GULFCO MARINE MAINTENANCE SUPERFUND SITE

REMOVAL ACTION WORK PLAN

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I. INTRODUCTION

A. Purpose of the Work Plan

This Work Plan sets forth certain requirements for completion of a removal action to remove or eliminate certain wastes, thereby eliminating or reducing risks from potential exposure pathways from those wastes at or from the Gulfco Marine Maintenance Superfund Site (the "Site"). The work described herein shall be implemented upon EPA's signing of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC).

B. Description of Action

An aboveground storage tank farm ("AST Tank Farm") located in the southern portion is to be addressed by this Removal Action. The AST Tank Farm is a concrete bermed area containing 14 above-ground storage tanks (a fifteenth tank, Tank No. 100, which was empty, was removed from the Site in September 2008 by Hurricane Ike storm surge), three of which appear to be empty. The tank locations and designations are shown on Figure 1. The contents of the tanks are to be removed and the tanks demolished. The concrete containment slab and walls will remain in place, except that the walls shall be breached so that rainfall will freely drain from the structure. Any accumulated water contained within the bermed area shall be characterized and properly managed. Any buried pipes will be capped at the surface after removing the contents of the pipes. The tanks' contents and structures, containerized wastes, and debris will be properly managed off-site.

The specific objectives for the AST Tank Farm Removal Action are: (1) to prevent the release of chemicals of concern that are stored in the tanks and any other containers, and (2) to prevent the exposure of site workers and visitors to chemicals of concern remaining in the tanks following removal of the stored liquids and other materials. The tanks contain water, various organic phases, oily sludges, and sand, rust solids, and debris. The tanks' contents include: benzene; chloroform; 1,2-dichloroethane; trichloroethylene; tetrachloroethylene; vinyl chloride; and petroleum hydrocarbons in various concentrations.

II. WORK TO BE PERFORMED

A. Preconstruction Activities

Preconstruction activities will consist of a Site inspection and assessment, and preparation of a Health and Safety Plan (HASP). The HASP will be prepared in compliance with Occupational Safety and Health Administration and EPA requirements. The HASP will be submitted to EPA and will be in place prior to any onsite construction activities. Site inspection and assessment shall begin with cutting weeds and vegetation as necessary to perform a visual inspection of the removal action area. This inspection shall be performed for safety purposes and to identify any drums or containers, which shall be visually inspected, inventoried, labeled with a control number, and logged, as necessary.

Sampling and Analysis Plan

Sampling of the AST contents was performed during the period from December 14 through 15, 2006 in accordance with a Work Plan dated November 6, 2006 (and addendum dated December 1, 2006) that were approved by an EPA letter dated December 4, 2006. As part of sampling activities, fluid levels were gauged in all ASTs and samples were collected from separate solid and liquid phases within the tanks, where present. In addition to the AST samples, samples of water accumulated within the north and south containment areas of the AST Tank Farm were collected on December 14, 2006. The AST and water samples were transported to Gulf Coast Analytical Laboratories, Inc. (GCAL) in Baton Rouge, Louisiana for analysis for various waste characterization parameters (e.g., reactivity, corrosivity, ignitability, toxicity). The results of these analyses are summarized on attached Tables 1 through 4. The original laboratory reports for these analyses were included in a report describing the tank sampling activities that was submitted to EPA on April 4, 2007. A summary of the projected tank volumes based on the gauging estimates is provided in Table 5.

The AST and water sample data listed in Tables 1 through 4 will be used for the classification and profiling of waste streams for off-site management (treatment, disposal and/or recycling) as acceptable to the intended management facilities. Possible off-site waste management facilities are listed in Table 6. All materials will be managed at a facility that is in compliance with EPA's "Off-Site Rule". Should more recent or additional data be required by these facilities or the tank removal contractor, additional sampling and analyses will be performed as described below. Additional samples may be collected from the accumulated water within each of the north and south containment areas if necessary to evaluate possible discharge or other management options for that material. Sampling of accumulated sludge (if any) within the containment berms will be performed as necessary.

Tank Gauging – Prior to sampling or content removal (if sampling is not required), each AST will be gauged to verify the approximate content volume. For gauging and sampling purposes, the tanks will be accessed utilizing ladders and/or man lifts. Gauging will be performed using various devices, such as weighted lines, gauge

rulers, visible means, or other appropriate method based on the tank size and location, content characteristics, and content volume.

Sample Collection – Samples will be collected using dippers, sampling thieves and/or other sampling devices as appropriate depending on tank size, content type (solid or liquid) and content volume in order to obtain a representative sample. One representative sample will be collected from each tank waste stream. Containment area water and sludge samples will be collected directly from the containment areas using dippers, bailers, and/or other appropriate devices.

All sampling equipment will be decontaminated prior to use. Disposable equipment meant to be used only once and discarded will be decontaminated prior to use, unless the equipment is properly packaged and sealed. All non-disposable components of the sampling equipment will be decontaminated as follows:

- Potable water rinse;
- Liqui-nox® detergent wash;
- DI water rinse;
- Liqui-nox® detergent wash;
- DI water rinse; and
- Air dry.

A methanol or hexane rinse may be used if evidence of organic staining is found after equipment has been cleaned. Following decontamination, the sampling equipment will be placed in bags or sealed to keep the equipment clean during storage. All liquids generated as a result of decontamination processes will be containerized and handled as investigation-derived waste (IDW).

Samples will be transferred from the sampling devices to sample containers in a central staging area near the AST Tank Farm. Sample containers will be prepared specifically for the required analyses by the analytical laboratory. Any required preservatives will be placed in the sample containers by the laboratory prior to shipment to the Site.

To prevent misidentification of samples, labels will be affixed to each sample container. Information will be written on the label with a permanent marker. The labels will be sufficiently durable to remain legible even when wet and will contain the following information:

- Sampling identification name;
- Name or initials of collector;
- Date and time of collection;
- Analysis required (if space on label allows); and
- Preservative inside bottle, if applicable.

Sample custody, packaging and shipment will be performed in accordance with Standard Operating Procedure (SOP) No. 6 in the approved Gulfco RI/FS Field Sampling

Plan (FSP) (PBW, 2006a). Samples will be placed in shipping coolers containing bagged, cubed ice immediately following collection. Samples will be shipped to the laboratory via an overnight courier service, generally on the day they are collected.

Evidence of collection, shipment, and laboratory receipt must be documented on a Chain-of-Custody record by the signature of the individuals collecting, shipping and receiving each sample. A sample is considered in custody if it is:

- In a person's actual possession;
- In view, after being in physical possession;
- Sealed so that no one can tamper with it, after having been in physical custody; and/or
- In a secured area restricted to authorized personnel.

Chain-of-Custody Records will be used, by all personnel, to record the collection and shipment of all samples. The Chain-of-Custody Record may specify the analyses to be performed and should contain at least the following information:

- Name and address of originating location of samples;
- Name of laboratory where samples are sent;
- Any pertinent directions/instructions to laboratory;
- Sample type (e.g., aqueous);
- Listing of all sample bottles, size, identification, collection date and time, and preservative, if any, and type of analysis to be performed by the laboratory;
- Sample ID;
- Date and time of sample collection; and
- Signature of collector as relinquishing, with date/time.

The Chain-of-Custody procedure will be as follows:

1) The field technician collecting the sample shall be responsible for initiating the Chain-of-Custody Record. Samples can be grouped for shipment on a common form.

2) Each time responsibility for custody of the samples changes, the receiving and relinquishing custodians will sign the record and note the date and time.

3) The Chain-of-Custody Record shall be sealed in a watertight container, placed in the shipping container, and the shipping container sealed prior to giving it to the carrier. The carrier waybill shall serve as an extension of the Chain-of-Custody Record between the final field custodian and receipt in the laboratory. The commercial carrier is not considered part of the COC chain and is not required to sign the COC.

4) Upon receipt in the laboratory, a designated individual shall open the shipping containers, measure and record cooler temperature, compare the contents with the

Chain-of-Custody Record, and sign and date the record. Any discrepancies shall be noted on the Chain-of-Custody Record.

5) If discrepancies occur, the samples in question shall be segregated from normal sample storage and the project manager will be notified for clarification.

6) Chain-of-Custody Records, including waybills, if any, shall be maintained as part of the project records.

Sample Analyses - The analytical suite for AST and accumulated sludge samples (if any) will be determined based on the requirements of the removal action contractor and/or the off-site waste management facility to be used for the specific waste stream to be evaluated. Based on the previous data in Table 4, containment area water samples (if needed) will be analyzed for volatile organic compounds (VOCs), pesticides and metals using the methods listed for water samples in the approved RI/FS FSP. Considering the intended use of these data, validation will be performed at Data Review Level 2 as described in the approved Gulfco RI/FS Quality Assurance Project Plan QAPP (PBW, 2006b). Sample analyses will be performed by GCAL, whose laboratory QAPP was provided as Appendix G of the RI/FS QAPP. All analytical data collected for this removal action shall be provided electronically to EPA.

Construction Quality Assurance Plan

The Construction Quality Assurance Plan (CQAP) for the removal action at the AST Tank Farm is provided below. This plan describes the project-specific components of the performance methods and quality assurance program to ensure that the completed project meets or exceeds all design criteria, plans, and specifications.

Responsibilities and Authorities - The Construction Quality Assurance (CQA) Officer will be Eric Pastor, P.E. of Pastor, Behling & Wheeler, LLC (PBW). Mr. Pastor will be assisted in the day-to-day project inspection activities by other PBW personnel, all of whom will have an appropriate level of engineering and/or consulting experience for their assigned responsibilities. EPA and/or its contractors may perform additional construction inspection/oversight at EPA's discretion.

CQA Qualifications - Mr. Pastor's and PBW's qualifications were provided to EPA in a letter dated August 26, 2005. As noted above, all inspection personnel will have an appropriate level of engineering and/or consulting experience for their assigned responsibilities.

CQA Inspection and Verification Activities – A CQA inspector will be on-site to monitor the performance of all tank content removal, truck loading, tank decontamination, and tank demolition activities; verify compliance with environmental requirements; and ensure compliance with all health and safety procedures. The CQA inspector will verify that removal action activities have been performed in accordance with this Work Plan and the project specifications. A CQA inspector will also collect the containment berm water and sludge (if any) samples as described above. CQA

inspection documentation will be performed in accordance with SOP No. 1 provided in Appendix A of the approved RI/FS FSP. This documentation will be retained in the project files in accordance with the requirements of Section XI of the AOC.

Regulatory Compliance Plan

In accordance with the National Contingency Plan, removal actions under Section 106 of CERCLA are required to meet the substantive requirements of other laws unless an ARAR waiver is granted by the lead regulatory agency. Compliance with the administrative requirements (e.g., permitting, administrative reviews, reporting, and record keeping) of other laws is not required under CERCLA. The substantive ARARs are divided into the three categories:

- Chemical-specific requirements, health- or risk-based numerical values, or methodologies that specify the acceptable amount or concentration of a chemical that may be found in, or discharged to, the environment;

- Location-specific requirements- restrictions placed on the types of activities that can be conducted or on the concentration of hazardous substances that can be present solely because of the location where they will be conducted; and

- Action-specific requirements- technology or activity-based requirements or limitations on actions taken with respect to hazardous wastes.

Chemical-specific requirements – The primary chemical-specific requirements for the removal action at the AST Tank Farm are the chemical-specific waste classification standards under 30 TAC 335 Subchapter R and the hazardous waste identification requirements in 40 CFR Part 261. These requirements will be used for the classification of the tank contents prior to removal and off-site management.

Location-specific requirements – No location-specific requirements were identified for this removal action.

Action-specific requirements – Action-specific requirements for the removal action at the Former AST Tank Farm include the following:

- Texas Commission on Environmental Quality (TCEQ) standards for hazardous waste generators (30 TAC Chapter 335, Subchapter C), including the Land Disposal Restrictions (Chapter 335, Subchapter 0) for any wastes to be landfilled will apply. Procedures to be implemented for compliance with generator requirements include completion of a One-Time Shipment Request for Texas Waste Code For Shipment of Hazardous and Class 1 Waste (TCEQ Form 0757) and/or other required forms. Compliance with off-site waste shipment requirements including, U.S. Department of Transportation (DOT) regulations contained in 49 C.F.R. 173, and 179 and placarded regulations in 49 C.F.R. 172 will be ensured through the use of only permitted waste haulers. Compliance with off-site waste management requirements, including Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901, *et seq.* at 40 C.F.R. 260 *et seq.* and

related Texas state requirements will be ensured through the use of only the potential facilities listed in Table 6. Compliance with the provisions of the NCP, 40 C.F.R. 300.440, with regard to EPA approval of the off-site waste management facilities will be performed through EPA approval of this Work Plan.

- TPDES permit requirements for wastewater discharge will be used to determine limits for discharge of water collected within the AST Tank Farm containment berms to the Intracoastal Waterway.

Waste Management Plan

The AST data listed in Tables 1 through 4, as supplemented by additional data collected through the sampling and analytical activities described in this Work Plan, will be used for the classification and profiling of waste streams for off-site management (treatment, disposal and/or recycling) as acceptable to the intended management facilities. Hazardous and non-hazardous wastes, as well as non-waste materials, shall be handled and managed in accordance with all applicable or relevant and appropriate requirements. To the extent possible based on tank content volumes, characteristics and waste classifications, the tank contents will be transferred directly from the tanks to the waste haulers (typically vacuum tankers) for liquid waste. Waste loads will be transported to one or more of the facilities listed in Table 6. All off-site transportation and management will be performed in accordance with applicable USDOT requirements. All materials will be managed at a facility that is in compliance with EPA's "Off-Site Rule". Wastewater from tank decontamination operations will be handled similarly. Following decontamination through triple rinsing, tanks not identified for re-use will be cut up and sold as scrap or disposed as non-hazardous waste. All loads will be properly manifested prior to leaving the Site.

Emissions Control Plan

During tank liquid content transfer operations, tank vapors will be vented through carbon canister or similar devices. Air exhaust from vacuum trucks and any other exhaust that potentially could contain volatile emissions shall be captured and treated onsite with vapor-phase carbon.

Ambient air monitoring will be periodically performed by the remediation contractor while tank contents are being transferred from the ASTs to trucks, and while gauging and sampling (if any) of the ASTs is being performed. Monitoring will be performed for total organic vapors using an organic vapor meter with a photoionization detector. Ambient air monitoring will be performed both within the work zone and on the downwind perimeter of the work area. Air monitoring results within the work area will be evaluated in accordance with procedures established in the HASP. If a sustained reading (more than 60 seconds) of 10 ppmv or higher is measured at a perimeter monitoring location, work activities upwind of that location will temporarily cease. Monitoring will then be performed at that location every five minutes for 15 minutes (three times). If concentrations of total organic vapors subside below the 10 ppmv action level, work may resume with continued focused monitoring performed at that location. If

total organic vapor concentrations do not subside below the 10 ppmv action level, or if vapor concentrations consistently return to 10 ppmv or higher after work is resumed, the PBW and EPA Project Managers will be notified and potential engineering and/or other controls and contingency plans will be discussed and implemented as necessary prior to further work resumption. During tank content transfer activities, additional monitoring may be performed using chemical-specific Draeger tubes. Monitoring measurements will be recorded by contractor personnel and will be included in the Final Report.

Contingency Plan

This contingency plan describes procedures to minimize hazards to human health and the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste constituents, procedures to be followed in the event of a spill, and procedures to be followed for movement of equipment and personnel from low-lying areas during a high water event.

Spill Prevention – In order to minimize the potential for spills or release of hazardous constituents to the environment, liquid tank contents will be transferred directly to transport trucks when possible. Potential spills at the tanks during this process will be contained by the existing tank containment berms. Receiving trucks will be loaded within temporary loading areas constructed to contain potential spills during the loading process. Spill control and cleanup kits along with fire extinguishers and eye wash kits will be located in the AST Tank Farm and loading areas.

Spill Response/Notification – In the event of a spill, field crews will immediately contain the spill as necessary to prevent a release and notify on-site CQA and EPA representatives. If not on-site, the EPA OSC will be notified immediately thereafter. In the event of any spill which causes or threatens a release of waste material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Respondents shall immediately notify the OSC or, in the event of his/her unavailability, the Regional Duty Officer, Emergency Planning and Response Branch, EPA Region 6, 214-665-3166, and the EPA Regional Emergency 24-hour telephone number, 1-866-372-7745. In addition, in the event of any release of a hazardous substance from the Site which, pursuant to Section 103 of CERCLA, requires reporting to the National Response Center, Respondents shall immediately notify the National Response Center at (800) 424-8802 and then the OSC at (866) 372-7745.-. A written report will be submitted to EPA within 7 days after a release of a hazardous substance from the Site that requires reporting to the National Response Center pursuant to Section 103(a) of CERCLA, 42 U.S.C. § 9603(a), setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the recurrence of such a release.

Site Activities during High Water Event – In the event that a high water condition (storm surge or hurricane) is predicted for the Site during the performance of the Work, the remediation contractor will take appropriate precautions to secure tanks, staging areas and equipment. Depending on the specific conditions, these precautions may include evacuation of the Site. The remediation contractor and the CQA officer will work closely

with the EPA representatives to determine the appropriate precautions to be taken on a case by case basis depending on the timing and severity of the predicted high water conditions.

Health and Safety Plan

Prior to Site mobilization, the remediation contractor for the AST Tank Farm removal action will prepare a HASP in accordance with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992) and all currently applicable regulations found at 29 CFR 1910.120. The HASP will ensure the protection of the public health and safety during performance of the removal action and will be submitted to EPA for review. Changes to the plan recommended by EPA will be incorporated into the final plan that will be implemented during the pendency of the removal action. All requirements under the Occupational Safety and Health Act (OSHA) of 1970, 29 U.S.C. § 651 et seq., and under the laws of the State approved under Section 18 of the Federal OSHA laws, as well as other applicable safety and health requirements, will be followed. Federal OSHA requirements include Hazardous Materials Operation, 20 CFR § 1910, as amended by 54 Fed. Reg. 9317 (March, 1989), all OSHA General Industry (29 CFR § 1910) and Construction (29 CFR § 1926) standards wherever they are applicable, as well as OSHA record keeping and reporting regulations, and the EPA regulations set forth in 40 CFR § 300, relating to the conduct of work at Superfund sites.

Schedule

The AST Tank Farm removal action will be implemented as described herein. The HASP was previously submitted to EPA for information only but not approval on March 30, 2010. The removal action field activities shall be completed within ninety (90) calendar days of the Effective Date of the AOC. The Draft Tank Removal Report shall be submitted to EPA within one hundred twenty (120) calendar days of the Effective Date of the AOC. The Final Tank Removal Report shall be submitted to EPA within fourteen (14) calendar days following receipt of EPA comments on the draft Removal Report. Any associated documentation (e.g., transporter and disposal facility manifests, weigh tickets, etc.) received after the Final Report is submitted will be provided as an addendum to the report.

B. Mobilization and Site Preparation

Mobilization and site preparation will involve mobilizing personnel, equipment, supplies and incidentals onto the project site; establishing all offices and facilities necessary to implement the project; and preparation of the site for the construction work. The major components of site preparation are:

- Utility Connections - Supplying electrical and potable water sources within the work area limits.

- Clearing and Grubbing - Clearing and grubbing and/or mowing areas as required for access to the work and surrounding areas and for constructing roads, work areas, and staging areas.

- Temporary Road Construction - Constructing temporary roads as necessary to provide access and egress to the site, and access and egress to the work areas.

- Work/Staging Area - Constructing work, staging and containment areas.

C. Removal Action Activities

AST Tank Farm removal action activities will consist of the following tasks:

Task 1 – Accumulated Water Removal – The purpose of this task is to remove any water accumulated within the containment berms in order to facilitate subsequent removal action activities. Data from water samples and other related information will be submitted to the TCEQ for determination of discharge limits that meet substantive TPDES permit requirements. If the water sample concentrations do not exceed these limits, the water will be discharged directly to the Intracoastal Waterway. If the water sample concentrations exceed the discharge limits, then the water will be transported for off-site management at one of the facilities listed in Table 6, or another facility approved in advance by EPA. This task will include the following:

a. Sample and analyze the accumulated water, as needed, to confirm previous data, evaluate management options and facilitate removal;

b. As necessary, transfer the water to temporary storage tanks to allow the removal action to continue pending determination of water discharge/management options;

c. Appropriately manage (discharge or otherwise manage) the accumulated water based on the sample analyses and management option evaluation, in accordance with all applicable state and federal regulations; and

d. Secure all records documenting the water characterization and subsequent management.

Task 2 – Container Content Removal and Disposal - The purpose of this task is to remove residual materials within AST Tank Farm containers followed by off-site management. Specifically, the liquid and sludge/solid contents of the above-ground storage tanks will be removed from the tanks and either recycled or disposed at one of the potential facilities listed in Table 6. To the extent possible based on tank content volumes, characteristics and waste classifications, the liquid tank contents will be transferred directly from the tanks to the waste haulers (typically vacuum tankers). The removal method for the tank contents will be determined after selection of the remedial contractor and will be selected and implemented to control volatile emissions. Debris that is encountered will be removed by suitable methods and placed into lined roll-off containers that will be covered except while the debris is being added. Transport of

residual containerized materials/wastes to appropriate off-site management facilities will be performed in accordance with all applicable state and federal regulations. All records documenting the waste stream characteristics, classifications, quantities and final management locations will be secured as part of this task.

Task 3 – Container Removal - The purpose of this task is to remove containers associated with former Site operations (e.g., ASTs and drums) from the AST Tank Farm area. The following activities will be performed as part of this task:

a. Evaluate the potential for re-use of containers. Based on this evaluation, identify containers for re-use and containers for demolition and disposal/recycling;

b. Decontaminate containers intended for re-use. Implement decontamination procedures on a container-specific basis considering former content characteristics and process knowledge. Decontamination procedures for containers intended for re-use will include the following:

    1. Remove material adhered to container sides using shovel or other tool;

    2. Scrub with a brush and detergent (or alternative cleaning solution as appropriate);

    3. Rinse with water;

    4. Repeat above steps; and

    5. Evaluate container condition and repeat one or more of above steps as necessary to provide visible indication of sufficient decontamination for container re-use. Alternative decontamination methods may be used as necessary and appropriate depending on the container contents and its intended re-use.

c. Manage all decontamination fluids in accordance with applicable state and federal regulations. Document decontamination procedures used;

d. Remove re-usable containers from the Site following proper decontamination. Document recipient of container to be reused; and

e. Decontaminate and demolish all containers not suitable for re-use.

Decontamination procedures for containers intended for demolition will include the following:

1. Remove material adhered to container sides using shovel or other tool;

2. Scrub with a brush and detergent (or alternative cleaning solution as appropriate);

3. Rinse with water; and

4. Evaluate container condition and repeat one or more of above steps as necessary to provide visible indication of sufficient decontamination for container demolition. Alternative decontamination methods may be used as necessary and appropriate depending on the container contents and the demolition method to be used.

Demolition may be performed on or off-site. Secure a certificate of destruction for each item demolished. Transport tank demolition debris off-site for recycling or disposal.

Task 4 – AST Containment Area Decontamination - The purpose of this task is to decontaminate the former AST containment areas. The following activities will be performed as part of this task:

a. Sample and analyze residual sludge (if any) within the containment berms to evaluate management options and facilitate waste classification (if needed);

b. Remove and manage the sludge (if any) in accordance with all applicable state and federal regulations;

c. Thoroughly pressure-wash the concrete floor and berms of the former AST Tank Farm and manage all washwater in accordance with all applicable state and federal regulations.

d. Demolish sections of the concrete containment berms at multiple locations as needed to preclude potential future water accumulation within this area (the number, area and locations where the berms will be demolished will be determined after an evaluation of water flow/accumulation patterns within the containment area during the pressure washing); and

e. Secure all records documenting the sludge characterization and subsequent management.

D. Emissions Control

The emissions control plan described above will be implemented throughout the removal and material-handling phases of the removal action to control air emissions. As noted therein, the air exhaust from any vacuum trucks and any other exhaust that potentially could contain volatile emissions (not including routine motor vehicle/construction equipment exhaust) will be captured and treated onsite with vapor-phase carbon.

E. Site Restoration and Demobilization

After completion of the removal action, the temporary roads and work areas will be dismantled and removed. Personnel, equipment, office trailer, supplies and incidentals

that were used on the removal project will be removed from the site, unless required for the completion of other work at the Site.

F. Preparation of Final Report

Any associated documentation (e.g., transporter and disposal facility manifests, weigh tickets, etc.) received after the Final Report is submitted will be provided as an addendum to the report. The Final Report will summarize the activities performed and will be submitted to the RPM/OSC for review and approval. The Final Report will include a listing of quantities and types of materials removed off-site or handled on-site, a discussion of removal and disposal options considered for those materials removed, a listing of the ultimate destination(s) of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action.

III. REFERENCES

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LT Environmental, Inc. (LTE), 1999. Site Characterization Report. Hercules Marine Service Site Freeport, Brazoria County Texas. June.

Pastor, Behling & Wheeler, LLC (PBW), 2006a. Sampling and Analysis Plan – Volume I Field Sampling Plan, Gulfco Marine Maintenance Site, Freeport, Texas. March 14.

Pastor, Behling & Wheeler, LLC (PBW), 2006b. Sampling and Analysis Plan – Volume II Quality Assurance Project Plan, Gulfco Marine Maintenance Site, Freeport, Texas. March 14.

TABLES

Table 1
Gulfco Former AST Tank Farm
Tank Sample - RCI/Toxicity Data

Tank No.	Sample ID.	Physical Description	pH	Reactivity Sulfide	Reactivity Cyanide	Flashpoint	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride
				ppm	ppm	Deg. F.	mg/L	mg/L	mg/L	mg/L	mg/L
Tank No. 2	TK-2-O	Aqueous Phase	NA	NA	NA	NA	<0.0024	12.1	<0.177	NA	NA
	TK-2-O	Organic Phase	5.95	112	<250	>212	<0.0024	8.19	0.415 J	0.0033 B	<0.013
	TK-2-S	Solids- sand, debris, etc.	NA	NA	NA	NA	<0.0024	2.82	24.1	0.0038 B	<0.256
Tank No. 4	TK-4-A	Oily Water	7.4	<96	<250	>212	<0.0024	29.7	<0.000177	0.016	<0.000336
Tank No. 6	TK-6-S	Rust Solids	NA	NA	NA	NA	<0.0024	0.89 B	<0.009	0.002 B	<0.00512
Tank No. 13	TK-13-O	Oily sludge	6.89	80	<250	>212	<0.0024	0.27 B	13.8	<0.00022	<0.128
Tank No. 14	None	Empty (2 in. of rust solids)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tank No. 15	TK-15-O	Oily sludge	6.38	<80	<250	126	<0.0024	0.22 B	5.3	<0.00022	<0.00512
Tank No. 16	TK-16-O	Oily sludge	6.31	<80	<250	>212	<0.0024	0.39 B	<0.009	<0.00022	<0.00512
Tank No. 17	TK-17-S	Rust solids	NA	NA	NA	NA	<0.0024	0.56 B	<0.009	0.0012 B	<0.00512
Tank No. 18	TK-18-O	Light Organic Phase	3.37	<417	<250	90	<0.024	0.53 B	<9	<0.0022	<5.12
Tank No. 19	TK-19-O	Oily sludge	6.75	216	<250	104	<0.0024	1.33	<4.5	<0.00022	<2.56
Tank No. 21	TK-21-A	Oily water	8.5	<80	<250	>212	<0.0024	0.0021 B	51.6 J	<0.00022	<5.12
Tank No. 22	TK-22-O	Oily sludge	6.74	<80	<250	>212	<0.0024	0.28 B	<0.009	<0.00022	<0.00512
Tank No. 23	TK-23-O (mg/kg)	Appears to be diesel	6.72	160	<250	126	<0.16	0.26B	<2.08	<0.013	<2.4
North Containment Area	Dike North	Water	NA	NA	NA	NA	0.012	1.17	0.011	<0.00019	0.00889 J
South Containment Area	Dike South	Water	NA	NA	NA	NA	0.024	0.49	0.015	<0.00019	<0.000336
Hazardous Criteria			<= 2 or >= 12.5	>= 500	>= 250	<140	5	100	0.5	1	0.5

Table 1
Gulfco Former AST Tank Farm
Tank Sample - RCI/Toxicity Data

Tank No.	Sample ID.	Physical Description	Chlordane	Chlorobenzene	Chloroform	Chromium	o-Cresol	m,p-Cresol	Cresol	1,2-Dichloroethane	1,4-Dichlorobenzene	2,4'-D
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Tank No. 2	TK-2-O	Aqueous Phase	NA	<0.162	1.5 J	0.16	<0.409	<0.368	NA	7.97	<0.0538	NA
	TK-2-O	Organic Phase	<0.00008	<0.021	2.25	<0.0012	<0.0012	<0.0014	<0.003	8.4	<0.0011	<0.0027
	TK-2-S	Solids- sand, debris, etc.	<0.00008	<0.426	20.7	0.0045 B	0.00275 J	<0.0014	0.00414 J	203	<0.0011	<0.0027
Tank No. 4	TK-4-A	Oily Water	NA	<0.000162	<0.00018	<0.0012	<0.00327	<0.00295	NA	<0.000176	<0.000538	<0.00027
Tank No. 6	TK-6-S	Rust Solids	<0.00008	<0.00852	<0.00776	<0.0012	<0.0012	<0.0014	<0.003	<0.0082	<0.0011	<0.0027
Tank No. 13	TK-13-O	Oily sludge	<0.00008	<0.213	1.32 J	<0.0012	<0.0012	0.00143 J	<0.003	2.73 J	<0.0011	<0.0027
Tank No. 14	None	Empty (2 in. of rust solids)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tank No. 15	TK-15-O	Oily sludge	<0.00008	<0.00852	<0.00776	<0.0012	<0.013 J	<0.0014	0.013 J	<0.0082	<0.0011	<0.0027
Tank No. 16	TK-16-O	Oily sludge	<0.00008	<0.00852	<0.00776	<0.0012	<0.0012	0.037 J	0.037 J	<0.0082	<0.0011	<0.0027
Tank No. 17	TK-17-S	Rust solids	<0.0004	<0.00852	<0.00776	<0.0012	<0.0012	<0.0014	<0.003	<0.0082	<0.0011	<0.0027
Tank No. 18	TK-18-O	Light Organic Phase	<0.01431	<8.52	216	<0.012	<0.1764	<0.2134	<0.444	<8.2	<0.1577	<0.0027
Tank No. 19	TK-19-O	Oily sludge	<0.00008	<4.26	<3.88	<0.0012	0.0046 J	<0.0014	0.00486 J	<4.1	<0.0011	<0.0027
Tank No. 21	TK-21-A	Oily water	<0.00008	<8.52	2100	<0.0012	<0.0012	<0.0014	<0.003	224	<0.0011	<0.0027
Tank No. 22	TK-22-O	Oily sludge	<0.00008	<0.00852	<0.00776	<0.0012	<0.0012	0.00364 J	0.00364 J	<0.0082	<0.0011	<0.0027
Tank No. 23	TK-23-O (mg/kg)	Appears to be diesel	NA	<3.31	<2.83	<0.049	NA	NA	NA	<2.28	<8.44	NA
North Containment Area	Dike North	Water	NA	<0.000324	0.095	0.0028 B	<0.000327	<0.000295	NA	0.045	<0.00108	<0.0027
South Containment Area	Dike South	Water	NA	<0.000162	0.03	0.0031 B	<0.000327	<0.000295	NA	0.00304 J	<0.000538	<0.00027
Hazardous Criteria			0.03	100	6	5	200	200	200	0.5	7.5	10

Table 1
Gulfco Former AST Tank Farm
Tank Sample - RCI/Toxicity Data

Tank No.	Sample ID.	Physical Description	1,1-Dichloroethene	2,4-Dinitrotoluene	Endrin	Heptachlor	Heptachlor Epoxide	Hexachlorobenzene	Hexachlorobutadiene	Hexachloroethane	Lead
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Tank No. 2	TK-2-O	Aqueous Phase	<0.205	<0.579	NA	NA	NA	<0.32	<0.45	<1.05	<0.0013
	TK-2-O	Organic Phase	<0.023	<0.0036	<0.00007	<0.00004	<0.00005	<0.0015	<0.0017	<0.0016	0.043 B
	TK-2-S	Solids- sand, debris, etc.	<0.458	<0.0036	<0.00007	<0.00004	<0.0005	<0.0015	<0.0017	<0.0016	0.0084 B
Tank No. 4	TK-4-A	Oily Water	<0.000205	<0.00464	<0.0000832	<0.0000439	0.00065	<0.00256	<0.00045	<0.00842	0.28
Tank No. 6	TK-6-S	Rust Solids	<0.00916	<0.0036	<0.00007	<0.00004	<0.00005	<0.0015	<0.0017	<0.0016	0.0028 B
Tank No. 13	TK-13-O	Oily sludge	<0.229	<0.0036	<0.00007	<0.00004	0.00057	<0.0015	<0.0017	<0.0016	0.0035 B
Tank No. 14	None	Empty (2 in. of rust solids)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tank No. 15	TK-15-O	Oily sludge	<0.00916	<0.0036	<0.00007	<0.00004	<0.00005	<0.0015	<0.0017	<0.0016	<0.0013
Tank No. 16	TK-16-O	Oily sludge	<0.00916	<0.0036	<0.00007	<0.00004	<0.00005	<0.0015	<0.0017	<0.0016	<0.0013
Tank No. 17	TK-17-S	Rust solids	<0.00916	<0.0036	<0.00033	<0.00019	<0.00024	<0.0015	<0.0017	<0.0016	0.022 B
Tank No. 18	TK-18-O	Light Organic Phase	<9.16	<0.5339	<0.01182	0.029 J	<0.00862	<0.2179	<0.248	<0.2358	<0.013
Tank No. 19	TK-19-O	Oily sludge	<4.58	<0.0036	<0.00007	<0.00004	<0.00005	<0.0015	<0.0017	<0.0016	0.0056 B
Tank No. 21	TK-21-A	Oily water	<9.16	<0.0036	<0.00007	<0.00004	<0.00005	<0.0015	<0.0017	<0.0016	<0.0013
Tank No. 22	TK-22-O	Oily sludge	<0.00916	<0.0036	<0.00007	<0.00004	<0.00005	<0.0015	<0.0017	<0.0016	<0.0013
Tank No. 23	TK-23-O (mg/kg)	Appears to be diesel	<3.19	NA	NA	NA	NA	NA	<24.9	NA	<0.097
North Containment Area	Dike North	Water	<0.000411	<0.000464	<0.00000832	<0.00000439	<0.00000732	<0.000256	<0.0009	<0.000842	<0.0013
South Containment Area	Dike South	Water	<0.000205	<0.000464	<0.00000832	<0.00000439	0.0000329	<0.000256	<0.00045	<0.000842	0.0044 B
Hazardous Criteria			0.7	0.13	0.02	0.008	0.008	0.13	0.5	3	5

Table 1
Gulfco Former AST Tank Farm
Tank Sample - RCI/Toxicity Data

Tank No.	Sample ID.	Physical Description	Lindane	Mercury	Methoxychlor	MEK	Nitrobenzene	Pentachlorophenol	Pyridine	Selenium	Silver
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Tank No. 2	TK-2-O	Aqueous Phase	<0.00003	0.00004	NA	13.4	<0.452	<1.33	<0.437	0.03 B	<0.0006
	TK-2-O	Organic Phase	<0.00003	0.00037	<0.00032	9.77	<0.0008	<0.0037	<0.0182	<0.0046	<0.0006
	TK-2-S	Solids- sand, debris, etc.	<0.00003	0.00014 B	<0.00032	30	<0.0008	<0.0037	<0.0182	<0.0046	<0.0006
Tank No. 4	TK-4-A	Oily Water	0.00035	0.00017 B	0.0018 J	0.011	<0.00362	<0.011	<0.00349	<0.0046	<0.0006
Tank No. 6	TK-6-S	Rust Solids	<0.00003	0.00013 B	<0.00032	<0.017	<0.0008	<0.0037	<0.0182	0.014 B	<0.0006
Tank No. 13	TK-13-O	Oily sludge	<0.00003	0.00012 B	<0.00032	<0.429	<0.0008	<0.0037	<0.0182	0.006 B	<0.0006
Tank No. 14	None	Empty (2 in. of rust solids)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tank No. 15	TK-15-O	Oily sludge	<0.00003	0.00039	<0.00032	0.085 J	<0.0008	<0.0037	<0.0182	0.0095 B	<0.0006
Tank No. 16	TK-16-O	Oily sludge	<0.00003	0.00011 B	<0.00032	0.367	<0.0008	<0.0037	<0.0182	0.013 B	<0.0006
Tank No. 17	TK-17-S	Rust solids	0.0185	0.00015 B	<0.00162	<0.017	<0.0008	<0.0037	<0.0182	<0.0046	<0.0006
Tank No. 18	TK-18-O	Light Organic Phase	<0.00556	<0.0048	<0.05816	<17.2	<0.1262	<0.5607	<2.74	0.88 B	<0.006
Tank No. 19	TK-19-O	Oily sludge	<0.00003	0.00008 B	<0.00032	<8.58	<0.0008	<0.0037	<0.0182	0.0064 B	<0.0006
Tank No. 21	TK-21-A	Oily water	<0.00003	0.00012 B	<0.00032	<17.2	<0.0008	<0.0037	<0.0182	<0.0046	<0.0006
Tank No. 22	TK-22-O	Oily sludge	<0.00003	0.00013 B	<0.00032	0.874	<0.0008	<0.0037	<0.0182	0.0067 B	<0.0006
Tank No. 23	TK-23-O (mg/kg)	Appears to be diesel	NA	0.011	NA	<6.25	NA	NA	NA	1.6B	<0.047
North Containment Area	Dike North	Water	<0.00000255	<0.00004	<0.00000214	<0.00217	<0.000362	<0.00106	<0.000349	0.0049 B	<0.0006
South Containment Area	Dike South	Water	<0.00000255	<0.00004	<0.00000214	<0.00109	<0.000362	<0.00106	<0.000349	<0.0046	<0.0006
Hazardous Criteria			0.4	0.2	10	200	2	100	5	1	5

Table 1
Gulfco Former AST Tank Farm
Tank Sample - RCI/Toxicity Data

Tank No.	Sample ID.	Physical Description	Tetrachloroethylene	Toxaphene	Trichloroethylene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4,5-TP (Silvex)	Vinyl Chloride
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Tank No. 2	TK-2-O	Aqueous Phase	<0.768	NA	0.851 J	<0.508	<0.525	NA	<0.383
	TK-2-O	Organic Phase	<0.023	<0.00025	1.52	<0.001	<0.0021	<0.0016	0.247 J
	TK-2-S	Solids- sand, debris, etc.	55.7	<0.00025	205	<0.001	<0.0021	<0.0016	<0.01
Tank No. 4	TK-4-A	Oily Water	<0.000768	<0.00275	0.00102 J	<0.00406	<0.00042	<0.00013	<0.000383
Tank No. 6	TK-6-S	Rust Solids	<0.00908	<0.00025	0.027 J	<0.001	<0.0021	<0.0016	<0.00356
Tank No. 13	TK-13-O	Oily sludge	47.7	<0.00025	2.98 J	<0.001	<0.0021	<0.0016	0.988 J
Tank No. 14	None	Empty (2 in. of rust solids)	NA	NA	NA	NA	NA	NA	NA
Tank No. 15	TK-15-O	Oily sludge	<0.00908	<0.00025	<0.011	<0.001	<0.0021	<0.0016	<0.00356
Tank No. 16	TK-16-O	Oily sludge	<0.00908	<0.00025	<0.011	<0.001	<0.0021	<0.0016	<0.00356
Tank No. 17	TK-17-S	Rust solids	<0.00908	<0.00125	<0.011	<0.001	<0.0021	<0.0016	<0.00356
Tank No. 18	TK-18-O	Light Organic Phase	<9.08	<0.045	<10.8	<0.1552	<0.3149	<0.0016	<3.56
Tank No. 19	TK-19-O	Oily sludge	<4.54	<0.00025	<5.4	<0.001	<0.0021	<0.0016	<1.78
Tank No. 21	TK-21-A	Oily water	<9.08	<0.00025	<10.8	<0.001	<0.0021	<0.0016	<3.56
Tank No. 22	TK-22-O	Oily sludge	<0.00908	<0.00025	<0.011	<0.001	<0.0021	<0.0016	<0.00356
Tank No. 23	TK-23-O (mg/kg)	Appears to be diesel	<3.85	NA	<3.55	NA	NA	NA	<7.03
North Containment Area	Dike North	Water	0.00627 J	<0.000275	0.018	<0.000406	<0.00042	<0.00013	<0.000765
South Containment Area	Dike South	Water	<0.000768	<0.000275	<0.000702	<0.000406	<0.00042	<0.00013	<0.000383
Hazardous Criteria			0.7	0.5	0.5	400	2	1	0.2

Table 1
Gulfco Former AST Tank Farm
Tank Sample - RCI/Toxicity Data

Tank No.	Sample ID.	Physical Description	Comments
Tank No. 2	TK-2-O	Aqueous Phase	Total Data
	TK-2-O	Organic Phase	TCLP Data
	TK-2-S	Solids- sand, debris, etc.	TCLP Data
Tank No. 4	TK-4-A	Oily Water	Total Data
Tank No. 6	TK-6-S	Rust Solids	TCLP Data
Tank No. 13	TK-13-O	Oily sludge	TCLP Data
Tank No. 14	None	Empty (2 in. of rust solids)	
Tank No. 15	TK-15-O	Oily sludge	TCLP Data
Tank No. 16	TK-16-O	Oily sludge	TCLP Data
Tank No. 17	TK-17-S	Rust solids	TCLP Data
Tank No. 18	TK-18-O	Light Organic Phase	TCLP Data
Tank No. 19	TK-19-O	Oily sludge	TCLP Data
Tank No. 21	TK-21-A	Oily water	TCLP Data
Tank No. 22	TK-22-O	Oily sludge	TCLP Data
Tank No. 23	TK-23-O (mg/kg)	Appears to be diesel	Total Data (mg/kg)
North Containment Area	Dike North	Water	Total Data
South Containment Area	Dike South	Water	Total Data
Hazardous Criteria			

Table 2
Gulfco Former AST Tank Farm
Tank Sample TPH/PCB Data

Tank No.	Sample ID.	Physical Description	C6-C12	>C12-C28	>C28-C35	Total TPH (C6-C35)	Arachlor-1016	Arachlor-1221	Arachlor-1232	Arachlor-1242	Arachlor-1248
Tank No. 4	TK-4-A	Oily Water	16.7J	130	<26.6	147	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Tank No. 6	TK-6-S	Rust Solids	<100	1,140	1,630	2,770	<1.2	<1.2	<1.2	<1.2	<1.2
Tank No. 13	TK-13-O	Oily sludge	<10	468,000	275,000	743,000	<120	<120	<120	<120	<120
Tank No. 15	TK-15-O	Oily sludge	135,000	719,000	197,000	>99%	<1.2	<1.2	<1.2	<1.2	<1.2
Tank No. 16	TK-16-O	Oily sludge	<20	761,000	512,000	>99%	<1.2	<1.2	<1.2	<1.2	<1.2
Tank No. 17	TK-17-S	Rust solids	<111	880	360	1,240	<1.33	<1.33	<1.33	<1.33	<1.33
Tank No. 18	TK-18-O	Light Organic Phase	961,000	37,800	<50	999,000	<1.2	<1.2	<1.2	<1.2	<1.2
Tank No. 19	TK-19-O	Oily sludge	59,600	441,000	128,000	629,000	<1.2	<1.2	<1.2	<1.2	<1.2
Tank No. 21	TK-21-A	Oily water	<20	51,400	266,000	780,000	<99.3	<99.3	<99.3	<99.3	<99.3
Tank No. 22	TK-22-O	Oily sludge	<20	789,000	449,000	>99%	<1.2	<1.2	<1.2	<1.2	<1.2
Tank No. 23	TK-23-O	Appears to be diesel	260,000	1,230,000	<50	>99%	<1.2	<1.2	<1.2	<1.2	<1.2
North Containment Area	Dike North	Water	<5.42	2.5J	<5.42	2.5J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
South Containment Area	Dike South	Water	<5.36	<5.36	<5.36	<16.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Table 2
Gulfco Former AST Tank Farm
Tank Sample TPH/PCB Data

Tank No.	Sample ID.	Physical Description	Arachlor-1254	Arachlor-1260	Comments
Tank No. 4	TK-4-A	Oily Water	<0.0005	<0.0005	mg/L
Tank No. 6	TK-6-S	Rust Solids	<1.2	<1.2	mg/kg
Tank No. 13	TK-13-O	Oily sludge	<120	<120	mg/kg
Tank No. 15	TK-15-O	Oily sludge	<1.2	<1.2	mg/kg
Tank No. 16	TK-16-O	Oily sludge	<1.2	<1.2	mg/kg
Tank No. 17	TK-17-S	Rust solids	<1.33	<1.33	mg/kg
Tank No. 18	TK-18-O	Light Organic Phase	<1.2	<1.2	mg/kg
Tank No. 19	TK-19-O	Oily sludge	<1.2	<1.2	mg/kg
Tank No. 21	TK-21-A	Oily water	<99.3	<99.3	mg/kg
Tank No. 22	TK-22-O	Oily sludge	<1.2	<1.2	mg/kg
Tank No. 23	TK-23-O	Appears to be diesel	<1.2	<1.2	mg/kg
North Containment Area	Dike North	Water	<0.0005	<0.0005	mg/L
South Containment Area	Dike South	Water	<0.0005	<0.0005	mg/L

Table 3
Gulfco Former AST Tank Farm
TK-21-A Sample Total Concentrations - Detected Values

Parameter	Concentration (mg/kg)
VOCs	
1,2-Dichloroethane	663
Benzene	121 J
Chloroform	6,850
Isopropylbenzene (Cumene)	119 J
Methylene chloride	241 J
Toluene	179 J
SVOCs	
2-Methylnapthalene	145 B
Benzaldehyde	123 J
Biphenyl	54.4 J
Bis(2-Ethylhexyl)phthalate	36.5 J
Caprolactum	2,410
Crysene	23.3 J
Fluorene	82.7 J
Phenanthrene	283
Pyrene	85.5 J
Metals	
Barium	7.09
Cadmium	0.062 J
Calcium	304
Chromium	2.28
Iron	1,660
Lead	2.44
Manganese	9.61
Mercury	0.027
Selenium	0.92 J
Silver	0.12 J
TPH (TX 1005)	
>C12-C28	514,000
>C28-C35	266,000
Total TPH	780,000
Pesticides/Herbicides	
Endosulfan I	1.25 J
Endosulfan II	3.72 J
Endrin aldehyde	2.9 J
Endrin ketone	9.6 J
gamma-Chlordane	3.1 J
2,4,5-T	0.446 J

Notes:
1. Only chemicals of interest detected above the sample detection limit are included in
2. Data qualifiers: J = Estimated value for organics. B = detected in blank sample.

Table 4
Gulfco Former AST Tank Farm
North and South Containment Dike Sample Analytical Results

Parameter	Dike North	Dike South
VOCs	**mg/L**	**mg/L**
1,1,1,2-Tetrachloroethane	<0.000965	<0.000482
1,1,1-Trichloroethane	0.031	<0.000461
1,1,2,2-Tetrachloroethane	<0.00024	<0.00012
1,1,2-Trichloroethane	<0.000665	<0.000333
1,1-Dichloroethane	0.00244 J	<0.000237
1,1-Dichloroethene	<0.000411	<0.000205
1,1-Dichloropropene	<0.00058	<0.00029
1,2,3-Trichloropropane	<0.00145	<0.000726
1,2,4-Trichlorobenzene	<0.000422	<0.000211
1,2,4-Trimethylbenzene	0.0037 J	0.00939
1,2-Dibromo-3-chloropropane	<0.00038	<0.00019
1,2-Dibromoethane	<0.000539	<0.000269
1,2-Dichlorobenzene	<0.000801	<0.000401
1,2-Dichloroethane	0.045	0.00304 J
1,2-Dichloropropane	<0.000507	<0.000254
1,3,5-Trimethylbenzene	<0.000422	0.00235 J
1,3-Dichlorobenzene	<0.00063	<0.000315
1,3-Dichloropropane	<0.000511	<0.000255
1,4-Dichlorobenzene	<0.00108	<0.000538
2,2-Dichloropropane	<0.000532	<0.000266
2-Butanone	<0.00217	<0.00109
2-Chloroethylvinyl ether	<0.00109	<0.000547
2-Chlorotoluene	<0.000603	<0.000301
2-Hexanone	<0.000823	<0.000412
4-Chlorotoluene	<0.000661	<0.000331
4-Isopropyltoluene	<0.000242	<0.000121
4-Methyl-2-pentanone	<0.0000996	<0.0000498
Acetone	<0.00382	0.021 J
Acrolein	<0.00403	<0.00201
Acrylonitrile	<0.00646	<0.00323
Benzene	0.011	0.015
Bromobenzene	<0.000641	<0.000321
Bromodichloromethane	<0.000289	<0.000145
Bromoform	<0.000755	<0.000377
Bromomethane	<0.00155	<0.000774
Carbon disulfide	<0.000487	<0.000244
Carbon tetrachloride	0.00889 J	<0.000336
Chlorobenzene	<0.000324	<0.000162
Chloroethane	<0.00115	<0.000574
Chloroform	0.095	0.03
Chloromethane	<0.00129	<0.000645
cis-1,2-Dichloroethene	0.00513 J	<0.000292
cis-1,3-Dichloropropene	<0.00033	<0.000165
Cyclohexane	0.00293 J	0.000936 J
Dibromochloromethane	<0.000455	<0.000228
Dibromomethane	<0.000756	<0.000378

Table 4
Gulfco Former AST Tank Farm
North and South Containment Dike Sample Analytical Results

Parameter	Dike North	Dike South
VOCs (cont'd)		
Dichlorodifluoromethane	<0.000677	<0.000339
Ethylbenzene	0.011	0.00135 J
Hexachlorobutadiene	<0.0009	<0.00045
Isopropylbenzene (Cumene)	0.00453 J	0.000515 J
m,p-Xylene	0.00292 J	0.011
Methyl Acetate	<0.00169	<0.000847
Methyl iodide	<0.000841	<0.00042
Methylcyclohexane	<0.000378	<0.000189
Methylene chloride	0.012 J	0.000765 J
Naphthalene	0.023	0.096
n-Butyl alcohol	<0.05	<0.025
n-Butylbenzene	<0.000561	<0.000281
n-Propylbenzene	<0.000609	<0.000305
o-Xylene	0.00189 J	0.00476 J
sec-Butylbenzene	<0.000598	<0.000299
Styrene	<0.000304	<0.000152
tert-Butyl methyl ether (MTBE)	<0.000358	<0.000179
tert-Butylbenzene	<0.000573	<0.000287
Tetrachloroethene	0.00627 J	<0.000768
Toluene	0.00791 J	0.033
trans-1,2-Dichloroethene	<0.000747	<0.000374
trans-1,3-Dichloropropene	<0.000359	<0.00018
trans-1,4-Dichloro-2-butene	<0.00143	<0.000717
Trichloroethene	0.018	<0.000702
Trichlorofluoromethane	<0.00051	<0.000255
Trichlorotrifluoroethane	<0.00072	<0.00036
Vinyl acetate	<0.000756	<0.000378
Vinyl chloride	<0.000765	<0.000383
Xylene (total)	0.00481 J	0.016
SVOCs		
1,2Diphenylhydrazine/Azobenzen	<0.000204	<0.000204
2,4,5-Trichlorophenol	<0.000406	<0.000406
2,4,6-Trichlorophenol	<0.00042	<0.00042
2,4-Dichlorophenol	<0.000387	<0.000387
2,4-Dimethylphenol	<0.00131	<0.00131
2,4-Dinitrophenol	<0.00112	<0.00112
2,4-Dinitrotoluene	<0.000464	<0.000464
2,6-Dinitrotoluene	<0.00041	<0.00041
2-Chloronaphthalene	<0.000343	<0.000343
2-Chlorophenol	<0.000344	<0.000344
2-Methylnaphthalene	<0.000102	<0.000102
2-Nitroaniline	<0.000267	<0.000267
2-Nitrophenol	<0.000522	<0.000522
3,3'-Dichlorobenzidine	<0.00208	<0.00208
3-Nitroaniline	<0.0004	<0.0004
4,6-Dinitro-2-methylphenol	<0.000284	<0.000284
4-Bromophenyl phenyl ether	<0.000366	<0.000366
4-Chloro-3-methylphenol	<0.000408	<0.000408

Table 4
Gulfco Former AST Tank Farm
North and South Containment Dike Sample Analytical Results

Parameter	Dike North	Dike South
SVOCs (cont'd)		
4-Chloroaniline	<0.000786	<0.000786
4-Chlorophenyl phenyl ether	<0.000346	<0.000346
4-Nitroaniline	<0.000564	<0.000564
4-Nitrophenol	<0.00201	<0.00201
Acenaphthene	<0.000135	<0.000135
Acenaphthylene	<0.0000884	<0.0000884
Acetophenone	0.00633 J	<0.000371
Aniline	<0.000556	<0.000556
Anthracene	<0.000102	<0.000102
Atrazine (Aatrex)	<0.00205	<0.00205
Benzaldehyde	<0.00121	<0.00121
Benzidine	<0.00718	<0.00718
Benzo(a)anthracene	<0.0000796	<0.0000796
Benzo(a)pyrene	<0.00015	<0.00015
Benzo(b)fluoranthene	<0.000165	<0.000165
Benzo(g,h,i)perylene	<0.000141	<0.000141
Benzo(k)fluoranthene	<0.0000662	<0.0000662
Benzoic acid	<0.001	<0.001
Benzyl alcohol	<0.000442	<0.000442
Biphenyl	<0.000341	<0.000341
Bis(2-Chloroethoxy)methane	<0.000241	<0.000241
Bis(2-Chloroethyl)ether	<0.00047	<0.00047
Bis(2-Chloroisopropyl)ether	<0.000528	<0.000528
Bis(2-Ethylhexyl)phthalate	<0.00191	<0.00191
Butyl benzyl phthalate	<0.000356	<0.000356
Caprolactam	<0.00258	<0.00258
Carbazole	<0.000293	<0.000293
Chrysene	<0.0000563	<0.0000563
Dibenz(a,h)anthracene	<0.000257	<0.000257
Dibenzofuran	<0.00032	<0.00032
Diethyl phthalate	<0.000257	<0.000257
Dimethyl phthalate	<0.000206	<0.000206
Di-n-butyl phthalate	<0.000944	<0.000944
Di-n-octyl phthalate	<0.000889	<0.000889
Fluoranthene	<0.000155	<0.000155
Fluorene	<0.00011	<0.00011
Hexachlorobenzene	<0.000256	<0.000256
Hexachlorocyclopentadiene	<0.000597	<0.000597
Hexachloroethane	<0.000842	<0.000842
Indeno(1,2,3-cd)pyrene	<0.000158	<0.000158
Isophorone	<0.00024	<0.00024
m,p-Cresol	<0.000295	<0.000295
Nitrobenzene	<0.000362	<0.000362
n-Nitrosodimethylamine	<0.00101	<0.00101
n-Nitrosodi-n-propylamine	<0.000313	<0.000313
n-Nitrosodiphenylamine	<0.00051	<0.00051
o-Cresol	<0.000327	<0.000327
Pentachlorophenol	<0.00106	<0.00106

Table 4
Gulfco Former AST Tank Farm
North and South Containment Dike Sample Analytical Results

Parameter	Dike North	Dike South
SVOCs (cont'd)		
Phenanthrene	<0.000137	<0.000137
Phenol	<0.000325	<0.000325
Pyrene	<0.0000899	<0.0000899
Pyridine	<0.000349	<0.000349
Metals		
Arsenic	0.012	0.024
Barium	1.17	0.49
Cadmium	<0.00019	<0.00019
Calcium	45.4	7.36
Chromium	0.0028 B	0.0031 B
Hardness	192	34.9
Iron	0.6	1.52
Lead	<0.0013	0.0044 B
Manganese	0.034	0.043
Mercury	<0.00004	<0.00004
Selenium	0.0049 B	<0.0046
Silver	<0.0006	<0.0006
TPH (TX 1005)		
>C12-C28	2.5 J	<0.815
>C28-C35	<0.824	<0.815
C6-C12	<0.249	<0.247
Total TPH (C6-C35)	2.5 J	<1.88
Pesticides/Herbicides		
4,4'-DDD	0.00095	0.00021
4,4'-DDE	<0.00000556	0.00004 J
4,4'-DDT	0.00026	0.00027
Aldrin	<0.00000261	0.00000336 J
alpha-BHC	0.0000466	0.0000113 J
alpha-Chlordane	<0.00000274	<0.00000274
beta-BHC	<0.00000424	<0.00000424
delta-BHC	<0.00000232	<0.00000232
Dieldrin	0.0000427 J	<0.00000471
Endosulfan I	0.00022	0.0000508
Endosulfan II	0.00019	0.000043 J
Endosulfan sulfate	0.00095	0.0000878
Endrin	<0.00000832	<0.00000832
Endrin aldehyde	0.00037	<0.00000484
Endrin ketone	0.000053	<0.00000426
gamma-BHC (Lindane)	<0.00000255	<0.00000255
gamma-Chlordane	<0.00000542	<0.00000542
Heptachlor	<0.00000439	<0.00000439
Heptachlor epoxide	<0.00000732	0.0000329
Methoxychlor	<0.00000214	<0.00000214
Toxaphene	<0.000275	<0.000275
2,4,5-T	<0.00015	<0.00015
2,4,5-TP (Silvex)	<0.00013	<0.00013
2,4'-D	<0.00027	<0.00027

Table 4
Gulfco Former AST Tank Farm
North and South Containment Dike Sample Analytical Results

Parameter	Dike North	Dike South
PCBs		
Aroclor-1016	<0.000125	<0.000125
Aroclor-1221	<0.000115	<0.000115
Aroclor-1232	<0.0001	<0.0001
Aroclor-1242	<0.000125	<0.000125
Aroclor-1248	<0.000065	<0.000065
Aroclor-1254	<0.000105	<0.000105
Aroclor-1260	<0.00012	<0.00012
TDS/TSS		
Total Dissolved Solids(TDS)	976	973
Total Suspended Solids	15	11

Notes:

J = Estimated value for organics.
B = Estimated value for metals.

Table 5
Gulfco Former AST Tank Farm
Tank Content Projected Quantities

Tank No.	Description	Projected Quantity[1] (gallons)[2]
Tank No. 2	Organic/Aqueous Mixture Solids - sand, debris (cy)	1,600 10
Tank No. 4	Oily Water	13,000
Tank No. 6	Rust Solids (cy)	106
Tank No. 10	Empty	0
Tank No. 13	Oily sludge	3,000
Tank No. 14	Empty (2 in. of rust solids)	0
Tank No. 15	Oily sludge	40,000
Tank No. 16	Oily sludge	2,500
Tank No. 17	Empty (Minimal rust solids)	0
Tank No. 18	Light Organic Phase	3,000
Tank No. 19	Oily sludge	8,000
Tank No. 21	Oily water	55,500
Tank No. 22	Oily sludge	6,000
Tank No. 23	Appears to be diesel	375
Tank No. 100[3]	Empty	0
Totals	Liquid (gals) Solids (cy)	132,975 116

Notes:
[1] Projected quantity based on CHESI field measurements (12-06) and LTE, 1999 tank volumes.
[2]Quanitities are in gallons unless listed otherwise (cy of solids in Tank Nos. 2 and 6).
[3]Tank No. 100 (empty tank) removed by Hurricane Ike storm surge in September 2006.

Table 6
Gulfco Former AST Tank Farm
Potential Off-site Tank Content Management Facilities

Name	Type	Location	Permit(s)
Clean Harbors Environmental Services	Fuels Blending, Incinerator	Deer Park, Texas	TXD055141378
Waste Management - Coastal Plains	Landfill	Alvin, Texas	MSW Permit # 1721A
Waste Management - Lake Charles	Landfill	Sulphur, Louisiana	LAD000777201

FIGURES

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 1

FORMER AST TANK FARM AREA MAP

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: DEC., 2009	CHECKED: EFP	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

N

Approx. Scale in Feet

0 15 30

Note:
Tank numbers, except 100, from LTE, 1999. Tank 100 (empty tank) removed by Hurricane Ike storm surge in September 2008.

Source of photo: H-GAC, Texas aerial photograph, 2006.