL = Dense Non-Aqueous Phase Liquid
DNAPL Specific Gravity = 1.0918
Mass Extracted$_{DNAPL}$, pound = Volume DNAPL (gallon) x Specific Gravity DNAPL x 8.345 (pounds/gallon)

The VOC concentrations have decreased over time since the system start-up. Mass removal estimates are calculated every quarter and based on these figures, the remediation systems at the Site are effectively removing the subsurface target parameters.

Activities conducted at the Site were consistent with the 1989 ROD, the three ESDs, and the 2001 ROD Amendment and all the work plans prepared for the design and implementation of the RA, including sampling and analysis. The RD Reports, including a Quality Assurance Project Plans, incorporated all US EPA and NC DENR quality assurance and quality control (QA/QC) procedures and protocol. US EPA analytical methods were used for all validation and monitoring samples during RA activities. Sampling of soil and water followed the US EPA protocol USEPA, Region 4, Science and Ecosystem Support Division, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996 (EISOPQAM), as revised, and Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods.

The QA/QC program developed and used for this RA was comprehensive. The Agency's contractors and subcontractors complied with the requirements set forth in the QA/QC plan; therefore, US EPA and NCDENR accept that all analytical results are accurate to the degree needed to assure satisfactory execution of the RA and are consistent with the ROD/ESDs/ROD Amendment and the RD plans and specifications.

## 6.6 Site Inspection

The Site inspection of the Cape Fear Wood Preserving Site was conducted on May 22, 2006. Attending the Site visit was:

- Jon Bornholm, RPM, US EPA
- Nile Testerman, Environmental Engineer, NC DENR, Superfund Section
- Beau Hodge, Site Manager, Proterra Consulting, Inc.

During the inspection, all on-site documents and records were noted as readily available and up-to-date. The Site was secure, fencing and gates were functioning and locked. The treatment system building and monitoring wells are locked, secure, functioning properly, and routinely sampled. O&M at the Site is conducted by Black & Veatch's subcontractor, Proterra. All O&M records are up-to-date and available. The groundwater extraction wells, pumps, and pipelines, as well as the treatment system and discharge system are in good condition.

## 6.7 Interviews

The following persons were interviewed regarding the activities and implementation of the remedial actions at the Cape Fear Wood Preserving Site. Only a portion of the interviews are stated below, for the complete interview statement see Attachment 3.

*Jon Bornholm, US EPA RPM*:

> *Is the Remedy Functioning as Expected?, "For groundwater, the original remedy included three technologies which included groundwater/DNAPL extraction and treatment with on-site discharge of the treated groundwater, air sparging, and injection*

*to nutrients to promote in-situ bio-degradation on the contaminants. Based on the findings a 2004 RSE, the air sparging and nutrient injection systems were shut down. Due to the extent of the DNAPL, the time-frame estimated in the Remedial Design to achieve the groundwater cleanup goals was underestimated. It will take significantly longer than eight years to achieve the groundwater cleanup goals."*

Four individuals within the surrounding community were contacted by the US EPA regarding the remedial activities at the Cape Fear Site. Four individuals were interviewed about issues they might have concerning the remediation and community involvement. Of the four individuals contacted, two had several concerns. One individual's concerns/comments included: "Infiltration gallery IG-02 located to the west of Reilly Road was built in a low area and was a total waste of taxpayers money because it does not pump much water"; "Three out of four air sparging -not sure if they are even working"; "Some of the plume is on private land and I would like to see a report that determines the boundaries of the plume in order to see if the treatment system is working"; and, Eight acres of private land is part of a 20 year easement and landowner is concerned that he cannot do anything with the eight acres. The second individual's concerns/ comments include: "Would like to see more communication with the public regarding the Site"; It has been two to three years since the private wells were sampled and landowner has yet to receive any results from the sampling; and, "When was the last time that the test wells were sampled and how often are the test wells sampled?" Attachment 3 is a complete list of the comments/issues.

## 7.0 Technical Assessment

### 7.1 Question A: Is the remedy functioning as intended by the decision documents?

The remedial action continues to operate as designed. Three of the four major groundwater treatment systems (extraction, treatment, and injection) performed their intended functions during the most recent semi-annual sampling period (October 2005 through March 2006). Through March 2006, approximately 11,766 gallons or 107,201 pounds of DNAPL (Free Product) have been removed from the groundwater since system startup. The groundwater extraction and infiltration system continues to have the desired effect on the shallow aquifer at the Site. Potentiometric surface maps for the semi-annual period indicate the influence from the extraction points and infiltration galleries continue to result in hydraulic control of the dissolved-phase groundwater plume. The current extraction/injection configuration appears to be accomplishing the two primary objectives of contaminant mass recovery and hydraulic plume control. The treatment system is effectively removing the contaminants in the extracted groundwater as evidenced by the system treatment effluent monitoring data collected monthly.

Although the groundwater remedy is functioning as designed, the 2006 Semi-Annual Report included several observations to improve the performance of the remedy. These include: Continue to monitor operations and make changes as necessary to increase total system flow to roughly 1.6 million gallons per semi-annual reporting period if possible; Continue to monitor treatment system monthly analytical results to maximize carbon loading on the primary unit but preventing an effluent exceedence; Replace the carbon in the primary vessel every 8 to 9 months; Evaluate replacing the DNAPL double diaphragm pumps in the extractions wells with bottom-loading pneumatic pumps (these pumps will recover both product and groundwater); Turn off the pumps in RW-2 and RW-6 and use the pumps in two of the MPE wells to focus the extraction on center of the DNAPL plume area; DO measurements will be collected quarterly; ORP measurements will be collected annually; Evaluate filtration options to reduce bag filter change outs and system alarms; and Install an intermediate-depth well down gradient of MW-161.

Since the groundwater remedy is a long-term remedial action for the Site, institutional controls need to be identified and implemented for the Cape Fear Wood Preserving Site.

## 7.2 Question B: Are the exposure assumptions, toxicity data, clean up levels and remedial action objectives (RAOs) used at the time of the remedy still valid?

The exposure assumptions, toxicity data, clean-up levels, and RAOs used at the time of the remedy are still valid for the COCs. The chemical-specific ARARs (i.e., MCLs and the State Groundwater Standards) have not changed for the COCs from the Remediation Goals given in the ROD Amendment. Although in March 2001, the Federal MCL for arsenic was changed from 50 µg/l to 10 µg/l. This revised Federal MCL for arsenic took effect as part of the National Primary Drinking Water Regulation, March 23, 2001. Based on arsenic levels collected for the Baseline Sampling Report (See Section 6.5, Data Review, Phase IV), the influent/effluent arsenic levels collected in 2001 were below the 50 µg/l former standard. But currently, these arsenic levels (ranging from 8 µg/l to 26 µg/l) exceed the new 10 µg/l standard. Though the arsenic standard has changed, there are no current exposures to contaminants in the groundwater.

The National Recommended Water Quality Criteria for surface water was not reviewed as there is no longer a discharge to surface water. The discharge to surface water was eliminated at the completion of the soil remediation phase. In addition, the May 1996 ESD, changed the point of discharge of the treated water from Bones Creek to the local POTW. Additionally, the 2001 ROD Amendment modified the remedy to discharge the amended, treated groundwater back into the aquifer through infiltration galleries located within and at the boundaries of the plume and if necessary, to discharge the treated groundwater to the local POTW.

Although arsenic has not been identified has a COC within the groundwater, an evaluation of the existing arsenic analytical data will be conducted. Based on the conclusions of this evaluation, the collection of additional arsenic analytical data may be warranted in order to determine if arsenic should be identified as a Site COC or if the treatment system may need to be modified do to the presence of arsenic. In the short-term, there are no current exposure routes to the groundwater and the remedy is still protective of human health.

Currently, the land use at the Site remains unchanged and no new human health or ecological routes of exposure have been identified or modified in anyway that would change the protectiveness of the remedy. However, in May 2006, the US EPA spoke with the property owner of the Site, and he stated that he intends on redeveloping the Site into residential properties in the future. Based on this future property land use, the residential risk scenario used in the RI is still valid, and the groundwater clean-up goals are acceptable for residential property use.

The purpose of the remedial action as stated in the 1989 ROD is to minimize, if not mitigate contamination in the soils, groundwater, and surface waters and sediment and to reduce, if not eliminate, potential risks to human health and the environment. The following clean-up objectives were determined based on regulatory requirements and levels of contaminants found at the Site:

- To Protect the public health and the environment from exposure to contaminated on-site soils through inhalation, direct contact, and erosion of soils into surface water and wetlands;
- To prevent off-site movement of contaminated groundwater; and,
- To restore contaminated groundwater to levels protective of human health and the environment.

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. All remediation goals were achieved during the remedial action for soil and the remedial action for groundwater continues to operate as designed.

### 7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has come to light that could call into question the protectiveness of the remedy.

### 7.4 Technical Assessment Summary

The remedy is functioning as intended by the decision documents, ROD, ESDs, and ROD Amendment. The exposure assumptions, toxicity data, clean-up levels and RAOs used at the time of the remedy are still valid for the COCs. As stated above, the Federal MCL for arsenic was changed as part of the National Primary Drinking Water Regulation. Currently, arsenic is not a COC within the groundwater, the collection and evaluation of arsenic analytical data and evaluation of the potential impact on the treatment system will need to be conducted. In the short-term, there are no current exposure routes to the groundwater and the remedy is still protective of human health.

The groundwater remedy is functioning as designed, and as discussed earlier, the 2005 RSE made several recommendations to improve the performance of the remedy including the addition of a monitoring well downgradient of the most south-southwest well (MW-161). Additionally, institutional controls need to be identified and implemented at the Site; however, these items do not affect the protectiveness of the remedy as currently there are no groundwater users in the area of the contamination.

## 8.0 Issues

There are six issues that have been identified during this review.

- Institutional controls need to be identified.
- Institutional controls need to be implemented.
- Install well(s) downgradient from monitoring well MW-16i to complete the delineation of the plume in the intermediate zone of the aquifer.
- Optimization of dense non-aqueous phase liquid (DNAPL) removal. Several options have been reviewed already, including a pilot study on electrical resistance heating (ERH); however, further evaluation is needed.
- Evaluate existing data, collect additional data, if needed, and determine if arsenic should be included as a COC and evaluate the potential impact of arsenic on the treatment system.
- Continue the collection of monitored natural attenuation (MNA) parameters for data and trend analysis to determine if MNA can become a more integral part of the groundwater remedial action.

# 9.0 Recommendations and Follow-up Actions

**Table 12: Recommendations and Follow-up Actions**

| Issues | Recommendations/ Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Identify institutional controls. | Identify institutional controls and make necessary changes via ROD Amendment or ESD. | US EPA & State | US EPA & State | September 2007 | N | Y |
| Implement institutional controls. | Implement Institutional controls and review implementation in next five-year review | US EPA, State & cooperation of land owners | US EPA & State | September 25, 2008 | N | Y |
| Complete the delineation of the plume in the intermediate zone of the aquifer. | Install an additional monitoring well downgradient of MW-161 | US EPA | US EPA & State | September 25, 2009 | N | Y |
| Determine if arsenic should be identified as a Site contaminant of concern as the Federal MCL was changed from 50 µg/l to 10 µg/l. | Evaluate existing arsenic data, collect additional data (if needed), determine if arsenic should be listed as a COG, and evaluate potential impact of arsenic on treatment system | US EPA | US EPA & State | September 25, 2008 | N | Y |
| Continue monitoring the groundwater to ensure the groundwater system is operating/functioning as designed and remedial goals are being achieved. | Continue optimization of the groundwater remediation system | US EPA | US EPA & State | September 25, 2011 | Y | Y |
| Evaluating components for possible MNA as a future remedy. | Continue to gather information on Monitored Natural Attenuation. | US EPA | US EPA & State | September 25, 2011 | Y | Y |
| Complete evaluation of implementing a more aggressive remediation technology to remove DNAPL | Complete final report on Pilot Study and present findings/conclusions to US EPA's management. | US EPA | US EPA & State | September 2008 | Y | Y |

## 10.0 Protectiveness Statement

The remedy at the Site currently protects human health and the environment in the short-term because the main source of contamination was remediated through source removal. Currently, no human or ecological exposure pathways exist to contaminated groundwater or soil. As stated in the 1989 ROD and/or 2001 ROD Amendment, the goal of the Cape Fear remedial action is to reduce on-site levels of contamination as to allow for unlimited use and unrestricted exposure. However, as there is a dense non-aqueous phase liquid (DNAPL) present, this goal will not be achieved for a long time. Therefore, to insure long-term protection during this interim, the Agency has decided to implement institutional controls at the Site.

## 11.0 Next Review

The next Five-Year Review for the Cape Fear Wood Preserving Site is required to be completed within five years from the US EPA Region 4 Waste Management Division Director's (or his designee) signature/approval date of this document.

# ATTACHMENT 1
# List of Documents Reviewed

# List of Documents Reviewed
# Cape Fear Wood Preserving Site
# Five-Year Review

U.S. Environmental Protection Agency, Region IV. October 6, 1988. Final Remedial Investigation Report, Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

U.S. Environmental Protection Agency, Region IV. June 30, 1989. Record Of Decision, Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

U.S. Environmental Protection Agency, Region IV. September 24, 1991. Explanation of Significant Differences. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

U.S. Environmental Protection Agency, Region IV. August 27, 1995. Explanation of Significant Differences. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

Bechtel Environmental, Inc. September 1999. Remedial Action Completion Report for Soils. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

U.S. Environmental Protection Agency, Region IV. March 23, 2001. Record Of Decision Amendment, Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

U.S. Environmental Protection Agency, Region IV. September 2001. Preliminary Close-Out Report, Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

Black & Veatch Special Projects Corp. December 20, 2001. Baseline (Data Evaluation) Report (Prior to System Startup) for the Groundwater Remediation System. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

Black & Veatch Special Projects Corp. March 7, 2002. Remedial Action Report for Phase IV-Groundwater Extraction/Treatment System. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

Black & Veatch Special Projects Corp. August 2005. Operation and Maintenance Monthly Report, June 2005. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

Black & Veatch Special Projects Corp. July 2005. Operation and Maintenance Monthly Report, July 2005. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

Black & Veatch Special Projects Corp. February 2006. September 2005 Semi-Annual Report, April 1 through September 30, 2005, Groundwater Extraction and Treatment Facility. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

Black & Veatch Special Projects Corp. June 2006. March 2006 Semi-Annual Report, October 1, 2005 through March 31, 2006, Groundwater Extraction and Treatment Facility. Cape Fear Wood Preserving Site, Fayetteville, North Carolina.

# ATTACHMENT 2
# Site Inspection Checklist

# Site Inspection Checklist

| I. SITE INFORMATION | |
|---|---|
| **Site name:** Cape Fear Wood Preserving | **Date of inspection:** May 22, 2006 |
| **Location and Region:** Fayetteville, NC/ US EPA Region 4 | **EPA ID:** NCD 003188828 |
| **Agency, office, or company leading the five-year review:** NC DENR Superfund Section | **Weather/temperature:** Showers, 70 degrees |

**Remedy Includes:** (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☐ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other – DNAPL Removal
- ☐ Monitored natural attenuation
- ☒ Groundwater containment
- ☐ Vertical barrier walls

**Attachments:** ☐ Inspection team roster attached ☒ Site map attached - see Five Year Review Report

## II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Ed Hicks (Name) Project Manager (Title) May 5, 2006 (Date)
   Interviewed ☐ at site ☐ at office ☒ by phone
   Problems, suggestions; ☒ Report attached

2. **O&M staff** Beau Hodge/Proterra (Name) Site Manager (Title) May 22, 2006 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 704-701-9099
   Problems, suggestions; ☒ Report attached, see attached questionnaire

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency Cumberland County Planning
   Contact Pam Spears (Name) Planning (Title) May 22, 2006 (Date) 910-678-7600 (Phone no.)
   Problems; suggestions; ☒ Report attached: City recently annexed site and need to talk with them. There have been no problems with the site.

4. **Other interviews** (optional) ☐ Report attached.

| III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply) | | | | |
|---|---|---|---|---|
| 1. | **O&M Documents** | | | |
| | ☒ O&M manual | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | ☒ As-built drawings | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | ☒ Maintenance logs | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | Remarks – Everything up to date with maintenance logs on computer | | | |
| 2. | **Site-Specific Health and Safety Plan** | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | ☒ Contingency plan/emergency response plan | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | Remarks - The Contingency Plan/Emergency Response Plan is maintained as part of the site-specific Health and Safety Plan. | | | |
| 3. | **O&M and OSHA Training Records** | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | Remarks - All O&M and OSHA Records are maintained in central office. | | | |
| 4. | **Permits and Service Agreements** | | | |
| | ☐ Air discharge permit | ☐ Readily available | ☐ Up to date | ☐ N/A |
| | ☐ Effluent discharge | ☐ Readily available | ☐ Up to date | ☐ N/A |
| | ☒ Waste disposal, POTW | ☐ Readily available | ☐ Up to date | ☒ N/A |
| | ☐ Other permits ________________ | ☐ Readily available | ☐ Up to date | ☐ N/A |
| | Remarks | | | |
| 5. | **Gas Generation Records** | ☐ Readily available | ☐ Up to date | ☒ N/A |
| | Remarks | | | |
| 6. | **Settlement Monument Records** | ☐ Readily available | ☐ Up to date | ☒ N/A |
| | Remarks | | | |
| 7. | **Groundwater Monitoring Records** | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | Remarks | | | |
| 8. | **Leachate Extraction Records** | ☐ Readily available | ☐ Up to date | ☒ N/A |
| | Remarks | | | |
| 9. | **Discharge Compliance Records** | | | |
| | ☐ Air | ☐ Readily available | ☐ Up to date | ☐ N/A |
| | ☒ Water (effluent) | ☒ Readily available | ☒ Up to date | ☐ N/A |
| | Remarks – No discharge to City POTW | | | |
| 10. | **Daily Access/Security Logs** | ☐ Readily available | ☐ Up to date | ☒ N/A |
| | Remarks – No security logs. Site is fenced and the gate is locked. | | | |

| IV. O&M COSTS | | |
|---|---|---|
| 1. | **O&M Organization** | |
| | ☐ State in-house | ☐ Contractor for State |
| | ☐ PRP in-house | ☐ Contractor for PRP |
| | ☐ Federal Facility in-house | ☐ Contractor for Federal Facility |
| | ☒ Other – Proterra is subcontractor to Black & Veatch who are contractor to EPA | |

2. **O&M Cost Records**

☒ Readily available ☒ Up to date

☒ Funding mechanism/agreement in place

Original O&M cost estimate ☐ Breakdown attached

Total annual cost by year for review period if available

| | | | | | | |
|---|---|---|---|---|---|---|
| From | 6/1/05 | To | 6/30/06 | $130K | ☐ Breakdown attached |
| | Date | | Date | Total cost | |
| From | 6/1/04 | To | 6/1/05 | $140K | ☐ Breakdown attached |
| | Date | | Date | Total cost | |
| From | 6/1/03 | To | 6/1/04 | $140K | ☐ Breakdown attached |
| | Date | | Date | Total cost | |

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: None to date for the everyday operations of the systems.

## V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

### A. Fencing

1. Fencing damaged ☒ Location shown on site map ☒ Gates secured ☐ N/A

Remarks

### B. Other Access Restrictions

1. Signs and other security measures ☒ Location shown on site map ☐ N/A

Remarks

### C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by)

Frequency -

Responsible party/agency -

Contact

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☐ N/A

Other problems or suggestions: ☒ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks - Institutional Controls have not been placed on the Cape Fear Wood Preserving Site although access controls (i.e., fencing around remediation systems is maintained).

| D. General |
|---|
| 1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident<br>Remarks – Someone stole tractor used for cutting grass. Fence was cut but repaires. |
| 2. **Land use changes on site** ☐ N/A<br>Remarks – None but possible residential now that City has annexed the site. |
| 3. **Land use changes off site** ☒ N/A<br>Remarks - No |
| **VI. GENERAL SITE CONDITIONS** |
| **A. Roads** ☐Applicable ☒ N/A |
| 1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A<br>Remarks |
| **B. Other Site Conditions** |
| Three 55-gallon drums on site filled with material that needs to be disposed properly. Thirty empty 55-gallon drums also on site. Plastic container and electrical box left by Electric Resistance Heating Pilot Study contractor needs to be disposed properly. |
| **VII. LANDFILL COVERS** ☐ Applicable ☒ N/A |
| **A. Landfill Surface** |
| 1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident<br>Areal extent__________ Depth__________<br>Remarks |
| 2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident<br>Lengths__________ Widths__________ Depths__________<br>Remarks |
| 3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident<br>Areal extent__________ Depth__________<br>Remarks |
| 4. **Holes** ☐ Location shown on site map ☐ Holes not evident<br>Areal extent__________ Depth__________<br>Remarks |
| 5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress<br>☐ Trees/Shrubs (indicate size and locations on a diagram)<br>Remarks |
| 6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A<br>Remarks |
| 7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident<br>Areal extent__________ Height__________ |

| | | |
|---|---|---|
| | Remarks | |
| 8. | **Wet Areas/Water Damage**<br>☐ Wet areas<br>☐ Ponding<br>☐ Seeps<br>☐ Soft subgrade<br>Remarks | ☐ Wet areas/water damage not evident<br>☐ Location shown on site map  Areal extent______________<br>☐ Location shown on site map  Areal extent______________<br>☐ Location shown on site map  Areal extent______________<br>☐ Location shown on site map  Areal extent______________ |
| 9. | **Slope Instability**  ☐ Slides<br>Areal extent______________<br>Remarks | ☐ Location shown on site map  ☐ No evidence of slope instability |
| **B.** | **Benches**  ☐ Applicable  ☐ N/A<br>(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.) | |
| 1. | **Flows Bypass Bench**<br>Remarks | ☐ Location shown on site map  ☐ N/A or okay |
| 2. | **Bench Breached**  ☐ Location shown on site map<br>Remarks | ☐ N/A or okay |
| 3. | **Bench Overtopped**<br>Remarks | ☐ Location shown on site map  ☐ N/A or okay |
| **C.** | **Letdown Channels**  ☐ Applicable  ☐ N/A<br>(Channel lined with erosion control mats, rip rap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.) | |
| 1. | **Settlement**  ☐ Location shown on site map<br>Areal extent______________  Depth____________<br>Remarks | ☐ No evidence of settlement |
| 2. | **Material Degradation**  ☐ Location shown on site map<br>Material type______________  Areal extent_____________<br>Remarks | ☐ No evidence of degradation |
| 3. | **Erosion**  ☐ Location shown on site map<br>Areal extent______________  Depth____________<br>Remarks | ☐ No evidence of erosion |
| 4. | **Undercutting**  ☐ Location shown on site map<br>Areal extent______________  Depth____________<br>Remarks | ☐ No evidence of undercutting |
| 5. | **Obstructions**  Type____________________<br>☐ Location shown on site map  Areal extent_____________<br>Size____________<br>Remarks | ☐ No obstructions |
| 6. | **Excessive Vegetative Growth**  Type____________________ | |

☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map   Areal extent______________
Remarks

**D. Cover Penetrations** ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks

**E. Gas Collection and Treatment** ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks

**F. Cover Drainage Layer** ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks

| | | | |
|---|---|---|---|
| **G. Detention/Sedimentation Ponds** | ☐ Applicable | ☐ N/A | |
| 1. | **Siltation** Areal extent______________ Depth____________ ☐ N/A<br>☐ Siltation not evident<br>Remarks | | |
| 2. | **Erosion** Areal extent______________ Depth____________<br>☐ Erosion not evident<br>Remarks | | |
| 3. | **Outlet Works** ☐ Functioning ☐ N/A<br>Remarks | | |
| 4. | **Dam** ☐ Functioning ☐ N/A<br>Remarks | | |
| **H. Retaining Walls** | ☐ Applicable | ☐ N/A | |
| 1. | **Deformations** ☐ Location shown on site map ☐ Deformation not evident<br>Horizontal displacement____________ Vertical displacement_______________<br>Rotational displacement____________<br>Remarks | | |
| 2. | **Degradation** ☐ Location shown on site map ☐ Degradation not evident<br>Remarks | | |
| **I. Perimeter Ditches/Off-Site Discharge** | ☐ Applicable | ☐ N/A | |
| 1. | **Siltation** ☐ Location shown on site map ☐ Siltation not evident<br>Areal extent______________ Depth____________<br>Remarks | | |
| 2. | **Vegetative Growth** ☐ Location shown on site map ☐ N/A<br>☐ Vegetation does not impede flow<br>Areal extent______________ Type____________<br>Remarks | | |
| 3. | **Erosion** ☐ Location shown on site map ☐ Erosion not evident<br>Areal extent______________ Depth____________<br>Remarks | | |
| 4. | **Discharge Structure** ☐ Functioning ☐ N/A<br>Remarks | | |
| **VIII. VERTICAL BARRIER WALLS** | ☐ Applicable | ☒ N/A | |
| 1. | **Settlement** ☐ Location shown on site map ☐ Settlement not evident<br>Areal extent______________ Depth____________<br>Remarks | | |
| 2. | **Performance Monitoring** Type of monitoring__________________________<br>☐ Performance not monitored<br>Frequency________________________________ ☐ Evidence of breaching<br>Head differential________________________________ | | |

| |
|---|
| Remarks |
| **IX. GROUNDWATER/SURFACE WATER REMEDIES** ☒ Applicable ☐ N/A |
| **A. Groundwater Extraction Wells, Pumps, and Pipelines** ☒ Applicable ☐ N/A |
| 1. **Pumps, Wellhead Plumbing, and Electrical**<br>☒ Good condition ☒ All required wells properly operating ☐ Needs Maintenance ☐ N/A<br>Remarks |
| 2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**<br>☒ Good condition ☐ Needs Maintenance<br>Remarks |
| 3. **Spare Parts and Equipment**<br>☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided<br>Remarks |
| **B. Surface Water Collection Structures, Pumps, and Pipelines** ☐ Applicable ☒ N/A |
| 1. **Collection Structures, Pumps, and Electrical**<br>☐ Good condition ☐ Needs Maintenance<br>Remarks |
| 2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**<br>☐ Good condition ☐ Needs Maintenance<br>Remarks |
| 3. **Spare Parts and Equipment**<br>☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided<br>Remarks |
| **C. Treatment System** ☒ Applicable ☐ N/A |
| 1. **Treatment Train** (Check components that apply)<br>☐ Metals removal ☐ Oil/water separation ☐ Bioremediation<br>☐ Air stripping ☐ Carbon adsorbers<br>☒ Filters – Bag<br>☐ Additive (*e.g.*, chelation agent, flocculent)<br>☐ Others<br>☒ Good condition ☐ Needs Maintenance<br>☐ Sampling ports properly marked and functional<br>☐ Sampling/maintenance log displayed and up to date<br>☐ Equipment properly identified<br>☐ Quantity of groundwater treated annually<br>☐ Quantity of surface water treated annually________________<br>Remarks |
| 2. **Electrical Enclosures and Panels** (properly rated and functional)<br>☐ N/A ☒ Good condition ☐ Needs Maintenance<br>Remarks |

| | |
|---|---|
| 3. | **Tanks, Vaults, Storage Vessels**<br>☐ N/A ☒ Good condition ☒ Proper secondary containment ☐ Needs Maintenance<br>Remarks |
| 4. | **Discharge Structure and Appurtenances**<br>☐ N/A ☒ Good condition ☐ Needs Maintenance<br>Remarks |
| 5. | **Treatment Building(s)**<br>☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair<br>☐ Chemicals and equipment properly stored<br>Remarks |
| 6. | **Monitoring Wells** (pump and treatment remedy)<br>☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition<br>☒ All required wells located ☐ Needs Maintenance ☐ N/A<br>Remarks – RW2 needs to be locked. Infiltration Gallery 3 needs cap on top of piping. |
| **D. Monitoring Data** | ☒ Applicable ☐ N/A |
| 1. | Monitoring Data<br>☒ Is routinely submitted on time ☒ Is of acceptable quality |
| 2. | Monitoring data suggests:<br>☒ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining |
| **E. Monitored Natural Attenuation** | ☐ Applicable ☒ N/A |
| 1. | **Monitoring Wells** (natural attenuation remedy)<br>☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition<br>☐ All required wells located ☐ Needs Maintenance ☐ N/A<br>Remarks |

## X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

See text of Five Year Report

## XI. OVERALL OBSERVATIONS

**A. Implementation of the Remedy**

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The soil was remediated with on site thermal desorption. The groundwater is being contained with a pump and treat system and DNAPL removal using recovery wells. The groundwater system appears to be containing the plume. There is a question if the plume in the intermediate aquifer is defined. There are plans to put in another monitoring well downgradient of MW16i. Containment concentrations in the groundwater are declining. DNAPL is being removed. A pilot study using electric resistance heating was performed to speed up DNAPL removal. It is unclear if the results from the study warrant the extra cost to speed up DNAPL removal.

**B. Adequacy of O&M**

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

See text of Five Year Report

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

See text of Five Year Report

**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

A Remedial Site Evaluation was performed. All recommendations except one were implemented. The one recommendation not completed is to look at the intermediate aquifer for extent of contamination in the southwest part of the plume. The proposed well will be located off site and proper access agreement needs to be finalized. The subcontractor is looking for ways to lower maintenance for the groundwater pump and treat system. Including replacing pumps, updating software, replacing water and air lines.

# 5.0 RECOMMENDATIONS

## 5.1 Next Month

The following routine tasks will be conducted in May 2006:

- Evaluate performance of modifications and repairs completed during April 2006.
- Perform monthly system checks.
- Daily remote monitoring of the system.
- Change out bag filters as needed.
- Complete minor repairs to system to maintain run-time.
- Conduct monthly system sampling.
- Transport and dispose of 20 drums of DNAPL.

## 5.2 Future Activities

The following recommendations are proposed to enhance the operation and performance of the remedial system. Complete integration of the MPE wells will require reprogramming of the PLC to use the solenoid valves that controlled the groundwater pumps in RW-2 and RW-6 to control the MPE wells; this will take place during June 2006. While programming is being conducted, additional minor programming will be performed to address control logic concerns that have been raised in previous monthly reports.

Proterra recommends converting the remaining dual pump wells (RW-1 and RW-7) to single bottom loading pumps, simplifying the process and increasing flows of groundwater and DNAPL.

Proterra recommends changing the frequency of the system sample collection. Influent and mid-carbon samples will be collected every other month, and effluent samples will be collected semi-annually.

When Air Component Systems returns to the site during the June quarterly maintenance visit, change the hoses on AC#2. The hoses on AC#1 were changed in August 2005.

Purchase two replacement flow meters with similar capabilities to the replace the faulty flow meters at the IG outfall and the POTW outfall. Similar specifications will reduce the amount of

# ATTACHMENT 3
# Community Notice

# EPA ANNOUNCES A FIVE-YEAR REVIEW
## of the Cape Fear Wood Preserving Site in Fayetteville, North Carolina

The Environmental Protection Agency is conducting a Five-Year Review of the clean-up remedy implemented at the Cape Fear Wood Preserving Superfund Site. The Cape Fear Site is located in Cumberland County, North Carolina, on the western side of Fayetteville at 1219 South Reilly Road. The purpose of the Five-Year Review is to evaluate the implemented clean-up remedy and to ensure that this remedy is effective and continues to be protective of human health and the environment.

The Cape Fear Wood Preserving Company commenced operations in 1953 and continued until 1983. The 41-acre facility produced creosote-treated wood from 1953 until 1978 when demand for creosote-treated products declined. Wood was then treated using copper-chromium-arsenic. Both liquid and sludge wastes were generated by these two treatment processes. Waste from the creosote process was pumped into a concrete sump and as liquid separated from the sludge, it was pumped into a drainage ditch that discharged into a diked pond. Stormwater runoff from the treatment yard also drained into this ditch. Waste from the copper-chromium-arsenic treatment process was pumped into a unlined lagoon north of the drying kiln and allowed to percolate into the ground. The Site was finalized on the National Priorities List (NPL) in J u ly 1987.

The construction phase of the Remedial Action (clean-up) at the Site began in J u ly 1995 and was completed in August 2001. The Remedial Action included the following activities: general Site clean-up, the successful treatment of approximately 113,000 cubic yards of contaminated soils/sediments through a low-thermal desorption unit, and the installation of a groundwater extraction and treatment system. General Site clean-up activities and the soil remediation effort occurred between July 1995 and May 1999. Construction of the groundwater remediation phase started in April 2001 and was completed in August 2001 when the groundwater remediation system became operational. As of November 2005, the groundwater remediation system has removed and treated approximately 15.5 million gallons of groundwater and has removed approximately 960 pounds of dissolved organic contaminants and approximately 11,440 gallons of creosote (104,250 pounds).

EPA will announce the release of the Final Five-Year Review and will place a copy of the report in the information repository located at the Cumberland County Public Library & Information Center, 300 Maiden Lane, Fayetteville, North Carolina, for the public to review.

**For further information on the Cape Fear Wood Preserving Superfund Site,**
**please feel free to contact:**
**Jon Bornholm, EPA Remedial Project Manager, or**
**Angela Miller, EPA Community Involvement Coordinator**
**(800) 435-9233 ext. 28820 or 28561**

# ATTACHMENT 4
# Complete Interviews

**Interview Questionnaire**
Prepared by Jon Bornholm (5/3/06)

1. What is your overall impression of the project? (general sentiment)
   No particular response.

2. What effects have site operations had on the surrounding community?
   The first negative off-site impact was the contamination of a potable well across the street. A new potable well was drilled. During the Remedial Action, the owners of two adjacent properties were paid for 20 year easements. The Remedial Action brought money into the local economy and continues to do so during the long term operation and maintenance effort.

3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
   The Agency has not heard of any community concerns. However, a recent Fayetteville newspaper article stated some residents in the South Gate community voiced some concern about the potential impact the Site has had on the quality of their drinking water. Other individuals, have questioned the Agency on the estimated timeframe to cleanup the groundwater.

4. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.
   Since the Emergency responses in the early 1980's, none that I know of.

5. Do you feel well informed about the site's activities and progress?
   Yes

6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
   No

7. What is the current status of construction (e.g., budget and schedule)?
   Remedial Action activities have been completed. Operation and maintenance (O&M) activities have been funded through FY 2007. Anticipate continuing O&M funding on a yearly basis.

8. Have any problems been encountered which required, or will require, changes to this remedial design or this ROD?
   A pilot scale treatability study on aggressively removing the dense non-aqueous phase liquid (DNAPL) was recently completed. The Agency is currently evaluating the results. Based on these results, the Agency may continue status quo (pump groundwater and DNAPL from existing wells) or may opt to implement a more aggressive system of removing the DNAPL front the subsurface.

9. Have any problems or difficulties been encountered which have impacted construction progress or implementability?
The original selected soil clean-up technology, soil washing, did not achieve soil clean-up goals. The contingent soil clean-up remedy, low thermal desorption, was then implemented and was successful. The Agency treated over 113,000 cubic yards of contaminated soil.

10. Do you have any comments, suggestions, or recommendations regarding the project (i.e., design, construction documents, constructability, management, regulatory agencies, etc.)?
None

11. Is the remedy functioning as expected? How well is the remedy performing?
For groundwater. the original remedy included three technologies which included groundwater/DNAPL, extraction and treatment with on-site discharge of the treated groundwater, air sparging, and injection to nutrients to promote in-situ bio-degradation on the contaminants. Based on the findings a. 2004 RSE, the air sparging and nutrient injection systems were shut down. Due to the extent of the DNAPL, the time-frame estimated in the Remedial Design to achieve the groundwater cleanup goals was underestimated. It will take significantly longer than eight years to achieve the groundwater cleanup goals.

12. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?
Monitoring data indicates that the benzene plume periphery is decreasing and the PAH plume in the shallow aquifer has been contained and reduced in size,

13. Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.
The groundwater extraction, treatment, and discharge systems were designed and built to he automated. However, the O&M contractor visits the Site approximately twice a week to deal with alarm conditions.

14. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.
The changes in the O&M requirements, maintenance schedules, or sampling routines were either pre-determined in the Remedial Design or the result of the recommendation made in the 2004 Remediation System Evaluation (RSE).

15. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.
Yes, the destructiveness of the creosote being extracted was underestimated. Most of the piping throughout the ground water extraction and treatment systems that came into contact with the creosote has been changed to HDPE which is more resistant to chemical attack.

16. Have there been opportunities to optimize O&M, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.
Yes, changes documented in the 2004 RSE.

17. Do you have any comments, suggestions, or recommendations regarding the project?
No

**FIVE YEAR REVIEW - MAY 2006**
**Cape Fear Wood Preserving Site, Fayetteville, North Carolina**
**Community Interviews**

This interviewee stated that he did not have any comments or concerns about the site. He has requested a copy of the final report when it is released.

This interviewee had several comments/concerns:

- Infiltration gallery IG-02 located to the west of Reilly Road was built in a low area and was a total waste of taxpayers money because it does not pump much water,
- Three out of four air sparging - not sure if they are even working,
- Some of the plume is on private land and he would like to see a report that determines the boundaries of the plume in order to see if the treatment system is working.
- Eight acres of this land is part of a 20 year easement and this interviewee is concerned that the property owner cannot do anything with the eight acres.
- The interviewee requests a copy of the final report when it is released.

This interviewee had several comments/concerns:

- Would like to see more communication with the public regarding the Site,
- It has been two to three years since the private wells were sampled and the interviewee has yet to receive any results from the sampling,
- When was the last time that the test wells were sampled? How often are the test wells sampled?

This interviewee's concern focused on when this property will be released by the government so that the property can be developed. The intent is to develop this property as residential.

**Community interviews were conducted by:**
**Angela R. Miller / Jon Bournholm**
**U.S. Environmental Protection Agency**
**Public Affairs Specialist / Remedial Project Manager**