LE'FLEUR'S LANDING
JACKSON, MS

LeFLEUR'S LANDING
JACKSON, MS
HINDS COUNTY
CORRECTIVE ACTION PLAN

APPENDIX B
PPM DRAFT REMEDIAL ACTION REPORT

PPM

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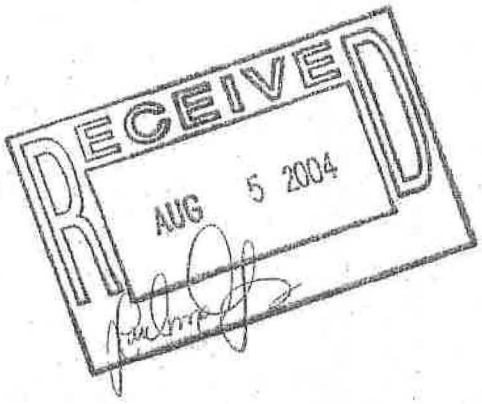
REMEDIAL ACTION REPORT

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QULAITY
LEFLEUR'S BLUFF FESTIVAL GROUNDS
JEFFERSON STREET
JACKSON, MISSISSIPPI



FACILITY I.D. NO. 10428

PPM PROJECT NO. 341906-EXC

AUGUST 2004

PPM Consultants, Inc.

REMEDIAL ACTION REPORT

AT
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
LEFLEUR'S BLUFF FESTIVAL GROUNDS
JEFFERSON STREET
JACKSON, MISSISSIPPI

FACILITY I.D. NO. 10428

PREPARED FOR:

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL-FEDERAL LUST PROGRAM
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PPM PROJECT NO. 341906-EXC

AUGUST 2004

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1.0 INTRODUCTION

PPM Consultants, Inc. was retained by the Mississippi Department of Environmental Quality (MDEQ) to provide engineering oversight during the excavation of petroleum impacted soil at the proposed LeFleur's Bluff Festival Grounds site, located on Jefferson Street, in Jackson, Mississippi. The objective of the project was to excavate and aerate diesel free product and impacted soil from the vicinity of the former fuel storage tanks. Using the remaining funds in a USTfields pilot grant obtained by the MDEQ. This report provides background information on the site, describes subsurface conditions and remedial activities conducted, and presents analytical data gathered during excavation activities.

2.0 SITE DESCRIPTION AND HISTORY

The site consists of an approximate 45-acre tract located between the Pearl River and Jefferson and Pascagoula Streets, and is owned by the City of Jackson. Historical data indicates that the City of Jackson has had facilities on this property dating back to the early 1900s. Former activities included vehicle storage and maintenance operations. A portion of the site appears to have been used as a landfill, along with motor fuel storage for fueling city-owned vehicles.

The LeFleur's Bluff site is currently being developed by the City of Jackson under a Brownfields initiative. In February 2003, PPM conducted a Phase II ESA at the site under the auspices of the MDEQ's USTfields Program funded by U.S. Environmental Protection Agency (EPA) Region IV. The purpose of the Phase II ESA was to determine if soil and/or groundwater in the vicinity of former underground storage tank (UST) areas had been impacted by motor fuels previously stored in the tanks.

Findings from the assessment indicated that tanks were located in four separate areas at the site, designated as Areas 1 through 4 by PPM for clarity. PPM installed 13 soil borings and ten piezometers in these areas using Direct-Push Technology (DPT) to a general depth of 5 feet below the depth at which saturated soil conditions were encountered [16 to 24 feet below ground surface (BGS)]. Selected soil and groundwater samples were analyzed for petroleum hydrocarbon constituents, additives, and lead. Site lithology was extremely heterogeneous, consisting of silts, clays, and sands at widely varying depths. Soils at the site appeared to consist entirely of fill material from earlier landfilling activities. Saturated soil conditions were encountered at average depths of 14 feet BGS, though thin saturated zones were encountered at other intervals in the fill material. Static groundwater levels in the piezometers were measured at depths of 12.81 to 20.04 feet BGS.

Based on findings from the investigation, PPM concluded that all four former UST areas show some evidence of petroleum hydrocarbon impact above the various action levels associated with a release of motor fuels, as indicated below:

- Benzene, Toluene, Ethylbenzene, and xylenes (BTEX) concentrations in soil and groundwater in Area 1 (former gasoline tank) were well below the MDEQ-UST Branch action levels established for these media. However, lead concentrations in the soil were elevated in one of the borings installed in this area.

- BTEX concentrations in soil in Area 2 (former gasoline tank) were well below the established MDEQ-UST Branch action level of 100 parts per million (ppm). However, lead concentrations in the soil were elevated in several of the borings installed in this area, but below the MDEQ Target Remediation Goals (TRG) of 400 ppm. Also, dissolved BTEX concentrations in the groundwater were above the action level of 18 ppm in one of the piezometers installed during assessment activities.

- BTEX concentrations in soil and groundwater in Area 3 (former diesel tank) were well below the established MDEQ-UST Branch action levels. However, eight polynuclear aromatic hydrocarbons (PAH) constituents were detected in the soil in this area above the Tier I Risk Based Screening Levels (RBSLs). Lead concentrations in the soil were elevated in several of the borings installed in this area, and the lead concentrations may be at levels that could constitute a hazardous waste. Free product (diesel) was present in the boring installed near the former diesel dispenser at a thickness of 0.37 feet.

- BTEX concentrations in soil and groundwater in Area 4 (former diesel tank) were well below the established MDEQ-UST Branch action levels. However, lead concentrations in the soil were elevated, and may constitute a hazardous waste.

- Petroleum hydrocarbon impact appeared to be defined in each of the areas investigated. However, the extent of lead impact in soil was not defined.

- It could not be determined within the scope of the investigation if the elevated lead concentrations in soil at the site could be directly attributed to releases of motor fuels from the former UST systems, from fill material placed at the site, or from some other point source. While lead was common in gasoline prior to 1978 and can cause soil and groundwater impact, the long-term historical usage of the site as a landfill and automotive repair facility could have contributed to the lead concentrations found during this investigation.

On May 6, 2003, PPM met with the MDEQ to discuss alternatives for utilizing remaining funds in the USTfields grant for remediating the site. The MDEQ subsequently requested that PPM provide alternatives for remediating the impacted soil in Areas 2 and 3. Excavation and on-site aeration was considered to be the most feasible method, although PPM expressed

concern regarding the possibility of lead concentrations in soil at levels that would constitute a hazardous waste. The MDEQ requested that PPM develop a work plan to further evaluate the feasibility of soil excavation and on-site aeration of soils in Area 3 only.

After reviewing the work plan, the MDEQ approved the excavation and on-site aeration in the vicinity of former UST areas that had been impacted by diesel fuel. Construction specifications were developed, approved by the MDEQ, and sent to contractors for bids. Contractor bids were submitted on April 9, 2004 and the project was awarded to Fair Construction and Environmental, Inc. on April 13, 2004.

3.0 SCOPE OF WORK

The primary objective of the excavation was to remove all diesel impacted soil at the site in the area surrounding piezometer well PZ-3-1 where free product had been previously found. The following scope of work was completed:

- Engineering oversight during excavation activities, including soil screening, sampling, and laboratory analysis of samples collected from the base and sidewalls of the excavation. Thirteen soil samples were collected and submitted for Polynuclear Aromatic Hydrocarbons (PAH) analysis per EPA Method 8100. Nine soil samples were collected approximately every 20 feet around the sidewalls and base of the excavation (7 sidewall and 2 base) to ensure hydrocarbon impact had been removed from the area. Four additional samples were collected from stockpiled soil to determine if aeration was necessary.

- Engineering oversight during installation of three, 1-inch piezometer wells in the excavated area and the collection of three groundwater samples plus QA/QC samples for laboratory analysis for PAH per EPA Method 8100 and the collection of one groundwater sample from piezometer PZ-2 for laboratory analysis for BTEX per EPA Method 8021B or 8260.

- Preparation of an excavation report which included:

    - Volume of soil excavated
    - Field observations
    - Applicable figures with sampling locations
    - Analytical results (originals and tables)
    - Schedule for turning of soil pile, sampling, and reporting\

4.0 CORRECTIVE ACTION

4.1 EXCAVATION

On June 7, 2004, PPM and Fair Construction mobilized to the site and cleared the work area. The former concrete dispenser island and light pole were removed, and the vegetation covering the work area was cleared. On June 9, 2004, Fair Construction began excavation of the soil near piezometer well PZ-3-1. An area approximately 53 feet by 42 feet was excavated to approximately 9 feet below ground surface (BGS), then the east, west, and south sidewalls were sloped to approximately 45 degrees to allow safe access to deeper soils. Soil was placed in dump trucks and transferred to a stockpile located north of the excavation. Some of the excavated soil was used to create a road through the wet grass to prevent equipment from getting stuck in the stockpile area. Twenty-three dump-truck loads of soil removed from the southwestern corner of the excavation (near the former dispenser island) exhibited a hydrocarbon odor. These 23 loads were suspected to exhibit hydrocarbon impact, and were segregated and stockpiled in a separate location. Several large pieces of concrete and brick debris were removed from the northern and eastern portions of the excavation.

After sloping the sidewalls, the soil was excavated to approximately 20 feet BGS to the saturated gray sand layer starting in the southwestern corner of the excavation. While excavating, an approximately 2.5 foot thick layer of garbage and refuse was excavated from 12 to 14 feet BGS. This garbage layer was overlying a gray silty clay layer that appeared to be native soil. While excavating from the southern sidewall north towards piezometer well PZ-3-1, free product was observed seeping from between the clay layer and the garbage layer at approximately 14-15 feet BGS. The seep was noticed approximately 12 feet southeast of PZ-3-1. The clay beneath the free product did not exhibit any free product staining, and review of the boring log for PZ-3-1 revealed the free product in that location was originally observed at approximately 12 feet BGS. Upon review of this information, it was determined the free product present on the water column in PZ-3-1 was likely the result of the soil boring penetrating the 5 foot thick silty clay layer and creating a pathway to the water bearing sand layer.

After this discovery, the depth of the excavation was modified to approximately 17 feet BGS to only remove the top three feet of the clay layer to reduce the costs of the excavation activities. Confirmation sampling revealed this depth was sufficient to remove the free product and any hydrocarbon impacted clay that may have resulted from the free product. A 10-foot radius around PZ-3-1 was excavated to the top of the water bearing sand to remove any hydrocarbon impact that may have occurred due to the pathway created through the clay layer. In the northeastern corner of the excavation, many large pieces of tar covered concrete and brick debris were found. The tar covered pieces were removed from the excavation, but several pieces that were not covered in tar were too large to be removed from the excavation.

The soil and debris was stockpiled in three separate locations to the north and northeast of the excavation area. All large pieces of concrete and bricks were segregated from the stockpiles and disposed of off-site. Approximately 1,805 cubic yards of clean soil excavated from ground surface to 12 feet BGS were stockpiled for use as clean backfill. The 23 loads (380 cubic yards) of soil suspected to contain hydrocarbon impact that were excavated from the southwestern corner of the excavation were stockpiled for confirmation sampling to determine the level of hydrocarbon impact. Approximately 972 cubic yards of diesel impacted debris and soil from 12 to 17 feet BGS were stockpiled for future on-site aeration. The excavated area is shown on **Figure 1, Excavated Area (Appendix A, Figures).**

4.2 BACKFILLING

Excavation activities were completed on Friday, June 11, 2004. After collection of all confirmation soil samples, backfilling activities began before confirmation results were received due to the threat of inclement weather over the weekend. Backfilling activities began along the eastern sidewall, and the sidewall was sloped to allow trucks and equipment into the excavation. The 1,805 cubic yards of clean soil excavated from ground surface to 12 feet BGS were utilized as backfill material. On Monday, June 14, 2004, PPM and Fair Construction returned to the site to resume backfilling the excavation, however; the confirmation soil samples collected on June 10 and June 11, 2004. The courier did not deliver the samples to the lab on Saturday morning as instructed, and the samples were received at the laboratory on Monday morning. Due to the delay, the ice melted and the sample temperatures were well above the 4°C temperature required by our QA/QC plan. Fair Construction had to remove some of the backfilled soil in order to gain access to the base and sidewalls of the excavation to collect new confirmation samples. After the new confirmation samples were collected, Fair Construction resumed backfilling the excavation using the clean soil. Four composite stockpile samples (designated SP) were collected from the 380 cubic yards of stockpiled soil suspected to exhibit hydrocarbon impact to determine if this soil was suitable for use as backfill.

Results from the stockpile samples revealed PAH concentrations were below the MDEQ Tier 1 Risk-Based Screening Levels (RBSLs), therefore; the stockpiled soil was suitable for use as backfill. Backfilling activities were resumed on June 21, 2004. On June 22, 2004, all non-impacted stockpiled soil had been replaced into the excavation, and clean backfill material was brought in to finish backfilling the excavation. Eighteen loads of backfill were brought to the site before rain halted backfilling activities.

Backfilling activities were not resumed until July 6, 2004, due to rain. On July 6, 2004, Fair Construction pumped standing water from the excavation and removed wet backfill soil to allow it to dry. The rainwater was pooled on clean backfill at the surface of the excavation, therefore; the MDEQ project manager approved pumping the rainwater out onto the surrounding areas rather than containerizing and treating the water. Backfilling activities were completed on July 8, 2004. Approximately 1,805 cubic yards of the backfill material consisted of clean soil previously removed from the excavation. The upper 5-6 feet of the excavation was backfilled with 972 cubic yards of clean imported soil.

4.3 SOIL SAMPLING

During the excavation, soil samples were collected for laboratory analysis to determine the extent of PAH concentrations in soils that were not excavated. Seven samples (designated SW) were collected from the sidewalls of the excavation at depths ranging from 12 to 17 feet BGS. Two floor samples (designated FS) were collected from the floor of the excavation. Soil sample locations are shown on **Figure 2, Excavation Soil Sampling Locations, (Appendix A).**

As previously mentioned, four composite soil samples were collected from the 380 cubic yards of stockpiled soil (designated SP) that was located beneath the former dispenser island and suspected to contain hydrocarbon impact. These composite samples were collected from the areas of the stockpile that exhibited the highest headspace concentrations during field screening of each load of suspect soil.

Soil samples were collected by hand. Disposable latex gloves were worn during soil sampling and were changed after each sample acquisition. Soil samples were placed in glass jars and stored on ice prior to shipment to the laboratory. Samples were sent to Environmental Science Corp. (ESC) in Mt. Juliet, Tennessee for analysis. Soil samples were analyzed for PAH per EPA Method 8100.

4.4 SOIL ANALYTICAL RESULTS

Analytical results from the soil samples indicate all PAH constituents found in samples collected from the excavation and the suspect soil stockpile were below the MDEQ Tier-1 RBSLs for samples collected 600 feet from a receptor. A GPS survey of the area indicated the excavation is located approximately 0.14 miles (740 feet) west of the Pearl River, which was determined to be the nearest receptor. Soil analytical results are presented in **Table 1, Soil Analytical Summary, (Appendix B, Tables).** Laboratory reports are included in **Appendix C, Excavation Soil Sampling Results.** Tier-1 RSBLs for soil are included in **Appendix D, Tier-1 Risk Based Screening Levels for Soil.**

4.5 ON-SITE AERATION

On July 7 and 8, 2004, approximately 972 cubic yards of diesel impacted soil was spread to the northeast of the excavation area to begin aeration activities. The soil was spread 5-7 inches thick over the previously cleared area. Per MDEQ requirements, the soil was spread over bare ground, and no impermeable barrier was installed beneath the soil.

PPM and Fair Construction will return to the site during the first week of August 2004 (depending on availability of equipment and the weather) to turn the soil using a tractor and disk to help aerate the soil. The soil will be turned again during the first week of September 2004, and confirmation soil samples will be collected to ensure PAH constituents are below the MDEQ Tier-1 RBSLs. Pending results of the confirmation soil samples, final turning of

the soil will be conducted at the end of September. If no hydrocarbon odors are present during the first turning event, confirmation soil samples may be collected during August 2004 to expedite completion of the project.

4.6 WELL INSTALLATION

During excavation activities, piezometer wells PZ-3-1, PZ-3-2, PZ-3-3, and PZ-3-5 were destroyed. PZ-3-1 was located within the excavation area and was removed with the surrounding soil. PZ-3-2, PZ-3-3, and PZ-3-5 were destroyed at the surface by the equipment repeatedly driving over the surface during excavation activities. On July 12, 2004, PPM returned to the site to install three one-inch piezometer within the excavation area to collect groundwater samples. The piezometer wells (PZ-3-6 through PZ-3-8) were installed with a hydraulically driven probe (Geoprobe®) system operated by Walker Hill Environmental, Inc. The wells were installed within clean backfill therefore no soil samples were collected. Well locations are shown on **Figure 3, Piezometer Well Locations (Appendix A).**

4.7 GROUNDWATER SAMPLING

Groundwater samples were collected from the three newly installed piezometer wells (PZ-3-6, PZ-3-7, and PZ-3-8) and PZ-2-2, on July 20, 2004. Groundwater samples were collected in accordance with the MDEQ's Standard Operating Procedure Manual dated March 7, 2003. Samples were shipped to Environmental Science Corp. (ESC) in Mt. Juliet, Tennessee. The samples collected from PZ-3-6, PZ-3-7, and PZ-3-8 were analyzed for PAH per EPA Method 8100 to determine if dissolved PAH concentrations were present in the excavation area. The sample collected from PZ-2-1 was analyzed for BTEX concentrations via EPA Method 8021B due to historically high BTEX concentrations in this well. A duplicate sample and trip blank were submitted for laboratory analysis as Quality Assurance/Quality Control (QA/QC) samples. The sample collected from PZ-2-2 was duplicated and reported as PZ-2-3 in the groundwater analytical results.

4.8 GROUNDWATER ANALYTICAL RESULTS

Groundwater depths ranged from 18.60 to 19.19 feet below the top of the well casing (TOC) in all wells sampled. Free product was not measured in any of the site wells during the sampling event. The only dissolved PAH constituents above laboratory detection limits were naphthalene and acenaphthene in the sample collected from PZ-3-8 (0.0016 ppm and 0.0011 ppm, respectively). The dissolved PAH concentrations in the groundwater samples collected from the newly install piezometer wells were below the MDEQ Tier-1 RBSLs for samples collected 600 feet from a receptor.

The dissolved BTEX concentration of 3.866 parts per million (ppm) was detected in the sample collected from monitoring well PZ-2-2. This represents a decrease from 19.01 ppm from the previous sampling event (December 5, 2002). The dissolved BTEX concentration detected in the sample collected from PZ-2-2 was below the MDEQ action level of 18 ppm, however; the dissolved benzene concentration of 3.8 ppm exceeded the Tier-1 RBSL for

benzene for a sample collected 600 feet from a receptor (1.4 ppm). Toluene, ethylbenzene, and total xylenes concentrations were below the MDEQ Tier-1 RBSLs in the sample collected from PZ-2-2.

Groundwater analytical results are shown in **Table 2, Groundwater Analytical Summary (Appendix B)** and are included in **Appendix E, Groundwater Analytical Results**. Tier-1 RSBLs for groundwater are included in **Appendix F, Tier-1 Risk Based Screening Levels for Groundwater**.

5.0 SUMMARY

Analysis of soils collected from the base and sidewalls of the excavated area indicate that all contaminated soils with PAH concentrations exceeding the MDEQ Tier-1 RBSLs have been removed from the site. Excavation activities performed are shown in **Appendix G, Site Photographs**. During excavation activities, existing piezometer wells PZ 3-1, PZ 3-2, PZ 3-3, PZ 3-5 were destroyed. Piezometer wells PZ-3-6, PZ-3-7, and PZ-3-8 were installed within the excavation area and groundwater samples were collected on July 20, 2004. Analytical results indicate PAH concentrations in the groundwater in the excavation area are below the Tier-1 RBSLs.

Due to historically high dissolved BTEX concentrations, piezometer well PZ-2-2 was sampled on July 20, 2004. The total dissolved BTEX concentration of 3.8 is below the MDEQ action level of 18 ppm, however; the dissolved benzene concentration (3.8 ppm) exceeded the Tier-1 RBSL for benzene (1.4 ppm).

The landfarmed soil is scheduled to be turned for aeration the week of August 9, 2004.

6.0 RECOMMENDATIONS

Based on MDEQ protocol, one more confirmation groundwater sampling event is required on a triannual basis to ensure PAH concentrations do not rebound in the excavation area. PPM recommends sampling PZ-3-6, PZ-3-7, and PZ-3-8 for PAH analysis per EPA Method 8100 or equivalent method.

PPM also recommends sampling PZ-2-2 for BTEX analysis per EPA Method 8021B or equivalent method to determine if the dissolved benzene concentration is naturally attenuating.