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Addendum to Site Investigation Work Plan

Former Gulf States Creosoting Site Hattiesburg, Mississippi

February 23, 1998

Project No. 21-04

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Summary

Kerr-McGee Chemical Corporation (KMCC) submitted a *Site Investigation Work Plan* to MDEQ for review on January 8, 1997. In a letter dated February 21, 1997, MDEQ approved the work plan for implementation. RI field activities were conducted between February 24 and April 30, 1997. The findings of the investigation were presented in the *Remedial Investigation Report* dated June 30, 1997.

MDEQ comments on the *Remedial Investigation Report* were transmitted to KMCC's legal counsel in a letter dated January 13, 1998. In its comment #7, MDEQ requested the submittal of a remedial investigation work plan sufficient to establish the horizontal and vertical extent of affected soil and ground water at the site. This work plan addendum presents activities proposed by KMCC to accomplish this goal.

1.0 Introduction

1.1 Objectives of Investigation

The objectives of additional site investigation activities include the following:

1. Delineate the vertical and horizontal extent of creosote-impacted soils to the north and east of the Process Area;
2. Delineate the vertical extent of creosote-impacted surface soils;
3. Determine the geometry of the sand channel to the north and east of the Process Area;
4. Determine the lateral extent of creosote-impacted ground water within the sand channel to the north and east of the Process Area;
5. Determine ground water quality within the Fill Area sands; and
6. Determine appropriate locations and depths for additional ground water monitoring wells.

1.2 Work Plan Addendum Organization

The original *Site Investigation Work Plan* and its appendices presented extensive site background information (Sections 2.0 through 4.0) and detailed procedures for data collection, quality assurance and quality control (QA/QC), health and safety, and planning and reporting activities (Sections 5.0 through 9.0). In order to avoid duplication and reduce the volume of paperwork generated, this addendum incorporates the background information and procedures from the original work plan by reference. This addendum, therefore, consists of the proposed scope of work for additional activities and presents only those procedures not detailed in the original plan.

The work plan addendum includes the following sections:

1.0 Introduction
2.0 Soils Investigations
3.0 Stratigraphic Characterization
4.0 Ground Water Investigations
5.0 Data Evaluation and Future Activities

1.3 Access to Sampling Locations

KMCC does not own or control any of the properties where samples are proposed to be collected. KMCC will use its best efforts to obtain access to the properties where samples are to be collected from those persons or entities who own or control the properties. If KMCC is unsuccessful, it may seek assistance from MDEQ and/or the courts to gain access to the properties.

2.0 Soils Investigations

2.1 Process Area

During 1997 RI activities, the Rapid Optical Screening Tool (ROST) system was utilized to delineate the extent of creosote-impacted soils within the Process Area and Gordon's Creek Fill Area. Correlation soil samples were collected and analyzed at a fixed-base laboratory to corroborate the results of ROST testing. The ROST system was demonstrated to be an effective screening tool for the delineation of the vertical and lateral extent of creosote-impacted soils. ROST results were correlated with laboratory analytical data to allow for the determination of the presence/absence and relative concentrations of creosote.

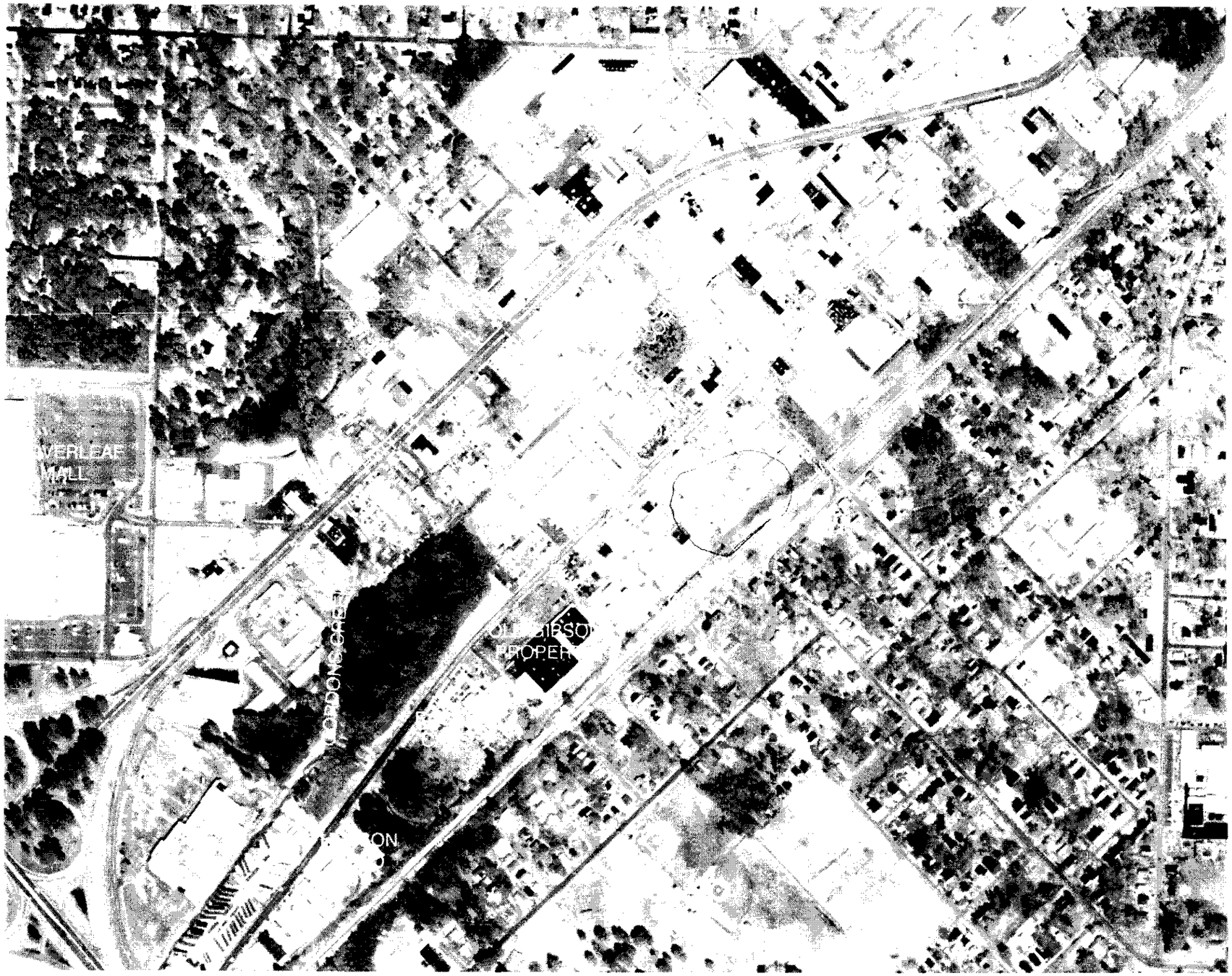
The results of the 1997 RI indicated that creosote-impacted soils within the Process Area are confined to areas beneath or immediately adjacent to former wood treating operational features. The extent of creosote-impacted soils to the southwest and northwest of the Process Area was well defined. Creosote-impacted soils were, however, detected at the southeastern edge (i.e., the fenceline between Courtesy Ford and the N.O. & N.E. Railroad right-of-way) and northeastern edge (i.e., along the southwestern side of Scooba Street) of the Process Area (see Figure 2-1 for current site features). KMCC will conduct additional soils investigations to determine the extent of impacted soils within these areas.

Figure 2-2 depicts proposed additional soil sampling locations. As surface soil samples collected during the 1997 RI were designated SS-01 through SS-18, new sample locations were numbered beginning with 19. At locations 19 through 23, KMCC will advance Geoprobe borings to depths of 10 feet below grade. Soil samples will be collected from the zero to 2-, 4- to 6-, and 8- to 10-foot intervals, and will be analyzed for Target Compound List semivolatile organic compounds (TCL SVOCs). Should field evidence of contamination (e.g., staining or odors) be present, samples may be collected at additional locations and/or depths to further delineate the extent of creosote-impacted soils.

2.2 Former Wood Storage Areas

During 1997 RI activities, surface soil samples (i.e., samples from the zero to 12-inch interval) were collected from unpaved areas and analyzed to determine the presence/absence of creosote constituents in near surface soils. A total of 18 surface soil samples were collected on a grid pattern at a frequency of approximately one per each 40,000 square feet of exposed area. Samples were analyzed for TCL SVOCs.

Low concentrations of polynuclear aromatic hydrocarbons (PAHs) were reported in all but two of the 18 surface soil samples collected during the RI. The low concentrations observed were typical of those found in areas historically used for treated wood storage. Generally, constituents in these areas are confined to the uppermost two feet of soil. KMCC will collect samples from deeper intervals to determine the vertical extent of impacted soils.



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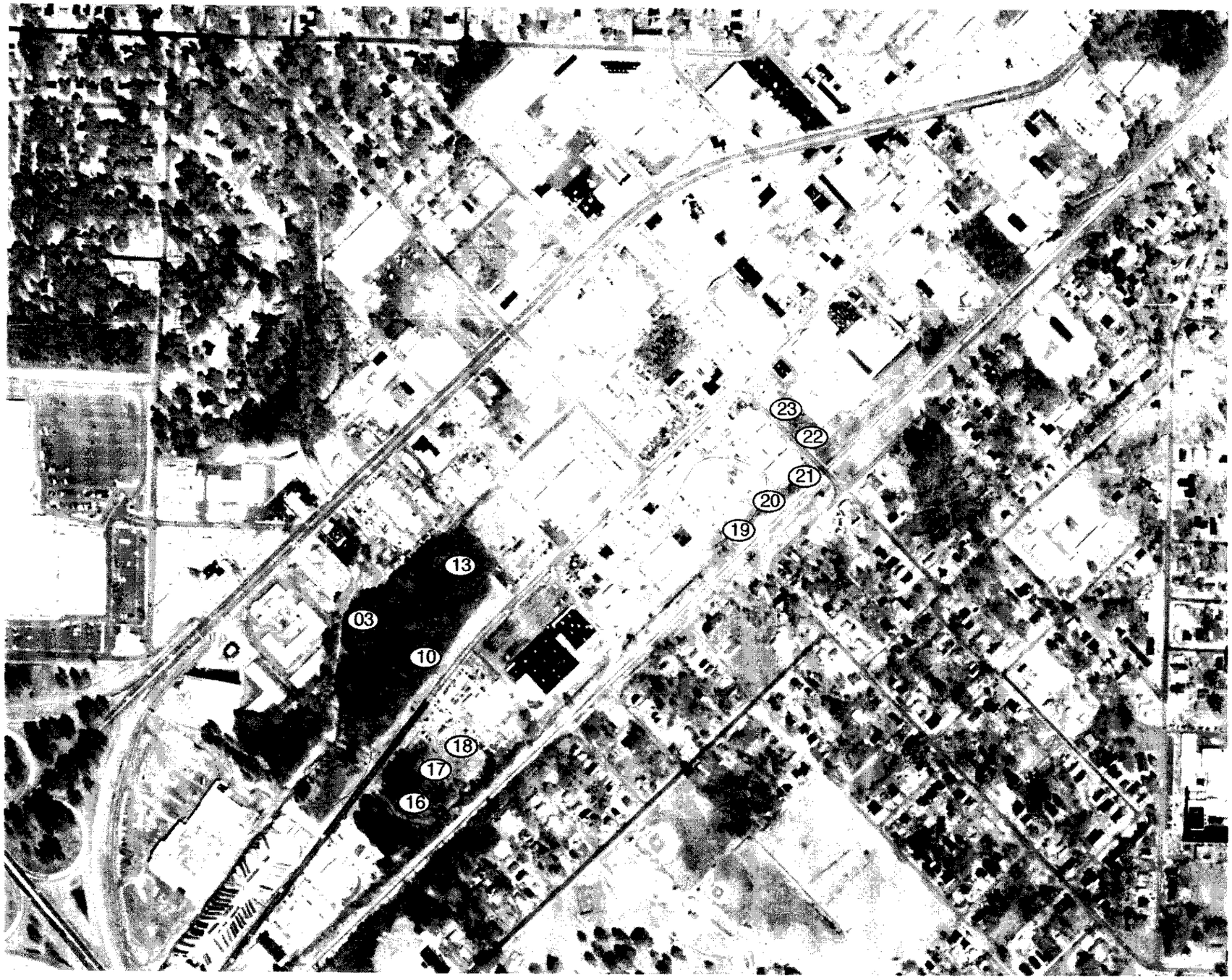
TITLE	FIGURE 2-1 CURRENT SITE FEATURES
PROJECT	FORMER GULF STATES CREOSOTING SITE
LOCATION	HATTIESBURG, MISSISSIPPI
SCALE	DWG. NO.



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(02) Soil Sampling Location

0' 500' 1000'

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TITLE	FIGURE 2-2 SOIL SAMPLING LOCATIONS
PROJECT	FORMER GULF STATES CREOSOTING SITE
LOCATION	HATTIESBURG, MISSISSIPPI
SCALE	DWG NO.

Soil samples designated 03, 10, 13, 16, 17, and 18 on Figure 2-2 will be collected at 1997 RI surface soil sample locations designated by the same numbers. Historical aerial photographs indicate that sample locations 16, 17, and 18 (see Figure 2-2) are within areas formerly used for treated wood storage. At each of these locations, borings will be advanced using a Geoprobe or hand auger (depending on accessibility) to depths of 6 feet. Soil samples will be collected from the 2- to 3-foot and 5- to 6-foot intervals, and will be analyzed for TCL SVOCs.

Historical aerial photographs do not indicate that any portion of the area north of West Pine Street was ever used for treated wood storage. However, low concentrations of PAHs were reported in surface soil samples east-northeast of the Gordon's Creek Fill Area. KMCC will collect samples from the 2- to 3-foot and 5- to 6-foot intervals at locations 03, 10, and 13 to determine the vertical extent of impacted soils. Samples will be analyzed for TCL SVOCs.

3.0 Stratigraphic Characterization

3.1 Process Area

The geometry of the sand channel beneath and immediately adjacent to the 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 channel trends and dips from the southwest to the northeast. The geometry of the sand channel to the north and east of the Process Area is unknown.

KMCC will utilize cone penetrometer testing (CPT) to achieve the following objectives:

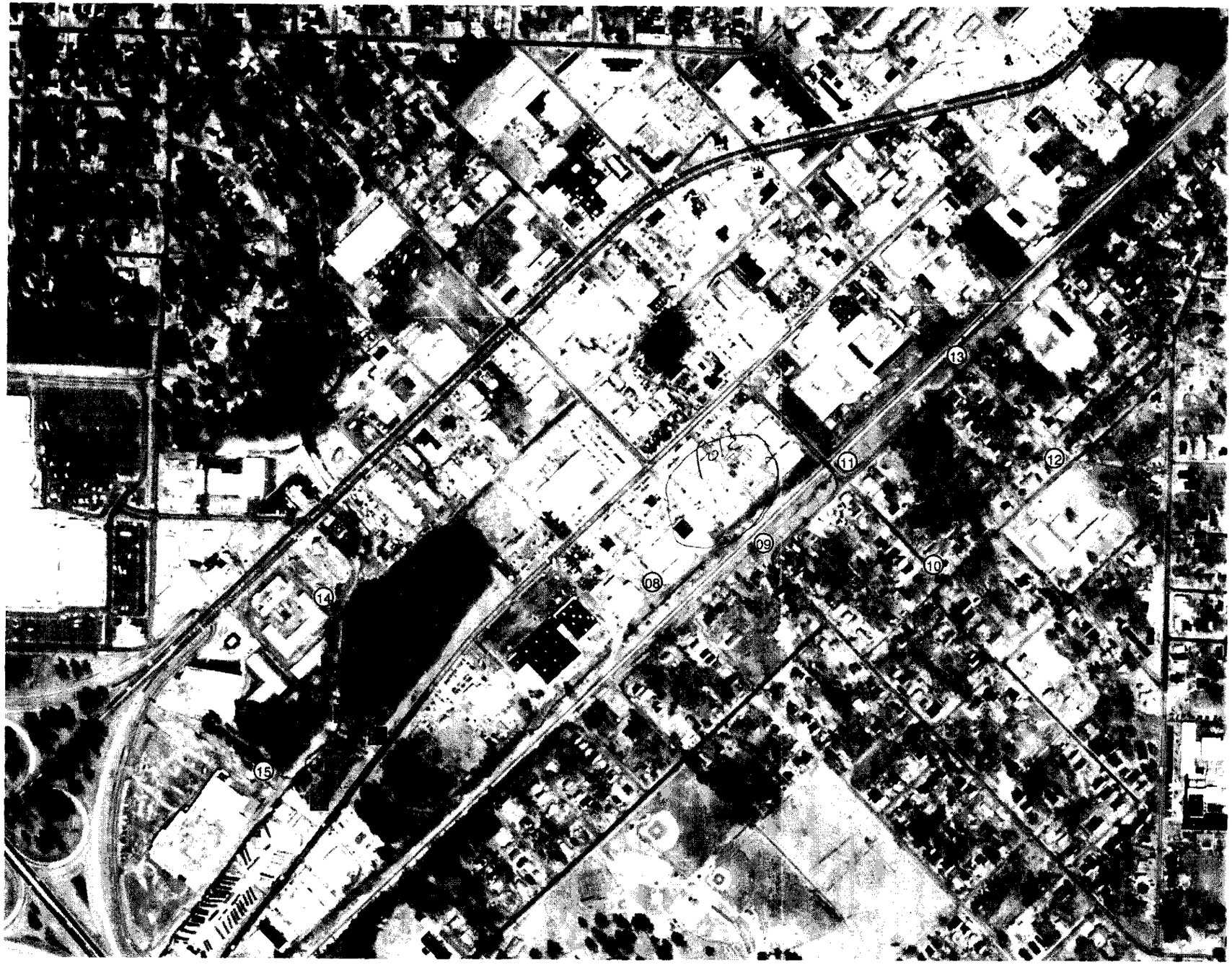
- Determine the geometry (i.e., configuration, alignment, and thickness) of the sand channel to the north and east of the Process Area;
- Determine the elevation and slope of the underlying confining clay; and
- Determine appropriate depths for ground water sampling.

As site-wide CPT pushes advanced during the 1997 RI were designated CPT-01 through CPT-07, new CPT locations were numbered beginning with 08. Six CPT pushes (pushes 08 through 13 on Figure 3-1) will be advanced through the sand channel to the top of the underlying confining clay. If the sand channel is absent, pushes will be terminated at a depth of 60 feet below grade. Locations may be modified based on field observations; MDEQ will be notified of the rationale for any deviations from this work plan addendum. CPT logs will be evaluated to determine locations and appropriate depths for additional ground water sampling (see Section 4.1).

3.2 Gordon's Creek Fill Area

The stratigraphy within the Fill Area was defined using CPT and Geoprobe methods during 1997 RI activities. No stratigraphic information was obtained, however, from the opposite (northwest) bank of Gordon's Creek. KMCC will utilize CPT to characterize the stratigraphy on the opposite bank of the Creek and determine appropriate depths for ground water sampling.

Two CPT pushes (pushes 14 and 15) will be advanced to depths of 50 feet below grade. Based on the geology of the Fill Area, this should be sufficiently deep to fully penetrate the shallow sands near the creek and encounter the upper portion of the underlying confining clay. CPT logs will be evaluated to determine appropriate depths for additional ground water sampling (see Section 4.2).



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13 CPT Stratigraphic Push/ Push-In Well Screen

Push-In Well Screen

0' 500' 1000'

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TITLE:	FIGURE 3-1 CPT & PUSH-IN WELL SCREEN LOCATIONS
PROJECT:	FORMER GULF STATES CREOSOTING SITE
LOCATION:	HATTIESBURG, MISSISSIPPI
SCALE:	DWG. NO.:

4.0 Ground Water Investigations

4.1 Process Area

Results of previous investigations indicate that ground water in the uppermost water-bearing zone beneath the 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 Process Area. The extent of affected ground water to the north and east of the Process Area has not been defined.

KMCC will utilize a CPT push-in well screen sampler to delineate the extent of affected ground water and determine appropriate locations for plume defining wells. The push-in well screen is a stainless steel sampler which is designed to remain closed and water-tight until the target sampling depth is attained. Once the tool has been pushed to the target sampling interval, the sampling rods are retracted approximately one foot, exposing the stainless steel well screen and allowing water to enter the sampling chamber. Ground water samples are then collected by lowering a small-diameter bailer through the sampling rods into the sampling chamber. When sampling is completed, the resulting borehole is pressure grouted from the bottom to the surface to ensure complete filling. The CPT push-in well screen has proven to be an effective tool for delineating ground water plumes, allowing the user to make informed and logical decisions regarding the placement of ground water monitoring wells.

Ground water samples will be collected at pushes 08 through 13 (see Figure 3-1), unless the sand channel is absent. The sampler will be pushed to a depth at the approximate vertical midpoint of the sand channel at each location. Samples will be transferred directly from the small-diameter bailer into clean, laboratory-supplied sample containers. Ground water samples will be analyzed for TCL SVOCs.

4.2 Gordon's Creek Fill Area

Ground water quality within the Fill Area has not been characterized during previous investigations. However, the extent of creosote-impacted soils within the Fill Area was delineated during the 1997 RI activities using ROST and subsurface soil data. It is anticipated that the ground water plume will be similar in size and shape to the footprint of affected soil. KMCC will utilize the CPT push-in well screen to delineate the extent of affected ground water and determine appropriate locations for plume defining wells in the Fill Area.

Ground water samples will be collected at pushes 14 through 20 (see Figure 3-1) from the uppermost water-bearing sand (typically 8 to 12 feet below grade). Samples will be transferred directly from the small-diameter bailer into clean, laboratory-supplied sample containers. Ground water samples will be analyzed for TCL volatile organic compounds (VOCs) and SVOCs.

4.3 Ground Water Monitoring Wells

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 1997 RI activities to monitor site-wide ground water. The results of ground water screening activities outlined in Sections 4.1 and 4.2 will be used to determine locations for three new wells downgradient of the Process Area and three new wells within the Fill Area. Prior to installation of the new wells, KMCC will submit a letter and map depicting proposed well locations to MDEQ for review and approval.

Wells will be installed, developed, and surveyed using the same procedures utilized during the 1997 RI. Ground water samples will be collected from the four new wells and four site-wide monitoring wells using dedicated PVC bailers. Samples will be analyzed for TCL SVOCs.

5.0 Data Evaluation and Reporting

Upon completion of the activities detailed in Sections 2.0 through 4.0, and once laboratory analytical reports are received, the data obtained will be evaluated and summarized in an addendum to the RI Report. The report will include descriptions of field activities, summary data tables, maps depicting sample locations, and conclusions drawn from the new RI data. Laboratory reports, boring logs, well construction diagrams, and CPT logs will be provided as appendices to the report.