# Appendix G

Data Validation Reports (due to volume, provided upon request)

Former Gulf States Creosoting Site Hattiesburg, Mississippi

### Interim Report Phase II Remedial Investigation

Former Gulf States Creosoting Site Hattiesburg, Mississippi

August 14, 1998

Project No. 21-04

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# Interim Report Phase II Remedial Investigation

### Former Gulf States Creosoting Site Hattiesburg, Mississippi

### **Executive Summary**

Kerr-McGee Chemical Corporation recently completed a program to further characterize site stratigraphy and to screen ground water quality at the former Gulf States Creosoting Site in Hattiesburg, Mississippi. Stratigraphic characterization was performed by advancing eight CPT pushes near the former Process Area. Ground water screening activities consisted of collecting and analyzing ground water samples from temporary well points downgradient of the former Process Area and within the Fill Area.

CPT data indicate that the sand channel extends to the northeast of the former Process Area, and that the base of the channel continues to dip eastward toward the Leaf River. The results of ground water screening indicate that site constituents have migrated off-site from the former Process Area via the ground water pathway, but that constituent concentrations decrease dramatically with distance from the site. Screening results also indicate that the affected ground water within the Fill Area is confined to the area containing creosote-impacted soils.

Based on the results of stratigraphic characterization and ground water screening activities, proposed monitoring well locations are presented in this report. Four wells are proposed downgradient of the former Process Area, at distances ranging from approximately 200 to 1,700 feet off-site. Three wells are proposed at the perimeter of the Fill Area. All wells will be installed, developed, and sampled in accordance with procedures presented in the MDEQ-approved work plan addendum.

The purpose of this interim report is to present proposed monitoring well locations for MDEQ review and approval. As per the approved work plan addendum, monitoring wells will not be installed until MDEQ approval of proposed locations is received.

#### 1.0 Introduction

### 1.1 Project Background

In 1997, Kerr-McGee Chemical Corporation (KMCC) completed a Phase I Remedial Investigation (RI) at the former Gulf States Creosoting Site (GSCS) in Hattiesburg, Mississippi. The findings of the investigation were presented in a Remedial Investigation Report dated June 30, 1997. In response to MDEQ comments received in a letter dated January 13, 1998, KMCC submitted a plan for Phase II RI activities (Addendum to Site Investigation Work Plan) on February 25, 1998.

On March 16, 1998, representatives of KMCC met with MDEQ in Jackson, Mississippi to discuss the Phase II RI activities proposed by KMCC. The work plan addendum was revised to include additional proposed investigative activities and to provide clarification requested by MDEQ at the meeting; the Revised Addendum to Site Investigation Work Plan was submitted to MDEQ on April 8, 1998. The revised work plan addendum was approved by MDEQ in a letter dated April 23, 1998.

### 1.2 Purpose of Interim Report

The work plan addendum stipulates that once stratigraphic characterization and ground water screening activities are completed, the data from these activities will be evaluated to determine appropriate monitoring well locations. The purpose of this interim report is to summarize stratigraphic and ground water screening data and to propose locations for additional monitoring wells at the site. As stated in the work plan addendum, the installation of additional monitoring wells will not commence until MDEQ approval of proposed well locations is received.

#### 2.0 Field Activities

### 2.1 Stratigraphic Characterization

During Phase II RI activities, as during Phase I, cone penetrometer testing (CPT) methodology was used to characterize site stratigraphy. The use of CPT allowed for the rapid, real-time collection of accurate stratigraphic information and resulted in significant time and cost savings over conventional drilling methods. The results of stratigraphic characterization activities were used to evaluate the potential for off-site migration of affected ground water and to determine appropriate locations and depths for ground water screening and well installation.

#### 2.1.1 Former Process Area

The geometry of the sand channel beneath and immediately adjacent to the former Process Area was defined during 1997 RI activities. These activities established that the sand channel does not extend westward to the Fill Area, and that the base of the channel dips from the southwest to the northeast. The geometry of the sand channel to the northeast of the former Process Area was unknown prior to Phase II RI stratigraphic characterization.

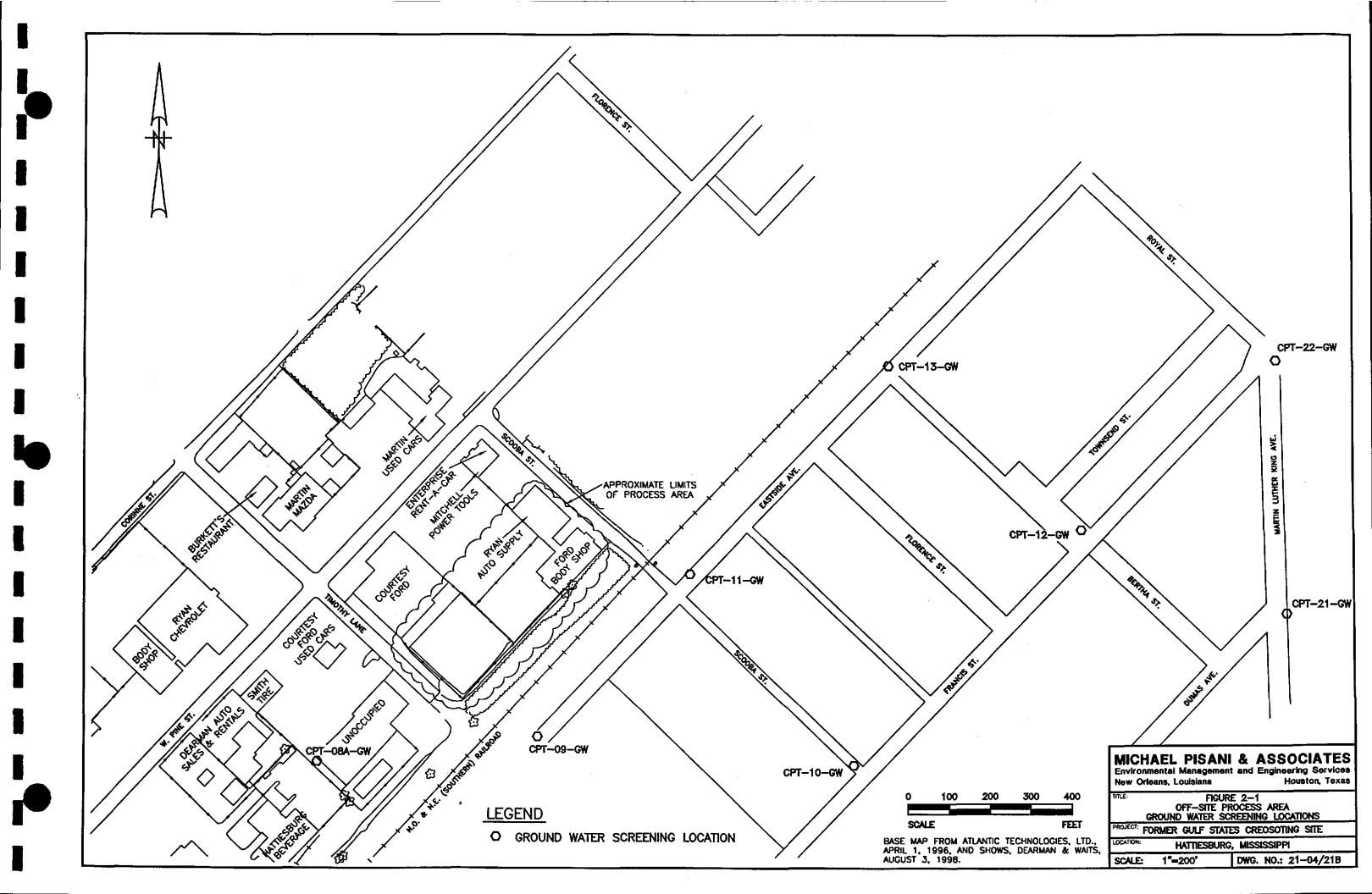
The objectives of stratigraphic characterization activities in the former Process Area were to:

- Determine the geometry (i.e., configuration, alignment, and thickness) of the sand channel to the northeast of the former Process Area;
- Determine the elevation and slope of the underlying confining clay; and
- · Determine appropriate depths for ground water sampling.

During the Phase II RI, KMCC advanced eight CPT pushes to achieve these objectives (see Figure 2-1). The work plan addendum called for one upgradient push (CPT-08A) and five downgradient pushes (CPT-09 through -13); CPT-21 and CPT-22 were added during the field program due to field evidence of potentially-affected ground water in CPT-12 (i.e., a slight mothballs or naphtha odor). If possible, each CPT push was advanced through the sand channel to the top of the underlying confining clay. CPT logs were evaluated to determine the appropriate depth for ground water sampling at each location. The results of stratigraphic characterization are presented in Section 3.1 of this report.

#### 2.1.2 Gordon's Creek Fill Area

The stratigraphy within the Fill Area was defined using CPT and Geoprobe methods during 1997 RI activities. The work plan addendum called for two CPT pushes to be advanced on the opposite (northwest) bank of Gordon's Creek from the Fill Area. These activities have not yet been completed due to site access issues. However, KMCC continues to work to resolve these issues and hopes to complete stratigraphic



characterization on the northwest bank of Gordon's Creek in conjunction with the upcoming well installation activities.

### 2.2 Ground Water Screening

In the former Process Area, KMCC utilized a CPT push-in well screen sampler to delineate the extent of affected ground water and determine appropriate locations for downgradient wells. In the Fill Area, temporary piezometers were installed using a Geoprobe to accomplish the same objectives. Both methods are proven, effective tools for delineating the extent of affected ground water, allowing the user to make informed and logical decisions regarding the placement of ground water monitoring wells.

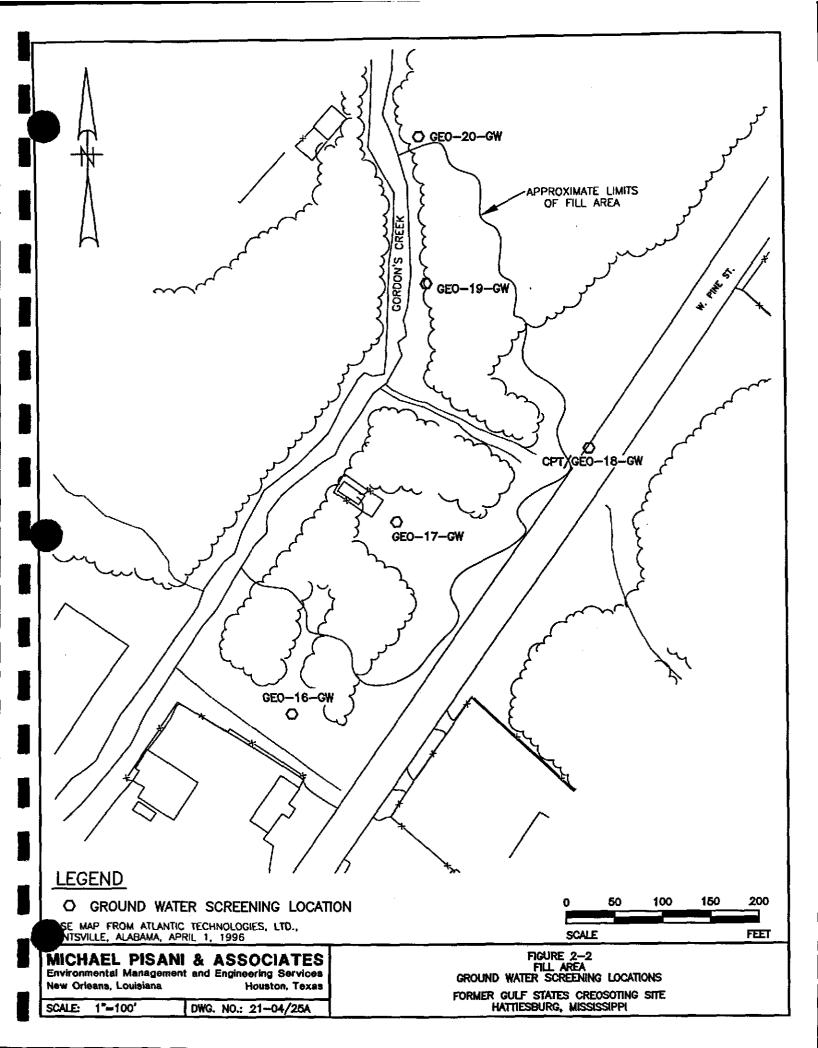
#### 2.2.1 Former Process Area

Results of previous investigations indicate that ground water in the uppermost water-bearing zone beneath the former Process Area has been impacted by former wood treating operations. However, analytical data from on-site monitoring wells show that affected ground water does not extend westward or significantly southward from the former Process Area. The extent of affected ground water to the northeast of the former Process Area had not been defined prior to Phase II RI ground water screening activities.

Ground water samples were collected at pushes CPT-08A-GW through CPT-13-GW, CPT-21-GW, and CPT-22-GW. At each location, the push-in well screen sampler was pushed to a depth at the approximate vertical midpoint of the sand channel. Samples were transferred directly from a small-diameter bailer into clean, laboratory-supplied sample containers. Ground water samples from the former Process Area were analyzed for Target Compound List semivolatile organic compounds (TCL SVOCs).

#### 2.2.2 Gordon's Creek Fill Area

Ground water quality within the Fill Area had not been characterized prior to Phase II RI ground water screening activities. Ground water samples were collected at GEO-16-GW through GEO-20-GW (see Figure 2-2) from the uppermost water-bearing sand. Initially, attempts were made to collect ground water samples using a Geoprobe push-in well screen sampler. When this proved ineffective, a Geoprobe boring was advanced and a temporary, small-diameter, PVC piezometer was installed at each location. Samples were collected using dedicated silicone tubing and a peristaltic pump, and were pumped directly into clean, laboratory-supplied sample containers. Ground water samples from the Fill Area were analyzed for TCL volatile organic compounds (VOCs) and SVOCs.



### 3.0 Summary of Results

### 3.1 Former Process Area Stratigraphic Characterization

CPT data from the eight new stratigraphic pushes was used to define the geometry of the sand channel to the northeast of the former Process Area. The sand channel was present at all eight locations, and was fully penetrated at all locations except CPT-10, where the sand was too dense to fully penetrate. Where fully penetrated, the sand ranged in thickness from 16.7 feet in CPT-11 to 24.5 feet in CPT-22. CPT logs for the eight new stratigraphic pushes are provided as Appendix A to this report.

Phase I RI activities established that within the former Process Area, the base of the sand channel dips from the southwest to the northeast. A contour map on the top of the underlying clay was included as Figure 3-7 of the Phase I RI Report. Figure 3-1 of this report is an expanded contour map including data from the eight new stratigraphic pushes. The new map shows that the sand channel continues to dip eastward from the former Process Area toward the Leaf River at a rate of approximately 2 feet per thousand feet.

### 3.2 Ground Water Screening

Phase II RI ground water screening activities were successful in delineating the extent of affected ground water downgradient of the former Process Area and within the Fill Area. Ground water screening results are presented in the following sections. Proposed locations for additional monitoring wells based on the results of ground water screening are presented in Section 4.0.

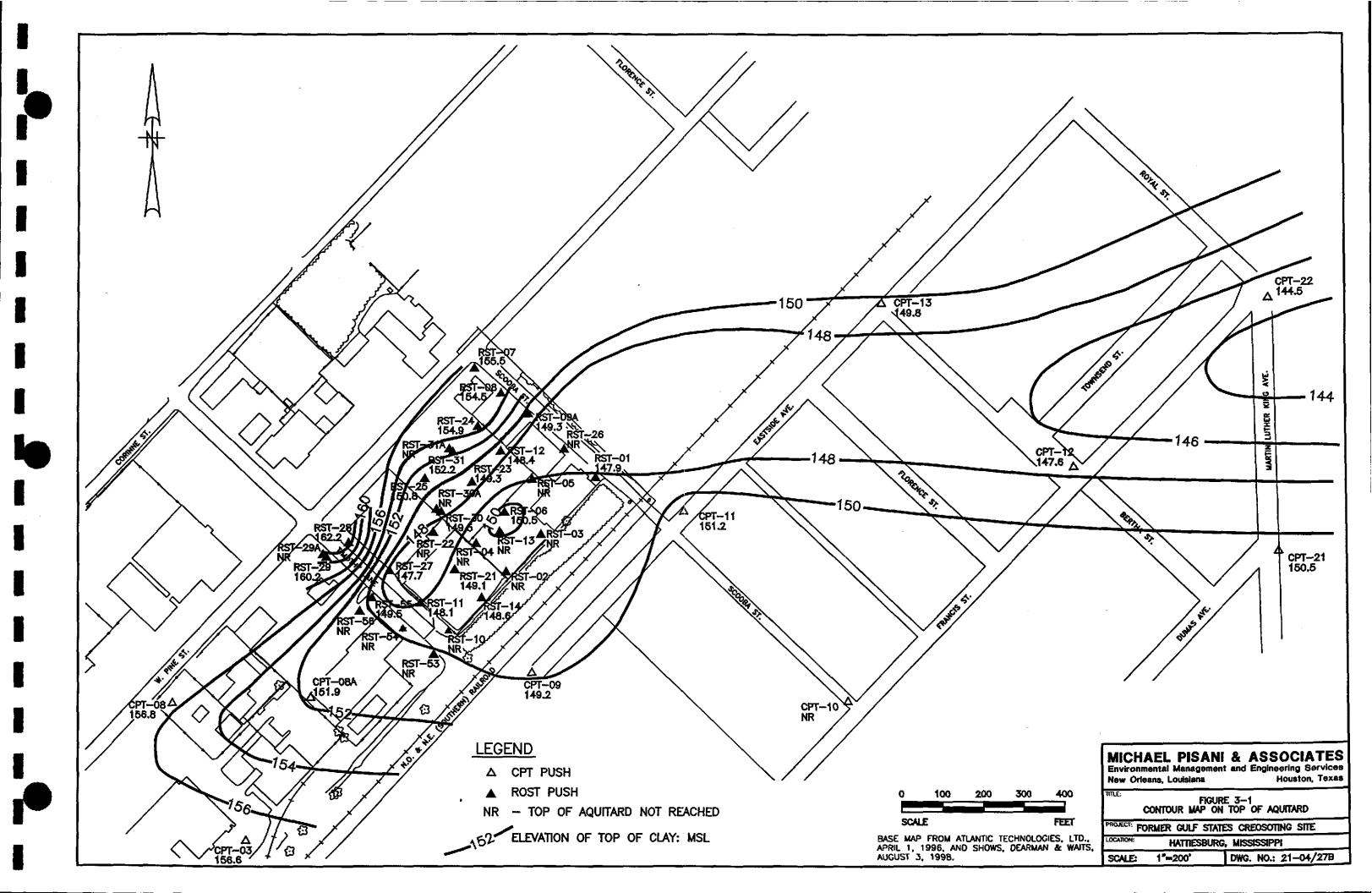
#### 3.2.1 Former Process Area

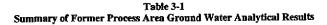
Ground water samples collected from the off-site Process Area were analyzed for TCL semivolatile compounds. Process Area ground water screening data are summarized in Table 3-1. Laboratory data are provided as Appendix B to this report.

With the exception of bis(2-ethylhexyl)phthalate, a common laboratory artifact, no target compounds were detected above laboratory limits of quantitation in the following five ground water samples:

- CPT-08A-GW
- CPT-10-GW
- CPT-13-GW
- CPT-21-GW
- CPT-22-GW

Target compounds in the low parts per billion range were reported in samples CPT-11-GW and CPT-12-GW. Higher concentrations of target constituents, most notably naphthalene, were reported in sample CPT-09-GW. The data indicate that constituent concentrations decrease dramatically with distance from the former Process Area.





# Former Gulf States Creosoting Site Hattiesburg, Mississippi

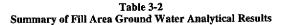
1	MP&A Sample ID Lab Sample Number Date Collected	CPT-08 2932 5/21	450	CPT-0: 2932 5/21	451	CPT-07- 2932 5/21	449	CPT-1 2934 5/21	1151	CPT-1 2932 5/21	452	CPT-1: 2932 5/21	453	CPT-1. 2932 5/21	454	CPT-2 2934 5/21	153	CPT-2 2934 5/21	154
Parameter	Standard Method Detection Limit	Result	Notes	Result	Notes	Result	Notes	Result	Notes	Result	Notes	Result	Notes	Result	Notes	Result	<u>Notes</u>	Result	Notes
									-										
TCL Semivolatiles													_		_		_		_
phenol	0.001	0.004	J	0.001	J	ND		ND		0.008	J	0.003	J	0.001	J	0.001	J	0.004	J
2-methylphenol	0.001	ND		0.009	J	0.008	J	ND		0.001	J	ND		ND		ND		ND	
4-methylphenol	0.003	ND		810.0		0.018		ND		0.009	J	ND		ND		ND		ND	
isophorone	0.001	ND		ND		0.001	J	ND		ND		ND		ND		ND		ND	
2,4-dimethylphenol	0.001	ND		0.060		0.063		ND		0.002	J	ND		ND		ND		ND	
naphthalene	0.001	0.004	J	12.0		11.0		0.001	J	0.120		0.710		0.009	j	ND		ND	
2-methylnaphthalene		0.001	J	0.800	j	0.710	J	ND		0.023		0.042		0.002	J	ND		ND	
acenaphthylene	0.002	ND		0.029		0.026		ND		ND		0.007	j	ND		ND		ND	
acenaphthene	0.001	0.002	J	0.250	J	0.220	J	0.002	J	0.019		0.100		0.002	J	ND		ND	_
dibenzofuran	0.001	0.002	J	0.210	J	0.140		0.002	J	0.030		0.087		0.003	J	ND		0.001	J
2,6-dinitrotoluene	0.002	0.005	J	0.002	J	0.006	J	0.003	J	0.003	J	0.004	J	ND		0.003	J	0.006	1
diethyl phthalate	0.002	0.005	J	ND		0.004	J	ND		0.003	J	0.006	J	ND		0.002	J	0.008	J
fluorene	0.001	0.003	J	0.130		0.110		0.001	J	0.015		0.046		0.003	J	ND		ND	
phenanthrene	0.001	0.007	J	0.088		0.067		ND		0.017		0.057		0.004	J	ND		ND	
anthracene	0.001	0.002	,	0.009	J	0.007	J	ND		ND		0.006	J	ND		ND		ND	
carbazole	0.001	ND		0.360	J	0.370	j	0.002	1	0.003	J	0.084		0.005	J	0.002	J	ND	
di-n-butyl phthalate	0.002	0.005	J	0.003	J	0.004	J	0.003	J	0.004	J	0.004	J	ND		0.003	J	0.005	J
fluoranthene	0.001	0.006	J	0.002	J	0.001	J	ND		0.001	J	0.006	J	ND		ND		ND	
pyrene	0.001	0.006	J	0.001	J	ND		ND		0.001	J	0.009		ND		ND		ND	
benzo (a) anthracene		0.002	J	ND		ND		ND		ND		0.001	J	ND		ND		ND	
bis (2-ethylhexyl) ph		0.042		0.004	J	0.003	J	ND		ND		0.007	1	0.002	J	0.019		0.010	
chrysene	0.001	0.001	J	ND		ND		ND		0.017		0.001	J	ND		ND		ND	
di-n-octyl phthalate	0.002	0.006	j	ND		ND		ND		0.005	J	ND		ND		0.004	J	0.003	J
benzo (a) pyrene	0.001	0.001	J	ND		ND		ND		ND		ND		ND		ND		ND	

All method detection limits and results are reported in mg/l.
Only those constituents reported in one or more samples are included in this table.
Analytical method: SW-846 8270B
J - Estimated value
(a) Sample CPT-07-GW is a blind duplicate of sample CPT-09-GW

#### 3.3.2 Gordon's Creek Fill Area

Ground water samples from the Fill Area were analyzed for TCL volatile and semivolatile compounds. Fill Area ground water screening data are summarized in Table 3-2. Laboratory data are provided as Appendix B to this report.

No target compounds were detected above laboratory limits of quantitation in samples GEO-16-GW, CPT/GEO-18-GW, and GEO-20-GW. Low to medium concentrations of target compounds were reported in samples GEO-17-GW and GEO-19-GW. The data confirm that the area of affected ground water is similar in size and shape to the overlying area of creosote-impacted soils delineated during the Phase I RI.



#### Former Gulf States Creosoting Site Hattiesburg, Mississippi

	MP&A Sample ID Lab Sample Number Date Collected	GEO-16-GW 2946085 6/11/98		GEO-17-GW (a) 2946086 6/11/98		GEO-21-0 2946 6/11	087	GEO-18- 2934 6/11	151	GEO-19-GW (a) 2932452 6/11/98		GEO-20-GW 2946089 6/11/98	
<u>Parameter</u>	Standard Method Detection Limit	Result	Notes	Result	Notes	Result	Notes	Result	Notes	Result	Notes	Result	Notes
TCL Volatiles													
Xylene (total)	0.001	ND		0.082	J	0.057	J	ND		0.027		ND	
TCL Semivolatiles													
2-methylphenol	0.001	ND		ND		0.001	J	ND		0.003	J	ND	
4-methylphenol	0.003	ND		0.006	J	ND	4	ND		ND	•	ND	
2,4-dimethylphenol	0.001	ND		ND	·	0.011		ND		0.014		ND	
naphthalene	0.001	ND		8.8		5.5		0.001	J	1.9		ND	
2-methylnaphthalene	0.001	ND		0.73	J	0.59	J	ND		0.13		ND	
acenaphthylene	0.002	ND		0.016		0.015		ND		0.009	J	ND	
acenaphthene	0.001	ND		0.34	J	0.32	J	0.001	J	0.14		ND	
dibenzofuran	0.001	ND		0.22	J	0.22	J	0.002	j	0.048		ND	
fluorene	0.001	ND		0.22	J	0.2	J	0.002	J	0.067		ND	
phenanthrene	- 0.001	ND		0.31	j	0.28	J	0.004	J	0.14		ND	
anthracene	0.001	ND		0.036		0.03		ND		0.026		ND	
carbazole	0.001	ND		ND		0.2	J	0.002	J	0.077		ND	
di-n-butyl phthalate	0.002	ND		ND		ND		0.002	J	ND		ND	
fluoranthene	0.001	ND		0.075		0.047		ND		1.0		ND	
pyrene	0.001	ND		0.048		0.03		ND		0.076		ND	
benzo (a) anthracene	0.001	ND		0.014		0.007	J	ND		0.017		ND	
bis (2-ethylhexyl) phth		ND		ND		ND		0.007	J	ND		ND	
chrysene	0.001	ND		0.01		0.005	J	ND		0.015		ND	
di-n-octyl phthalate	0.002	ND		ND		ND		0.003	1	ND		ND	
benzo (b) fluoranthene		ND		0.007	J	0.004	J	ND		0.013		ND	
benzo (k) fluoranthene		ND		0.003	j	0.002	J	ND		0.004	j	ND	
benzo (a) pyrene	0.001	ND		0.005	J	0.003	ĵ	ND		0.008	J	ND	
indeno (1,2,3-cd) pyrer		ND		0.002	· J	0.001	J	ND		0.004	ĵ	ND	
dibenz (a,h) anthracene		ND		ND	-	ND		ND		0.001	J	ND	
benzo (ghi) perylene	0.001	ND		0.002	J	0.001	J	ND		0.003	J	ND	

All method detection limits and results are reported in mg/l.

Only those constituents reported in one or more samples are included in this table.

Analytical method: SW-846 8240B for Volatiles and SW-846 8270B for Semivolatiles

J - Estimated value

<sup>(</sup>a) Quantitation limits for volatile compounds raised due to the level of non-target compounds.
(b) Sample GEO-21-GW is a blind duplicate of sample GEO-17-GW
(c) Semivolatiles for sample GEO-18-GW collected as sample CPT-18-GW.

### 4.0 Proposed Ground Water Monitoring Wells

#### 4.1 General

Currently, there is a network of eight ground water monitoring wells on site: four wells installed within the Process Area in 1994, and four wells installed during the Phase I RI to monitor site-wide ground water. KMCC proposes to install four new monitoring wells downgradient of the former Process Area and three new monitoring wells at the perimeter of the Fill Area. Rationale for the selection of well locations is provided in Sections 4.1 and 4.2 of this report.

A hollow-stem drilling rig will be mobilized to the site for the installation of monitoring well. Wells will be constructed in accordance with the same procedures utilized during the Phase I RI. Well construction materials will be two-inch, Schedule 40 PVC, with 0.01-inch machine-slotted screen spanning the entire thickness of the first saturated permeable zone. Wells will be completed at grade with water-tight, flush-mount manhole covers. Keys to well locks will be maintained by KMCC and/or its designated representative.

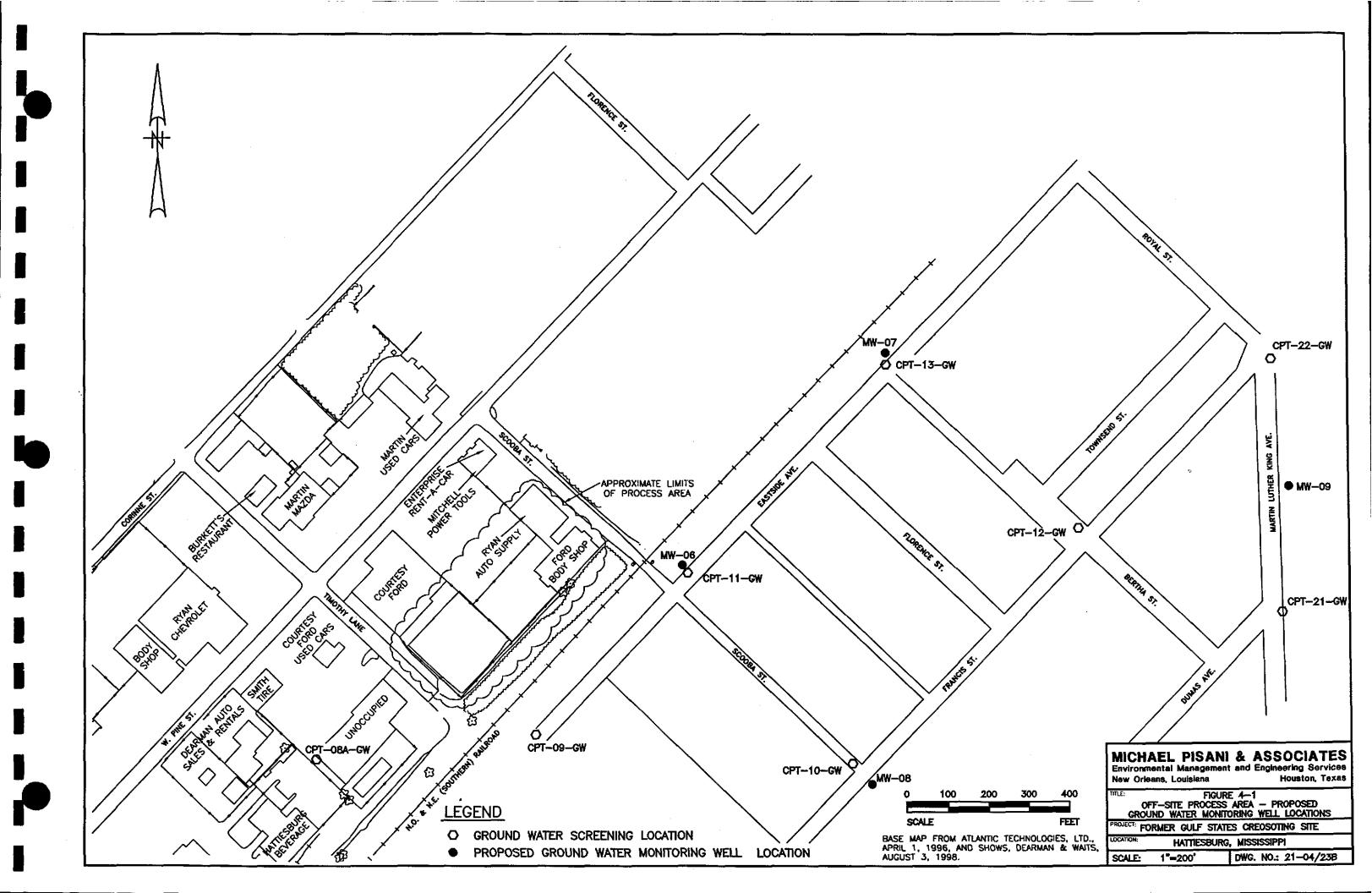
Wells will be developed and surveyed using the same procedures utilized during the Phase I RI. Upon completion of the well installation program, ground water samples will be collected from the seven new wells and four existing site-wide monitoring wells using dedicated PVC bailers. Samples will be analyzed for TCL SVOCs. Laboratory reports, boring logs, and well construction diagrams will be provided as appendices to the Phase II RI Report.

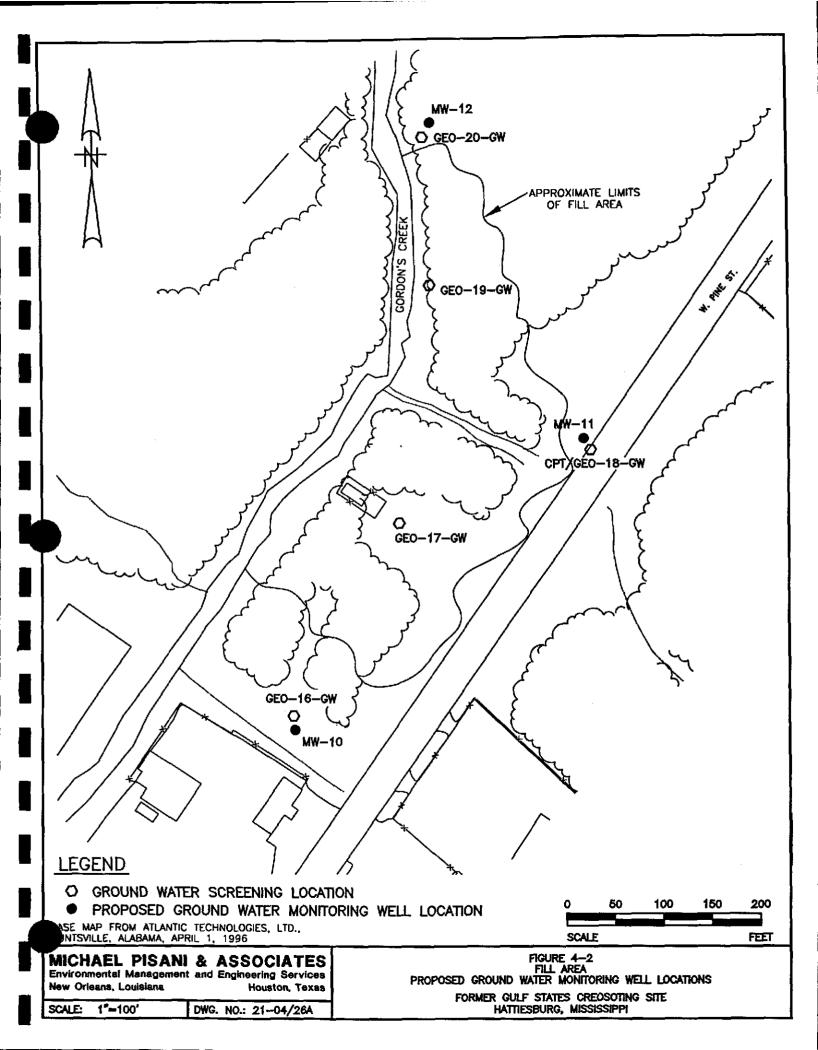
#### 4.2 Former Process Area

Locations of the four proposed off-site Process Area wells are depicted on Figure 4-1. Proposed well MW-06 is located approximately 200 feet downgradient of the former Process Area within the area of affected ground water; proposed wells MW-07, -08, and -09 are located outside the area of affected ground water. Data from well MW-06 will be used to evaluate the potential for natural attenuation of site constituents in ground water. Data from the three "sentry" wells will be monitored for further off-site migration of site constituents.

### 4.3 Gordon's Creek Fill Area

Locations of the three Fill Area perimeter wells are depicted on Figure 4-2. Although ground water flow direction in the shallow Fill Area sediments has not been established, flow is anticipated to be toward Gordon's Creek then downstream along the creek. The water level elevation data from the proposed wells, along with data from a stream gauge to be installed in Gordon's Creek, should allow for the determination of shallow ground water flow direction. The three perimeter wells will be monitored to determine if affected ground water is migrating outside its current limits.





### 5.0 Schedule

The schedule for the remainder of the activities proposed in the revised work plan addendum is shown on Figure 5-1. It is important to note that the installation of monitoring wells is contingent upon MDEQ approval of well locations proposed in this interim report. Once the locations are approved and subcontractors are procured, KMCC or its representatives will advise MDEQ of the schedule for field activities. Should the schedule change significantly, a revised schedule will be prepared and submitted to MDEQ.

# Figure 5-1 Schedule for Additional Site Investigation Activities

# Gulf States Creosoting Site Hattiesburg, Mississippi

Task Name	Planned Start	Duration in Days	Planned Finish	1998			_	<b>A</b>	<b>.</b>	<b>1</b>	<b>0</b> -4	1999	
	Ì			May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Submit Interim Report	8/14/98	0	8/14/98				•						
MDEQ Review and Approval	8/14/98	30	9/13/98				)	-				<u></u>	
Install and Sample Monitoring Wells	9/13/98	15	9/28/98				1	H					
Laboratory Analysis	6/22/98	131	10/31/98		<b>)</b> -								
Data Validation	10/31/98	30	11/30/98										
Prepare Addendum to RI Report	8/15/98	138	12/31/98							1		(	