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Transmitted Electronically

December 31, 2003

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**Subject: Final Preliminary Assessment/Site Inspection Report, Revision 1
Gulf States Creosoting
EPA ID No. MSN000407423
EPA Contract No. 68-W-00-123
Technical Direction Document (TDD) No. 4W-02-03-A-003
Document Control Number (DCN) WSI-GSC-0011**

Dear Ms. Webster:

Weston Solutions, Inc., Superfund Technical Assessment and Response Team - 2 (START-2) is submitting two copies of the final preliminary assessment/site inspection (PA/SI) report, Revision 1 for the **Gulf States Creosoting facility in Flowood, Rankin County, Mississippi** and an additional copy of references for the state.

Please contact me at (404) 527-7016 if you have any questions regarding this final PA/SI report.

Sincerely,
Weston Solutions, Inc.

Shanieka Pennamon
START-2 Project Manager

Enclosure

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FINAL PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT

**GULF STATES CREOSOTING COMPANY
FLOWOOD, RANKIN COUNTY, MISSISSIPPI
U.S. EPA ID NO. MSN000407423**


Revision 1

Prepared for

**U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 4
Atlanta, Georgia 30303**

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) tasked the Weston Solutions, Inc. Superfund Technical Assessment and Response Team - 2 (START-2) to prepare a preliminary assessment/site inspection (PA/SI) report for the Gulf States Creosoting Company (Gulf States) facility in Flowood, Rankin County, Mississippi, EPA ID No. MSN000407423. The PA/SI was conducted under Contract No. 68-W-00-123, Technical Direction Document (TDD) No. 4W-02-03-A-003.

The primary objective of a PA/SI is to determine whether a site has the potential to be placed on the National Priorities List (NPL). The NPL identifies sites at which a release, or threatened release, of hazardous substances poses a serious enough risk to public health or the environment to warrant further investigation and possible remediation under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986.

Information gathered during the PA/SI is used to generate a preliminary Hazard Ranking System (HRS) score. The HRS is the primary criterion EPA uses to determine whether a site should be placed on the NPL. PA/SIs are generally conducted at sites where environmental sampling and/or monitoring well installation are necessary to fulfill HRS documentation requirements.

Specifically, the objectives of the PA/SI are as follows:

- Obtain and review relevant file material
- Collect samples to attribute hazardous substances to site operations
- Collect samples to establish representative background levels
- Evaluate target populations for the groundwater migration, surface water migration, soil exposure, and air migration pathways
- Collect any other missing HRS data
- Document current site conditions
- Develop a site layout map

This report documents the results of the PA/SI conducted at the Gulf States facility during the week of April 21, 2003. All sampling was conducted by personnel from EPA's Science and Ecosystem Support Division (SESD) (Refs. 1; 2). Information reviewed for the PA/SI was gathered from the Mississippi Department of Environmental Quality (MDEQ) and from the EPA Region 4 CERCLA files.

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2.0 SITE BACKGROUND

This section describes the facility, its present and past operations (including waste disposal practices and regulatory history), previous investigations, and potential source areas located at the facility.

2.1 SITE DESCRIPTION AND ENVIRONMENTAL SETTING

The former 141-acre Gulf States Creosoting Company is located at 1625 Flowood Drive (Mississippi Hwy 468), Flowood, Rankin County, Mississippi (Refs. 3; 4, p. v; 5, pp. 1-4). The geographic coordinates of the facility are 32°18'43.8" north latitude and 90°58'38.3" west longitude (Ref 6). The facility is currently operating as a horse farm and as ConSteel Co, Inc.(ConSteel). Both current operations appear to be located on portions of the property where creosoting operations were conducted (Ref. 11). Currently, the southernmost building on the property is owned by ConSteel. The northernmost structures (i.e. metal barn and shed) are used to house tractors and helicopters for a local news station and are part of the horse farm. The horse farm has been operating on the property for approximately 7 years. The facility is bound by railroad tracks to the north and east, an adjacent business to the south, and marshland/tributary of the Pearl River to the west. The facility is bound by natural barriers and is not fenced (Refs. 3; 5). The facility lies within an area comprised of mixed industrial, commercial, and residential uses (Ref. 3).

The climate of Rankin County is characterized by long, hot summers and mild winters. Moist tropical air from the Gulf of Mexico has a moderating influence on maximum temperatures in summer (Ref. 7, p. 1). Normal annual total precipitation for Rankin County is approximately 55 inches, and the mean annual lake evaporation is 44 inches, yielding a net annual precipitation of 10 inches (Ref. 8). The 2-year, 24-hour rainfall is 4.5 inches (Ref. 9).

2.2 SITE OPERATIONS AND REGULATORY HISTORY

Gulf States owned the property as early as 1929 (Ref. 10, p. 11). Gulf States operated as a wood treating facility until the mid 1950s (Ref. 5, pp. 2, 3). In July 1958, American Creosoting Corporation obtained portions of the property (Ref. 10, pp. 7-11). In June 1959, W.G. Avery Body Company obtained portions of the property and operated a body shop on the property (Ref. 4, Deeds, p. 6). There are several tracts of

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land on the Gulf States property. The horse farm is owned and operated by Mr. Jim Webb; Webb owns the portion of the property just north of the main entrance to the property. ConSteel owns a portion of the property due south of the main entrance. ConSteel appears to be operating on the portion of the property that it owns. The onsite levee is owned by the Levee Board - which is a joint venture between the state and Rankin County. Mr. John McGowan owns the marsh area due west of the levee. McGowan has plans of developing the marsh areas as residential subdivisions (Ref. 30).

During Gulf States operations, railroad cross ties were treated at the facility with coal-tar creosote and transported on and off-site by means of railroad box cars (Refs. 5, p. 2; 11). Creosote is typically applied to the wood by commercial pressure treatment or by home and farm dipping (Ref. 12, p. 69). Creosote is a wood preservative used to treat railroad ties, telephone poles, marine pilings, and fence posts (Ref. 12, pp. 1, 2).

A Phase I investigation of the property in July 1993 included a review of the MDEQ Underground Storage Tank (UST) division records. No past UST usage on the property was found during the review (Ref. 4, p. xii). No other environmental permits have been identified for the facility.

2.3 PREVIOUS RELEASES AND INVESTIGATIONS

In June 1993, BCM Engineers, Inc. (BCM) conducted a Phase I Environmental Assessment (Phase I) of the former Gulf States property on behalf of Trustmark National Bank. The objective of the Phase I was to identify adverse environmental conditions, suspect activities, and potential hazardous wastes or materials on or in the vicinity of the subject property. The Phase I included the collection of soil samples from soil borings ranging in depth from 0 to 8 feet below ground surface (bgs). The seven soil borings were concentrated in the suspected location of the former creosote operations. Of the seven borings, five samples were collected and analyzed for semi-volatile organic compounds (SVOC). Constituents detected in the soil samples were naphthalene, 2-methylnaphthalene, dibenzofuran, fluorene, phenanthrene, and fluoranthene. The concentrations ranged from below the detection limit to 604 milligrams per kilogram (mg/kg) (Ref. 4).

In August 1993, BCM conducted a Phase II Environmental Assessment of the former Gulf States property. The objective of the Phase II was to delineate the extent of the creosote contaminated soil identified during

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the Phase I investigation. During the Phase II, several soil borings were advanced and five soil samples were collected for SVOC laboratory analysis. The soil borings ranged in depth from 0 to 8 feet bgs. Sample results indicated the presence of 2-methylnaphthalene, naphthalene, dibenzofuran, phenanthrene, fluoranthene, pyrene, and chrysene. Constituents ranged from below the detection limit to 1,057 mg/kg. The data were compared to health-based criteria for exposure via groundwater ingestion. Based on such a comparison, the recommendation for no further action was presented because the soil contaminants were below the target cleanup levels (Ref. 13).

2.4 POTENTIAL SOURCE AREAS

The source considered for the purpose of this PA/SI is contaminated soil.

3.0 PA/SI ACTIVITIES

This section outlines field observations and sampling procedures at the sampling locations. Individual subsections address the sampling investigation and rationale for specific PA/SI activities. The PA/SI was conducted in accordance with the EPA Quality Assurance Project Plan (QAPP) for the Gulf States facility (Ref. 2). The QAPP was prepared by SESD and includes the sample recommendations submitted by START-2 (Refs. 2; 14). The only deviation from the sampling plan involved the addition of a control sample along Prairie Branch in order to attribute contamination to another source upstream of the Gulf States property (Ref. 5, p.11).

3.1 SAMPLE COLLECTION METHODOLOGY AND PROCEDURES

SESD personnel collected 24 surface soil samples, 20 subsurface soil samples, four groundwater samples, and five sediment samples on or near the Gulf States property during the week of April 21, 2003 (Ref. 5). Sample locations are depicted on Figure 1 in Reference 1, Appendix A and are summarized in Tables 1 through 4 of this report.

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SESD personnel collected the surface soil samples from 0 to 6 inches below ground surface (bgs), and subsurface soil samples were collected from 2 to 3 feet bgs; two of the subsurface soil samples were collected between 6 and 12 inches. SESD personnel followed sample collection procedures outlined in the EPA Region 4 SESD, *Environmental Investigation Standard Operating Procedures and Quality Assurance Manual* (EISOPQAM) and the *Analytical Support Branch Operations and Quality Control Manual* (November 2001).

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TABLE 1
SURFACE SOIL SAMPLING LOCATIONS AND RATIONALE

Sample Number	Location	Rationale
GS-01-SS	Background; from Jackson Prep School (3100 Lakeland Dr.) located northeast of the property	Background soil sample for comparison to on-site sample results
GS-02-SS	North-central portion of the property	Determine presence or absence of hazardous substances
GS-03-SS	Depression located on the west-central portion of the property, west of the levee	Determine presence or absence of hazardous substances
GS-04-SS	Southwestern portion of the property	Determine presence or absence of hazardous substances
GS-05-SS	Southeastern portion of the property	Determine presence or absence of hazardous substances
GS-06-SS	Southwestern portion of the property	Determine presence or absence of hazardous substances
GS-07-SS	Southeastern portion of the property	Determine presence or absence of hazardous substances
GS-08-SS	Southeastern portion of the property	Determine presence or absence of hazardous substances
GS-09-SS	Southwestern portion of the property	Determine presence or absence of hazardous substances
GS-10-SS	Southeastern portion of the property near the existing ConSteel building	Determine presence or absence of hazardous substances
GS-11-SS	Central portion of the property from the barren area west of the ConSteel building	Determine presence or absence of hazardous substances
GS-12-SS	Western portion of the property, west of the levee	Determine presence or absence of hazardous substances
GS-13-SS	Central portion of the property south of the barn	Determine presence or absence of hazardous substances

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TABLE 1 (Continued)
SURFACE SOIL SAMPLING LOCATIONS AND RATIONALE

Sample Number	Location	Rationale
GS-14-SS	Central portion of the property west of the barn	Determine presence or absence of hazardous substances
GS-15-SS	East-central portion of the property	Determine presence or absence of hazardous substances
GS-16-SS	Northeastern portion of the property	Determine presence or absence of hazardous substances
GS-17-SS	Northeastern portion of the property	Determine presence or absence of hazardous substances
GS-18-SS	Northeastern portion of the property	Determine presence or absence of hazardous substances
GS-19-SS	North-central portion of the property	Determine presence or absence of hazardous substances
GS-20-SS	North-central portion of the property	Determine presence or absence of hazardous substances
GS-20-SD	North-central portion of the property; duplicate of GS-20-SS	Determine presence or absence of hazardous substances
GS-21-SS	Northwestern portion of the property	Determine presence or absence of hazardous substances
GS-22-SS	Northern portion of the on-site drainage ditch	Determine presence or absence of hazardous substances
GS-23-SS	Central portion of the on-site drainage ditch	Determine presence or absence of hazardous substances
GS-24-SS	Southern portion of drainage ditch near fenced area	Determine presence or absence of hazardous substances

Notes: GS Gulf States Creosoting Company SD - Duplicate surface soil sample
 SS Surface soil sample
 Surface soil samples were collected from 0 to 6 inches below ground surface (bgs)

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TABLE 2
SUBSURFACE SOIL SAMPLING LOCATIONS AND RATIONALE

Sample Number	Location	Rationale
GS-01-SB	Background; from Jackson Prep School (3100 Lakeland Dr.) located northeast of the property	Background soil sample for comparison to on-site sample results
GS-02-SB	North-central portion of the property	Determine presence or absence of hazardous substances
GS-03-SB	Depression located on the west-central portion of the property, west of the levee	Determine presence or absence of hazardous substances
GS-04-SB	Southwestern portion of the property	Determine presence or absence of hazardous substances
GS-05-SB	Southeastern portion of the property	Determine presence or absence of hazardous substances
GS-06-SB	Southwestern portion of the property	Determine presence or absence of hazardous substances
GS-07-SB	Southeastern portion of the property	Determine presence or absence of hazardous substances
GS-08-SB	Southeastern portion of the property	Determine presence or absence of hazardous substances
GS-09-SB	Southwestern portion of the property	Determine presence or absence of hazardous substances
GS-10-SB*	Southeastern portion of the property near the existing ConSteel building	Determine presence or absence of hazardous substances
GS-11-SB	Central portion of the property from the barren area west of the ConSteel building	Determine presence or absence of hazardous substances
GS-12-SB	Western portion of the property, west of the levee	Determine presence or absence of hazardous substances
GS-13-SB*	Central portion of the property south of the barn	Determine presence or absence of hazardous substances

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TABLE 2 (Continued)
SUBSURFACE SOIL SAMPLING LOCATIONS AND RATIONALE

Sample Number	Location	Rationale
GS-14-SB	Central portion of the property west of the barn	Determine presence or absence of hazardous substances
GS-15-SB	East-central portion of the property	Determine presence or absence of hazardous substances
GS-16-SB	Northeastern portion of the property	Determine presence or absence of hazardous substances
GS-17-SB	Northeastern portion of the property	Determine presence or absence of hazardous substances
GS-18-SB	Northeastern portion of the property	Determine presence or absence of hazardous substances
GS-19-SB	North-central portion of the property	Determine presence or absence of hazardous substances
GS-20-SB	North-central portion of the property	Determine presence or absence of hazardous substances
GS-21-SB	Northwestern portion of the property	Determine presence or absence of hazardous substances

Notes: GS Gulf States Creosoting Company
 SB Subsurface soil sample
 * Sample collected from 6 inches to 1 foot bgs.
 Subsurface soil samples were collected from 2 to 3 feet bgs, except as noted.

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TABLE 3

GROUNDWATER SAMPLING LOCATIONS AND RATIONALE

Sample Number	Location	Rationale
GS-01-GW	Background; from Jackson Prep School (3100 Lakeland Dr.) located northeast of the property	Background groundwater sample for comparison to on-site sample results
GS-02-GW	North-central portion of the property	Determine presence or absence of hazardous substances
GS-03-GW	Depression located on the west-central portion of the property, west of the levee	Determine presence or absence of hazardous substances
GS-04-GW	Southwestern portion of the property	Determine presence or absence of hazardous substances
GS-05-GW	Southeastern portion of the property	Determine presence or absence of hazardous substances

Notes: GS Gulf States Creosoting Company
 GW Groundwater sample

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TABLE 4
SEDIMENT SAMPLING LOCATIONS AND RATIONALE

Sample Number	Location	Rationale
GS-01-SD	Background; from tributary to Pearl River accessed from Jackson Prep School (3100 Lakeland Dr.) located northeast of the property	Background sediment sample for comparison to downstream marsh sample results
GS-02-SD	Northern portion of tributary to the Pearl River; area north of gated dirt road leading to the tributaries	Determine presence or absence of hazardous substances in the marsh
GS-03-SD	Southern portion of tributary to the Pearl River; area south of gated dirt road leading to the tributaries	Determine presence or absence of hazardous substances in the marsh
GS-04-SD	Half-way to the Pearl River along the southern portion of the tributary to the Pearl River	Determine presence or absence of hazardous substances in the marsh
GS-05-SD	Confluence of the southern tributary to the Pearl River and its tributary	Determine presence or absence of hazardous substances in the marsh
GS-06-SD	Control from Pearl River; approximately 1/8 mile upstream of confluence of Pearl River and Prairie Branch	Control sample for comparison to on-site sample results
GS-07-SD	Pearl River, downstream of the confluence of the tributary adjacent to Gulf States Creosoting and the Pearl River	Determine presence or absence of hazardous substances
GS-08-SD	Prairie Branch	Control sample for comparison to on-site sample results

Notes: GS Gulf States Creosoting Company
 SD Sediment sample

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3.2 ANALYTICAL SUPPORT AND METHODOLOGY

All samples collected during the PA/SI were analyzed through the EPA Contract Laboratory Program (CLP). The laboratories analyzed for EPA Target Compound List (TCL) volatile organic compounds (VOC), extractable semivolatile organic compounds (SVOC), pesticides, and polychlorinated biphenyls (PCB). Certain samples were analyzed for specific SVOC concentrations at lower concentrations than the standard levels of analysis under the CLP. The samples were also analyzed for Target Analyte List (TAL) inorganic substances (metals) and cyanide. EPA Region 4 SESD reviewed all data for compliance with the terms of the CLP.

3.3 ANALYTICAL DATA QUALITY AND DATA QUALIFIERS

All analytical data were subject to a quality assurance review as described in the EPA SESD laboratory data evaluation guidelines. The text and analytical data tables presented in this report show some concentrations of organic and inorganic parameters as qualified with a "J," indicating that the qualitative analysis was acceptable; however, the quantitative value has been estimated. Other compounds may have been qualified with an "N," indicating that they were detected based on the presumptive evidence of their presence. This means that the compound was only tentatively identified, and its detection cannot be considered a positive indication of its presence. Some sample results are reported with a "U" qualifier, meaning that the material was analyzed for but not detected. The reported number is the laboratory-derived sample quantitation limit (SQL) for the constituent in that sample. At times, miscellaneous organic compounds that do not appear on the TCL are reported with the data set. These constituents are qualified as "JN," indicating that they are tentatively identified at estimated quantities. Because these constituents are not routinely analyzed for or reported, background levels of SQLs are not generally available for comparison. Some compounds are qualified with an "R" which indicates the QC evaluation has determined the concentration of the compound is unusable. Compounds qualified with a "C" have been confirmed by gas chromatograph or mass spectrometry. The complete analytical data sheets are presented in Reference 1.

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4.0 SOURCE SAMPLING

This section discusses the source area evaluated at the facility and the sampling locations and analytical results of samples collected from the Gulf States property. The source area at the Gulf States property evaluated in this PA/SI is contaminated soil.

Surface soil and subsurface soil sampling locations are depicted on the sample location map in Reference 1, Appendix A and described in Tables 1 and 2. Surface soil inorganic and organic analytical results are summarized in Tables 5 and 6, respectively, and subsurface soil inorganic and organic analytical sampling results are summarized in Tables 7 and 8, respectively. Tables 5 through 8 are presented following Section 6.0. Elevated concentrations of constituents are shaded in the tables. The concentration of a constituent is considered to be elevated if the concentration is greater than or equal to three times the concentration detected in the background or control sample. In the case where a constituent is undetected in the background or control sample, any concentration equal to or greater than the SQL is considered to be elevated. The summary analytical data tables are presented as Appendix A.

The following discussion of hazardous constituents detected at elevated levels in soil samples collected at the facility includes only those hazardous constituents that are associated with site operations and those hazardous constituents that may pose a threat to human health or the environment.

4.1 SOURCE SAMPLING LOCATIONS AND ANALYTICAL RESULTS

SESD personnel collected 24 surface soil samples and 20 subsurface soil samples (including a duplicate sample) from various locations on the Gulf States property. One background surface soil sample (GS-01-SS) and one background subsurface soil sample (GS-01-SB) were collected from a location northeast of the facility. The background samples were collected from Jackson Preparatory School at 3100 Lakeland Drive. Locations for surface and subsurface soil samples collected on-site are presented in Tables 1 and 2 of this report, and in Reference 1, Appendix A, Figure 1.

Soil data is compared to background samples and is considered elevated if the compound is three times the background concentration. In the case where a constituent is undetected in the background sample, any

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concentration equal to or greater than the SQL is considered to be elevated. Specific findings regarding sample results are summarized below and presented in Tables 5 through 8.

Surface Soil

- SVOCs were detected at elevated concentrations in eleven of the twenty-three on-site surface soil samples. Constituents detected include acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzo-a-pyrene, carbazole, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Elevated constituent concentrations ranged from 380J micrograms per kilogram ($\mu\text{g}/\text{kg}$) to 12,000J $\mu\text{g}/\text{kg}$. The majority of SVOC constituents were detected in surface soil samples GS-05-SS, GS-07-SS, GS-08-SS, GS-10-SS, GS-11-SS, GS-14-SS, GS-15-SS, GS-16-SS, GS-17-SS, GS-23-SS, and GS-24-SS which are located on the northeastern, central, and southeastern portions of the property. Areas of contamination are located where boxcars containing wood treated with creosote were stored on the railroad tracks (Refs. 1, Appendix A, Figure 1; 11).
- Endrin, endrin aldehyde, endrin ketone, and 4,4'-DDT were the only pesticides detected at elevated concentrations in the surface soil samples collected. Pesticide concentrations ranged from 6.4J $\mu\text{g}/\text{kg}$ to 150 $\mu\text{g}/\text{kg}$. Pesticides were detected at elevated concentrations in eight of the twenty-three on-site surface soil samples.
- PCBs were not detected in the on-site surface soil samples.
- Methyl ethyl ketone (MEK) is the only volatile organic compounds (VOC) detected at an elevated concentration in the surface soil samples. MEK concentrations in samples GS-02-SS, GS-11-SS, GS-12-SS, GS-15-SS, GS-17-SS, GS-18-SS, GS-19-SS, GS-20-SD, GS-21-SS, and GS-23-SS ranged from 12 $\mu\text{g}/\text{kg}$ to 31J $\mu\text{g}/\text{kg}$. MEK is a common laboratory contaminant, and cannot be directly attributed to the processes at the facility.
- Inorganic constituents detected at elevated concentrations in on-site surface soil samples include antimony, barium, beryllium, cadmium, copper, lead, manganese, and zinc. Elevated constituent

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concentrations ranged from 0.09 milligrams per kilogram (mg/kg) to 5,500 mg/kg. Samples containing elevated levels of one or more constituent include GS-02-SS, GS-03-SS, GS-08-SS, GS-10-SS, GS-11-SS, GS-13-SS, GS-14-SS, GS-15-SS, GS-19-SS, GS-20-SS, GS-21-SS, and GS-24-SS.

Subsurface Soil

- Extractable SVOCs were detected at elevated concentrations in four of the twenty on-site surface soil samples. Constituents detected include acenaphthylene, anthracene, benzo(a) anthracene, benzo(b) fluoranthene, benzo(g,h,i) perylene, benzo(k) fluoranthene, benzo-a-pyrene, bis(2-ethylhexyl) phthalate, carbazole, chrysene, dibenzo(a,h) anthracene, fluoranthene, indeno(1,2,3-cd) pyrene, phenanthrene, and pyrene. Elevated constituent concentrations ranged from 420J $\mu\text{g}/\text{kg}$ to 37,000 $\mu\text{g}/\text{kg}$. Elevated constituents were detected in samples GS-05-SB, GS-08-SB, GS-10-SB, GS-14-SB located along the central and southeastern portion of the property.
- The pesticides 4,4'-DDE and 4,4'-DDT were detected in subsurface soil samples GS-13-SB (6.9 $\mu\text{g}/\text{kg}$) and GS-14-SB (16J $\mu\text{g}/\text{kg}$), respectively.
- PCB-1260 was detected in subsurface soil sample GS-18-SB at 42J $\mu\text{g}/\text{kg}$.
- Acetone and MEK were the only VOCs detected at elevated concentrations ranging from 11J $\mu\text{g}/\text{kg}$ to 99J $\mu\text{g}/\text{kg}$ in samples GS-08-SB, GS-10-SB, GS-14-SB, and GS-15-SB. Both constituents are common laboratory contaminants that cannot be directly attributed to the processes at the facility.
- The majority of elevated inorganic constituents were detected in subsurface soil sample GS-10-SB. Barium, beryllium, cadmium, cobalt, copper, lead, magnesium, nickel, and zinc were detected at concentrations ranging from 0.87 mg/kg to 2,400J mg/kg in this sample. Elevated constituents detected in samples GS-14-SB, GS-15-SB, and GS-19-SB include lead (27 mg/kg), manganese (600 mg/kg to 1,000 mg/kg), and selenium (2.3 J mg/kg).

Several unknown and miscellaneous compounds were detected in surface and subsurface soil samples as detailed in Appendix A.

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4.2 SOURCE CONCLUSIONS

Based on the analytical results for samples collected during the PA/SI, surficial soil contamination is present at the Gulf States property. Inorganic constituents detected at elevated concentrations include antimony, barium, beryllium, cadmium, cobalt, copper, lead, manganese, nickel, and zinc. Organic constituents detected at elevated levels include, but are not limited to, acenaphthylene, anthracene, benzo(a) anthracene, benzo(b) fluoranthene, benzo(g,h,i) perylene, benzo(k) fluoranthene, benzo-a-pyrene, bis(2-ethylhexyl) phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. The presence of the aforementioned polynuclear aromatic hydrocarbons (PAHs) are common constituents in creosote wood-treating operations. Site processes involved treating wood with creosote, a wood preservative comprised of PAHs, phenol, and cresols (Ref. 12, pp. 1, 67).

5.0 PATHWAYS

This section discusses the groundwater migration, surface water migration, soil exposure, and air migration pathways. Additionally, this section discusses the targets associated with each pathway and draws pathway-specific conclusions. Sampling locations and analytical results for samples collected from the specific pathways are also discussed.

5.1 GROUNDWATER MIGRATION PATHWAY

Four groundwater samples and one background groundwater sample were collected during the PA/SI. Groundwater sampling locations are depicted on the Sample Location Map found in Reference 1 Appendix A and are described in Table 3. Field parameters and inorganic and organic analytical results for groundwater samples are summarized in Tables 9, 10, and 11, respectively, located in Appendix A of this report following Section 6.0.

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5.1.1 Geologic and Hydrogeologic Setting

The property is located entirely within the East Gulf Coastal Plain province of North America and, more specifically, within the Jackson Prairie Belt physiographic province (Refs. 7, p. 2; 15, p. 269; 16, p. 23). The property is located along the western border of Rankin County, northeast of Jackson, and east of the Pearl River (Ref. 3). The topography of Rankin County ranges from gently rolling to steep with elevations ranging from 612 feet above mean sea level (amsl) to 220 feet amsl, the property is located at approximately 265 feet amsl (Refs. 3; 7, p. 3). The soil that directly underlies the property is comprised of the Cascilla-Arkabutla soil group which is classified as nearly level, well-drained and somewhat poorly drained, silty soil. These soils typically occur along the flood plains of the Pearl River and its tributaries. The nearly linear flood plain surface within the vicinity of the property is irregularly broken by old river runs, natural levees, sloughs, chutes, and scarps. The slope of the soils ranges from 0 to 2 percent and the average thickness of the soil is approximately 40 feet (Refs. 7, p. 8; 17, p. 32). The property is underlain in descending stratigraphic order by the Cockfield Formation, the Cook Mountain Formation, the Kosciusko Formation (also known as the Sparta Sand), the Zilpha and Winona Formations, the Tallahatta formation, and the Wilcox Group (Ref. 18).

The Claiborne Group consists of the Cockfield Formation, the Cook Mountain Formation, the Kosciusko Formation, the Zilpha and Winona Formations, and the Tallahatta formation (Ref. 18). The Cockfield Formation consists of irregularly bedded laminated lignitic clay, sand, and lignite that is slightly glauconitic (Ref. 18). Based on drillers' logs, the top of the Cockfield is located at approximately 40 feet below ground surface (bgs) and is approximately 133 feet thick in the vicinity of the property (Ref. 19). The Cook Mountain Formation underlies the Cockfield and consists of marl, limestone, glauconitic sand, and chocolate colored clay (Ref. 18). The Sparta Sand (Kosciusko Formation) consists of an irregularly bedded sand with clay and some quartzite. The Sparta Sand is approximately 300 feet thick in the area, but can reach a thickness in excess of 800 feet in southwestern Hinds County (Ref. 16, p. 15). The Zilpha and Winona Formations underlie the Sparta Sand and consist of a chocolate colored clay that contains glauconitic sand and a highly glauconitic more or less clayey sand, respectively (Ref. 18). The Zilpha Formation ranges in thickness from 200 feet on the Jackson Dome to 420 feet in the southwestern portion of Rankin County. The Winona Formation ranges from 10 to 15 feet thick over the Jackson Dome to up to 65 feet thick in other

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portions of the county (Ref. 16, p. 190). The Tallahatta Formation underlies the Winona Formation and consists of predominately glauconitic claystone and clay with lenses of sand and some sandstone (Ref. 18). The Wilcox Group underlies the Claiborne Group and consists of irregularly bedded fine to coarse sand, more or less lignitic clay and lignite (Ref. 18). The Wilcox Group varies in thickness from 1,100 feet to 1,300 feet over the Jackson Dome, and attains a thickness of 2,830 feet in southern Rankin County (Ref. 16, p. 188).

Three aquifers are available for the development of moderate to large groundwater supplies in the vicinity of the property. The aquifers in descending stratigraphic order, are the Cockfield Formation, the Sparta Sand, and the Wilcox Group. All of these aquifers are part of the Eocene aquifer system in Mississippi and extend to the west, southwest, and south, and contain freshwater in approximately 50 percent of the State. All of the aquifers are regional in extent and all except the Cockfield and the lower Wilcox merge northward into a single aquifer south of Memphis, Tennessee (Ref. 15, p. 274). The formations dip southwest at approximately 15 to 25 feet per mile toward the Mississippi Embayment and the Mississippi River, and the groundwater flow generally follows this regional trend (Ref. 17, p. 4). Within the geologic column, the water-bearing sand beds are interbedded with shale of both marine and continental origin, fossiliferous limestone, and calcareous sandstone. Strata that were deposited by marine origin generally consist of clay, and they form aquicludes (or confining layers) between the water-bearing sands. The aquicludes are widespread and more uniform in thickness than the aquifers (Ref. 17, p. 4).

The Cockfield Formation is the source of more than half of the municipal water supply in the area, mainly because it is the most shallow aquifer in the area (Ref. 17, pp. 1, 32). The top of the formation is located beneath the alluvial soil deposits at approximately 40 feet bgs in the vicinity of the property, ranges from 80 to 140 feet thick, and is unconfined (Refs. 17, p. 32; 19). Municipal water supplies for several small towns are obtained from the Cockfield, some wells yielding as much as 500 gallons per minute (gpm) (Ref. 17, p. 1). The hydraulic conductivity of the Cockfield is approximately 1×10^{-2} centimeters per second (cm/s) (Ref. 20, p. 29). The Cook Mountain Formation underlies the Cockfield aquifer and consists of marl, limestone, glauconitic sand, and chocolate colored clay (Ref. 18). The Cook Mountain Formation was deposited in a marine environment, exhibits a high clay content, and serves as a confining layer between the overlying

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Cockfield Formation and the underlying Sparta Sand (Ref. 17, p. 4).

The Sparta Sand underlies the Cook Mountain Formation in the vicinity of the property and is approximately 300 feet thick in the area, but can reach a thickness in excess of 800 feet in southwestern Hinds County. The Sparta Sand is the most intensively developed aquifer in the vicinity of the property. The Sparta exhibits a hydraulic conductivity of approximately 1×10^{-2} cm/s (Refs. 17, pp. 15, 32; 20, p. 29).

The Zilpha and Winona Formations underlie the Sparta Sand and consist of a chocolate colored clay that contains glauconitic sand and a highly glauconitic more or less clayey sand, respectively (Ref. 18). Due to the high clay content and marine origin of these formations, they serve as the lower confining layer for the Sparta Sand and the upper confining layer for the Wilcox Group in the vicinity of the property. These formations underlie the area at depths that range from 650 feet in northeastern Madison County to 2,600 feet in southwestern Hinds County. The depth of the formations throughout the remainder of the study area ranges from 420 to 570 feet (Ref. 17, p. 15).

The Wilcox Group contains a large reserve of soft water that has been tapped by only a few small-supply wells. The water is more highly mineralized and is warmer than that in the more shallow aquifers. The water in the aquifer is of good quality in Madison and northern Rankin Counties, but the quality deteriorates down the dip in Hinds County (Ref. 17, p. 1). In counties to the northeast, the results of several pumping tests indicate that the sands in the Wilcox aquifer are probably as permeable as the Sparta Sand (Ref. 17, p. 15).

5.1.2 Groundwater Sampling Locations and Analytical Results

SESD personnel collected four groundwater samples from temporary monitoring wells installed on the Gulf States property. The background groundwater sample was collected from the Jackson Preparatory School at 3100 Lakeland Drive located northeast of the facility. Locations for the groundwater samples are detailed in Table 3 and depicted in Reference 1, Appendix A, Figure 1. Within this report, Appendix A, Table 9 lists the field parameters for the groundwater samples. Sample results are summarized in Tables 10 and 11 located in Appendix A of this report.

- Inorganic constituents detected at elevated concentrations when compared to background concentrations

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include aluminum, barium, cobalt, magnesium, manganese, vanadium, and zinc. Concentrations of inorganic constituents ranged from 1.9 micrograms per liter ($\mu\text{g/L}$) to 8,200 $\mu\text{g/L}$. Barium, cobalt, magnesium, manganese, and zinc were also detected at elevated concentrations in on-site soil samples and can therefore be attributed to the site.

- MEK is the only organic compound detected at an elevated concentration in GS-04-GW at 7.2 J $\mu\text{g/L}$.
- No SVOCs, pesticides, or PCBs were detected in any of the groundwater samples.

5.1.3 Groundwater Targets

During the June 1993 Phase I investigation at the property, substances detected in groundwater samples collected from a temporary monitoring well included 2,4-dimethylphenol, naphthalene, dibenzofuran, fluorene, phenanthrene, fluoranthene, and pyrene at concentrations ranging from 79 micrograms per liter ($\mu\text{g/L}$) to 1,279 $\mu\text{g/L}$ (Ref. 4, p. 26).

The majority of local residents obtain drinking water from the City of Flowood Water Department (CFWD). The CFWD obtains its drinking water from six wells screened in the Cockfield Formation and the Sparta Sand aquifers, which have depths ranging from 562 feet to 1,185 feet. Water from the wells is blended prior to distribution within the system. CFWD serves approximately 5,400 connections (Ref. 21). According to the 2000 Census, there are 2.62 people per household in Rankin County (Ref. 22). Based on the number of service connections and the number of people per household, CFWD serves approximately 14,148 people (2.62 people per household x 5,400 connections with an average of 2,358 people served per well) (Refs. 21; 22). The CFWD well distribution is as follows: 0 to 0.25 mile: 0 wells; 0.25 to 0.50 mile: 0 wells; 0.50 to 1 mile: 1 well; 1 to 2 miles: 0 wells; 2 to 3 miles: 1 well; 3 to 4 miles: 1 well. Therefore, the CFWD population distribution is as follows: 0 to 0.25 mile, 0 persons; 0.25 to 0.50 mile, 0 persons; 0.50 to 1 mile, 2,358 persons; 1 to 2 miles, 0 persons; 2 to 3 miles, 2,358 persons; 3 to 4 miles, 2,358 persons (Refs. 3; 21; 22). No private wells were identified in the surrounding neighborhoods during the June 2002 site reconnaissance (Ref. 5, p. 11).

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5.1.4 Groundwater Conclusions

The only site-attributable constituents detected in the groundwater samples collected from the surficial aquifer during the PA/SI were barium, cobalt, manganese, and zinc. The majority of people in the area receive their drinking water from the City of Flowood Water Department. CFWD's wells are screened in the Cockfield Formation and the Sparta aquifers below a confining layer. Due to the small number of people served water by the CFWD and the fact that the municipal wells are screened at depths greater than 550 feet, the groundwater pathway does not appear to be a viable migration route.

5.2 SURFACE WATER MIGRATION PATHWAY

Six sediment samples were collected during the PA/SI to document the migration of on-site contaminants into the marsh located west of the Gulf States property, and the Pearl River (Ref. 3).

5.2.1 Hydrologic Setting

Currently, a levee separates the Gulf States property from the marsh area located west of the property (Refs. 3; 5, pp. 7, 8). The construction date of the levee is unknown, however, the levee was in existence in 1955 (Ref. 4, p. vii). The surface water migration pathway prior to the construction of the levee, appears to have flowed west toward the marsh and the tributaries which flow into the Pearl River (Ref. 3). There is a drainage ditch on the western portion of the property which flows north to south. The drainage ditch is located to the east of the levee (Ref. 5, pp. 7, 8). Currently, it appears that the on-site drainage flows into this drainage ditch. Prior to the construction of the levee, it appears that creosote was discharged to the marsh areas west of the property, and these areas have been defined as creosote slough by the U.S. Geological Survey (Refs. 3; 5, p. 4). During the operation of the facility, the Pearl River was re-channeled to flow further to the west of the facility and the creosote slough areas (Refs. 3; 11). The surface water pathway includes the marshland and tributaries which flow approximately 0.8 mile to the Pearl River. The 15-mile downstream surface water pathway is completed in the Pearl River which flows at an average rate of 759 cubic feet per second (Refs. 3; 23). The property itself is within a flood area that is undefined, perhaps due to the construction of the levee. However, the marsh area adjacent to the facility is within the 100-year flood plain (Ref. 24). A City of Jackson surface water intake is located approximately 0.75-mile northwest

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of the Gulf States property on the Pearl River (Ref. 5, p. 4).

5.2.2 Sediment Sampling Locations and Analytical Results

SESD personnel collected five sediment samples from the marsh adjacent to the Gulf States property and the Pearl River. Two background sediment samples (one from the Pearl River and one from a marsh) and one control sediment sample were collected for comparison to the downstream samples. The background and control sediment sample locations are detailed in Table 4 and depicted in Reference 1, Appendix A, Figure 1. Specific findings regarding sample results are summarized below and presented in Tables 12 through 13.

- Several SVOCs were detected at elevated concentrations in the sediment samples. Such constituents include acenaphthene, acenaphthylene, anthracene, benzo(a) anthracene, benzo(b) fluoranthene, benzo(k) fluoranthene, benzo-a-pyrene, chrysene, dibenzo(a,h) anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. Constituent concentrations ranged from 2 µg/kg to 560 µg/kg. Elevated constituents were detected in all of the sediment samples collected from the marsh adjacent to the Gulf States property.
- VOCs including acetone, carbon disulfide, and MEK were detected at elevated concentrations in sediment samples GS-03-SD and GS-04-SD.
- The pesticides 4,4'-DDE (7.9 µg/kg) and beta-BHC (12 µg/kg) were detected in sediment sample GS-03-SD and GS-04-SD, respectively.
- Inorganic constituents detected at elevated concentrations in sediment samples are barium, beryllium, lead, and zinc. All four constituents were detected in sample GS-03-SD at concentrations ranging from 1.3 mg/kg to 300 mg/kg. An elevated level of beryllium was also detected in sample GS-04-SD (1.2 mg/kg).

Several unknown and miscellaneous compounds were detected in the sediment samples as detailed in Appendix A of this report.

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5.2.3 Surface Water Targets

Federally endangered or threatened species within the Pearl River are the Ringed map turtle (*Graptemys oculifera*) and the Gopher tortoise (*Gopherus polyphemus*) (Refs. 25, p. 2; 26, pp. 20, 21). Although their exact location is unknown, other endangered/threatened species potentially within the area include the Bayou darter (*Etheostoma rubrum*); Pallid sturgeon (*Scaphirhynchus albus*); Southern combshell (*Epioblasma penita*) (Ref. 26, pp. 23, 30, 31). Approximately 2.5 miles of wetland frontage is present along the Pearl River (Ref. 3). Recreational fishing occurs in both the marsh and Pearl River. Commercial fishing also occurs along the Pearl River (Ref. 5, pp. 3, 4). There is a fish tissue advisory in effect for the Pearl River from Highway 25 near Carthage, downstream to the Leake County Water Park. The advisory recommends limited consumption of largemouth bass and large catfish due to mercury contamination (Ref. 27).

5.2.4 Surface Water Conclusions

Sediment samples collected from the marsh located west of the Gulf States property revealed elevated levels of site-attributable contaminants. The constituents include acenaphthene, acenaphthylene, anthracene, benzo(a) anthracene, benzo(b) fluoranthene, benzo(k) fluoranthene, benzo-a-pyrene, chrysene, dibenzo(a,h) anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene at concentrations ranging from 2 µg/kg to 560J µg/kg. These constituents are common constituents in the composition of creosote and are commonly found at wood treating facilities. Such constituents pose a threat to the marsh and the Pearl River due to the recreational fishing that occurs in these water bodies. Due to the detection of the aforementioned constituents in the nearby surface water bodies, the surface water pathway is a viable migration route for contaminants.

5.3 SOIL EXPOSURE PATHWAY AND AIR MIGRATION PATHWAY

Twenty-three surface soil and 20 subsurface soil samples were collected during the PA/SI at the Gulf States property. Surface and subsurface soil sample results were discussed in Section 4.0.

5.3.1 Physical Conditions

The 141-acre Gulf States property is zoned for heavy industrial use (I-2) (Refs. 5, p. 2; Ref. 13, p. 1). The property currently consists of a horse farm and a company that sells reinforcing steel and wire mesh (Ref. 5, pp. i, 1). The facility is bound by railroad tracks to the north and east, an adjacent business to the south, and marshland/tributary to the Pearl River to the west (Ref. 3; 11). The facility is bound by natural barriers and portions of the facility property are fenced. The fenced portions of the property include the area surrounding the ConSteel building, and the horse grazing area (Ref. 5, p. 8). Access to the entire property is unrestricted.

During the 1993 Phase I conducted at the property, seven soil borings were constructed ranging in depth from 0 to 8 feet bgs. Of the seven borings, five samples were collected and analyzed for PAHs. Constituents detected in the soil samples included naphthalene, 2-methylnaphthalene, dibenzofuran, fluorene, phenanthrene, and fluoranthene. Organic concentrations ranged from below the detection limit to 604 (mg/kg) (Ref. 4).

5.3.2 Sampling Locations and Analytical Results

Surface and subsurface soil sampling locations and analytical results are discussed under Source Sampling in Section 4.1. No air samples were collected at the facility.

5.3.3 Soil and Air Targets

The facility currently houses a horse farm and the ConSteel Company (Ref. 5, p. 1). The nearest residences are located east of the property across Highway 15 (Ref. 3; 4). There are no schools, daycare facilities, or residences within 200 feet of the property (Refs. 3; 5, p. 11). However, the two businesses on the property are operational and the potentially exposed population includes the workers at these two facilities (Ref. 5, p.1).

According to a LandView[®] Census Data report and a house count, approximately 805 persons reside within 4 radial miles of the Gulf States property. The estimated population distribution within 4 radial miles of the Gulf States property is as follows: 0 to 0.25 mile, 118 persons; 0.25 to 0.50 mile, 45 persons; 0.50 to 1 mile, 152 persons; 1 to 2 miles, 87 persons; 2 to 3 miles, 44 persons; and 3 to 4 miles, 359 persons (Ref. 28; 29).

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Several federal threatened and endangered species are suspected within the vicinity of the Gulf States property. Such species may include the Indiana bat (*Myotis sodalis*). However, their exact locations have not been identified (Ref. 26, p. 2). Approximately 410 acres of wetlands are located within 4 miles of the Gulf States property. The wetlands distribution is as follows: 0 to 0.25 mile, 10 acres; 0.25 to 0.50 mile, 15 acres; 0.50 to 1 mile, 185 acres; 1 to 2 miles, 190 acres; 2 to 3 miles, 10 acres; 3 to 4 miles, 0 acres (Ref. 3).

5.3.4 Soil and Air Conclusions

Elevated constituents were detected in the surface soil samples collected from the property; however, the property is not residential, and has been zoned heavy industrial. Based on the nature of the constituents detected at the property, the potential exposure to employees and local residences via soil or air is considered minimal.

6.0 SUMMARY AND CONCLUSIONS

The former 141-acre Gulf States Creosoting Company is located at 1625 Flowood Drive (Mississippi Hwy 468), Flowood, Rankin County, Mississippi. The facility is currently operating as a horse farm and ConSteel. Both current operations appear to be located on portions of the property where creosoting operations were conducted. Currently, the southernmost building on the property is owned by ConSteel. The northernmost structures (i.e. metal barn and shed) are used to house tractors and helicopters for a local news station, and are part of the horse farm. The horse farm has been operating on the property for approximately 7 years.

Gulf States owned the property as early as 1929 and operated as a wood treating facility until the mid 1950s. In July 1958, American Creosoting Corporation obtained portions of the property and operated there until the late 1950s. In June 1959, W.G. Avery Body Company purchased portions of the property and operated a body shop on the site. There are several tracts of land on the Gulf States property and some are currently occupied. The horse farm tract is owned and operated by Mr. Jim Webb; Webb owns the portion of the property just north of the main entrance to the property. ConSteel owns a portion of the property due south of the main entrance. ConSteel appears to be operating on the portion of the property that it owns. The

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onsite levee is owned by the Levee Board - which is a joint venture between the state and Rankin County. Mr. John McGowan owns the marsh area due west of the levee. McGowan has plans of developing the marsh areas as residential subdivisions.

During Gulf States operations, railroad cross ties were treated at the facility and transported on and off-site by means of railroad box cars. Creosote was applied to the wood by commercial pressure treatment or by home and farm dipping. Creosote is a wood preservative used to treat railroad ties, telephone poles, marine pilings, and fence posts.

Based on the analytical results for the samples collected during the PA/SI, soil contamination is present at the Gulf States property. Inorganic constituents detected at elevated concentrations include antimony, barium, beryllium, cadmium, cobalt, copper, lead, manganese, nickel, and zinc. Organic constituents detected at elevated levels include, but are not limited to, acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzo-a-pyrene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd) pyrene, phenanthrene, and pyrene. The presence of the aforementioned PAHs are attributable to the site operations.

The only site-attributable constituents detected in the surficial aquifer were barium, cobalt, manganese, and zinc. The majority of people in the area receive their drinking water from the City of Flowood Water Department. CFWD's wells are screened in the Cockfield Formation and the Sparta aquifers beneath a substantial a confining layer. Due to the small number of people served water by the CFWD and the fact that the municipal wells are screened at depths greater than 550 feet, groundwater does not appear to be a viable migration route.

Sediment samples collected from the marsh located west of the Gulf States property exhibited elevated levels of constituents detected in on-site soils and are common constituents used in the wood preserving industry. Such constituents include acenaphthene, acenaphthylene, anthracene, benzo(a) anthracene, benzo(b) fluoranthene, benzo(k) fluoranthene, benzo-a-pyrene, chrysene, dibenzo(a,h) anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene at concentrations ranging from 2 µg/kg to 560J µg/kg. Such constituents pose a threat to both the marsh and the Pearl River because of the

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recreational fishing that occurs on these water bodies. Due to the detection of the aforementioned constituents, the surface water pathway is a viable migration route for contamination.

Surface soil contamination is present at the property. However, because the property is primarily industrial and not residential, and the non-volatile nature of the contamination, the exposure to employees and local residences by means of soil or air is considered to be minimal.

Based on the analytical results for the samples collected during the PA/SI, further CERCLA action is recommended for the Gulf States property.

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Final Preliminary Assessment/Site Inspection Report
Gulf States Creosoting Company
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APPENDIX A
ANALYTICAL DATA TABLES

15 Pages

TABLE 5
SUMMARY OF INORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

COMPOUND	UNITS	On-site Samples														
		Background	GS01SS	GS02SS	GS03SS	GS04SS	GS06SS	GS06SS	GS07SS	GS08SS	GS08SS	GS09SS	GS10SS	GS11SS	GS12SS	GS13SS
METALS																
ALUMINUM	MG/KG	4700 J	7800 J	8900 J	4300 J	3100 J	6700 J	2800 J	1800 J	2500	4700 J	4400 J	5500 J	4400 J		
ANTIMONY	MG/KG	0.56 UJ	0.64 R	--	--	--	--	--	--	1.2 R	1 R	--	--	--	0.6 R	
ARSENIC	MG/KG	6.3	3.3 J	11	2	13	2	3.6	3.4	0.95 R	6.8	3.7	4.4	6.3		
BARIUM	MG/KG	72	120	67	60	37	85	34	21	25	120	54	83	58		
BERYLLIUM	MG/KG	0.33	0.94	0.94	0.37	0.3	0.28	0.2	0.19	0.15	0.46	0.44	0.46	0.54		
CADMIUM	MG/KG	0.05 U	--	--	--	--	--	--	0.89	--	0.34	0.19	--	0.16 R		
CALCIUM	MG/KG	1100	690	790	690	500	1200	810	800	340	2500	660	760	1200		
CHROMIUM	MG/KG	8.4	6.1	20	6	7.5	7.7	4.5	4	4.1	23	12	8.9	7.8		
COBALT	MG/KG	5.8	17	8.1	1.7	6.6	1.4	2	1.5	0.95	4.8	5.4	7.3	4.2		
COPPER	MG/KG	6	2 J	--	--	--	--	--	--	--	19 J	--	--	7.2 J		
IRON	MG/KG	10000	8400	27000 J	4500 J	15000 J	5600 J	5400 J	4700 J	2800	14000	11000	11000 J	12000		
LEAD	MG/KG	11 J	17	120	18	19	17	11	12	8.8	80	290	25	33		
MAGNESIUM	MG/KG	520 J	470 J	680	280	180	550	250	180	160 J	780 J	260 J	380	280 J		
MANGANESE	MG/KG	630	2800	550	140	610	170	180	230	28	500	880	990	940		
POTASSIUM	MG/KG	380 J	240 J	350	200	120	430	170	150	120 J	560 J	330 J	280	390 J		
SELENIUM	MG/KG	1.3	0.93 R	1.9 J	--	--	--	--	--	--	0.98 R	0.77 R	--	1.2		
SILVER	MG/KG	0.39 R	0.71 R	0.63	0.26 R	0.43	0.29	--	--	0.28 R	0.49	0.38	0.43	0.33 R		
SODIUM	MG/KG	270	300	82 J	120 J	58 J	110	63	--	300	320	200	91	230		
VANADIUM	MG/KG	17	15	46	11	18	13	8.1	7.1	6.6	18	16	22	17		
ZINC	MG/KG	29	47	34	27	23	35	24	26	19	160	840	28	72		

Notes:
GS - Gulf States Creosoting
SS - surface soil sample
MG/KG - milligrams per kilogram
U - value is below the reporting limit
J - estimated value
R - data is unusable
shading - elevated concentrations of constituents

TABLE 5 (CONTINUED)
 SUMMARY OF INORGANIC ANALYTICAL RESULTS
 SURFACE SOIL SAMPLES
 GULF STATES CREOSOTING
 FLOWOOD, MISSISSIPPI

COMPOUND	UNITS	On-site Samples												
		Background	GS14SS	GS15SS	GS16SS	GS17SS	GS18SS	GS19SS	GS20SS	GS20SD*	GS21SS	GS22SS	GS23SS	GS24SS
ALUMINUM	MG/KG	4700 J	4800 J	8000 J	7700 J	9000 J	4900 J	8500 J	6700 J	6100 J	4200 J	7500 J	4900 J	
ANTIMONY	MG/KG	0.56 UJ	0.69 J	6.9	5.5 J	5.5	5.4	6.5	5.8	4.5	2.7	4	5	
ARSENIC	MG/KG	6.3	9	72	50	120	53	89	410	130	88	42	83	
BARIUM	MG/KG	72	65	0.44	0.71	0.43	0.35	0.73	1.2	0.76	0.81	0.43	0.5	
BERYLLIUM	MG/KG	0.33	0.11 R	0.1	0.07 R	0.07 R	0.07 R	0.17	0.17	0.17	0.17	0.17	0.17	
CADMIUM	MG/KG	0.05 U	1800	2000	1200	2300	890	2000	1700	1400	190	280	960	
CALCIUM	MG/KG	1100	8.6	11	4	12	7.6	13	17	6.8	14	5.5	6.8	
CHROMIUM	MG/KG	8.4	7.3	11	4	12	7.6	13	17	6.8	14	5.5	6.8	
COBALT	MG/KG	5.8	6	6	6	6	6	6	6	6	6	6	6	
COPPER	MG/KG	6	6	6	6	6	6	6	6	6	6	6	6	
IRON	MG/KG	10000	11000	12000	12000	12000	10000	12000	12000	8800	7300	9700 J	13000	
LEAD	MG/KG	11 J	24	26	15 J	20 J	15 J	19 J	24 J	22 J	13 J	9.8	24	
MAGNESIUM	MG/KG	520 J	340 J	430 J	510 J	490 J	340 J	530 J	380 J	410 J	270 J	220	630 J	
MANGANESE	MG/KG	630	870	1800	240	2500	590	1900	5660	1800	2200	470	920	
POTASSIUM	MG/KG	380 J	200 J	580 J	490 J	620 J	180 J	550 J	240 J	250 J	250 J	170	480 J	
SELENIUM	MG/KG	1.3	0.63 R	1.1 R	1.3	1.5J	1.1	1.2	1.3 J	1.1 R	0.8	1.1 R	1.1 R	
SILVER	MG/KG	0.39 R	0.37	0.5	0.39 R	0.51 R	0.29	0.53 R	0.9 R	0.42	0.52	0.2	0.46 R	
SODIUM	MG/KG	270	300	310	270	280	310	290	290	290	300	340	86 J	
VANADIUM	MG/KG	17	21	23	22	23	20	22	22	17	13	21	26	
ZINC	MG/KG	29	44	48	33	65	34	52	88	63	24	19	89	

Notes:
 GS - Gulf States Creosoting
 SS - surface soil sample
 MG/KG - milligrams per kilogram
 U - value is below the reporting limit
 J - estimated value
 R - data is unusable
 shading - elevated concentrations of constituents
 * - Sample GS20SD is a duplicate of sample GS20SS.

TABLE 6 (CONTINUED)
SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

COMPOUND	UNITS	On-Site Samples												
		080188	081488	081888	081988	081788	081888	081988	082088	082088	082188	082288	082488	
METHYL ACETATE	UG/KG	100 J	75 J	100 J	56 J	250 J	130 J	180 J	83 J	220 J	270 J	110 J	130 J	220 J
METHYL ETHYL KETONE	UG/KG	11 U	--	3 J	--	--	34 J	17 J	--	--	11 J	--	--	--
UNKNOWN COMPOUNDS														
ACETALDEHYDE	UG/KG	18 J2	7 J1	10 J1	16 J2	12 J1	8 J1	19 NU		9 J1	12 J1	6 J	30 J0	150 J2
BUTANAL	UG/KG		12 NU	24 NU		38 NU				42 NU	47 NU		14 NU	
BUTANAL 3-METHYL	UG/KG													
BUTANAL	UG/KG				31 NU		20 NU			11 NU				
BUTANAL 2-METHYL	UG/KG					7 NU				7 NU				
KNOWN COMPOUNDS														
2-ANISOL 4-METHYLPHENOL	UG/KG	380 U	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	UG/KG	380 U	--	--	--	--	--	--	--	--	--	--	--	--
ACENAPHTHYLENE	UG/KG	380 U	1150	250 J	87 J	270 J	--	--	--	--	--	--	86 J	150 J
ANTHRACENE	UG/KG	380 U	370 J	--	--	380 J	--	--	--	--	--	--	--	300 J
BENZALDEHYDE	UG/KG	380 U	270	80	260 J	100	--	--	--	--	--	--	430 J	900
BENZOPHTHALENE	UG/KG	380 U	1500	1500	700	2000 J	--	--	--	56 J	44 J	--	700 J	1000
BENZOPHTHALENE	UG/KG	380 U	830	380 J	92 J	280 J	--	--	--	160 J	140 J	--	180 J	330 J
BENZOPHTHALENE	UG/KG	380 U	1100	1100	750	2100 J	--	--	--	170 J	150 J	--	500	7000 J
BENZOPHTHALENE	UG/KG	380 U	530	650	230 J	1000	--	--	--	46 J	47 J	--	260 J	870
BIPHENYL	UG/KG	380 U	--	--	--	--	--	--	--	--	--	--	--	--
CARBACOL	UG/KG	380 U	280 J	250 J	62 J	130 J	--	--	--	86 J	69 J	--	510	1100
CHRYSENE	UG/KG	380 U	810	1700	380 J	1800	--	--	--	--	--	--	120 J	280 J
DIBENZOLANTRACENE	UG/KG	380 U	380	200 J	95 J	330 J	--	--	--	--	--	--	350	1300
DIBENZOPURAN	UG/KG	380 U	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE	UG/KG	380 U	3100	3100	750	2500	--	--	--	73 J	81 J	--	340 J	660 J
FLUORENE 2,3-DIOPYRONE	UG/KG	380 U	1750	740 J	270 J	850	--	--	--	83 J	51 J	--	59 J	--
FLUORENE 2-METHYL	UG/KG	380 U	--	--	--	--	--	--	--	--	--	--	--	--
FLUORENE 2-METHYL	UG/KG	380 U	320 J	1100	310 J	250 J	--	--	--	--	--	--	59 J	--
FLUORENE 2-METHYL	UG/KG	970 U	3300	3300	340	1700	--	--	--	100 J	63 J	--	450	1800
UNKNOWN COMPOUNDS														
STIGMAST-4-EN-3-ONE	UG/KG		5500 J0	12000 J1	24000 J17	5600 J16	3100 J17	12000 J25	8800 J17	8100 J17	1300 J14	1300 J14	300 J21	5600 J15
UNKNOWN ALCOHOL	UG/KG									330 NU			170 NU	2800 NU
UNKNOWN RETENESANO	UG/KG													
2,10-ANTHRACENE	UG/KG				700 NU	180 J								
PHENANTHRENE 1-METHYL	UG/KG													
PHENANTHRENE 2-METHYL	UG/KG													
PHENANTHRENE 2,2-DIMETHYL	UG/KG													
PHENANTHRENE 4,5-DIMETHYL	UG/KG													
ANTHRACENE 2-METHYL	UG/KG													
11-H-BENZOPHTHALENE	UG/KG		1700 NU		380 NU		510 NU							
11-H-BENZOPHTHALENE	UG/KG													

TABLE 7
 SUMMARY OF INORGANIC ANALYTICAL RESULTS
 SUBSURFACE SOIL SAMPLES
 GULF STATES CREOSOTING
 FLOWOOD, MISSISSIPPI

COMPOUNDS	UNITS	On-site Samples										
		GS01SB	GS02SB	GS03SB	GS04SB	GS05SB	GS06SB	GS07SB	GS08SB	GS09SB	GS10SB	GS11SB
Background												
ALUMINUM	MG/KG	7300 J	7800 J	8600 J	6600 J	5300 J	7700 J	9400 J	8100 J	5800 J	8600 J	9600 J
ANTIMONY	MG/KG	0.59 UJ	--	--	--	--	--	--	--	--	0.96 R	1.6 R
ARSENIC	MG/KG	6.7	3.4 J	9.4	1.9	0.91	2.7	2.7	3.5	--	13	6.6
BARIUM	MG/KG	62	34	63	57	59	48	50	45	29	430	41
BERYLLIUM	MG/KG	0.31	0.36	0.64	0.41	0.27	0.24	0.35	0.59	0.35	1.3	0.49
CADMIUM	MG/KG	0.05 U	--	--	--	--	--	--	--	--	0.87	--
CALCIUM	MG/KG	850	170	1400	670	580	990	670	450	540	9400	320
CHROMIUM	MG/KG	12	9.5	14	6.6	4.9	7.5	8	9.2	5.3	19	17
COBALT	MG/KG	3.3	2.6	4.3	1.4	0.78 R	1.2	1.6	9.4	1 R	12	3.2 R
COPPER	MG/KG	6.4	--	--	--	--	--	--	--	--	40 J	--
IRON	MG/KG	13000	13000	22000 J	7500 J	2300 J	5800 J	8200 J	12000 J	3800	20000	20000
LEAD	MG/KG	8.2 J	6.6	15	9.2	6.7	11	11	5.7	8.4	71	6.7
MAGNESIUM	MG/KG	580 J	480 J	770	370	220	580	550	370	290 J	2400 J	680 J
MANGANESE	MG/KG	180	200	200	60	16	18	19	1000	9.3	1800	120
NICKEL	MG/KG	5.2 U	--	--	--	--	--	--	--	--	20	--
POTASSIUM	MG/KG	320 J	320 J	360	190	170	240	260	350	190 J	970 J	430 J
SELENIUM	MG/KG	0.7	1.4	1.6	--	--	--	--	--	--	1.2	1.1 R
SILVER	MG/KG	0.38	0.38 R	0.49 R	--	--	0.28 R	--	0.32	--	0.76	1.1 R
SODIUM	MG/KG	290	290	98 J	300	190 J	250	220	46	440	490	350
VANADIUM	MG/KG	22	20	33	14	6.7	17	18	22	8.4	30	33
ZINC	MG/KG	18	20	23	15	7.3	12	15	25	12	280	44

Notes:
 GS - Gulf States Creosoting
 SB - subsurface soil sample
 MG/KG - milligrams per kilogram
 U - value is below the reporting limit
 J - estimated value
 R - data is unusable
 shading - elevated concentrations of constituents

TABLE 7 (CONTINUED)
SUMMARY OF INORGANIC ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

COMPOUNDS	UNITS	On-site Samples													
		GS01SB	GS12SB	GS13SB	GS14SB	GS15SB	GS16SB	GS17SB	GS18SB	GS19SB	GS20SB	GS21SB			
METALS															
ALUMINUM	MG/KG	7300 J	3700 J	8400 J	4600 J	11000 J	12000 J	6700 J	7700 J	12000 J	4700 J	8600 J			
ANTIMONY	MG/KG	0.59 UJ	--	0.58 R	--	--	--	--	--	--	--	--	--	--	--
ARSENIC	MG/KG	6.7	4.6	4.7	7.4	8.1	7.3	1.5	4.1	8.3	2.3	4.5			
BARIUM	MG/KG	62	19	23	54	45	49	61	26	43	24	28			
BERYLLIUM	MG/KG	0.31	0.3	0.34	0.48	0.59	0.49	0.39	0.31	0.46	0.3	0.3			
CADMIUM	MG/KG	0.05 U	--	--	--	--	--	--	--	--	--	--			
CALCIUM	MG/KG	850	160	400	620	710	390	620	190	190	120	140			
CHROMIUM	MG/KG	12	8.5	11	7.1	21	17	7	8.7	12	4.7	14			
COBALT	MG/KG	3.3	1.4	1.7	12	2.9	2.1	1.5	3.4	9.6	2.2	1.9			
COPPER	MG/KG	6.4	--	--	--	7 J	7.7	--	--	--	--	3.6			
IRON	MG/KG	13000	13000 J	14000	14000	24000	23000	5900	12000	20000	6900	13000			
LEAD	MG/KG	8.2 J	6.7	5.1	27	9.2	8.7 J	9.1 J	8 J	12 J	6 J	6.8 J			
MAGNESIUM	MG/KG	580 J	170	470 J	250 J	640 J	650 J	310 J	470 J	680 J	210 J	420 J			
MANGANESE	MG/KG	180	55	82	1900	410	52	57	76	600	140	95			
NICKEL	MG/KG	--	--	--	--	--	--	--	--	--	--	--			
POTASSIUM	MG/KG	320 J	170	410 J	180 J	490 J	470 J	280 J	220 J	480 J	170 J	300 J			
SELENIUM	MG/KG	0.7	1.4	--	--	2.3 J	1.7 J	--	--	1.7 J	--	0.95 R			
SILVER	MG/KG	0.38	0.47	0.39	0.42	0.65	0.45	0.32 R	0.32 R	0.53	0.25 R	0.4			
SODIUM	MG/KG	290	96	310	260	290	290	340	540	280	340	310			
VANADIUM	MG/KG	22	26	22	23	36	33	13	18	31	14	21			
ZINC	MG/KG	18	8.4	20	20	36	25	12	16	30	11	16			

Notes:
GS - Gulf States Creosoting
SB - subsurface soil sample
MG/KG - milligrams per kilogram
U - value is below the reporting limit
J - estimated value
R - data is unusable
shading - elevated concentrations of constituents

TABLE 8
SUMMARY OF ORGANIC ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

COMPOUNDS	UNITS	GS01SB	GS02SB	GS03SB	GS04SB	GS05SB	GS06SB	GS07SB	GS08SB	GS09SB	GS10SB	GS11SB
ACETONE	UG/KG	39 U	12 J	35 J	--	--	--	--	69 J	--	78 J	24 J
BENZENE	UG/KG	11 U	--	--	--	--	--	--	--	--	2 J	--
METHYL ETHYL KETONE	UG/KG	11 U	--	--	--	--	--	--	11 J	--	--	--
NON-HALOGENATED VOLATILE ORGANICS												
1,1-DICHLOROETHANE	UG/KG	400 U	--	--	8 J1	8 J1	8 J1	8 J1	8 J1	8 J1	25 J2	49 J
1,1-DIBROMOETHANE	UG/KG	400 U	--	--	--	--	--	--	74 J	--	1200	210 J
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	--	--	6100	--
1,1-DIBROMOETHANE	UG/KG	400 U	--	--	--	--	--	--	--	--	3000	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	47 J	120 J	--	37000	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	1500 J	--	1500	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	520 J	520 J	--	1500	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	45 J	45 J	--	5000	48 J
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	240 J	--	6500	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	--	--	1900	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	220 J	--	3000	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	150 J	--	540 J	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	200 J	--	2000	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	400	--	2000	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	--	--	200	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	--	--	680 J	--
1,1-DIBROMOETHYLENE	UG/KG	400 U	--	--	--	--	--	--	230 J	--	37000	--
NON-HALOGENATED SEMI-VOLATILES												
1-PHENANTHRENE	UG/KG	92 NJ	--	--	--	--	--	--	--	--	--	88 J
1-PHENANTHRENE	UG/KG	840 J5	220 J2	250 J2	--	--	--	190 J1	1500 J7	370 J3	17000 J4	530 J3
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	110 J	560 J3	--	65000 J13	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	490 NJ	--	--	16000 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	8200 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	6000 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	2800 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	4600 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	9600 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	4600 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	6200 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	3100 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	190 NJ	--	--	4700 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	7400 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	--	--	--	2900 NJ	--
1-PHENANTHRENE	UG/KG	400 U	--	--	--	--	--	120 NJ	--	--	4600 NJ	--
NON-HALOGENATED POLYCYCLIC AROMATIC HYDROCARBONS												
1-PHENANTHRENE	UG/KG	4 U	--	--	--	--	--	--	--	--	110 N	--
1-PHENANTHRENE	UG/KG	4 U	--	--	--	--	--	--	--	--	180 N	--
1-PHENANTHRENE	UG/KG	4 U	--	--	--	--	--	--	--	--	--	--
1-PHENANTHRENE	UG/KG	2.1 U	--	--	--	--	--	--	--	--	--	--
1-PHENANTHRENE	UG/KG	40 U	--	--	--	--	--	--	--	--	--	--
1-PHENANTHRENE	UG/KG	40 U	--	--	--	--	--	--	--	--	--	--

Notes:
GS - Gulf States Creosoting
SB - subsurface soil sample
UG/KG - micrograms per kilogram
U - value is below the reporting limit
J - estimated value
shading - elevated concentrations of constituents

TABLE 9
SUMMARY OF FIELD PARAMETERS FOR
GROUNDWATER SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

Sample Number	pH	Conductivity (μS/cm)	Turbidity (NTU)	Temperature °C
GS01GW	5.41	218	5.97	18.5
GS02GW	4.95	724	3.7	18.4
GS03GW	5.93	180	9.84	17.5
GS04GW	5.81	59	11	18.9
GS05GW	5.32	608	6.23	17.6

Notes:

- GS - Gulf States Creosoting
- GW - Groundwater sample
- (μS/cm) - microsiemens per centimeter
- NTU - Nephelometric turbidity units
- °C - degrees Celsius

TABLE 10
SUMMARY OF INORGANIC ANALYTICAL RESULTS
GROUNDWATER SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

COMPOUND	UNITS	Background	On-site Samples			
		GS01GW	GS02GW	GS03GW	GS04GW	GS05GW
METALS						
ALUMINUM	UG/L	320 UJ	450 J	850 J	1700 J	370 J
BARIUM	UG/L	20	120	29	26	32
BERYLLIUM	UG/L	0.11	0.14	0.11	--	0.9
CALCIUM	UG/L	4600	16000	3600	3500	15000
CHROMIUM	UG/L	1.8 R	0.92	1.8	1.6	--
COBALT	UG/L	1.2	1.2 R	--	--	10
IRON	UG/L	1500	1400	2100	1900	12000
MAGNESIUM	UG/L	1500	5500	940	930	8200
MANGANESE	UG/L	23	160	110	30	320
POTASSIUM	UG/L	520	1500	870	1800	1900
SODIUM	UG/L	40000	120000	29000	5000	86000
VANADIUM	UG/L	0.6 U	0.82 R	2	1.9	--
ZINC	UG/L	11 U	13	18	--	42

Notes:

- GS - Gulf States Creosoting
- GW - groundwater sample
- UG/L - micrograms per liter
- U - value is below the reporting limit
- J - estimated value
- R - data is unusable
- shading - elevated concentrations of constituents

TABLE 11
SUMMARY OF ORGANIC ANALYTICAL RESULTS
GROUNDWATER SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

COMPOUND	UNITS	Background					On-site Samples				
		GS01GW	GS02GW	GS03GW	GS04GW	GS05GW					
VOLATILE ORGANICS											
METHYL ETHYL KETONE	UG/L	6.1 UJ	--	--	7.2 J	--					
MISCELLANEOUS VOLATILE ORGANICS											
INDANE	UG/L			1.3 NJ							
EXTRACTABLES											
None											
MISCELLANEOUS EXTRACTABLES											
D-LIMONENE	UG/L	2.2 NJ									
LIMONENE	UG/L		2.2 NJ	2.1 NJ							
UNKNOWN COMPOUNDS/NO.	UG/L					4.7 J/2					
PESTICIDES/POBS											
None											

Notes:
GS - Gulf States Creosoting
GW - groundwater sample
UG/L - micrograms per liter
U - value is below the reporting limit
J - estimated value
N - presumed presence of constituent
shading - elevated concentrations of constituents

**TABLE 12
SUMMARY OF INORGANIC ANALYTICAL RESULTS
SEDIMENT SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI**

COMPOUND	UNITS	Background		Marsh/Samples				Pearl River		Prairie Branch	
		GS01SD	GS02SD	GS03SD	GS04SD	GS05SD	Control	Downstream	Control	GS08SD	
METALS											
ALUMINUM	MG/KG	8200 J	4700 J	16000 J	9100 J	4900 J	450 J	140 J	510 J		
ANTIMONY	MG/KG	1.2 UJ	--	--	--	2.1 R	0.7 R	--	--		
ARSENIC	MG/KG	5.7	1.8 R	7.9 R	5.5	2.9 R	--	--	--		
BARIUM	MG/KG	89	77	900	120	71	6.8	3.2	15		
BERYLLIUM	MG/KG	0.39	0.56	1.3	1.2	0.51	--	--	0.1		
CALCIUM	MG/KG	1500	880	2000	2000	1200	250	--	180		
CHROMIUM	MG/KG	13	7.8	24	15	8.4	--	--	1.4		
COBALT	MG/KG	4.4	4.7	12	11	5.5	0.61 R	0.47	1		
IRON	MG/KG	15000	6400	24000	13000	8400	950	340	2200 J		
LEAD	MG/KG	12 J	20 J	41 J	21	12	1.8	1.2 J	3.6		
MAGNESIUM	MG/KG	1000 J	410 J	1200 J	1000 J	660 J	64 J	--	81		
MANGANESE	MG/KG	340	500	720	280	320	52	53	44		
POTASSIUM	MG/KG	700 J	410 J	1100 J	811 J	480 J	90 J	52 J	56		
SELENIUM	MG/KG	1.9 R	--	4.2	--	--	--	--	--		
SILVER	MG/KG	0.68 R	0.45 R	1.1 R	1.1 R	0.71 R	0.24 R	--	--		
SODIUM	MG/KG	690	580	1500	1200	600	330	330	68		
VANADIUM	MG/KG	24	13	41	23	13	1.6 R	0.57 R	2.4		
ZINC	MG/KG	36	33	130	84	39	3.6	--	4.6		
T.O.C.	%	2	2.1	815	NR	1.8	--	NR	--		

Notes:
 SP - Surfond Products
 SS - surface soil sample
 MG/KG - milligrams per kilogram
 U - value is below the reporting limit
 J - estimated value
 R - data is unusable
 NR - no reading
 shading - elevated concentrations of constituents
 T.O.C. - Total Organic Carbon (%)

TABLE 13
SUMMARY OF ORGANIC ANALYTICAL RESULTS
SEDIMENT SAMPLES
GULF STATES CREOSOTING
FLOWOOD, MISSISSIPPI

COMPOUNDS VOLATILES	UNITS	Background		Methyl Benzenes		Dinitrobenzenes		Methyl Fluor		Fractions (benzene)
		GS018D	GS023D	GS038D	GS045D	GS058D	GS078D	GS085D	GS092D	
ACETONE	UG/KG	94 J	130 J	50 J	50 J	51 J	22 J	49 J	29 J	
CARBON DISULFIDE	UG/KG	5 J		51 J			13 U		14 U	
METHYL ETHYL KETONE	UG/KG	37 U			88 J		13 U		14 U	
SEMIVOLATILE ORGANICS										
UNKNOWN COMPOUNDS NO.	UG/KG				190 J	33 J				8 J
ACETALDEHYDE	UG/KG				71 NJ					
EXTRACTABLES										
ACENAPHTHENE	UG/KG	0.5 J	1 J	100	6	0.9 J	0.8 U		0.8 U	
ACENAPHTHYLENE	UG/KG	3	2	44	0		0.8 U		0.8 U	
ANTHRACENE	UG/KG	3	7	140	34	7	2 U		0.8 U	
BENZALDEHYDE	UG/KG	69 J		110 J	130 J		330 U		330 U	
BENZO(A)ANTHRACENE	UG/KG	1 J		111	19	12	5 U		1 U	
BENZOBIFLUORANTHENE	UG/KG	440 U		540 J			330 U		330 U	
BENZO(G)HAPERYLENE	UG/KG	82 J					330 U		330 U	
BENZO(K)FLUORANTHENE	UG/KG	440 U					330 U		330 U	
BENZOPHANTHRENE	UG/KG	2	4	660 J			4 U		0.8 U	
CHRYSENE	UG/KG	1 J	10	130	17	18	7 U		2 U	
DIBENZ(O,A)ANTHRACENE	UG/KG	1 U	1	40	6	4	1		0.8 U	
FLUORANTHENE	UG/KG	2	21	190	50	24	12 U		2 U	
FLUORENE	UG/KG	0.5 J	2	82	8	1 J	0.3 J		0.8 U	
INDENO(1,2,3-CD)PYRENE	UG/KG	440 U		180 J			330 U		330 U	
2-METHYLNAPHTHALENE	UG/KG	0.8 J	0.9 J	53	2 J	0.8 J	0.4 J		0.8 U	
NAPHTHALENE	UG/KG	0.6 J	0.6 J	61	2 J	0.9 J	0.5 J		0.4 J	
PENTACHLOROPHENOL	UG/KG	24 U					13 U		13 U	
PHENANTHRENE	UG/KG	2 J	12	72	11	4	4		0 U	
PYRENE	UG/KG	2	18	140	33	27	10 U		2 U	
SEMI-VOLATILE ESTERS										
HEXABENZOIC ACID	UG/KG	420 NJ								
1-HEXADECENE	UG/KG	640 NJ		1000 NJ						
ERGOST-5-N-3-OL	UG/KG	1500 NJ			1700 NJ					
GAMMA-SITOSTEROL	UG/KG	1400 NJ								
STIGMASTEROL	UG/KG	1100 NJ								
STIGMAST-4-EN-3-ONE	UG/KG	730 NJ		1400 NJ	2200 NJ	800 NJ				
UNKNOWN COMPOUNDS NO.	UG/KG	23000 J/23		54000 J	54000 J/24	140000 J/25	61 J/1	69 J/1	170 J/5	
UNIDENTIFIED COMPOUNDS NO.	UG/KG	82000 J/28								
BENZO(B)PYRENE	UG/KG									
CHOLESTANOL	UG/KG			500 NJ						
UNKNOWN ALCOHOL	UG/KG			1600 NJ						
UNKNOWN KETONE	UG/KG			8200 J						
BENZENE, 1-METHYL-2-ISOPROPYL	UG/KG			1800 J						
UNKNOWN CARBOXYLIC ACID	UG/KG					1200 NJ				
PHENANTHRENE DERIVATIVE	UG/KG					500 J				
PESTICIDES										
4,4'-DDE	UG/KG	7.3 U	7.9				4.1 U		4.1 U	
BETA-BHC	UG/KG	3.8 U		13			2.1 U		2.1 U	
ENDOSULFAN II (BETA)	UG/KG	7.3 U	6.5 J				4.1 U		4.1 U	
ENDOSULFAN SULFATE	UG/KG	7.3 U	10 NJ	14 NJ			4.1 U		4.1 U	

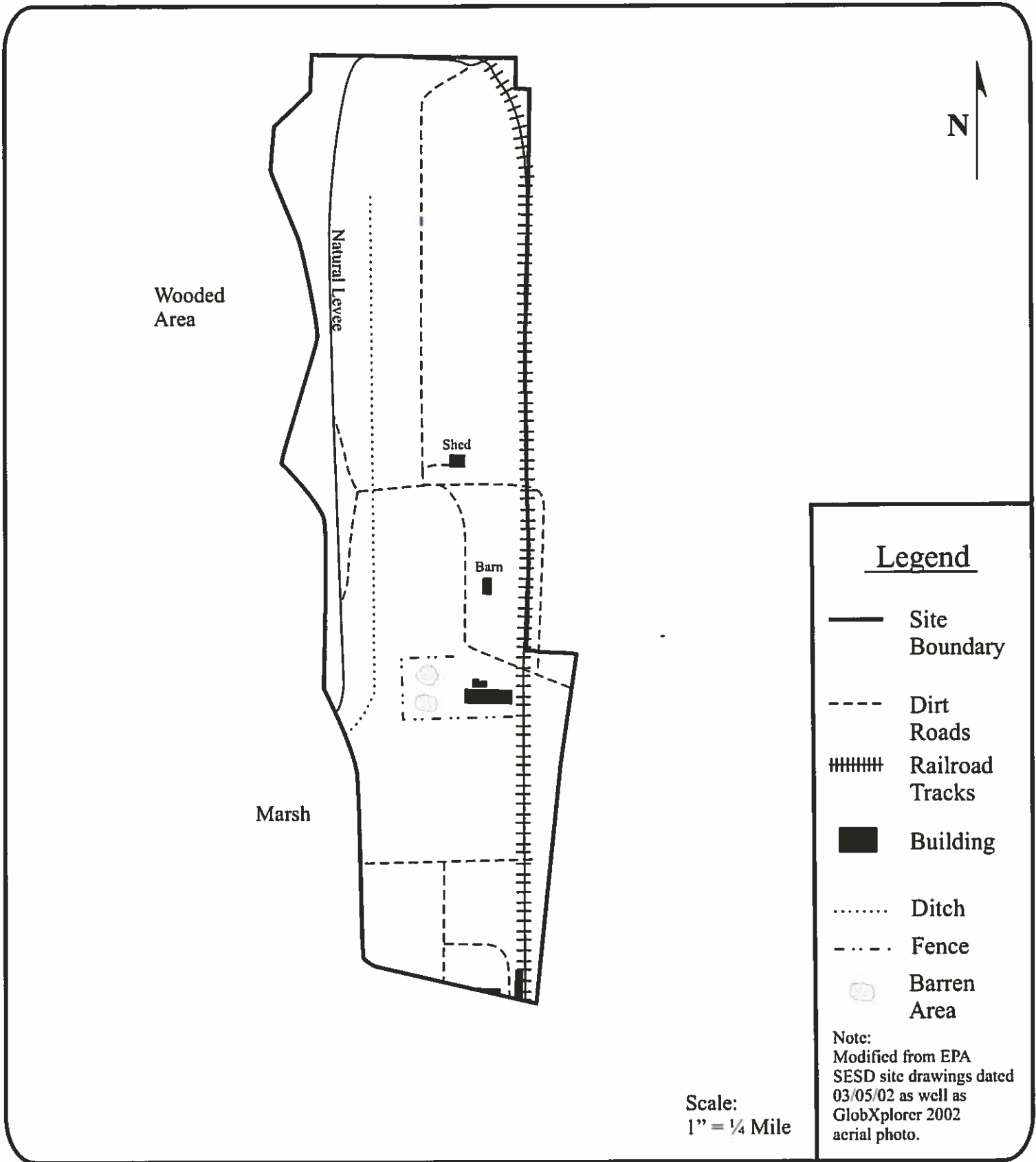
Notes:
GS - Gulf States Creosoting
SD - sediment sample
UG/KG - micrograms per kilogram
J - value is below the reporting limit
U - estimated value
shading - elevated concentrations of constituents

Final Preliminary Assessment/Site Inspection Report
Gulf States Creosoting Company
Revision: 1
December 2003
DCN: WSI-GSC-0011

APPENDIX B

FIGURES

2 Pages



GULF STATES CREOSOTING
 1625 FLOWOOD DRIVE
 FLOWOOD, RANKIN COUNTY, MISSISSIPPI

SITE LAYOUT MAP
 FIGURE 2



DRAWN: KNS	DATE: 07/12/02	WO. NO.: 12587-001-001-0133-00
EPA ID No: MSN000407423	DOO No.: 4W-02-03-A-003	

CONFIDENTIAL

HAZARD RANKING SYSTEM PRELIMINARY SCORE

FOR

GULF STATES CREOSOTING COMPANY

FLOWOOD, RANKIN COUNTY, MISSISSIPPI

EPA ID No. MSN000407423

Pathways evaluated using the Site Inspection (SI) Worksheets were groundwater migration, surface water migration, soil exposure, and air migration.

Pathway Scores

$$S_{gw} = 5.88$$

$$S_{sw} = 100$$

$$S_{sc} = 0.64$$

$$S_{air} = 0.96$$

$$\text{OVERALL SCORE} = 50.09$$

Sources and Waste Characteristics

The site score for the Gulf States property is based on a hazardous waste quantity (HWQ) of 10 for the groundwater migration, surface water migration, soil exposure, and air migration pathways. The HWQ is based on the area of contaminated soil (55.7 acres) located on the Gulf States property. The former 141-acre Gulf States Creosoting Company is located at 1625 Flowood Drive (Mississippi Hwy 468), Flowood, Rankin County, Mississippi. The facility is currently operating as a horse farm and ConSteel Co, Inc. Both current operations appear to be located on portions of the property where creosoting operations were conducted. Currently, the southernmost building on the property is owned by ConSteel Co, Inc. The northernmost structures (i.e. metal barn and shed) are used to house tractors and helicopters for a local news station, and are part of the horse farm. The horse farm has been operating on the property for approximately 7 years.

Polyaromatic hydrocarbons (PAHs) have been detected on the property during several previous investigations as well as the preliminary assessment/site inspection (PA/SI). PAH concentrations detected in soil samples during the PA/SI ranged from 380J micrograms per kilogram ($\mu\text{g}/\text{kg}$) to 37,000 $\mu\text{g}/\text{kg}$. PAHs were detected on the northeastern, central, and southeastern portions of the property. Areas of contamination are primarily evident in the areas next to the railroad tracks where boxcars containing creosote treated wood were staged. Certain constituents such as benzo(a) anthracene, benzo(b) fluoranthene, benzo(a) pyrene, dibenzo(a,h) anthracene, and indeno(1,2,3-cd) pyrene are above Region III Industrial Cleanup Goals. PAHs are common constituents of creosote and are site attributable.

Groundwater Migration Pathway

During the 2003 PA/SI, the groundwater pathway was evaluated for all three aquifers beneath the property, the surficial aquifer, the Cockfield Formation, and the Sparta aquifer. An observed release of barium, cobalt, manganese, and zinc was discovered in the surficial aquifer. However, no targets are associated with the surficial aquifer and the pathway score is zero. Alternately, the Cockfield Formation and the Sparta aquifer (two additional aquifer systems) were evaluated based on the potential to release to the aquifers. One municipal well that is screened within the Cockfield Formation is located within the 0.5 to 1 mile radius ring of the Gulf States property. Two municipal wells are located within a 4-mile radius of the property that are screened within the Sparta aquifer; one within the 2 to 3 mile radial ring, and the other within the 3 to 4 mile radial ring. All three municipal wells are owned by the City of Flowood and serve approximately 7,074 persons. The City of Flowood blends the water from the wells prior to distribution to the public. The groundwater pathway score was calculated for all three aquifers and the highest score was used. Based on the low number of targets and the fact that the municipal wells are screened at depths greater than 550 feet, groundwater does not appear to be a viable migration route.

Surface Water Migration Pathway

The surface water migration pathway was evaluated based on an observed release to the marsh adjacent to the Gulf States property. The surface water migration pathway prior to construction of the levee, appears to have flowed west toward the marsh and the tributaries which flow to the Pearl River. There is a drainage

ditch located on the western portion of the property, east of the levee, that flows north to south. Currently, it appears that on-site drainage flows to this drainage ditch. Prior to the construction of the levee, it appears that creosote was discharged to the marsh areas west of the property. Such areas have been defined as creosote slough by the U.S. Geological Survey. During the operation of the creosote facilities, the Pearl River was re-channeled to flow further west of the facility and the areas impacted by discharged creosote slough. The surface water pathway includes the marshland and tributaries which flow approximately 0.8 mile into the Pearl River. The 15-mile downstream surface water pathway is completed in the Pearl River. The property is located within a flood area that is undefined, perhaps due to the construction of the levee. However, the marsh area adjacent to the facility is within the 100-year flood plain. A City of Jackson surface water intake is upstream approximately 0.75-mile northwest of the Gulf States property on the Pearl River.

The observed release to the surface water pathway includes constituents such as; barium, beryllium, lead, zinc, acenaphthylene, anthracene, benzo(a) anthracene, benzo(b) fluoranthene, benzo(k) fluoranthene, benzo(a) pyrene, chrysene, dibenzo(a,h) anthracene, fluoranthene, phenanthrene, and pyrene. Several of the PAH are attributable to the site operations, because they are common components of creosote. Such constituents a threat to the marsh and the Pearl River because they are fished for recreationally and/or commercially. During the June 2002 site reconnaissance, a creosote odor was detected in an area west of the levee that leads to the marsh.

The component that drives the surface water migration pathway is the human food chain threat. The majority of samples collected along the surface water pathway that contained PAHs were collected within the marsh. Attribution is clear due to the documentation of PAHs (from previous investigations and the PA/SI) in the on-site soils and the marsh adjacent to the property. Due to the observed release to the marsh, the surface water pathway is of concern.

Soil Exposure and Air Migration Pathways

The soil exposure pathway was evaluated based on the likelihood of exposure to inorganic constituents and extractable semivolatile organic compounds (SVOC). The air migration pathway was evaluated on the potential to release inorganic and organic constituents detected in the source samples. The PAHs detected in on-site soils are at a significant concentration; however, both the soil exposure and air migration pathway scores were limited by low target values. The exposure to employees on the property and nearby residences by means of soil or air is considered to be minimal because of the non-volatile nature of the contaminants. An estimated 221 persons live within 1 radial mile of the Gulf States property and approximately 805 persons live within 4 radial miles. Based on these low target values, the soil exposure and air migration pathways are considered to be of minimal concern.

Conclusion

The overall site score for the Gulf States property is 50.09, which is above the cutoff value of 28.5. The overall site score was driven by an observed release to the surface water pathway. Based on the available file information and sample data, START-2 recommends further evaluation for the Gulf States property at the federal level under the Comprehensive Environmental Response, Compensation, and Liability Act.

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

FINAL
 December 2003

AIR MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
1. Observed Release	550	<u>500*</u>
2. Potential to Release		
2a. Gas Potential to Release	500	<u>--</u>
2b. Particulate Potential to Release	500	<u>--</u>
2c. Potential to release higher of lines 2a and 2b)	500	<u>--</u>
3. Likelihood of Release (higher of lines 1 and 2c)	550	<u>500*</u>
<u>Waste Characteristics</u>		
4. Toxicity/Mobility	^a	<u>200</u>
5. Hazardous Waste Quantity	^a	<u>10</u>
6. Waste Characteristics	100	<u>6</u>
<u>Targets</u>		
7. Nearest Individual	50	<u>20</u>
8. Population		
8a. Level I Concentrations	^b	<u>0</u>
8b. Level II Concentrations	^b	<u>0</u>
8c. Potential Contamination	^b	<u>5.21</u>
8d. Population (lines 8a + 8b + 8c)	^b	<u>5.21</u>
9. Resources	5	<u>0</u>
10. Sensitive Environments		
10a. Actual Contamination	^c	<u>0</u>
10b. Potential Contamination	^c	<u>1.13</u>
10c. Sensitive Environments (lines 10a + 10b)	^c	<u>1.13</u>
11. Targets (lines 7 + 8d + 9 + 10c)	^b	<u>26.34</u>
<u>Air Migration Pathway Score</u>		
12. Air Migration Pathway Score (S_{air}) ^d ([lines 3 x 6 x 11]/82,500)	100	<u>0.96</u>

^a Maximum value applies to waste characteristics category.

^b Maximum value not applicable.

^c No specific maximum value applies to factor. However, a pathway score based solely on sensitive environments is limited to a maximum value of 60.

^d Do not round to nearest integer.

- Not evaluated.

* Default value.

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

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 December 2003

SOIL EXPOSURE PATHWAY SCORESHEET, Concluded

<u>Factor Categories and Factors</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
NEARBY POPULATION THREAT (Concluded)		
<u>Targets</u>		
18. Nearby Individual	1	<u>1</u>
19. Population Within 1 Mile	b	<u>0.5</u>
20. Targets (lines 18 + 19)	b	<u>1.5</u>
<u>Nearby Population Threat Score</u>		
21. Nearby Population Threat ([(lines 14 x 17 x 20)/82,500])	b	<u>0.04</u>
SOIL EXPOSURE PATHWAY SCORE		
22. Soil Exposure Pathway Score (S_{soil}) ^c (lines 11 + 21, subject to a maximum of 100)	100	<u>0.64</u>

^a Maximum value applies to waste characteristics category.

^b Maximum value not applicable.

^c Do not round to nearest integer.

^d No specific maximum value applies to factor. However, a pathway score based solely on sensitive environments is limited to a maximum value of 60.

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

FINAL
 December 2003

SOIL EXPOSURE PATHWAY SCORESHEET

<u>Factor Categories and Factors</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
RESIDENT POPULATION THREAT		
<u>Likelihood of Exposure</u>		
1. Likelihood of Exposure	550	<u>550</u>
<u>Waste Characteristics</u>		
2. Toxicity	^a	<u>10,000</u>
3. Hazardous Waste Quantity	^a	<u>10</u>
4. Waste Characteristics	100	<u>18</u>
<u>Targets</u>		
5. Resident Individual	50	<u>0</u>
6. Resident Population		
6a. Level I Concentrations	^b	<u>0</u>
6b. Level II Concentrations	^b	<u>0</u>
6c. Resident Population (lines 6a + 6b)	^b	<u>0</u>
7. Workers	15	<u>5</u>
8. Resources	5	<u>0</u>
9. Terrestrial Sensitive Environments	^d	<u>0</u>
10. Targets (lines 5 + 6c + 7 + 8 + 9)	^b	<u>5</u>
<u>Resident Population Threat Score</u>		
11. Resident Population Threat ([(lines 1 x 4 x 10)/82,500])	^b	<u>0.6</u>

NEARBY POPULATION THREAT

<u>Likelihood of Exposure</u>		
12. Attractiveness/Accessibility	100	<u>100</u>
13. Area of Contamination	100	<u>10</u>
14. Likelihood of Exposure	500	<u>125</u>
<u>Waste Characteristics</u>		
15. Toxicity	^a	<u>10,000</u>
16. Hazardous Waste Quantity	^a	<u>10</u>
17. Waste Characteristics	100	<u>18</u>

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

FINAL
 December 2003

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET, Concluded

<u>Factor Categories and Factors</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
ENVIRONMENTAL THREAT (Concluded)		
<u>Waste Characteristics</u>		
23. Ecosystem Toxicity/Persistence/ Bioaccumulation	a	<u>5x10⁸</u>
24. Hazardous Waste Quantity	a	<u>100</u>
25. Waste Characteristics	1,000	<u>320</u>
<u>Targets</u>		
26. Sensitive Environments		
26a. Level I Concentrations	b	<u>0</u>
26b. Level II Concentrations	b	<u>50</u>
26c. Potential Contamination	b	<u>0.15</u>
26d. Sensitive Environments (lines 26a + 26b + 26c)	b	<u>50.15</u>
27. Targets (value from line 26d)	b	<u>50.15</u>
<u>Environmental Threat Score</u>		
28. Environmental Threat Score ([lines 22 x 25 x 27]/82,500, subject to a maximum of 60)	60	<u>60+</u>
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED		
29. Watershed Score ^c (lines 13 + 21 + 28, subject to a maximum of 100)	100	<u>100</u>
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE		
30. Component Score (S _{or}) ^c (highest score from line 29 for all watersheds evaluated, subject to a maximum of 100)	100	<u>100</u>

-
- a Maximum value applies to waste characteristics category.
 - b Maximum value not applicable.
 - c Do not round to nearest integer.
 - Not evaluated.
 - * Default value.

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

FINAL
 December 2003

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET, Continued

<u>Factor Categories and Factors</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
DRINKING WATER THREAT (Concluded)		
<u>Drinking Water Threat Score</u>		
13. Drinking Water Threat Score ([lines 5 x 8 x 12]/82,500, subject to a maximum of 100)	100	<u>1.07</u>
HUMAN FOOD CHAIN THREAT		
<u>Likelihood of Release</u>		
14. Likelihood of Release (value from line 5)	550	<u>550</u>
<u>Waste Characteristics</u>		
15. Toxicity/Persistence/Bioaccumulation	a	<u>5x10⁸</u>
16. Hazardous Waste Quantity	a	<u>100</u>
17. Waste Characteristics	1,000	<u>320</u>
<u>Targets</u>		
18. Food Chain Individual	50	<u>45</u>
19. Population		
19a. Level I Concentrations	b	<u>0</u>
19b. Level II Concentrations	b	<u>0</u>
19c. Potential Human Food Chain Contamination	b	<u>0</u>
19d. Population (lines 19a + 19b + 19c)	b	<u>0</u>
20. Targets (lines 18 + 19d)	b	<u>45</u>
<u>Human Food Chain Threat Score</u>		
21. Human Food Chain Threat Score ([lines 14 x 17 x 20]/82,500, subject to a maximum of 100)	100	<u>96</u>
ENVIRONMENTAL THREAT		
<u>Likelihood of Release</u>		
22. Likelihood of Release (value from line 5)	550	<u>550</u>

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

FINAL
 December 2003

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

<u>Factor Categories and Factors</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
DRINKING WATER THREAT		
<u>Likelihood of Release</u>		
1. Observed Release	550	<u>550</u>
2. Potential to Release by Overland Flow		
2a. Containment	10	<u>--</u>
2b. Runoff	25	<u>--</u>
2c. Distance to Surface Water	25	<u>--</u>
2d. Potential to Release by Overland Flow (lines 2a x [2b + 2c])	500	<u>--</u>
3. Potential to Release by Flood		
3a. Containment (Flood)	10	<u>--</u>
3b. Flood Frequency	50	<u>--</u>
3c. Potential to Release by Flood (lines 3a x 3b)	500	<u>--</u>
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	<u>--</u>
5. Likelihood of Release (higher of lines 1 and 4)	550	<u>550</u>
<u>Waste Characteristics</u>		
6. Toxicity/Persistence	a	<u>10,000</u>
7. Hazardous Waste Quantity	a	<u>100</u>
8. Waste Characteristics	100	<u>32</u>
<u>Targets</u>		
9. Nearest Intake	50	<u>0</u>
10. Population		
10a. Level I Concentrations	b	<u>0</u>
10b. Level II Concentrations	b	<u>0</u>
10c. Potential Contamination	b	<u>0</u>
10d. Population (lines 10a + 10b + 10c)	b	<u>0</u>
11. Resources	5	<u>5</u>
12. Targets (lines 9 + 10d + 11)	b	<u>5</u>

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

FINAL
 December 2003

GROUNDWATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

Sparta Aquifer

	<u>Likelihood of Release to an Aquifer</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
1. Observed Release		550	<u>0</u>
2. Potential to Release			
2a. Containment		10	<u>10</u>
2b. Net Precipitation		10	<u>6</u>
2c. Depth to Aquifer		5	<u>1</u>
2d. Travel Time		35	<u>5</u>
2e. Potential to Release (lines 2a x [2b + 2c + 2d])		500	<u>120</u>
3. Likelihood of Release (higher of lines 1 and 2e)		550	<u>120</u>
<u>Waste Characteristics</u>			
4. Toxicity/Mobility		^a	<u>10,000</u>
5. Hazardous Waste Quantity		^a	<u>10</u>
6. Waste Characteristics		100	<u>18</u>
<u>Targets</u>			
7. Nearest Well		50	<u>3</u>
8. Population			
8a. Level I Concentrations		^b	<u>0</u>
8b. Level II Concentrations		^b	<u>0</u>
8c. Potential Contamination		^b	<u>34.3</u>
8d. Population (lines 8a + 8b + 8c)		^b	<u>34.3</u>
9. Resources		5	<u>0</u>
10. Wellhead Protection Area		20	<u>0</u>
11. Targets (lines 7 + 8d + 9 + 10)		^b	<u>37.3</u>
<u>Groundwater Migration Score for an Aquifer</u>			
12. Aquifer Score ((lines 3 x 6 x 11)/82,500) ^c		100	<u>0.98</u>
<u>Groundwater Migration Pathway Score</u>			
13. Groundwater Migration Pathway Score (S_{gw}) ^c (highest value from line 12 for all aquifers evaluated)		100	<u>5.88</u>

- ^a Maximum value applies to waste characteristics category.
^b Maximum value not applicable.
^c Do not round to nearest integer.
 - Not evaluated.

Site Name: Gulf States Creosoting Company
 Location: Flowood, Mississippi

FINAL
 December 2003

GROUNDWATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

Cockfield Formation

	<u>Likelihood of Release to an Aquifer</u>	<u>Maximum Value</u>	<u>Value Assigned</u>
1.	Observed Release	550	<u>0</u>
2.	Potential to Release		
2a.	Containment	10	<u>10</u>
2b.	Net Precipitation	10	<u>6</u>
2c.	Depth to Aquifer	5	<u>3</u>
2d.	Travel Time	35	<u>35</u>
2e.	Potential to Release (lines 2a x [2b + 2c + 2d])	500	<u>440</u>
3.	Likelihood of Release (higher of lines 1 and 2e)	550	<u>440</u>
	<u>Waste Characteristics</u>		
4.	Toxicity/Mobility	^a	<u>10,000</u>
5.	Hazardous Waste Quantity	^a	<u>10</u>
6.	Waste Characteristics	100	<u>18</u>
	<u>Targets</u>		
7.	Nearest Well	50	<u>9</u>
8.	Population		
8a.	Level I Concentrations	^b	<u>0</u>
8b.	Level II Concentrations	^b	<u>0</u>
8c.	Potential Contamination	^b	<u>52.3</u>
8d.	Population (lines 8a + 8b + 8c)	^b	<u>52.3</u>
9.	Resources	5	<u>0</u>
10.	Wellhead Protection Area	20	<u>0</u>
11.	Targets (lines 7 + 8d + 9 + 10)	^b	<u>61.3</u>
	<u>Groundwater Migration Score for an Aquifer</u>		
12.	Aquifer Score ((lines 3 x 6 x 11)/82,500) ^c	100	<u>5.88</u>
	<u>Groundwater Migration Pathway Score</u>		
13.	Groundwater Migration Pathway Score (S_{gw}) ^c (highest value from line 12 for all aquifers evaluated)	100	<u>5.88</u>

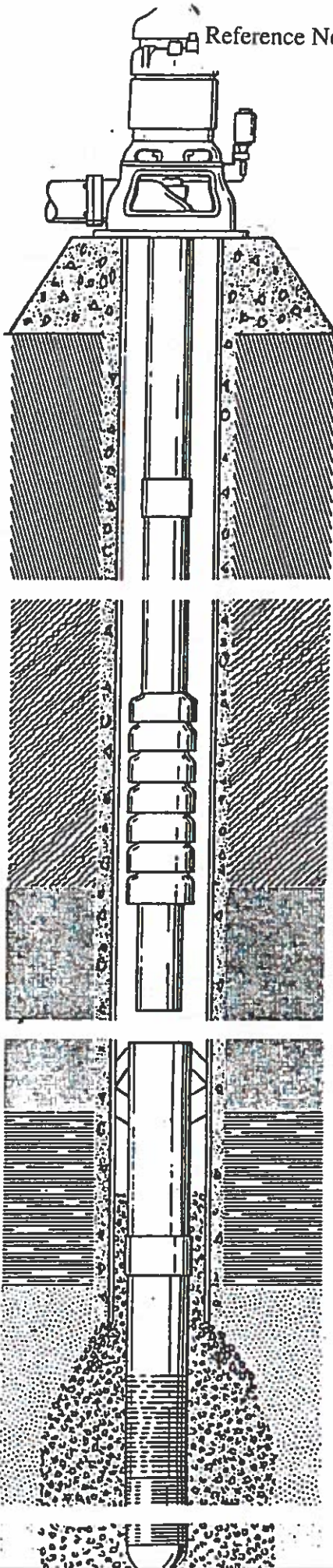
- ^a Maximum value applies to waste characteristics category.
^b Maximum value not applicable.
^c Do not round to nearest integer.
 - Not evaluated.

GRINER DRILLING SERVICE

Reference No.: 19

TELEPHONE 601/736-8347
 POST OFFICE DRAWER 825
 COLUMBIA, MISS. 39429

LOG FORM



NAME Town of Flowood
 LOCATION NE/4, NW/4, SE/4, NE/4, Section 12,
T5N, R1E, Rankin County, Ms
 ENGINEER Lester Engineering Co.
 DRILLER Allen Sistrunk LOG. NO. K68
 COMPLETED April 30 1982 ACCEPTED _____
 Sales Engineer T.N. SHOWS Field Supervisor F. SISTRUNK

WELL DATA

Length surface casing N/A; size surface casing N/A
 Cemented N/A No. Sacks N/A Size Drilled Hole 21"
 Depth drilled hole 562 Size well casing 16" Type Welded
 Length well casing 472' cemented Yes No. Sacks 600
 Size underreamed hole 32" length underreamed hole 82'
 Size screen 8" type Bar Weld mfg. by Houston Well S
 Slot size .016 material 304 S.S. length screen 82'
 Lap pipe size 8" lap pipe length 62' type Welded
 Type gravel Ratcliff No. yds. 12 Distance to lap 422
 Distance to screen top 482 distance to gravel _____
 Distance to screen bottom 562 type bottom Back Wash Valve
 Connection top of lap 8" R&L Collar static water level 185.78

PUMP DATA

Type Turbine make Floway Serial No. 8220415
 Size bowls 10" No. stages 12 Curve No. DKH Length bowls 9'6"
 Length column 280' size column 8" type column T & C
 Size oil tube N/A size shaft 1 1/2 length suction 20'
 Size suction 8" size discharge 8" Head No. C-16 1/2" x 8"
 Overall pump length 289'6" Length headshaft 10'3"
 Type lubrication Water type oiler N/A length air line N/A
 Rated capacity 750 GPM Total Head 385
 RPM 1770 Size foundation 2' x 2' Height 2'

ELECTRIC MOTOR DATA

Type VHS Make G.E. Serial No. DTJ422103
 HP 125 Voltage 480 RPM 1800 Frame B405TP16
 Style P Phase 3 Cycle 60 AMPS 144
 Height motor 36 1/2 Dia. base 16 1/2 Clutch bore 1 1/2 Clutch No. _____
 Top bearing No. 629A772G001 Lower bearing No. K5903493P016 Lubrication Oil & Gre

SWITCH DATA

Type Pumping Plant Panel Make Control Systems
 Catalog No. N/A Size 4 Rating 125 H.P.
 Volts 480 Phase 3 Cycles 60
 HP rating 125 Size relays 3 Relay type Quick Trip
 Entrance switch 200 Amp
 Fuse size & type 225 Amp Breaker Size wire 3-0

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AS&S-I-20000

PR-3GG-74





CJJ-36G-105

CCK - 36G - 105 (1965)

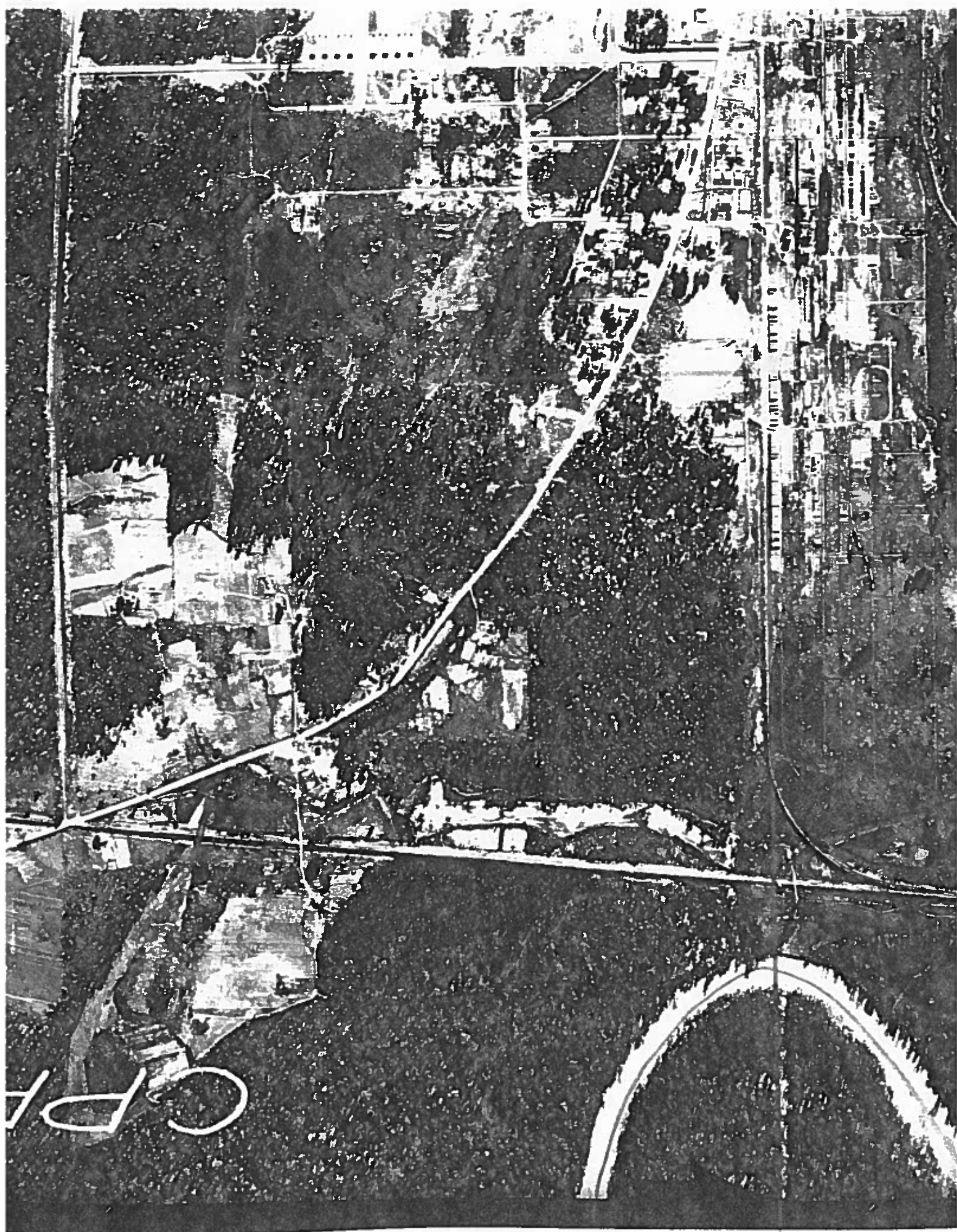


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CCR-3GG-104

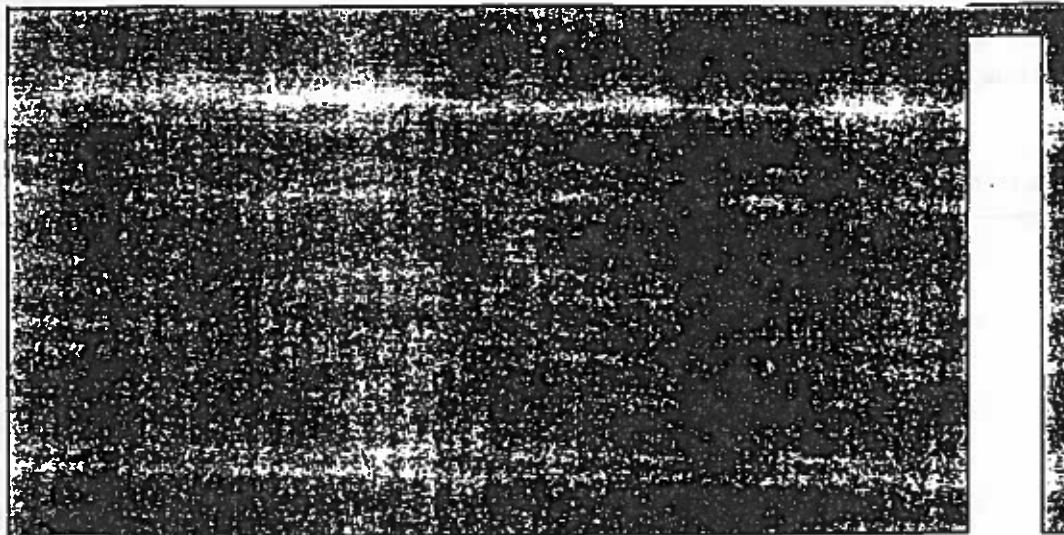
1965





CPA

Reference No.: 20



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John A. Cherry

Department of Earth Sciences
University of Waterloo
Waterloo, Ontario

GROUNDWATER

Prentice-Hall, Inc.
Englewood Cliffs, New Jersey 07632

Table 2.2 Range of Values of Hydraulic Conductivity and Permeability

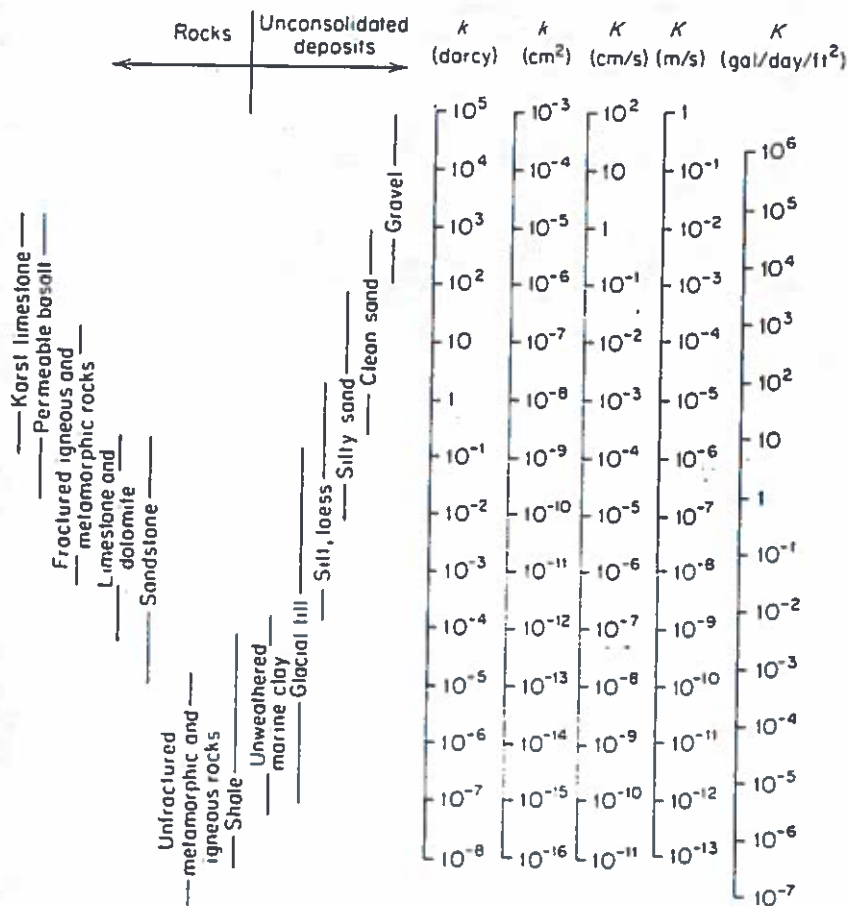


Table 2.3 Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, k^*			Hydraulic conductivity, K		
	cm^2	ft^2	darcy	m/s	ft/s	U.S. gal/day/ft ²
cm^2	1	1.08×10^{-3}	1.01×10^8	9.80×10^{-2}	3.22×10^3	1.85×10^9
ft^2	9.29×10^{-2}	1	9.42×10^{10}	9.11×10^3	2.99×10^6	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-5}	1.82×10^3
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^5	1	3.28	2.12×10^6
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^4	3.05×10^{-1}	1	6.46×10^5
U.S. gal/day/ft ²	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.55×10^{-6}	1

*To obtain k in ft^2 , multiply k in cm^2 by 1.08×10^{-3} .