MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY - UNDERGROUND STORAGE TANK BRANCH

ADDITIONAL SUBSURFACE INVESTIGATION
FOR LEAKING UNDERGROUND STORAGE TANK FACILITIES

August 13, 2007

This guidance is for performing an Additional Subsurface Investigation (ASI) at an underground storage tank (UST) site with a confirmed release. As the tank owner of the UST system, you are responsible for insuring the ASI is performed in accordance with the following sections included in this guidance:

I. Scope of Work for ASI Field Activities

Your Environmental Response Action Contractor (ERAC) shall submit to you a scope of work and cost estimate (SOW/CE) for performing the additional assessment in accordance with these guidelines. After you review, approve, and sign the SOW/CE, you shall submit two copies to our office.

The purpose of the ASI is to further define the extent of the contamination on a leaking underground storage tank (LUST) site. The scope of work includes site reconnaissance, soil investigation, and groundwater investigation.

The ASI field activities shall not be performed until you receive the approval letter from our office, which provides your maximum reimbursement for the assessment activities. These activities shall be completed by your ERAC at your direction.

II. Report Format for ASI Field Activities

Your ERAC shall prepare the ASI report for the assessment activities in this format.

III. Paperwork After ASI Field Activities

Your ERAC shall submit a complete ASI report to you. Then you shall review and submit a copy of the report to MDEQ. You shall submit your ERAC's invoices along with a Certification Affidavit.

IV. Attachments

Cost Price Summary Form
Unit Rate Bid Sheet for Drilling
Certification Affidavit

I. SCOPE OF WORK FOR ASI FIELD ACTIVITIES

As the tank owner, you shall request your ERAC to submit to you a scope of work and cost estimate (SOW/CE) for performing the ASI in accordance with this guidance. After you review, approve, and sign the SOW/CE, you shall submit two copies of the SOW/CE to our office.

The most recent MDEQ-UST Standard Operating Procedures Manual (SOP) shall be followed when performing all field activities.

1.0 INTRODUCTION

- Site location and description.
- Brief history of the site, which is to include:
  - The reason the additional assessment is being performed.
  - The significant contamination levels in the previous assessment(s).
  - The date and the cause of the release.
- The present, past, and future (if known) use of the site.

2.0 BRIEF OVERVIEW OF THE SCOPE OF WORK

- The proposed number of borings to be advanced.
- The proposed number and type of monitoring wells to be installed.
- The proposed number of soil samples and type of analysis to be performed.
- The proposed number of groundwater samples and type of analysis to be performed, including permit samples, if applicable.
- State any additional proposed activities and/or tests, if applicable.

3.0 ASSESSMENT ACTIVITIES

3.1 Proposed Boring Advancement & Soil Sampling

At a minimum, the following should be included in the SOW:

- The number of borings to be advanced.
- The method to be used for advancing the borings.
- The anticipated termination of the boring and justification for the depth.
- The number of soil samples and type of analysis to be performed.
- A map indicating the locations of proposed and existing borings/monitoring wells.

- A utility survey that will be conducted prior to the placement of borings and wells.
- Field screening of any utility manholes or storm drain openings.

NOTE: Remember to collect the required QA/QC samples as outlined in the SOP.

3.2 Proposed Monitoring Well Installation, Development, & Sampling

At a minimum, the following should be included in the SOW:

- The number, diameter, and type of monitoring well(s) to be installed.
- The anticipated depth of each monitoring well.
- The wells to be sampled.
- The type of analysis to be performed on the samples.
- The collection of groundwater elevations.

NOTE: (1) Remember to collect the required QA/QC samples as outlined in the SOP.
(2) If free product greater than 1/8 of an inch in thickness is encountered in a well, do not collect a groundwater sample from that well, simply record the free product thickness. Describe if the free product is diesel, gasoline, kerosene or waste oil, and state if it appears weathered or fresh.

3.3 Wastewater Permit Application

In the event a wastewater permit application needs to be submitted, at least the following information should be included in the SOW:

- Preparation of permit application.
- Permit sampling.
- Notification of adjacent land owners.
- Field verification of adequate discharge point.
- Receipt of city POTW approval, if applicable.

4.0 REPORT PREPARATION

A brief overview of the information to be included in the final report. Please refer to Section II of this guidance.

5.0 COST ESTIMATE

The ERAC shall include a detailed breakdown, by task, of costs/charges for all activities to be performed such as field work, analytical charges for sampling, and report preparation. Each task shall include a breakdown of anticipated labor hours by personnel classification, anticipated travel costs, equipment and materials, subcontractors, and other costs. All costs/prices for the proposed activities shall be included on a MDEQ Cost/Price Summary Form. Charges for drilling services shall be quoted on a Unit Rate Bid Sheet for Drilling Services.

II. REPORT FORMAT FOR ASI FIELD ACTIVITIES

The tank owner's ERAC shall follow this format for all ASI report submittals.

TRANSMITTAL LETTER:

All reports shall be accompanied with a transmittal letter. This letter shall, at a minimum, contain the following:

- The owner's name, address and phone number;
- The Mississippi UST Facility I.D. Number;
- The signature of the Mississippi Registered Professional Engineer (P.E.) and/or Geologist (P.G.) as stated in the Mississippi Groundwater Protection Trust Fund (MGPTF) Regulations

Also, all reports **shall** contain the stamp of a Mississippi Registered P.E. and/or P.G. as stated in the MGPTF Regulations.

1.0 INTRODUCTION

1.1 General

- State the name of the tank owner.
- State when the tank owner was authorized to perform the ASI and the date field activities commenced.
- State whether your ASI Scope of Work (SOW) was followed. If deviations from the ASI SOW occurred, please describe and explain the deviations and who authorized these deviations.
- State the latest version of the MDEQ-UST Standard Operating Procedure Manual (SOP) and whether it was adhered to. If any deviations occurred, please explain the deviations.

1.2 Brief Overview of Scope of Work

- The proposed number of borings to be advanced.
- The proposed number and type of monitoring wells to be installed.
- The proposed number of soil samples and type of analysis to be performed.
- The proposed number of groundwater samples and type of analysis to be performed, including permit samples, if applicable.
- State any additional proposed activities and/or tests, if applicable.

2.0 BACKGROUND

- Describe location of the site.
- Describe any potential off site sources that may contribute to any hydrocarbon contamination.
- Discuss and submit any data from prior environmental assessments that have been performed at the site.
- Describe proximity of site to sensitive receptors (lakes, creeks, water wells, etc.).
- Describe any emergency response that was conducted, and include the name of the contractor who performed the work.

3.0 SOIL CONTAMINATION

3.1 Soil Exploration, Sampling, and Field Testing

- Discuss the number of borings installed, depths of each boring and if groundwater was encountered.
- Discuss whether hydrocarbon odors or a sheen was encountered during drilling.
- Discuss any unusual conditions or complications encountered during drilling.
- Discuss the vapor readings of any utility manhole uncovered or storm drain openings.
- Present the field data collected from the borings in tabular form as shown below:

Sampling Date	Borehole/MW	Sampling Interval	PID (FID) Reading (ppm)
01/01/01	SB-1/MW-1	4’ – 6’	125
		9’ – 11’	347*
		14’ - 16’	140

* Soil sample sent to the laboratory.

3.2 Extent of Soil Contamination

- Discuss the lithologic characteristics of the soils encountered during drilling.
- Discuss the horizontal and vertical extent of soil contamination and whether the soil contamination has been defined. If additional soil borings are necessary, provide justification and locate proposed soil borings on map (refer to Figure 8).
- Discuss if adjacent properties could be affected by soil contamination.
- Estimate the volume (cubic yards) of contaminated soil that is above the MDEQ-UST Branch’s regulatory limit.
- Present and discuss the results of any Quality Control/Quality Assurance (QA/QC) measures and discuss whether they meet allowable QA/QC standards.
- Provide in tabular form the analytical results of the soil samples. The table should be presented as outlined on page II-5.

4.0 GROUNDWATER CONTAMINATION

4.1 Monitoring Well Installation

- Discuss which borings were converted to monitoring wells and why.
- Discuss whether pre-existing wells (leak detection wells, water supply wells, etc.) are located at the facility and if so how many.
- If certain monitoring wells were not sampled, explain (i.e., free product, no water, etc.).
- State whether groundwater and/or free product intersect the screened interval of the monitoring well. If not, explain.

4.2 Extent of Groundwater Contamination

- Discuss the potentiometric surface, flow direction and gradient.
- Discuss any anomalies in the flow regime.
- Discuss if free product is present on the water table. If so, describe if the free product is diesel, gasoline, kerosene or waste oil, and state if it appears weathered or fresh. Also discuss the areal extent and product thickness, and indicate on map. (refer to page II-7)
- Discuss the potential of contamination impacting sensitive receptors and/or adjacent properties.
- Discuss whether groundwater contamination has been defined. If additional monitoring wells are necessary, provide justification and locate proposed monitoring wells on map (refer to Figure 8).
- Present and discuss the results of any Quality Control/Quality Assurance (QA/QC) measures and discuss whether they meet allowable QA/QC standards.
- Provide in tabular form the analytical results of the groundwater samples. The table should be presented as outlined on page II-5.

5.0 WASTEWATER PERMIT

If permit preparation or sampling occurred:

- Discuss the number of samples taken and the type of analysis performed.
- Discuss the notification of adjacent landowners, including names and addresses.
- Discuss the location of the discharge point.
- Discuss approval for the city POTW, if applicable.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Discuss in detail what further action is necessary to address the contamination at the site, such as:

(a) There is no need for further action.
(b) There is only a need to monitor the site for "*" months.
(c) Soil excavation will be necessary. (Refer to Figure 8)
(d) A remediation system should be installed. If the ERAC states a remediation system should be installed, he shall indicate the type of remediation equipment and the necessary permits for operating such a system.
(e) An additional assessment will be necessary. (Refer to Figure 8)
(f) Free product recovery (FPR) activities will be necessary. If the ERAC states that FPR activities are needed, he shall include the method of FPR (vacuuming, hand bailing, etc.), the proposed schedule of FPR activities, and monitoring wells requiring FPR.

Examples of tables for presenting soil and groundwater sample results:

Boring / MW	Depth of Soil Sample (ft.)	Soil Sample (ppm)							Groundwater Sample (ppm)							Free Product Thickness (feet)
		Sampling Date	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX	Sampling Date	MTBE	Benzene	Toluene	Xylenes	Ethylbenzene	Total BTEX	

PAH Soil Sample (ppm)																		
Boring / MW	Sample Date	Depth of Soil Sample (ft)	Acenaphthene	Acenaphthylene	Anthracene	Benzo (b) Fluoranthene	Benzo (g, h, i) Perylene	Benzo (K) Fluoranthene	Benzo (a) Anthracene	Benzo (a) Pyrene	Chrysene	Dibenzo (a, h) Anthracene	Fluoranthene	Fluorene	Indeno (1,2,3,c,d) Pyrene	Naphthalene	Phenanthrene	Pyrene

PAH Groundwater Sample (ppm)																		
Boring / MW	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo (b) Fluoranthene	Benzo (g, h, i) Perylene	Benzo (K) Fluoranthene	Benzo (a) Anthracene	Benzo (a) Pyrene	Chrysene	Dibenzo (a, h) Anthracene	Fluoranthene	Fluorene	Indeno (1,2,3,c,d) Pyrene	Naphthalene	Phenanthrene	Pyrene	Free Product Thickness (feet)

FIGURES

The ASI Report shall contain these figures, if applicable:

1. Area/Vicinity Map

- Show location in relation to the city. City maps or similar are acceptable.
- Locate water supply well locations within a 1-mile radius of the site.

2. Surrounding Area Map (Approximately 500-ft. radius from the site.)

- Indicate other potential hydrocarbon sources.
- Indicate potential environmental receptors, i.e., lakes, streams, etc.
- Label the adjacent roads and intersections.
- Indicate utility openings.
- Indicate adjacent properties including property owners, and their zoning.

3. Site Map(s)

- Indicate location of fences or retaining walls.
- Indicate property lines.
- Indicate location of all aboveground and underground storage tanks (distinguish between those currently in use or those taken out of service or removed) and associated lines, pumps, and dispensers.
- Indicate location of all buildings and canopies.
- Indicate soil boring and monitoring well locations.
- Indicate underground and aboveground utilities on or adjacent to site (sewer, water, telephone, gas, electric, etc.).
- Indicate street names.
- Indicate area where release occurred, if known.

4A. BTEX Contaminated Soil Contour Map

- Indicate soil boring locations.
- Indicate location of buildings.
- Indicate location of former and/or existing tanks, product lines, canopies, and roads.
- Soil data should be plotted adjacent to the boring using the following format:

PID/FID Reading	BTEX (ppm)
Depth (ft)	

- Display only those contours of total BTEX of 100 ppm concentrations or greater.

FIGURES **continued**

4B. PAH Contaminated Soil Map

- Indicate soil boring locations.

- Indicate location of buildings.
- Indicate location of former and/or existing tanks, product lines, canopies, and roads.
- The PAH constituent above our soil level at 0 feet to a sensitive receptor should be plotted adjacent to the boring using the following format:

Constituent & level (ppm)
Depth (ft)

6. Groundwater Elevation Contour Map

- Indicate monitoring well locations.
- Groundwater elevation should be plotted adjacent to the well.
- Use arrows to depict groundwater flow direction.

7A. Dissolved Phase BTEX Contour Map

- Indicate monitoring well locations.
- Indicate location of buildings.
- Indicate location of former and/or existing tanks, product lines, canopies, and roads.
- Groundwater data should be plotted adjacent to the well using the following format:

BTEX (ppm)	Benzene (ppm)
Free Product Thickness (ft)	

- Display only those contours of total BTEX of 18 ppm concentrations or greater.
- Indicate any monitoring wells containing free product and display contour.

7B. Dissolved Phase PAH Map

- Indicate monitoring well locations.
- Indicate location of buildings.
- Indicate location of former and/or existing tanks, product lines, canopies, and roads.
- The PAH constituent above our groundwater level at 0 feet to a sensitive receptor should be plotted adjacent to the well using the following format:

Constituent & level (ppm)

8. Further Action Map *(If Necessary)*

- Map showing location of proposed borings and/or monitoring wells.
- Map showing area of recommended excavation.

APPENDICES

The ASI Report shall include:

A. Boring Logs

The presence of hydrocarbon odors and the location of water bearing zones shall be noted and included on the boring logs. Also, PID or FID readings and a qualitative

indication of soil saturation (dry, moist, wet, saturated) should be noted on the boring logs. Identify first water and stabilized water levels.

B. Well Construction Logs

C. Laboratory Chemical Data Sheets (including Chain of Custody)

D. Photo Documentation

E. Adjacent Property Owners' Names, Addresses and Phone Numbers

F. Copy of Wastewater Permit Application

III. PAPERWORK AFTER ASI FIELD ACTIVITES

As the tank owner of the UST system, you shall follow the three steps below after the field activities have been completed:

Step One - Final Report Submittal

After the fieldwork has been completed, the next step is for the ERAC to prepare the final report. Data collected from this scope of work shall be reported as described in Section II of this guidance document.

Once the final report has been completed, the ERAC shall forward a copy to you for your review. The report will detail the findings of the environmental assessment, so the MDEQ strongly recommends that you review this report and ask questions regarding its content and quality.

Once you are satisfied with the final report, a copy shall be submitted to the MDEQ. It is imperative that this report is submitted in a timely fashion. The letter accompanying this package sets a "Due Date" for final report submittal. As stated in that letter, $100.00 may be deducted from your eligible reimbursement for every calendar day the final report is overdue.

Step Two - Submittal of Certification Affidavit and Invoices

Reimbursement from the Trust Fund for the Assessment can only occur after the MDEQ approves the final report and the MDEQ receives a completed "Certification Affidavit" (copy attached) along with itemized invoices.

Be sure that the "Certification Affidavit" has been completed in its entirety and with accurate information. Also, ensure that you complete the appropriate box for the "Reimbursement Method Selection." **If you chose the Tank Owner option, you must provide proof of payment to the ERAC before you can be reimbursed.** All applicable invoices (laboratory services, drilling services, etc.) shall be included along with the completed "Certification Affidavit". You may want to compare the invoices to our Limits of Reimbursement. The MDEQ shall only reimburse up to these limits, unless previously approved by our office.

Please note that if information on the "Certification Affidavit" is incorrect or omitted or if applicable invoices are omitted, reimbursement will be delayed until the correct information is submitted. If you have any questions regarding the completion of the "Certification Affidavit" or about the reimbursement process, please contact Donna Rogers at (601) 961-5288.

Please submit the "Certification Affidavit" and itemized invoices to:

Donna Rogers
MDEQ
P.O. Box 2261
Jackson, MS 39225-2261

Step Three – Reimbursement to you and your ERAC

As stated above, reimbursement from the Trust Fund for the Assessment can only occur after the MDEQ approves the final report and the MDEQ receives a completed "Certification Affidavit" along with itemized invoices. Normally this process can take from 8 to 12 weeks from the time the Final Report is submitted to the MDEQ.

Depending on the option that you selected, the reimbursement from the Trust Fund will be paid directly to you or your ERAC. Please note that any evidence or discovery of fraud or other misuse of payments received from the Trust Fund may result in referral to the Attorney General for appropriate action.

IV. ATTACHMENTS

Attach

Cost / Price Summary Form

Attach

Unit Rate Bid Sheet For Drilling Services

Attach

Certification Affidavit