Appendix A

Soil Sampling and Analysis Plan
116 Townsend Street
Hattiesburg, Mississippi

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April 19, 2006

Mr. Tony Russell
Assessment Remediation Branch
MDEQ Office of Pollution Control
101 Capitol Centre
101 W. Capitol Street
Jackson, MS 39201

Re: *Final Soil Sampling and Analysis Plan*
116 Townsend Street
Hattiesburg, Mississippi

Dear Mr. Russell:

On March 28, 2006, the Mississippi Commission on Environmental Quality (MCEQ) issued to Tronox LLC (Tronox) an Administrative Order (MCEQ Order No. 5116 06) for certain response activities at 116 Townsend Street in Hattiesburg, Mississippi. One of the requirements of the Administrative Order was the submittal of a work plan for "post-remedial confirmation sampling associated with the old drainage ditch at 116 Townsend Street." This document has been prepared and submitted in fulfillment of that requirement.

Project Background

In 2003, the City of Hattiesburg, with funding from Tronox predecessor Kerr-McGee Chemical LLC (KMC), completed a drainage rehabilitation project that included the removal and offsite disposal of sediment and soils containing PAHs. Implementation of the *Removal Action Work Plan, Northeast Drainage Ditch* (Michael Pisani & Associates, August 3, 2001) was required pursuant to an Agreed Order between the MCEQ and KMC (Order No. 4539 03, January 28, 2003). During excavation activities, a visibly-affected seam of material was observed extending beneath the property at 116 Townsend Street. This seam appeared to be confined to the remnant of a former ditch that was apparently filled with soil prior to residential development in the area. Due to access limitations, KMC and MDEQ agreed to address affected soils beneath the property at 116 Townsend Street at a later date.

In late 2005, Tronox and the residents of 116 Townsend Street entered into an agreement for the remediation of affected soils on the property. Once the agreement was in place, MP&A advanced 15 soil borings at 116 Townsend Street to delineate the extent of visibly-affected soils in the trace of a former ditch. The results of the boring program indicated that the seam of visibly-affected soils in the base of the former ditch appeared to extend beneath the house on the property. Visibly-affected soils were encountered at a depth of 4 to 6 feet below land surface and appeared to be confined to a channel approximately 10 feet wide.

In order to facilitate the removal of affected soils, the residents moved to temporary housing and the structure at 116 Townsend Street was demolished in February 2006. Pursuant to MCEQ Administrative Order No. 5116 06, Tronox now stands prepared to implement the *Final Removal Action Work Plan, 116 Townsend Street and Harrell Street Sewer Line* (Michael Pisani & Associates, April 18, 2006), as well as this work plan for post-remediation verification sampling. This *Soil Sampling and Analysis Plan* presents procedures for the collection and analysis of soil samples to demonstrate that after removal of affected soils, residual concentrations of polycyclic aromatic hydrocarbons (PAHs) in soils do not exceed remediation goals established by the Mississippi Department of Environmental Quality (MDEQ).

Proposed Sampling and Analytical Program

MDEQ has ordered that Tronox collect soil samples from the sidewalls of the excavation and from the uppermost one foot of soils outside of the excavation to demonstrate that a remediation goal of 1 milligram per kilogram (mg/kg) benzo(a)pyrene is met. MDEQ and Tronox have agreed that if soils are excavated to a minimum depth of 6 feet, the base of the excavation will not require sampling. Tronox proposes to collect samples at 20-foot intervals from each sidewall at a depth coincident with visibly-affected soils. Two lines of samples will also be collected at 20-foot intervals on each side of the ditch from the zero to one-foot depth interval. Proposed sampling locations are shown on the attached figure.

The sidewall samples and the "inside" line of surface soil samples will be analyzed for polycyclic aromatic hydrocarbons (PAHs) by SW-846 Method 8270. A semivolatile extraction will be performed on samples from the "outside" line of surface soil samples. A decision regarding analyses of the "outside" line of samples will be based on the results from the "inside" line.

Data Evaluation

MDEQ has established a remediation goal of 1 mg/kg benzo(a)pyrene for the site. Tronox may calculate the 95% upper confidence limit (UCL) for benzo(a)pyrene using the verification sampling data. Pursuant to Section 601(d)(1) of *Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment of Brownfield Sites* (MDEQ, February 28,

2002), no further action will be required if the 95% UCL for benzo(a)pyrene is less than the approved remediation goal of 1 mg/kg.

Should you have any questions or wish to discuss our proposed sampling program, please contact us. As required by the Order, Tronox will begin implementation of this Work Plan within 30 days of receipt of MCEQ approval.

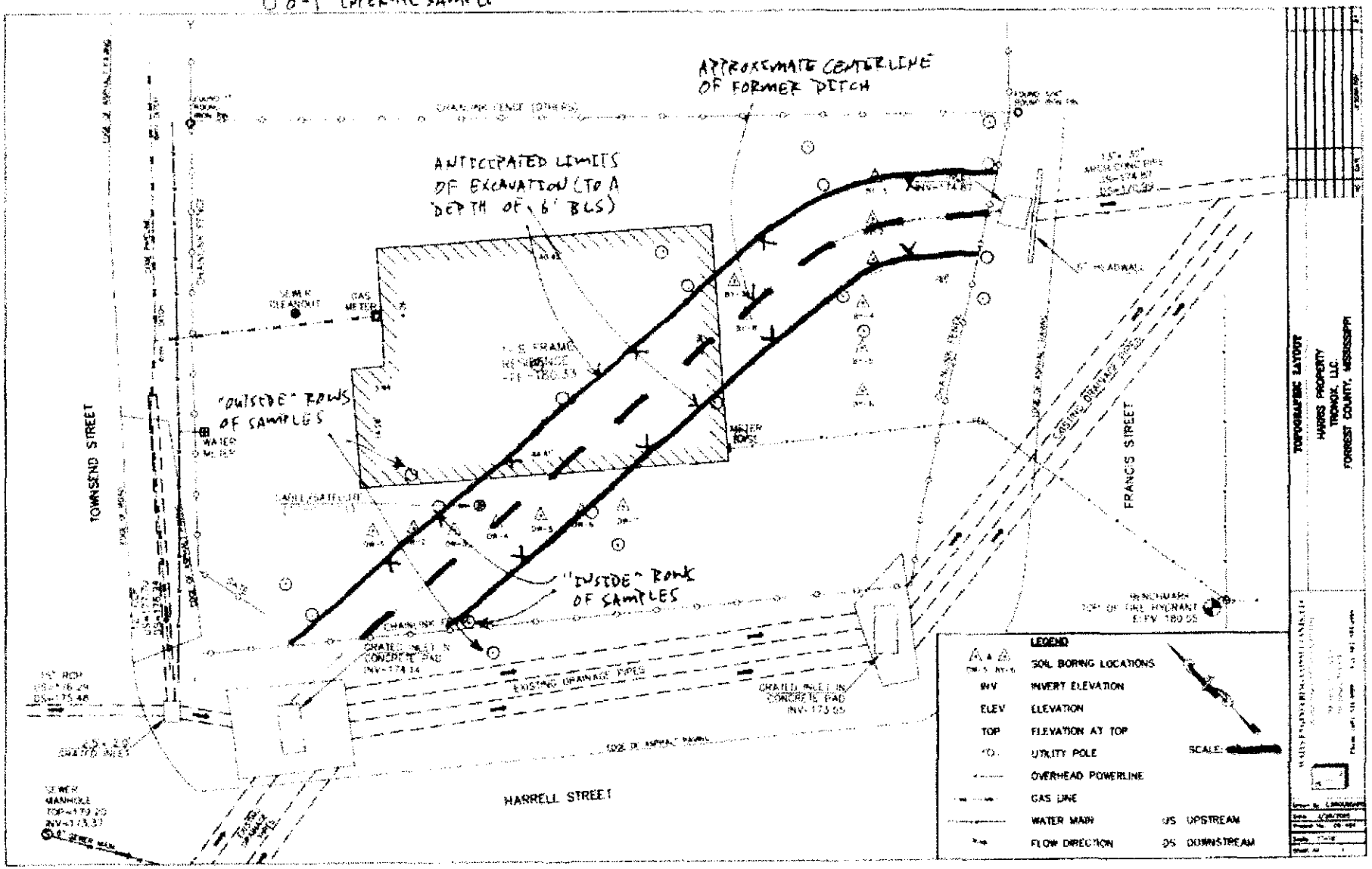
Sincerely,

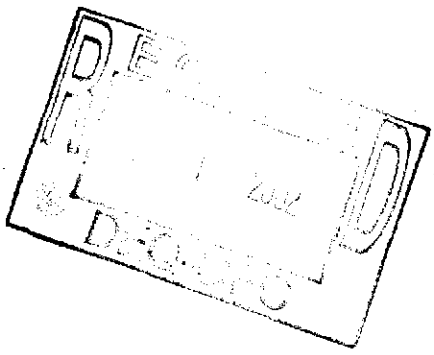
MICHAEL PISANI & ASSOCIATES, INC.

David C. Upthegrove, P.G.

cc: Jerry Banks – MDEQ
Keith Watson – Tronox

X SIDEWALL SAMPLE
○ 0-1' INTERVAL SAMPLE





FILE COPY

Final Remedial Action Work Plan

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

August 21, 2002

Project No. 21-04

MICHAEL PISANI & ASSOCIATES, INC.
Environmental Management and Engineering Services
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Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Executive Summary

Introduction

The Gulf States Creosoting site (the Site) is a former wood treating plant in Hattiesburg, Mississippi. Since 1996, Kerr-McGee Chemical (KMC) has conducted extensive investigations to determine the limits of affected media at the Site. Through the completion of this investigative process, referred to in both state and federal guidance as a Remedial Investigation (RI), the vertical extent and horizontal extent of affected media have been fully delineated.

In May 2001, KMC also completed a baseline risk assessment to evaluate existing and/or potential risks to human health and the environment. Both the RI and risk assessment have been approved by the Mississippi Department of Environmental Quality (MDEQ).

The results of the RI and risk assessment have been used to identify areas of the Site where remediation of affected media is necessary and appropriate. This work plan describes proposed remedial activities required to address affected media in these areas of potential concern.

Project Background

In January 1997, KMC, MDEQ, and the Mississippi Commission on Environmental Quality entered into an agreement for the investigation of the former Gulf States Creosoting site in Hattiesburg, Mississippi pursuant to MDEQ's Voluntary Evaluation Program (VEP). The agreement calls for characterization of the Site under the direction and review of the MDEQ Office of Pollution Control, Uncontrolled Sites Section. MDEQ guidance for the VEP states that investigations will include all activities necessary to characterize the environmental setting and to define the nature and extent of affected Site media. The MDEQ guidance refers to this investigative process as a Remedial Investigation.

A chronology of site response activities completed to date is provided in Table ES-1. The following reports presenting the results of site investigation activities have previously been submitted to MDEQ:

- *Remedial Investigation Report* (June 30, 1997)
- *Interim Report - Phase II Remedial Investigation*, August 14, 1998
- *Phase II Remedial Investigation Report* (December 30,1998)
- *Report on Additional Site Investigation Activities* (November 22, 2000)
- *Report on Site Investigation Activities, February and March 2001* (June 12, 2001)
- Several letter reports presenting the results of additional subsurface soil sampling.

Table ES-1
Chronology of Site Response Activities

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Date	Activity
January 8, 1997	KMC submitted *Site Investigation Work Plan* to MDEQ
February 21, 1997	MDEQ approved *Site Investigation Work Plan* for implementation
April 30, 1997	KMC completed Phase I RI field activities
June 30, 1997	KMC submitted *Remedial Investigation Report*
January 13, 1998	MDEQ commented on *Remedial Investigation Report*
February 25, 1998	KMC submitted *Addendum to Site Investigation Work Plan*
March 16, 1998	KMC met with MDEQ to discuss proposed Phase II RI activities
April 8, 1998	KMC submitted *Revised Addendum to Site Investigation Work Plan*
April 23, 1998	MDEQ approved *Revised Addendum to Site Investigation Work Plan* for implementation
June 11, 1998	KMC completed the ground water screening portion of Phase II RI field activities
August 14, 1998	KMC submitted *Interim Report - Phase II Remedial Investigation*
August 26, 1998	MDEQ approved the monitoring well locations proposed in *Interim Report - Phase II Remedial Investigation*
October 14, 1998	KMC completed Phase II RI field activities
December 30, 1998	KMC submitted *Phase II Remedial Investigation Report*
April 20, 1999	MDEQ approved *Phase II Remedial Investigation Report*
April 20, 1999	KMC submitted *Proposed Work Plan for Developing Site-Specific, Risk-Based Cleanup Goals*
August 3, 1999	MDEQ approved *Proposed Work Plan for Developing Site-Specific, Risk-Based Cleanup Goals*

Table ES-1 (continued)
Chronology of Site Response Activities

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Date	Activity
November 12, 1999	KMC submitted *Human Health Risk Assessment*
January 14, 2000	KMC submitted *Ecological Risk Assessment*
February 14, 2000	KMC submitted *Remedial Action Work Plan*
June 21, 2000	KMC met with MDEQ to discuss areas where additional assessment activities warranted
July 25, 2000	MDEQ commented on *Ecological Risk Assessment*
August 2, 2000	MDEQ commented on *Human Health Risk Assessment*
August 3, 2000	KMC submitted *Work Plan for Additional Site Investigation Activities*
August 11, 2000	MDEQ approved *Work Plan for Additional Site Investigation Activities*
September 18, 2000	KMC completed additional site investigation field activities
November 2000	KMC submitted *Report on Additional Site Investigation Activities* and revised *Human Health Risk Assessment*
February 1, 2001	MDEQ commented on *Report on Additional Site Investigation Activities*
February 6, 2001	MDEQ commented on *Human Health Risk Assessment*
February 6, 2001	KMC submitted letter proposing additional site investigation activities
February 7, 2001	MDEQ approved proposed additional site investigation activities
March 2, 2001	KMC completed additional field activities
April 3, 2001	KMC submitted *Human Health Risk Assessment*

Table ES-1 (continued)
Chronology of Investigation Activities

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Date	Activity
April 20, 2001	MDEQ issued conditional approval of *Human Health Risk Assessment*
May 4, 2001	KMC submitted revised portions of *Human Health Risk Assessment*
May 4, 2001	MDEQ approved *Human Health Risk Assessment*
June 12, 2001	KMC submitted *Report on Additional Site Investigation Activities, February and March 2001*
June 20-21, 2001	KMC conducted limited excavation activities to delineate the extent of subsurface features in the former Process Area
June 25, 2001	KMC submitted *Ground Water Monitoring Plan*
July 10, 2001	MDEQ requested additional subsurface soil sampling across railroad tracks from former Process Area
July 17, 2001	MDEQ commented on February 14, 2000 *Remedial Action Work Plan* and *Ground Water Monitoring Plan*
July 19, 2001	KMC conducted additional subsurface soil sampling across railroad tracks from former Process Area
August 3, 2001	KMC submitted a *Removal Action Work Plan* for the northeast drainage ditch
September 4, 2001	KMC submitted a letter report presenting the results of additional subsurface soil sampling
September 19, 2001	KMC submitted a *Remedial Action Work Plan* for onsite areas
January 24, 2002	KMC conducted additional subsurface soil sampling in the vicinity of the former retort building
May 8, 2002	MDEQ commented on the August 3, 2001 *Removal Action Work Plan* and the September 19, 2001 *Remedial Action Work Plan*

In February 2000, KMC submitted to MDEQ a *Remedial Action Work Plan* for the Site. The work plan outlined proposed remedial activities to address affected media in the following areas:

- the Gordon's Creek Fill Area (the Fill Area);
- several subsurface features (i.e., storage tanks, a sump, and a suspected burial area) within the former Process Area;
- the area situated between the former Process Area and the Southern railroad tracks; and
- the northeast drainage ditch.

In a June 28, 2001 meeting, MDEQ and KMC agreed that in order to expedite cleanup of affected sediment and soil in the northeast drainage ditch, proposed activities to address the ditch would be presented in a stand-alone document. A *Removal Action Work Plan* for the northeast drainage ditch was submitted to MDEQ on August 3, 2001. Proposed response activities for affected media in the other above-listed areas, including additional work necessary to address MDEQ comments on the February 2000 plan, were presented in a *Remedial Action Work Plan* dated September 19, 2001.

Since the submittal of that plan, KMC and MDEQ have had numerous discussions and meetings regarding a mutually-acceptable remedy. On May 8, 2002, MDEQ provided written comments on the September 19, 2001 plan. This revised *Remedial Action Work Plan* incorporates KMC responses to MDEQ comments.

Overview of Proposed Remedial Action

Gordon's Creek Fill Area

The scope of remedial action for addressing the Fill Area consists of the following steps:

1. Install culvert in the ditch bisecting the Fill Area between West Pine Street and Gordon's Creek.
2. Drive sheet pilings to cut off intermittent seeps of dense non-aqueous phase liquids (DNAPLs) to Gordon's Creek.
3. Delineate the extent of visible DNAPLs in the Gordon's Creek streambed, and develop a plan to remediate DNAPLs, if necessary.
4. Install a recovery system behind the sheet piling barrier to collect, contain, and dispose of DNAPLs.
5. Install a geosynthetic clay liner atop affected Fill Area materials to inhibit the infiltration of precipitation through affected soils and reduce the potential for ground water mounding.
6. Implement a phytoremediation program to reduce the potential for ground water mounding, promote the capture of affected ground water, and accelerate further degradation of site constituents in shallow soils.

Process Area Subsurface Features

The scope of remedial action for addressing subsurface features within the former Process Area consists of the following steps:

1. Remove free product and creosote-saturated materials from within, beneath, and around a concrete sump. Transport the solids offsite for disposal at an acceptable location. Transport the liquids offsite for re-use or appropriate treatment/disposal.
2. Remove free product and creosote-saturated materials (i.e., soils and treated timbers) from a wooden substructure. Transport the materials offsite for disposal at an acceptable location.
3. Fill the excavations within the Process Area with clean fill materials. Cap the affected soils left in place with a water-impervious liner and asphalt to preclude direct contact and reduce the potential for infiltration of precipitation.

Southern Railroad Track Area

The scope of remedial action for addressing the area situated between the former Process Area and the Southern railroad tracks consists of the following steps:

1. Remove affected sediment and soils within and beneath drainage ditches. Transport the materials offsite for disposal at an acceptable location.
2. Either cap affected soils outside of the ditches with a water-impervious liner, drainage layer, and crushed rock or remove affected shallow soils (i.e., soils to a depth of 3 feet) then backfill and cap area to preclude infiltration of precipitation through affected soils (the final remedy is currently being negotiated with the railroad and MDEQ).

1.0 Introduction

Site background and general information on proposed response activities are provided in the following sections.

1.1 Site Background

The former Gulf States Creosoting site is located in Hattiesburg, Mississippi near the intersection of Scooba Street and West Pine Street. The Site is situated entirely within Section 16 of Township 4 North, Range 13 West in Forrest County, Mississippi, and is roughly bounded by the Southern railroad tracks to the southeast, Scooba Street to the northeast, Corinne Street and Gordon's Creek to the northwest, and U.S. Highway 49 to the southwest.

The wood treating facility operated between the early 1900s and approximately 1960. Operations at the facility were of a relatively small scale, consisting of the use of creosote only in a single pressure treating cylinder. The Site was redeveloped for commercial and light industrial use beginning in approximately 1962. There are no residential or institutional uses of the Site.

Results of the RI indicated that media affected by constituents of concern are present in four areas: 1) the Gordon's Creek Fill Area; 2) the former Process Area; 3): the Southern railroad track area; and 4) the northeast drainage ditch. RI findings are summarized in Section 2 of this document.

1.2 Work Plan Objectives

This work plan defines activities required to address affected media at the Site. The primary objectives of these response activities are to:

- mitigate intermittent releases of wood treating constituents to Gordon's Creek;
- address potential sources in the former Process Area; and
- reduce Site risks posed by potential exposure to affected surface soils.

1.3 General Plan

The general plan for remedial action at the Site has two primary components. The first component is the targeted cleanup of affected media in the Fill Area, the former Process Area, and the Southern Railroad track area. The second component is the use of institutional controls to ensure that: a) future uses of the affected areas of the Site are consistent with their current use (i.e., commercial and/or industrial); and b) current and future Site owners and/or lessees of the affected areas are advised of the presence of affected media and restrictions on land use.

2.0 Summary of Remedial Investigation Findings

Detailed results of Remedial Investigation (RI) activities were presented in the following reports:

- *Remedial Investigation Report* (June 30, 1997)
- *Interim Report - Phase II Remedial Investigation*, August 14, 1998
- *Phase II Remedial Investigation Report* (December 30,1998)
- *Report on Additional Site Investigation Activities* (November 22, 2000)
- *Report on Site Investigation Activities, February and March 2001* (June 12, 2001)
- Letter report presenting the results of additional subsurface soil sampling (September 4, 2001).

A summary of the RI findings is provided in the following sections. Information on the site environmental setting is summarized in Section 2.1; information regarding the nature and extent of affected media is summarized in Section 2.2.

2.1 Site Environmental Setting

The following subsections contain information on the site topography and drainage, geology, and ground water occurrence and conditions.

2.1.1 Topography and Surface Drainage

Figure 2-1 is a topographic map of the Site prepared from a 1996 aerial survey by Atlantic Technologies of Huntsville, Alabama. The map indicates that present site elevations range from approximately 196 feet above mean sea level (msl) along a topographic ridge or divide in the north central portion of the Site to 176 feet msl within the Gordon's Creek channel at the western edge of the Site. The topographic divide for the Site is located approximately 300 to 400 feet southwest of Timothy Lane and runs roughly north-south. The ground surface west of this topographic divide slopes gradually from east to west, toward Gordon's Creek. East of the divide, the ground surface slopes northeastward toward Scooba Street.

Due to the presence of this topographic divide, surface drainage from the Site flows to two separate and distinct drainage basins. The first is a drainage basin created by a system of ditches and culverts, including the Southern railroad ditch immediately adjacent to Courtesy Ford, which flow eastward toward the Leaf River. The second is a drainage basin created by Gordon's Creek, which flows northward from the Site and eventually turns east towards the Leaf River. Surface runoff from the portion of the Site east of the topographic divide drains eastward toward the Leaf River via the ditch and culvert system; the remainder of the Site drains westward toward Gordon's Creek. Current site drainage is depicted on Figure 2-1.

2.1.2 Site Geology

Results of RI activities show the shallow geology of the former Process Area and Fill Area to be significantly different, with the exception of an underlying hard clay aquitard common to both areas. The top of this hard clay aquitard was encountered in all borings at elevations

TOPOGRAPHIC AND DRAINAGE DIVIDE

CORINNE ST.

W. PINE ST.

TIMOTHY LANE

SCOOBA ST.

N.O. & N.E. (SOUTHERN) RAILROAD

GROUND OBSCURED

LEGEND

GENERAL DIRECTION OF SURFACE DRAINAGE

0 100 200 300 400

SCALE FEET

BASE MAP FROM ATLANTIC TECHNOLOGIES, LTD., HUNTSVILLE, ALABAMA, APRIL 1, 1996

MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas

TITLE: FIGURE 2-1
SITE DRAINAGE

PROJECT: FORMER GULF STATES CREOSOTING SITE

LOCATION: HATTIESBURG, MISSISSIPPI

SCALE: 1"=200' DWG. NO.: 21-04/708

ranging from 145 to 165 feet above mean sea level (amsl). Published reports and geologic logs from wells in the Hattiesburg area indicate that this is roughly equivalent in elevation to the top of the massive Hattiesburg clay. No borings advanced during the RI fully penetrated the clay layer, which is reportedly between 120 and 200 feet thick in the Hattiesburg area.

The former Process Area geology is characterized by the presence of an upper clay unit, a sand channel, and the underlying Hattiesburg clay aquitard. The thickness of the upper clay unit ranges from 20 to 25 feet beneath the former Process Area, while the maximum thickness of the sand channel is 21 feet. The sand channel, which is the uppermost water-bearing zone beneath the former Process Area, pinches out to the west and does not extend westward to Gordon's Creek or beneath the Fill Area.

The Fill Area geology is characterized by shallow interbedded sands and clays underlain by the Hattiesburg clay aquitard. The interbedded sand deposits, which comprise the uppermost water-bearing zone beneath the Fill Area, do not extend eastward to the former Process Area. The shallow water-bearing zones beneath the former Process Area and Fill Area are not interconnected.

The locations of cross-sections depicting the geology of the former Process Area and Fill Area are shown on Figure 2-2. Cross-sections through the former Process Area and the Fill Area are displayed on Figures 2-3 and 2-4, respectively.

2.1.3 Ground Water Occurrence and Conditions

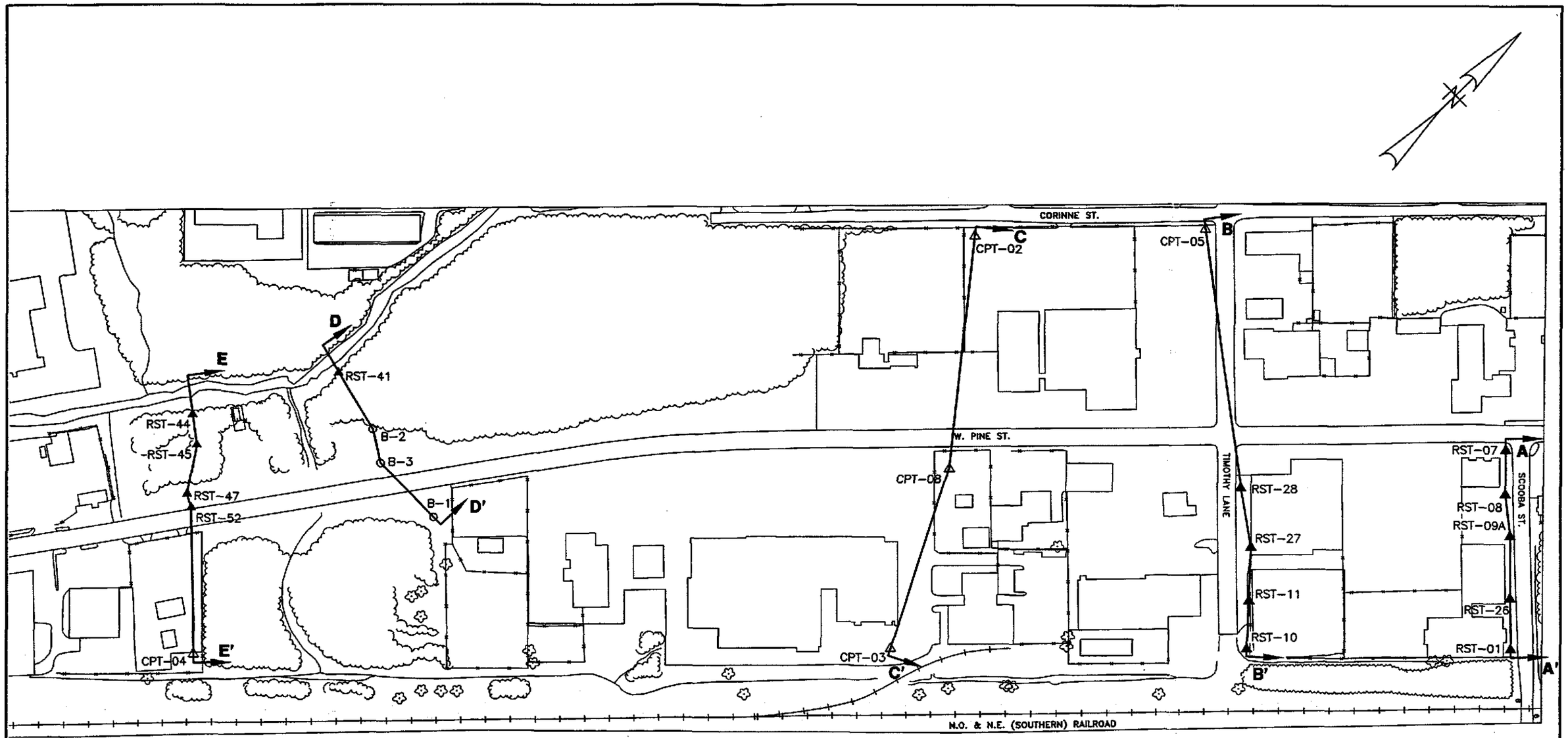
Just as the shallow geology of the former Process Area and Fill Area are significantly different, the shallow aquifer systems beneath the two areas are separate and distinct. As stated above, the uppermost water-bearing zone beneath the former Process Area does not extend westward to the Fill Area, and the uppermost water-bearing zones beneath the Fill Area do not extend eastward to the former Process Area. Furthermore, ground water within the two zones flows in completely opposite directions. Ground water within the Fill Area sands flows westward toward Gordon's Creek and downstream along the creek (see Figure 2-5). Ground water within the former Process Area sand channel flows eastward toward the Leaf River (see Figure 2-6).

2.2 Nature and Extent of Affected Media

The discussion regarding nature and extent of affected media at the Site is broken down into the following sections of this report:

2.2.1 Fill Area (DNAPL, soil, ground water,)
2.2.2 Former Process Area/Southern Railroad Track Area (free product, soil, ground water)

During the Phase I RI, a Rapid Optical Screening Tool (ROST) was used to determine the nature and extent of affected soil within the former Process Area and the Fill Area. The ROST system combines cone penetrometer testing (CPT) and laser-induced fluorescence



LEGEND

△ CPT PUSH

▲ ROST PUSH

○ SOIL BORING

0 100 200 300 400

SCALE FEET

BASE MAP FROM ATLANTIC TECHNOLOGIES, LTD., HUNTSVILLE, ALABAMA, APRIL 1, 1996

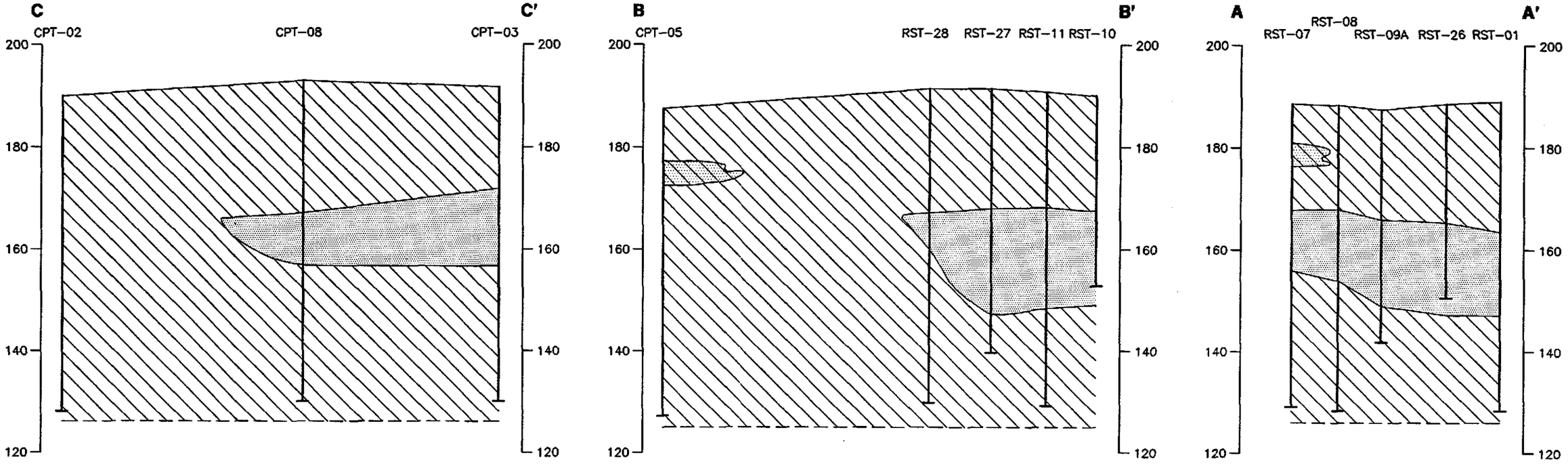
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas

TITLE: FIGURE 2-2
CROSS-SECTION LOCATION MAP

PROJECT: FORMER GULF STATES CREOSOTING SITE

LOCATION: HATTIESBURG, MISSISSIPPI

SCALE: 1"=200' DWG. NO.: 21-04/71B



LEGEND

- SAND CHANNEL
- SANDY CLAY/CLAYEY SAND
- CLAY

20
10
0
0 100 200
SCALE FEET

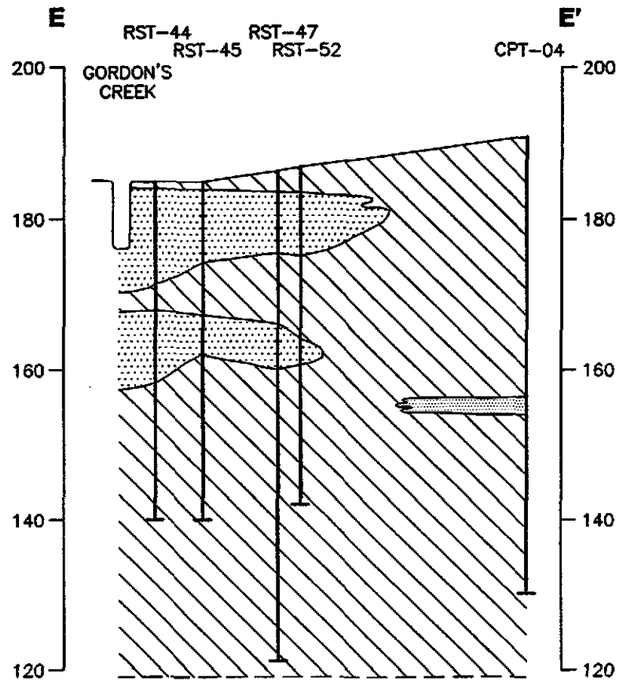
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas

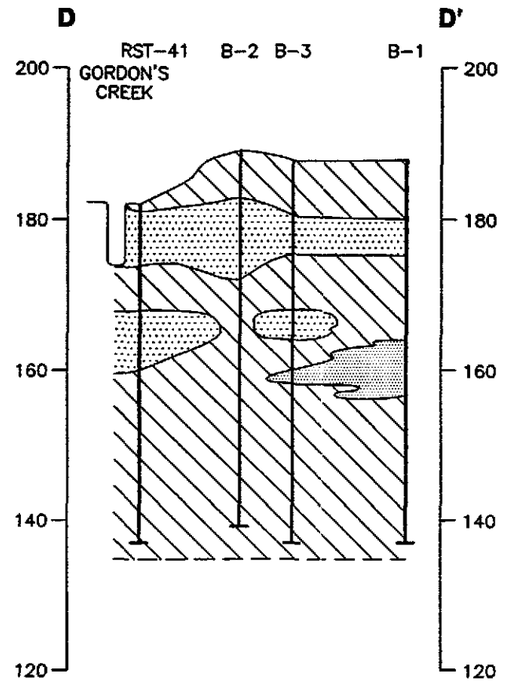
TITLE: FIGURE 2-3
FORMER PROCESS AREA CROSS-SECTIONS

PROJECT: FORMER GULF STATES CREOSOTING SITE

LOCATION: HATTIESBURG, MISSISSIPPI

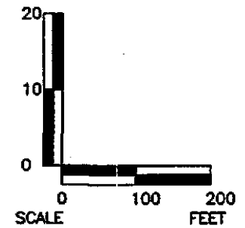
SCALE: 1"=200'/1"=20' | DWG. NO.: 21-04/72B





LEGEND

- SAND CHANNEL
- GORDON'S CREEK SAND DEPOSITS
- CLAY



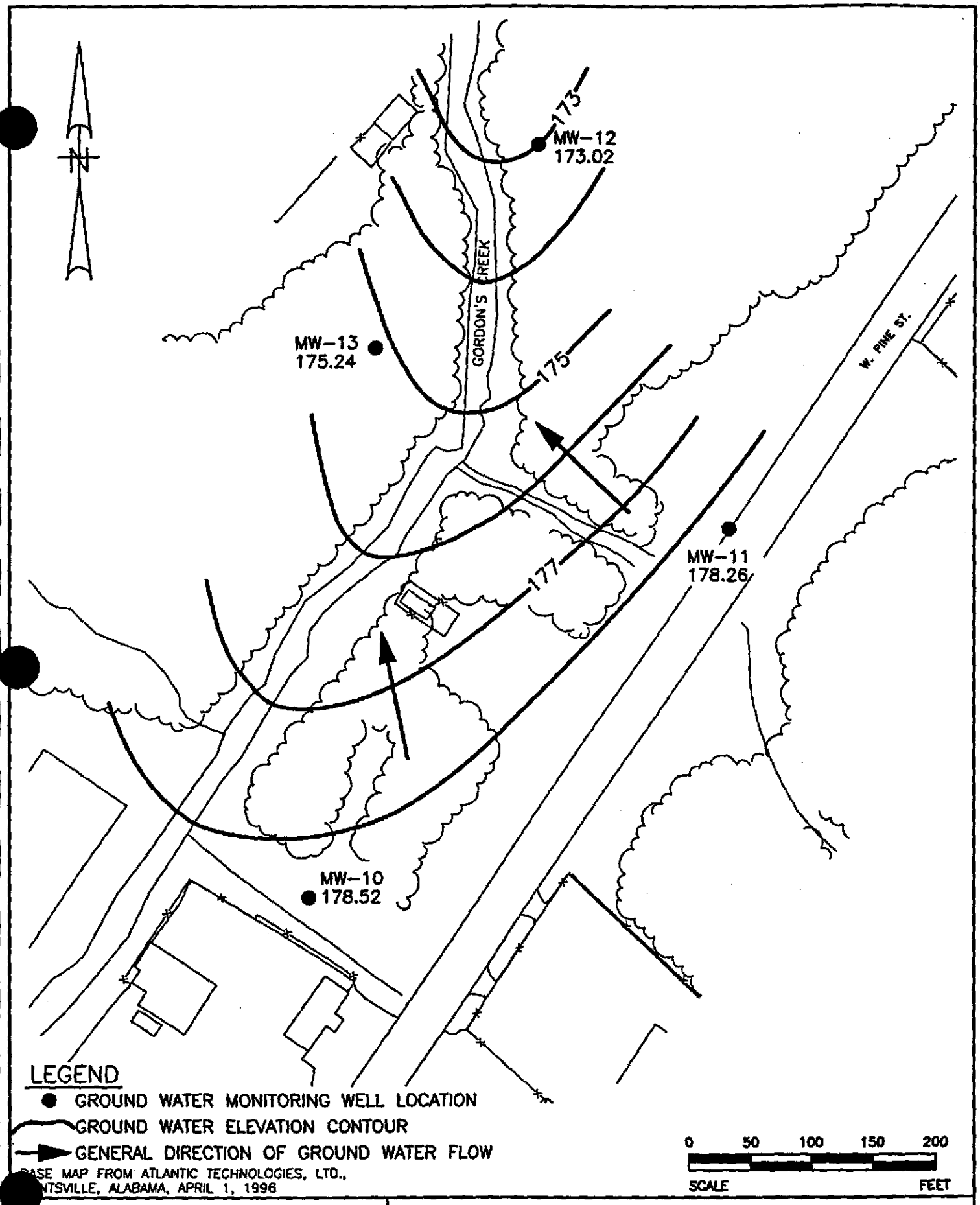
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana — Houston, Texas

TITLE: FIGURE 2-4
FILL AREA CROSS-SECTIONS

PROJECT: FORMER GULF STATES CREOSOTING SITE

LOCATION: HATTIESBURG, MISSISSIPPI

SCALE: 1"=200'/1"=20' | DWG. NO.: 21-04/73B

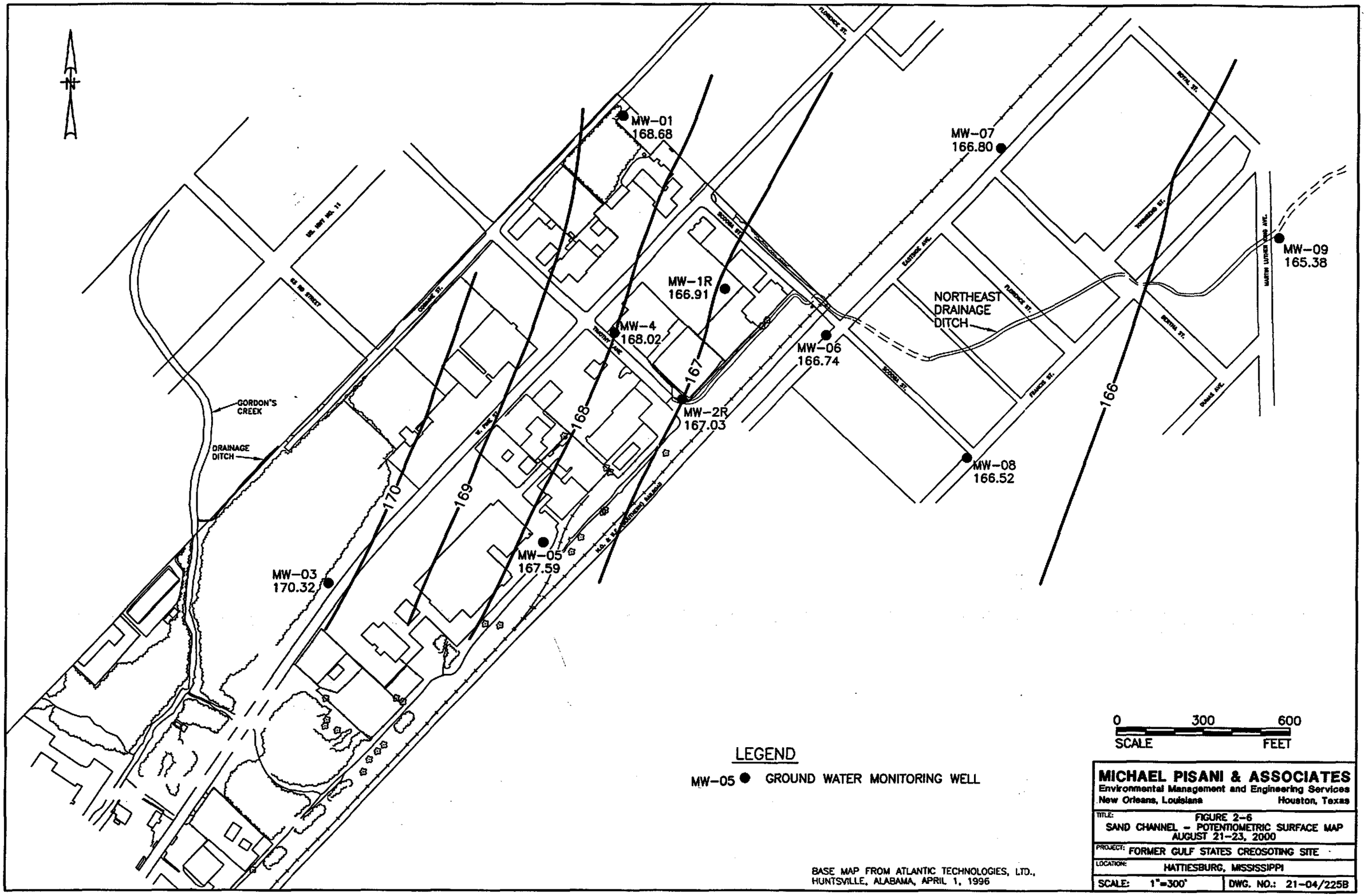


MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas

SCALE: 1"=100' | DWG. NO.: 21-04/224A

FIGURE 2-5
FILL AREA
POTENTIOMETRIC SURFACE MAP - AUGUST 21-23, 2000

FORMER GULF STATES CREOSOTING SITE
HATTIESBURG, MISSISSIPPI


MW-01
168.68
MW-1R
166.91
MW-4
168.02
MW-2R
167.03
MW-03
170.32
MW-05
167.59
MW-06
166.74
MW-07
166.80
MW-08
166.52
MW-09
165.38
NORTHEAST
DRAINAGE
DITCH
GORDON'S
CREEK
DRAINAGE
DITCH
167
168
169
170
166
FLORENCE ST.
SCHOOL ST.
EASTSIDE AVE.
FRANCE ST.
NORTH ST.
SOUTH ST.
DEMARE AVE.
MARTIN LUTHER KING AVE.
0
300
600
SCALE
FEET
LEGEND
MW-05 ● GROUND WATER MONITORING WELL
BASE MAP FROM ATLANTIC TECHNOLOGIES, LTD.,
HUNTSVILLE, ALABAMA, APRIL 1, 1996
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas
TITLE: FIGURE 2-6
SAND CHANNEL - POTENTIOMETRIC SURFACE MAP
AUGUST 21-23, 2000
PROJECT: FORMER GULF STATES CREOSOTING SITE
LOCATION: HATTIESBURG, MISSISSIPPI
SCALE: 1"=300'
DWG. NO.: 21-04/225B

(LIF) to provide a continuous stratigraphic profile, as well as rapid sampling and real-time, semi-quantitative analysis of the chemical characteristics (primarily aromatic hydrocarbons, including creosote) of subsurface soils on a continuous basis. In addition, correlation soil samples were collected and analyzed to confirm ROST results. The ROST system was demonstrated to be an excellent screening tool for determining the presence or absence of creosote and also the relative total concentration of creosote constituents (i.e., low, medium, or high).

Tables summarizing analytical data from the RI are provided in Appendix A of this document. Figures 2-7 through 2-12 depict benzo(a)pyrene equivalence values in soil within the following depth intervals: zero to 2 feet, 2 to 5 feet, 5 to 10 feet, 10 to 15 feet, and 15 to 20 feet. The use of benzo(a)pyrene equivalence is a toxicity equivalence factor (TEF) approach for assessment of potentially carcinogenic PAHs. This approach assigns each of the seven potentially carcinogenic PAHs (CPAHs) an "estimated order of potential potency" based on its toxicity relative to benzo(a)pyrene in laboratory studies. U.S. EPA provides this methodology as a tool for assessing risk associated with CPAHs in the document *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons*, EPA/600/R-93/089, July 1993.

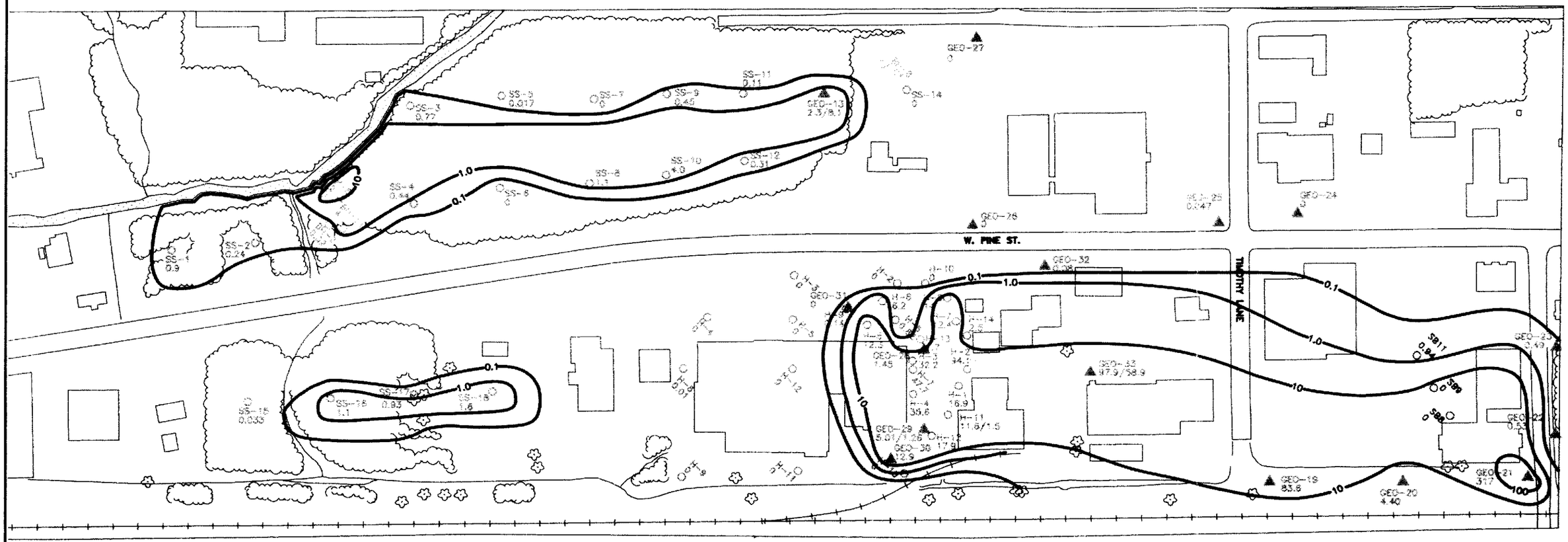
Figures 2-13 and 2-14 depict naphthalene concentrations in ground water samples. Naphthalene is the single most prevalent creosote constituent in ground water at the Site, and is a good indicator parameter due to its solubility and thus its mobility.

Figures 2-15 depicts total non-carcinogenic PAH and benzo(a)pyrene equivalence values in surface water samples collected from the two offsite drainage pathways (Gordon's Creek and the northeast drainage ditch). Figure 2-16 depicts benzo(a)pyrene equivalence values in sediment samples.

The tables and figures cited above provide the basis for the following discussions regarding the nature and extent of affected media at the Site.

2.2.1 Fill Area

Soil. The approximate extent of affected soil within the Fill Area, based on the ROST data and subsurface soil results, is depicted by the shaded area on Figure 2-17. The vertical and lateral extent of affected soil within the Fill Area appear to be dictated by the placement of fill materials and by the discontinuous sand and clay layers beneath the area. The approximate surface area underlain by affected soils is 1.9 acres. The upper 3 to 4 feet of soil in the Fill Area is generally not affected. Evidence of creosote impact extends into the upper saturated sand beneath the Fill Area. The thickness of affected soil varies by location and ranges from several feet to as much as 15 to 20 feet.



SITE INSPECTION, 1/92 BY MDEQ FOR EPA

SOIL GAS AND SOIL SAMPLING, 5/90 BY ROY F. WESTON FOR EPA

PHASE II INVESTIGATION OF PROCESS AREA, 1994 BY EPS FOR VAN SLYKE

PHASE II INVESTIGATION OF GIBSON'S SHOPPING CENTER, 8/94 BY BONNER FOR MS. THOMAS

PRELIMINARY SUBSURFACE INVESTIGATION OF RYAN MOTORS/PINCO REALTY, 11/94 BY BONNER ANALYTICAL TESTING

ADDITIONAL INVESTIGATION OF GIBSON'S SHOPPING CENTER, 7/95 BY BONNER FOR MS. THOMAS

SOIL BORING ASSESSMENT, 6/96 BY TDS

REMEDIAL INVESTIGATION, BY MP&A FOR KMCC

LEGEND

SS-7 O HISTORICAL SOIL BORING/SAMPLE

GEO-26 ▲ PHASE II RI SOIL BORING/SAMPLE

—0.1— BENZO(a)PYRENE ISOCONCENTRATION LINE (mg/kg)

NOTE:
CONTOUR LINES BETWEEN KNOWN POINTS ARE INTERPOLATIONS AND MAY NOT ACCURATELY REPRESENT CONSTITUENT CONCENTRATIONS.

0 100 200 300 400
SCALE FEET

BASE MAP FROM ATLANTIC TECHNOLOGIES, LTD., HUNTSVILLE, ALABAMA, APRIL 1, 1996

MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas

TITLE: FIGURE 2-7
BENZO(A)PYRENE EQUIVALENCE (mg/kg) IN 0-2' SOIL SAMPLES

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