Appendix E

Contingency Plan

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Contingency Plan

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

July 12, 2002

Project No. 21-04

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Former Gulf States Creosoting Site
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1.0 Introduction

This *Contingency Plan* has been developed at the request of the Mississippi Department of Environmental Quality (MDEQ) to respond to the potential migration of existing ground water contaminant plumes at the former Gulf States Creosoting Site in Hattiesburg, Mississippi. Kerr-McGee Chemical, L.L.C. (KMC) has completed a Remedial Investigation (RI) at the site, and the extent of affected ground water has been fully delineated. The results of a human health risk assessment indicate that there is no current risk associated with affected ground water, as shallow ground water in the vicinity of the site is unused for any purpose.

Section 2.0 of this plan provides background information on the existing ground water monitoring network. Procedures that will be implemented in response to the migration of existing plumes are established in Section 3.0. Section 4.0 presents information requested by MDEQ regarding financial assurance required to conduct ongoing ground water monitoring at the site.

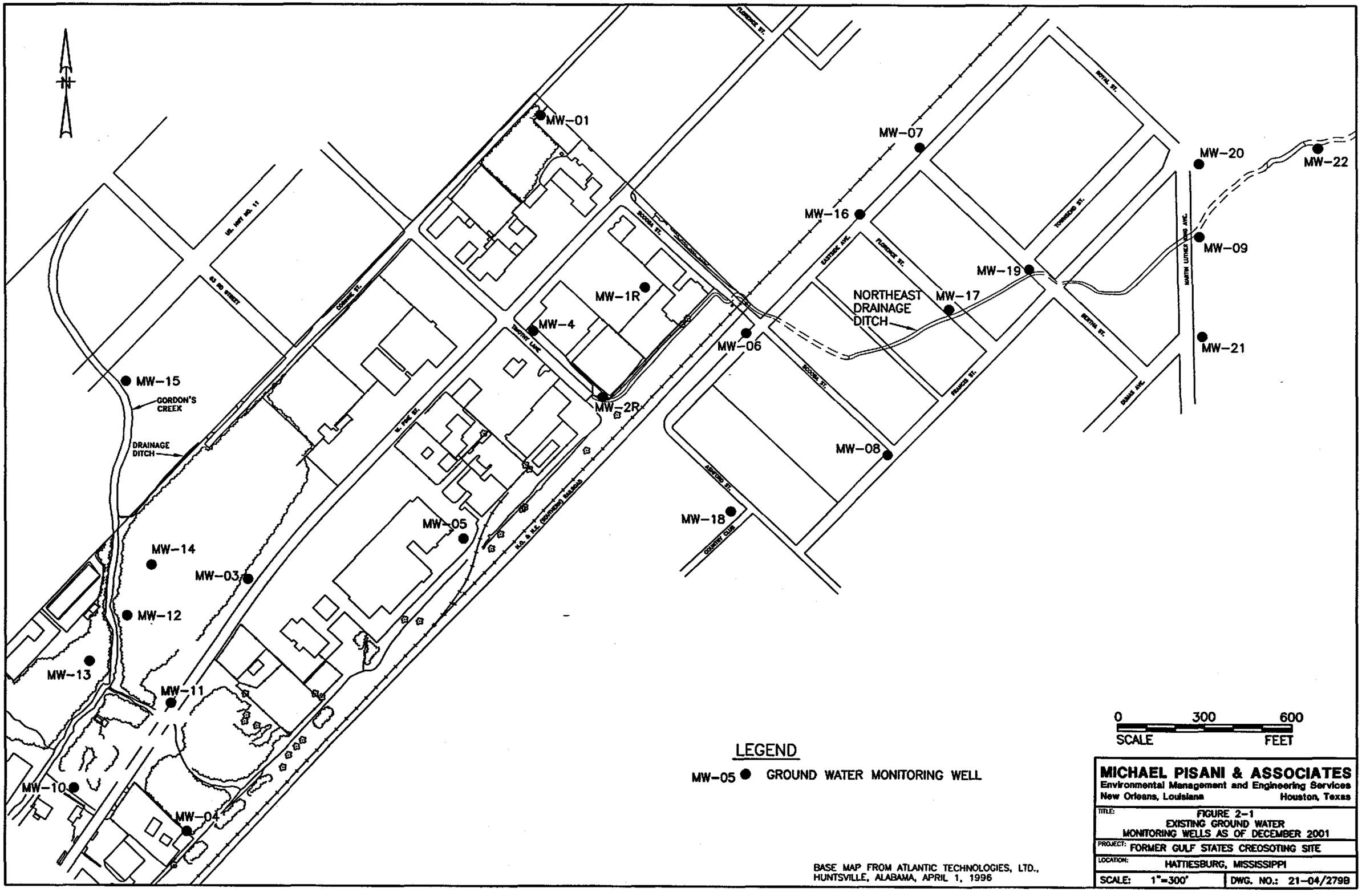
2.0 Existing Ground Water Monitoring Network

Currently, a network of 24 ground water monitoring wells exists to monitor site ground water conditions. The locations of these wells are depicted on Figure 2-1. During completion of the RI, temporary well points and ground water monitoring wells were used to delineate the extent of affected ground water. The RI results established that three distinct contaminant plumes are present at the site: One associated with the former Process Area, one associated with the Gordon's Creek Fill Area, and one associated with the northeast drainage ditch.

As part of the ongoing ground water monitoring program, wells within, upgradient of, and downgradient of each plume are routinely sampled for polycyclic aromatic hydrocarbons (PAHs). Due to its solubility, naphthalene is the only target constituent that migrates significant distance from source area. The extent of naphthalene in the Process Area plume and the northeast drainage ditch plume is depicted on Figure 2-2; the extent of naphthalene in the Fill Area is depicted on Figure and 2-3.

Plume-defining wells are as follows:

- Process Area plume: MW-16, MW-08, and MW-18;
- Northeast drainage ditch plume: MW-20, MW-21, and MW-22; and
- Fill Area plume: MW-13, MW-14, and MW-15.



0 300 600
SCALE FEET

LEGEND

MW-05 ● GROUND WATER MONITORING WELL

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

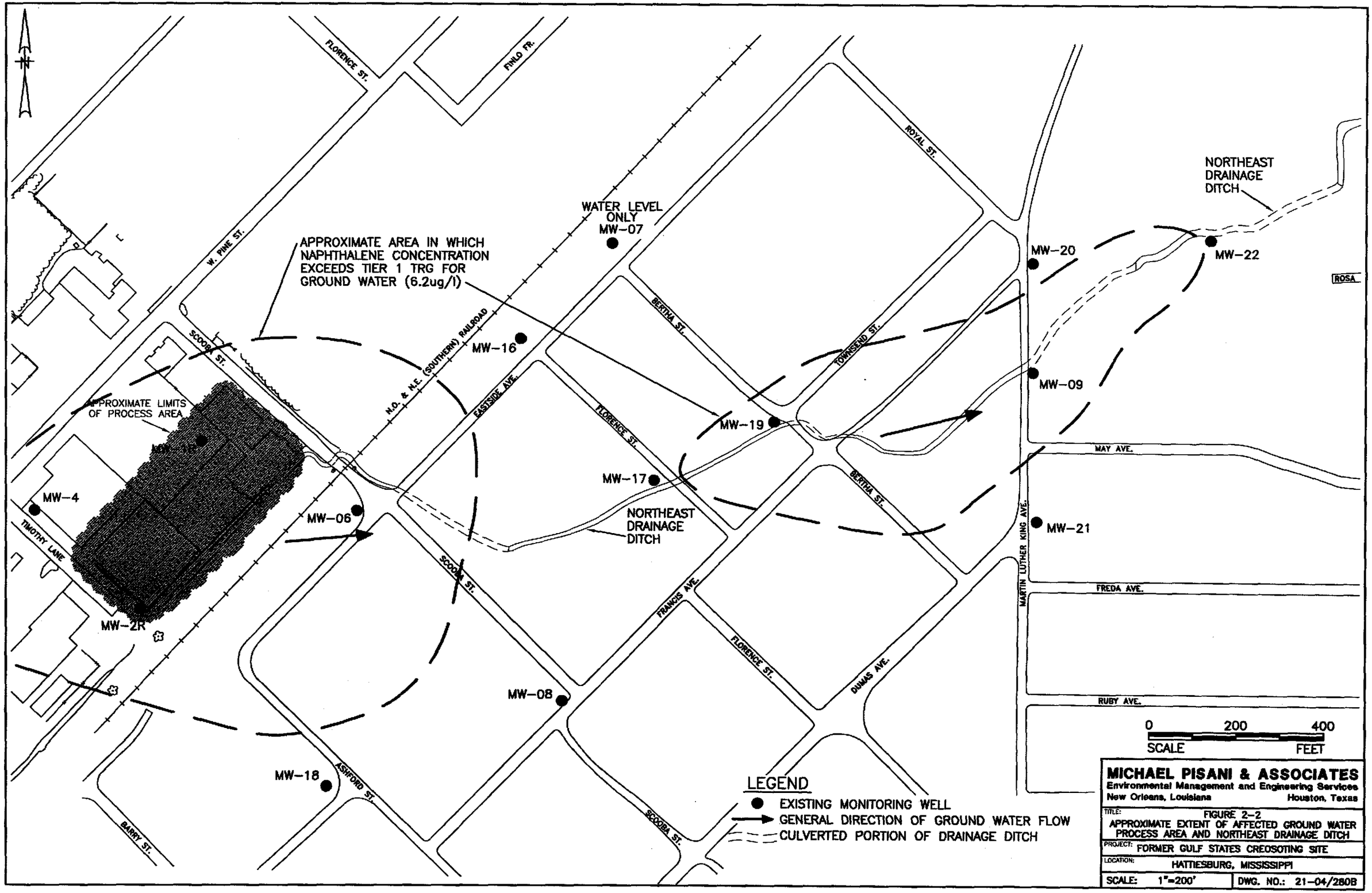
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas

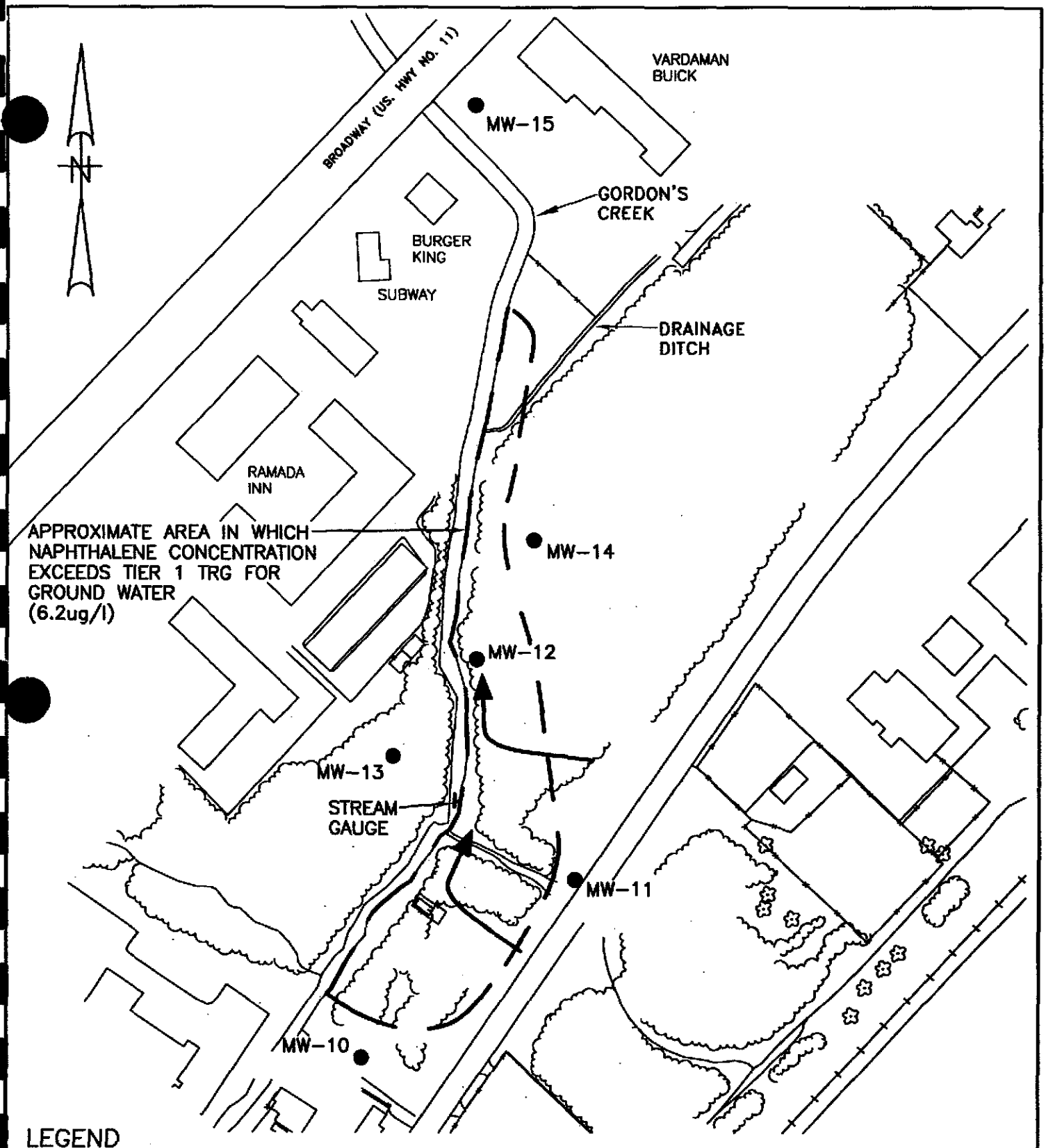
TITLE: FIGURE 2-1
EXISTING GROUND WATER
MONITORING WELLS AS OF DECEMBER 2001

PROJECT: FORMER GULF STATES CREOSOTING SITE

LOCATION: HATTIESBURG, MISSISSIPPI

SCALE: 1"=300' DWG. NO.: 21-04/279B


FLORENCE ST.
FINLO FR.
W. PINE ST.
APPROXIMATE AREA IN WHICH NAPHTHALENE CONCENTRATION EXCEEDS TIER 1 TRG FOR GROUND WATER (6.2ug/l)
WATER LEVEL ONLY MW-07
ROYAL ST.
NORTHEAST DRAINAGE DITCH
MW-20
MW-22
ROSA
SCOOBA ST.
MW-16
N.O. & N.E. (SOUTHERN) RAILROAD
EASTSIDE AVE.
BERTHA ST.
TOWNSEND ST.
MW-09
APPROXIMATE LIMITS OF PROCESS AREA
MW-19
FLORENCE ST.
MW-17
MAY AVE.
MW-4
MW-06
NORTHEAST DRAINAGE DITCH
MW-21
MARTIN LUTHER KING AVE.
TIMOTHY LANE
SCOOBA ST.
FRANCIS AVE.
FREDA AVE.
MW-2R
MW-08
FLORENCE ST.
DUMAS AVE.
RUBY AVE.
MW-18
ASHFORD ST.
BARRY ST.
SCOOBA ST.
0 200 400
SCALE FEET
LEGEND
EXISTING MONITORING WELL
GENERAL DIRECTION OF GROUND WATER FLOW
CULVERTED PORTION OF DRAINAGE DITCH
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas
TITLE: FIGURE 2-2
APPROXIMATE EXTENT OF AFFECTED GROUND WATER PROCESS AREA AND NORTHEAST DRAINAGE DITCH
PROJECT: FORMER GULF STATES CREOSOTING SITE
LOCATION: HATTIESBURG, MISSISSIPPI
SCALE: 1"=200' DWG. NO.: 21-04/280B



MAP FROM ATLANTIC TECHNOLOGIES, LTD., SVILLE, ALABAMA, APRIL 1, 1996

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New Orleans, Louisiana Houston, Texas

SCALE: 1"=200' | DWG. NO.: 21-04/281A

FIGURE 2-3
APPROXIMATE EXTENT OF AFFECTED GROUND WATER
FILL AREA

FORMER GULF STATES CREOSOTING SITE
HATTIESBURG, MISSISSIPPI

Monitoring results from these plume-defining wells will be evaluated to demonstrate that existing contaminant plumes have achieved steady state conditions, as believed, or are continuing to grow.

3.0 Contingency Plan

For the first two years of ground water monitoring (2002 and 2003), samples are being collected on a quarterly basis. During this time, should target constituents be detected in plume-defining wells at concentrations exceeding MDEQ Tier 1 Target Remediation Goals (TRGs) for three consecutive sampling events, KMC will, within 60 days, submit a plan for assessment activities at the specific wells impacted for MDEQ review and approval. At the completion of assessment activities, KMC will submit a report documenting assessment results and proposing appropriate further action, as required.

After the first two years of monitoring, should data indicate that ground water contaminants are not migrating, KMC will modify the program to monitor ground water annually. If, after the monitoring frequency is decreased, a well exhibits concentrations exceeding Tier 1 TRGs, the monitoring frequency for that well will revert to quarterly until Tier 1 TRGs are not exceeded for three consecutive quarters.

4.0 Financial Assurance

KMC is providing financial assurance for ongoing ground water monitoring activities. Estimated probable costs for 30 years of ground water monitoring are provided in Table 1. KMC will provide financial assurance for ongoing ground water monitoring activities starting with the first quarter of 2003.

Should the ground water remedy for the site change from monitored natural attenuation to an active remedy, KMC will consult with MDEQ and will provide additional financial assurance, as appropriate.

Table 4-1

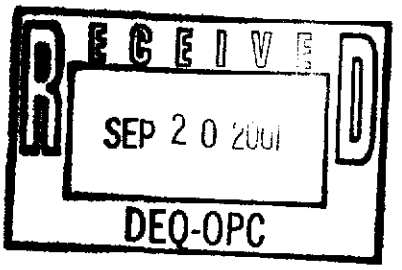
Estimated Probable Costs
Ground Water Monitoring and Post-Closure Inspections

Gulf States Creosoting Site
Hattiesburg, Mississippi

Estimated June 2002; Effective January 1, 2003

Task	Annual Cost	Number of Years	Total Cost
1. Quarterly Ground Water Monitoring (years 2; year 1 almost complete)	$60,000	1	$60,000
2. Annual Ground Water Monitoring (Sample collection and analysis) (years 3 through 30)	$15,000	28	$420,000
3. Annual Report Preparation (years 1 through 30)	$2,500	30	$75,000
4. Annual Inspections (years 1 through 30)	$1,500	30	$45,000
Total Estimated Costs (30 Years)			**$600,000**

FILE COPY



Remedial Action Work Plan

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

September 19, 2001

Project No. 21-04

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Remedial Action Work Plan

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 called 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 degree 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)
- Letter report presenting the results of additional subsurface soil sampling (September 4, 2001).

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*

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

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Date	Activity
August 3, 1999	MDEQ approved *Proposed Work Plan for Developing Site-Specific, Risk-Based Cleanup Goals*
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

Table ES-1 (continued)
Chronology of Investigation Activities

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Date	Activity
April 3, 2001	KMC submitted *Human Health Risk Assessment*
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 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

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 original plan, are presented in this *Remedial Action Work Plan.*

Overview of Proposed Remedial Action

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

1. Drive sheet pilings to cut off intermittent seeps of dense non-aqueous phase liquids (DNAPLs) to Gordon's Creek.
2. Install a recovery system behind the sheet piling barrier to collect DNAPLs.
3. Install a clay liner atop affected Fill Area materials to inhibit the infiltration of precipitation through affected soils.
4. Implement a phytoremediation program to 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 oily materials from a concrete sump. Transport the solids as listed hazardous waste to a permitted offsite facility for incineration and disposal. Transport the liquids offsite for deep well injection.
2. Remove affected fill materials (i.e., soils and treated timbers) from a wooden substructure. Dispose of the material at a Subtitle D landfill.
3. Fill the excavations within the Process Area with select fill materials. Re-pave the parking lots above affected soils left in place to preclude infiltration of precipitation through affected soils.

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. Drive sheet pilings between the Southern railroad tracks and the former Process Area. Pilings will be placed as close to the toe of the railroad berm as possible, taking into consideration structural stability issues.
2. Remove affected surface soils (i.e., soils to a depth of 6 feet below grade) from the area between the former Process Area and the Southern railroad tracks. Dispose of the soils at a Subtitle D landfill.
3. Fill the excavated area between the former Process Area and the Southern railroad tracks with clay fill material. Compact clay in lifts to preclude infiltration of precipitation through deeper affected soils.

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 source materials 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.: 21-04/70B

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

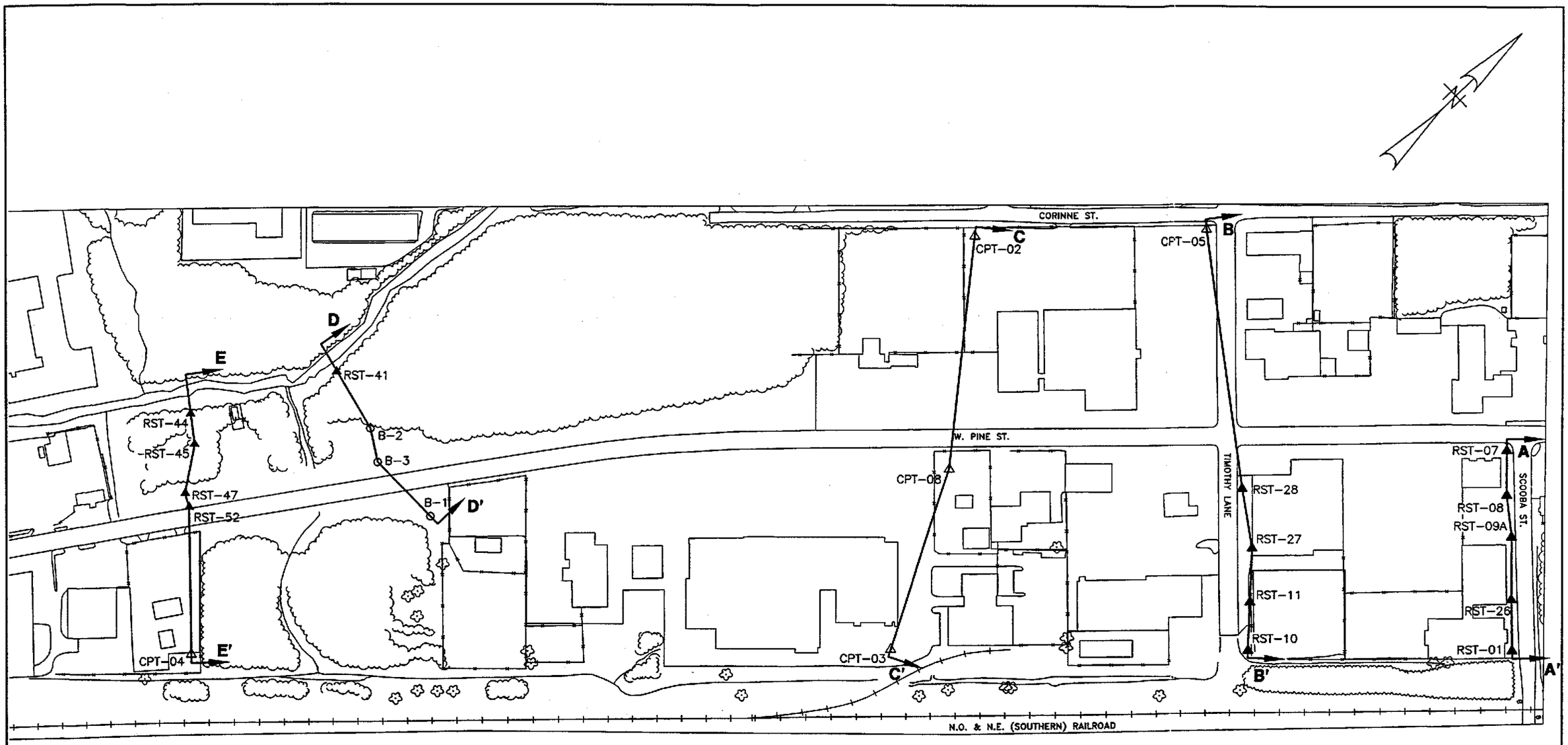
Just as the shallow geology of the former Process Area and Fill Area are significantly different, the shallow aquifer systems beneath the two areas are separate and distinct. As stated above, the uppermost water-bearing zone beneath the former Process Area does not extend westward to the Fill Area. and 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 (source materials, 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

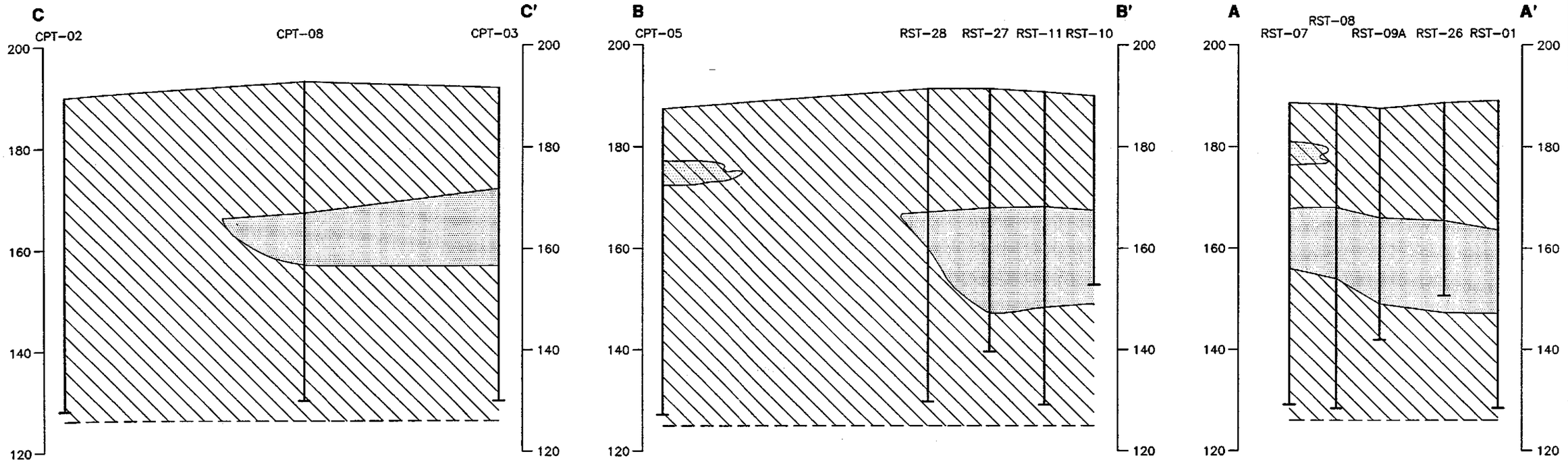
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana Houston, Texas

TITLE: FIGURE 2-2
CROSS-SECTION LOCATION MAP

PROJECT: FORMER GULF STATES CREOSOTING SITE

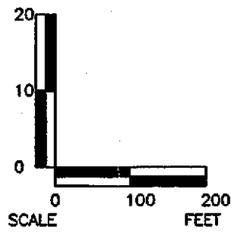
LOCATION: HATTIESBURG, MISSISSIPPI

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



LEGEND

- SAND CHANNEL
- SANDY CLAY/CLAYEY SAND
- CLAY



MICHAEL PISANI & ASSOCIATES
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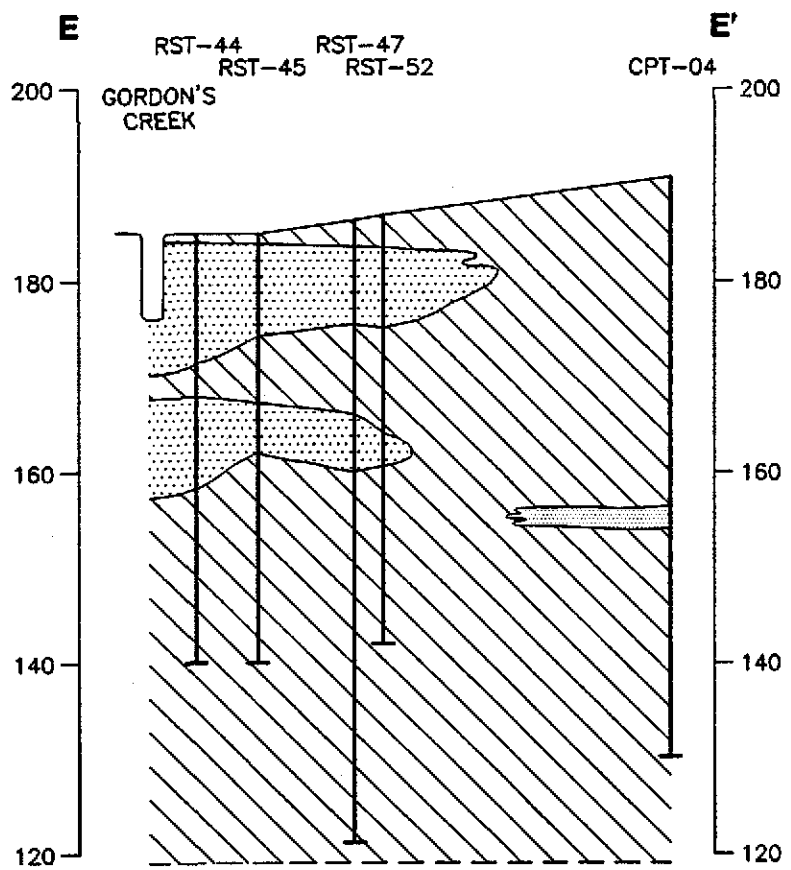
New Orleans, Louisiana — Houston, Texas

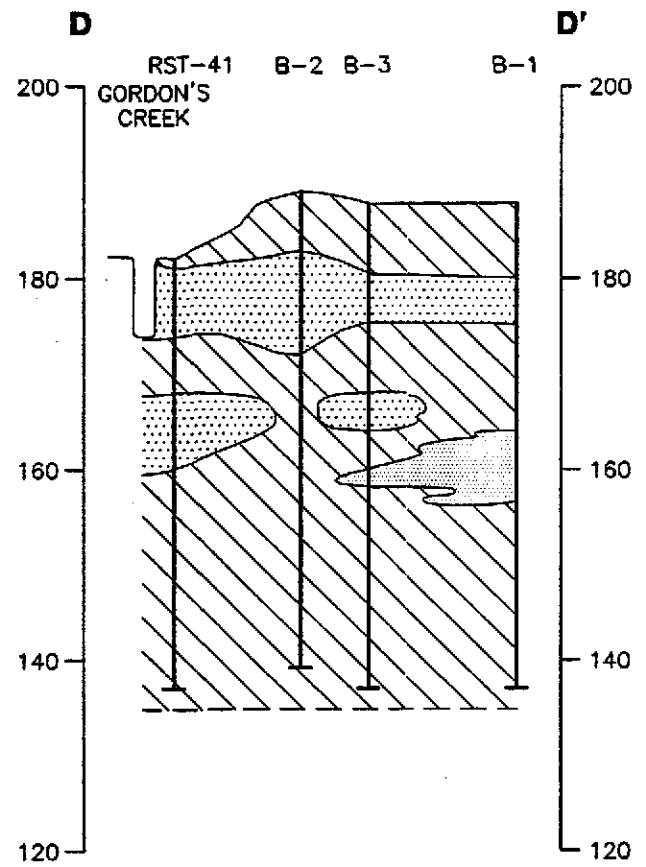
TITLE: FIGURE 2-3
FORMER PROCESS AREA CROSS-SECTIONS

PROJECT: FORMER GULF STATES CREOSOTING SITE

LOCATION: HATTIESBURG, MISSISSIPPI

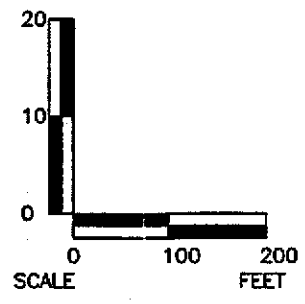
SCALE: 1"=200'/1"=20' | DWG. NO.: 21-04/72B





LEGEND

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



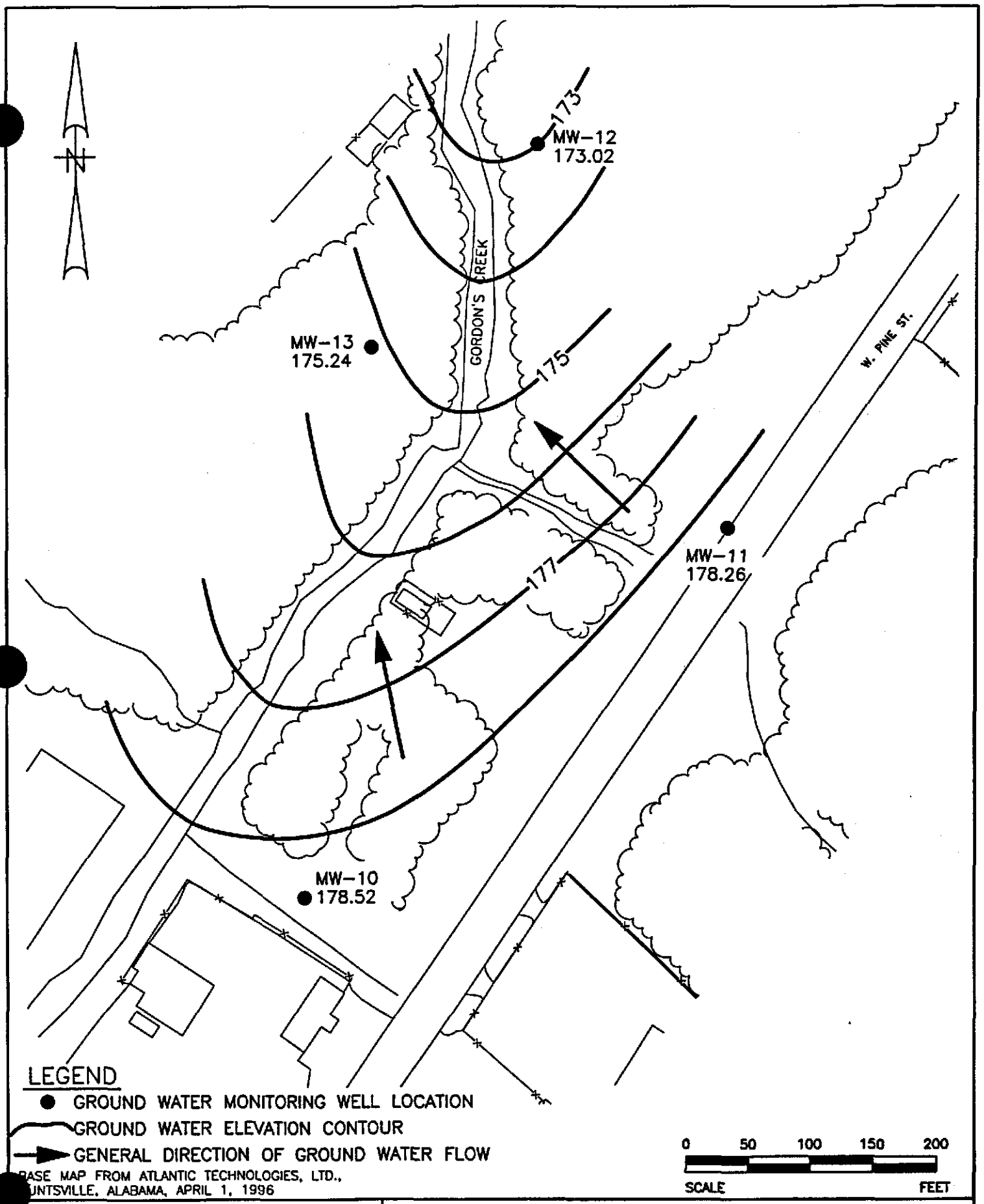
MICHAEL PISANI & ASSOCIATES
Environmental Management and Engineering Services
New Orleans, Louisiana — Houston, Texas

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



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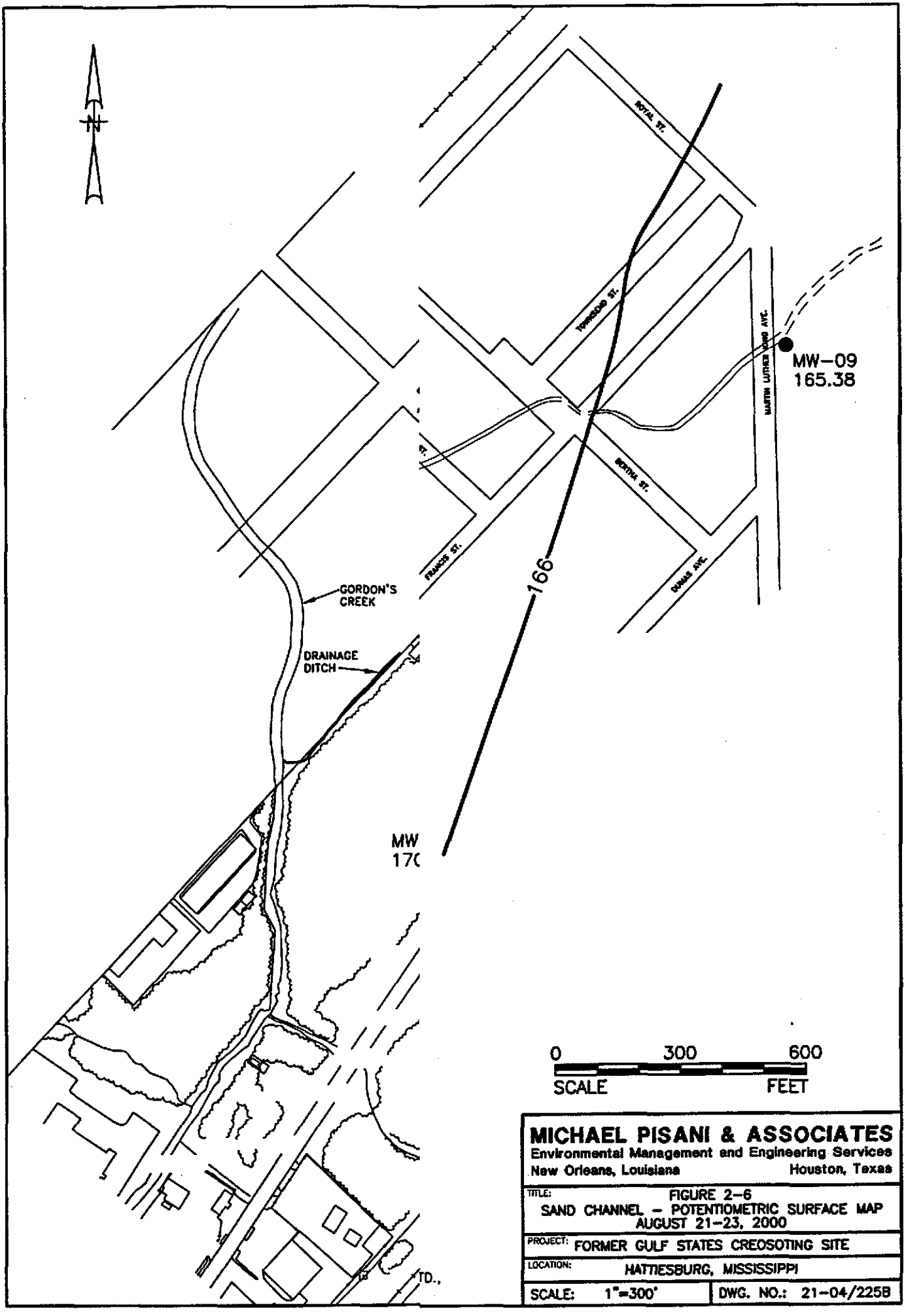
SCALE: 1"=100' | DWG. NO.: 21-04/224A

FIGURE 2-5
FILL AREA
POTENTIOMETRIC SURFACE MAP - AUGUST 21-23, 2000
FORMER GULF STATES CREOSOTING SITE
HATTIESBURG, MISSISSIPPI



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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.

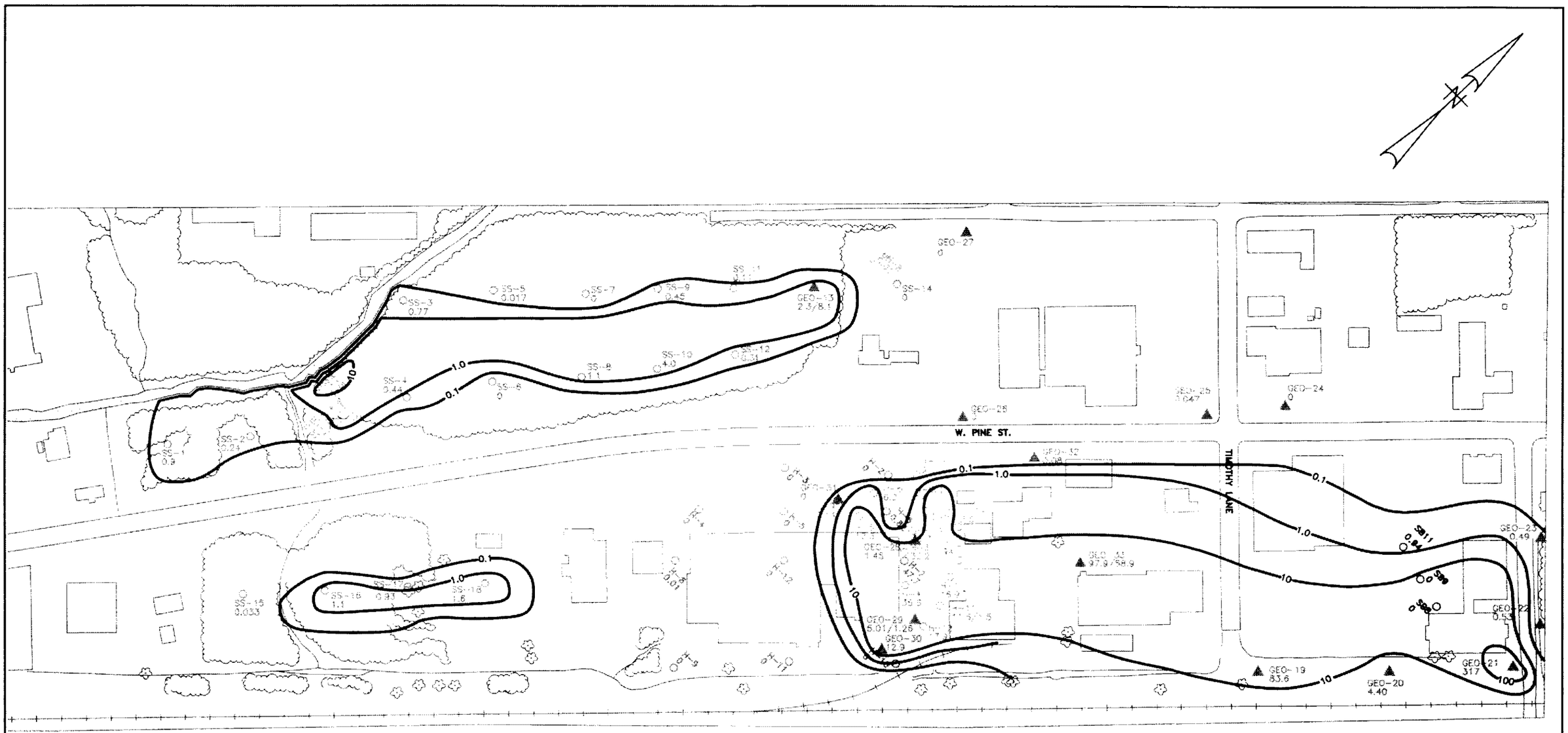
Figures 2-13 and 2-14 depict naphthalene concentrations in ground water samples. Naphthalene is the single most prevalent creosote constituent in ground water at the Site, and is a good indicator parameter due to its solubility and thus its mobility.

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 SITE PHASE INVESTIGATION OF MAIN MONITORING WELL CLUSTER 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 ○ 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

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

PROJECT: FORMER GULF STATES CREOSOTING SITE

LOCATION: HATTIESBURG, MISSISSIPPI

SCALE: 1"=200' DWG. NO.: 21-04/76B