Falcon Refinery Superfund Site
Ingleside
San Patricio County, Texas
TXD 086 278 058

Barge Dock Facility
Closure Report

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December 30, 2013

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1.0 INTRODUCTION

This request for consideration of no further action at the barge dock facility at the Falcon Refinery Superfund Site (Site) in Ingleside, Texas (Figure 1) has been developed with consideration of the Administrative Order on Consent for Remedial Investigation, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Docket No. 06-05-04.

During 2007 the EPA approved the RI/FS Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) for the former refinery, adjacent properties and background sampling locations. A Phase I FSP was completed also in 2007. Analytical data obtained during the sampling was evaluated for human health and ecological exposures based on the approved conceptual site model and analyzed using Visual Sample Plan (VSP) during 2008.

Results of the sampling indicated that further sampling was necessary to adequately assess certain portions of the Site, which was delineated into seven Areas of Concern (AOC) (Figure 2). Based on the results of the 2007 sampling and data analysis a Phase II Field Sampling Plan was submitted and approved by the EPA during 2009. Prior to the implementation of the Phase II sampling the responsible party (NORCO) experience financial concerns and was unable to perform the sampling.

In addition to the RI/FS NORCO entered into an Administrative Order on Consent (AOC[1]) for Removal Action for the former refinery. Actions related to the AOC[1] for Removal Action included removing; hazardous waste from the above ground storage tanks, abandoned and buried drums, site security and the cleanout and abandonment of ten pipelines, which were formerly used to transport crude oil and refined products to the former and current barge dock facilities.

During 2012 NORCO sold the former Falcon Refinery to Lazarus Texas Refining I, LLC (Lazarus). Since the sale Lazarus has been operating the former refinery as a crude oil bulk storage and transfer facility.

Due to inactivity on the RI/FS by the operator, the EPA determined that further sampling was necessary and during 2013 the EPA conducted an abbreviated Phase II Field Sampling Plan, which included sampling at the barge dock facility.

By obtaining a notice of no further action at the barge dock facility Lazarus will be able to obtain a "bridge loan" until additional permanent funding can be secured. Lazarus has indicated that the bridge loan will lead to employment expansion, allow further finance development of the site including additional remedial actions and upgrades to the site.

Documents including the EPA approved RI/FS Work Plan, FSP, QAPP, Removal Action Work Plan and Addendum Reports will be provided as requested.

2.0 PROJECT BACKGROUND

The Falcon Refinery Site consists of a refinery that operated intermittently and is currently inactive. When in operation, the refinery had a capacity of 40,000 barrels per day and the primary products consisted of naphtha, jet fuel, kerosene, diesel, and fuel oil.

The Site occupies approximately 104 acres in San Patricio County, Texas, and is located 1.7 miles southeast of State Highway 361 on FM 2725 at the north and south corners of FM 2725 and Bishop Road. Other portions of the Site include piping leading from the Site (North and South) to dock facilities at Redfish Bay, where crude oil and hydrocarbons were historically and are currently transferred between barges and storage tanks, and adjacent properties.

The Site is divided into the North Site, South Site and current barge dock facility. There are pipelines that connect the North and South Sites with the current and former barge dock facilities.

Following are discussions of the Site to provide background of past sampling activities as a means of discerning the barge dock facility from the remainder of the Superfund Site.

2.1 North Site

When operational, the storage and truck rack property (North Site) had nine above ground storage tanks, that ranged in capacity from 1,000 barrels (Tank 3) to 20,000 barrels (Tanks 8 and 9), three truck loading racks, associated piping and a transfer pump.

Prior to sampling and remedial actions, the North Site experienced several spills, which were documented in the RI/FS Work Plan.

2.2 South Site

The South Site includes the main operation portion of the refinery (Figures 2 and 3) and included the control room, heaters, crude towers, coalesers, boilers, fire water tank, exchangers, cooling towers, desalters, exchangers, compressors, a lab, above ground tanks 10 through 31, tanks N1 and N2, an American Petroleum Institute (API) separator, clarifier and an aeration pond.

The South Site is bordered by Bishop Road to the northeast, FM 2725 to the northwest, wetlands to the east and south and County Road CR-152 to the southwest. Across Bishop Road and FM 2725 there are residences.

Prior to sampling and remedial actions, the South Site experienced several spills, which were documented in the RI/FS Work Plan.

2.3 Current Barge Dock Facility

The current barge dock facility is located on Redfish Bay (Figures 3,4 and 5) and was previously used to load and unload crude oil and refined hydrocarbons via pipelines that connect the dock

facility to the North and South Sites. The fenced dock facility contains a dock and several small structures to load and unload crude oil. Currently only crude oil is transferred at the Site.

There have been no known spills, releases and there are no visible indications of environmental impacts at the Barge Dock Facility.

3.0 AREAS OF CONCERN (AOC)

Provided is a brief discussion of the relevant AOCs to the barge dock facility.

3.1 AOC-1 Former Operational Units (OU)

Included in AOC-1 are the entire North Site, former operational unit (OU) areas of the South Site a drum disposal area and an area where metal waste was discarded (Figures 2 and 3). In addition to the historical record of releases, there are several locations within AOC-1 where grossly stained soil was evident. Grossly stained soil was addressed in the Removal Action Work Plan (RAW) for the site.

Potentially affected media included soil and groundwater.

3.2 AOC-2 On-Site Non Operational Areas

Included in AOC-2 are areas of the refinery that have not been used for operations or storage and have no record of releases. Encompassing approximately 25 acres the AOC is located between operating portions of the refinery and FM 2725 to the west and southwest and CR-152 to the south and southwest.

Potentially affected media included soil and groundwater.

3.3 AOC-3 Wetlands

Included in AOC-3 are 1) the wetlands immediately adjacent to the Site that are bordered by Bay Avenue, Bishop Road and a dam on the upstream side, 2) the wetlands located between Bishop Road, Sunray Road, Bay Avenue and residences along Thayer Avenue and 3) the wetlands between Sunray Road, residences along FM 2725, Gulf Marine Fabricators, Offshore Specialty Fabricators and the outlet of the wetlands into Redfish Bay (Figures 2 and 3).

There is one active and several abandoned pipelines that lead from the refinery to the current and former barge dock facilities. During June 2006 the abandoned pipelines were cut, the contents of the pipelines were removed and plates were welded on the pipelines. These activities were performed under the RAW.

Assessment activities in the wetlands will evaluate releases from the refinery, including the unpermitted wastewater effluent discharge into the wetlands, releases into the wetlands from two known pipeline releases, and the possible releases from the pipelines leading from the refinery to the current and former barge dock facilities.

There have been documented spills into the wetlands of hydrocarbons, waste and volatile organics. As a result the COPCs screened at this AOC included metals, VOCs, SVOCs, PCBs, herbicides and pesticides.

Potentially affected media included sediment, soil, surface water and groundwater.

3.4 AOC-4 Current Barge Docking Facility

Included in AOC-4 is the current barge docking facility, which is approximately 0.5 acres and is located on Redfish Bay. The fenced facility, which is connected to the refinery by pipelines, is used to load and unload barges. At the time of this report only crude oil passed through the docking facility. Historically however, refined products were also loaded and unloaded.

There have been no reported releases nor is there evidence of spills associated with this AOC. Therefore the COPCs screened at this AOC were limited to metals, VOCs and SVOCs.

Potentially affected media included soil and groundwater.

3.5 AOC-5 Redfish Bay

Included in this AOC are the sediments and surface water adjacent to the current and former barge dock facility. The COPCs screened at this AOC included metals, VOCs and SVOCs.

Potentially affected media included sediment and surface water.

For the barge dock closure request review of the analytical data from this AOC were not performed due the significant quantity of barge and industrial traffic in the intercoastal waterway. Any detections of COPC in the sediment or surface water in this AOC could be the result of numerous entities that are located on the waterway or transport materials on the waterway.

3.6 AOC-6 Thayer Road

Included in this AOC is the neighborhood along Thayer Road, which is across Bishop Road from the refinery (Figure 2).

The COPCs screened at this AOC included metals, VOCs and SVOCs.

Potentially affected media included soil and groundwater.

3.7 AOC-7 Bishop Road

Included in this AOC is the neighborhood along Bishop Road, which is across Bishop Road from the North Site (Figure 2).

The COPCs screened at this AOC included metals, VOCs and SVOCs.

Potentially affected media include soil and groundwater.

4.0 SAMPLING OBJECTIVES

As stated in the data quality objectives (DQOs) for the RI/FS, the following study question, included in the Quality Assurance Project Plan, was formulated for the Site RI:

Where do levels of chemicals of potential concern (COPCs) exist either on or off-site at concentrations above or below risk-based screening levels (RBSLs) and/or background concentrations along complete exposure pathways for relevant exposure scenarios?
The primary objective of the FSP sampling design at the barge dock facility was to collect data of sufficient quantity and quality to resolve the study question and support risk assessment and remedy evaluation.

The goal sampling was to determine the nature and extent of contamination and to identify contaminant migration pathways. Data must be of sufficient quality (including acceptable reporting limits) and quantity to perform an ecological risk assessment (ERA) and human health risk assessment (HHRA) for the site in accordance with risk assessment guidance (EPA 1991, 1997, 2000d).

The strategy for characterizing the site contamination was based on the site-specific DQOs, which are based on the following media-specific screening levels:

EPA Region 6 human health MSSLs and TCEQ Tier 1 PCLs for human health risk screening of soil and groundwater. Groundwater ingestion pathways will only apply, upon consultation with the EPA and TCEQ, if the shallow aquifer is of sufficient yield and natural quality to constitute a Potable water supply. Soil screening levels (assuming the dilution/attenuation factor of 10 as suggested by the EPA Soil Screening Level guidance document) will be used to evaluate soil-to-groundwater migration potential.

- TCEQ ecological benchmarks for ecological screening of soil, sediment and surface water;
- Texas and Federal Surface Water Quality Criteria for human health screening; and
- Other applicable or relevant and appropriate requirements (ARARs)

A complete list of all human health and ecological screening levels (benchmarks) are provided in Appendix E and F of the FSP.

Each of the field sampling activities and the data collection requirements are discussed in the following sections.

5.0 AOC-4 BARGE DOCK FACILITY SAMPLING CRITERIA

During the Phase I FSP sampling completed in 2007 there were 5 random start grid sampling locations (G-57S through G-61S) selected at AOC-4 (by VSP), which was comprised of the current barge dock facility for the Site (Figure 5). There is no history of releases at this AOC. Composite samples were obtained from the five adjacent samples locations resulting in one surface and one subsurface sample from this AOC.

Samples were obtained from the surface 0.0 to 0.5 feet and from the interval with the highest PID reading. Since there were no PID readings, a soil sample from the groundwater interface was obtained. Samples were be analyzed in a fixed laboratory for metals, VOCs, SVOCs, PCBs, and pesticides/herbicides. Each boring was advanced a minimum of five feet below the initial contact with groundwater.

During 2013 the EPA obtained surface and subsurface soil samples from five boring locations labeled SO4-01 through S4-05. Additionally one monitor well MW-17 was also installed and surface and subsurface soil samples were obtained from the boring for the monitor well.

Since TRC did not install the boring or obtain the soil and groundwater samples this report does not include boring logs or monitor well completion logs. The information can be included if supplied by the EPA and its contractor.

5.1 Pipeline Cut Points

During August 2006, Removal Action Work Plan Addendum No.1 was submitted and approved by the EPA. The report described the cleanout and decommissioning of pipelines in AOC-3 adjacent to the barge dock facility. The locations of the pipeline cut points are shown on Figures 3, 4 and 5.

Ten out of service pipelines were cut and capped at the point that the pipelines go underground near the intersection of Bishop Road and Bay Avenue. Near the intersection of Sunray Road the ten pipelines were cut again and a section of pipe was removed from each pipeline. Caps were welded on the ends of the pipelines after the pipelines were either pigged clean or a vacuum was placed on the pipeline to remove all the contents. In total approximately 8,400 gallons of hydrocarbons and water were removed from the pipelines and placed in Tank 26 on the refinery property.

As required by the EPA the contents of the pipelines were removed from the section of pipeline form Bishop Road to Sunray Road and from Sunray Road to the former and current barge dock facilities.

After any spilled liquid and impacted soil was removed from the excavation at Sunray Road two sediment samples were obtained for laboratory analysis of volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC). Results of the analyses indicated only acetone and toluene were detected above the laboratory reporting limits.

The maximum value for acetone in the sediment was 73 ug/kg and the TCEQ Ecological Benchmark for acetone is 60,030 ug/kg for freshwater and 167,230 ug/kg for marine sediment. The maximum value for toluene was 6.6 ug/kg and the Ecological Benchmarks are 2,880 ug/kg and 940 ug/kg respectively. As a result no further assessment or remediation was required.

During August 2007, Removal Action Work Plan Addendum No.2 was submitted and approved by the EPA. The report described the cleanout of pipelines designated as Area 4 on Figures 3, 4 and 5.

To complete the pipeline clean out, NORCO hired a contractor to locate and stake the exact location of the former barge dock facility and submitted a plan to ensure that all fluid was removed from the pipelines from Sunray Road to the former barge dock facility.

During the second pipeline cleanout, the EPA and a contractor decided that the pipelines leading from the former barge dock were at a higher elevation that the area where the jetting of the pipelines (toward the wetland area) was performed and that any liquids present between the former dock and the jetting area would be retrieved at the excavation. The concurrence was that the lines leading from the former dock to the excavation area in the wetlands were adequately cleaned.

Results of sampling from Area 4 indicated that no human health or ecological risk assessment values were exceeded. Complete pipeline cleanout reports are available.

5.2 Data Analysis

As shown on several of the figures the barge dock is located on the intercoastal waterway, which is transportation channel of the Gulf of Mexico. As a result the groundwater, beneath the barge dock is salty and not fit for human consumption due to naturally elevated chloride. As a result the human health soil to groundwater pathway as eliminated from risk analysis.

6.0 RISK ASSESSMENT

Provided in this section is a discussion of Human Health and Ecological risk.

6.1 Screening Risk Evaluation

A screening human health and ecological risk evaluation (SRE) was conducted on the soil and groundwater samples that were collected at the Site. This SRE provides a quantitative assessment of the potential for adverse human health and ecological effects that may result from exposure to the chemicals of potential concern (COPCs). Note, SREs are inherently not site-specific, rather, the assessment of potential risk for both human use and ecological use is determined by comparing site concentrations to default screening levels protective of human and ecological receptor exposure.

The Site is an inactive refinery that is located in an industrial area of San Patricio County, Texas. The future Site use will likely remain industrial; however, for this SRE, both residential and commercial/industrial receptors will be evaluated for soil. The residential receptor pathway is included to evaluate potential unrestricted use of the Site. Soil will also be evaluated with ecological standards that are protective of earthworms and plants. A human health evaluation will not be conducted for groundwater since it is identified as having no beneficial use and is brackish and non-potable. Groundwater concentrations will be compared to saltwater ecological benchmarks, since the site is located adjacent to Redfish Bay.

6.2 Selection of Chemicals of Potential Concern

The detected concentration and non-detect reporting limits for each chemical were compared to the following human health risk-based and ecological screening levels for soil (collectively referred to as SSLs), consistent with the approved QAPP and FSP:

- Residential – United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) (USEPA, 2013b) and Texas Commission on Environmental Quality (TCEQ) protective concentration limit (PCL) (TCEQ, 2012);
- Commercial/Industrial – USEPA RSLs (USEPA, 2013b) and TCEQ PCL (TCEQ, 2012);
- Earthworms – TCEQ benchmarks (TCEQ, 2006); and
- Plants – TCEQ benchmarks (TCEQ, 2006).

The soil data and analytes that exceed the risk-based and ecological SSLs are identified on Table 1. Although several chemicals had reporting limits greater than the risk-based and ecological SSLs, this is not unusual for screening level comparisons, the nondetect exceedances are shown in Table 1 for completeness, however, the focus of the SRE will be on the detected COPC.

There are seven chemicals that were detected above the risk-based and ecological SSLs, which include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, mercury, and zinc. These seven chemicals were retained as COPCs and will be evaluated further in the SRE. Although total petroleum hydrocarbons (TPH) was detected in soil at the Site, TPH was not retained as a COPC because there is limited TPH data

and the volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) that were detected in soil at the Site include the components that would be reflected in the TPH fraction for screening, thus double counting potential risk. The natural occurring metals detected in the soil at the Site that were detected at concentrations consistent with "background" conditions were not further evaluated. Metals that exceed the Texas Specific Median Background concentrations (TCEQ, 2013) were retained as COPCs. Table 2 presents the background evaluation.

A statistical summary of the data was developed for each COPC detected at the Site. The statistical summary table for soil (Table 2) includes total soil samples analyzed, number of samples detected, percent detected, range of detects, background concentration, 95 upper confidence limit (UCL), and exposure point concentration (EPC). Samples that were collected with a duplicate sample were treated as one sample. The value that was selected for the COPC followed the following duplicate rules:

- if both samples were detected then the maximum concentration was selected;
- if one sample had a detection and the other was non-detect, then the detection was selected; and
- if both samples were non-detect, then the lowest non-detect value was selected.

The chemicals analyzed in groundwater were compared to TCEQ chronic saltwater ecological benchmarks (TCEQ, 2011) in Table 3. Groundwater concentrations were compared to saltwater ecological benchmarks because groundwater is shallow and located adjacent to Redfish Bay. Groundwater was not screened against human health screening levels because there is no beneficial use of groundwater (the water is brackish and non-potable). No detected concentration exceeded the chronic saltwater ecological benchmarks. No COPCs were identified in groundwater. Groundwater will not be further evaluated.

6.3 Exposure Point Concentrations

Following determination of COPCs, the site data were further evaluated to determine the potential for cumulative risk from the COPCs. The risk-based SSLs as outlined above are combined with analyte representative concentration to estimate a risk. The concentrations of COPCs at specific exposure points will vary over space and time. However, a single estimate of an EPC is required for risk assessment calculations (USEPA, 1989). This single value must be representative of the average concentration to which a person would be exposed over the duration of the exposure. EPCs generally are estimated using measured concentrations in soil.

The EPC of measured data are calculated as the 95 percent upper confidence limit (95% UCL) (alpha = 0.05) of the arithmetic mean concentration. The most current statistical program and guidance from USEPA (currently ProUCL 5.0.00) (USEPA, 2013a) was used to calculate the 95% UCL. ProUCL provides guidance and a range of parametric and nonparametric methodologies for handling datasets of different distributions, left-censored datasets, identification of outliers, datasets with non-detect values, and treatment of datasets with small sample sizes. The appropriate ProUCL method ultimately used depends on the characteristics of each data set and is documented in Table 2. If there was an insufficient data (ISD) to calculate a meaningful 95% UCL (i.e. 3 detections out of 19 samples collected), then the maximum detected

concentration is used as the EPC. If the 95% UCL is higher than the maximum detected concentration, the maximum detected concentration is used as the EPC, consistent with USEPA guidance.

The data used to develop the UCLs are presented in Table 1. The ProUCL outputs are provided in Table 4, and the UCLs are summarized on Table 2.

6.4 Risk Characterization

The risk characterization is not a Site specific evaluation. The risk characterization developed noncancer hazards and cancer risks using default human health risked-based SSLs from USEPA RSLs (USEPA, 2013b) and TCEQ PCL (TCEQ, 2012). The intent of this assessment is to provide a very conservative evaluation of land use risk (residential, industrial, and ecological) such that if the results are acceptable, land use controls would be unnecessary or very limited. At the conclusion of this SRE, the need for either further site-specific risk assessment of evaluation of remedial action (or no action) will be determined. The development of the noncancer hazards and cancer risks are further discussed below.

6.5 Noncancer Hazard Evaluation

Potential noncarcinogenic effects are typically evaluated by comparing exposure over a specified time period with a reference dose derived for a similar exposure period. This ratio of exposure to toxicity is referred to as a HQ. The HQ was calculated as follows for each COPC:

$$HQ_i = \frac{EPC_i}{SSL_{NC_i}} \times THQ$$

where:

HQ_i = Hazard quotient for chemical "i" (unitless);

EPC_i = Exposure point concentration for chemical "i" (mg/kg);

SSL_{NC_i} = Noncancer Health-based soil screening level for chemical "i" (mg/kg); and

THQ = Target hazard quotient (unitless).

In cases where individual COPCs potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), potential additive effects may be addressed by calculating a HI as follows:

$$HazardIndex = \sum_{i=1}^{n} HazardQuotient_i$$

where: i = specific health endpoint

A HI or HQ (for effects which are not additive) of less than or equal to 1 (referred to herein as the significance threshold) indicates acceptable levels of exposure for COPCs having an additive effect. In this SRE, a screening-level HI was calculated by summing the HQs for all COPCs, regardless of toxic endpoint, as recommended by agency guidance (USEPA, 1989). This approach is generally believed to overestimate the potential for noncarcinogenic health effects due to simultaneous exposure to multiple chemicals because it does not account for different toxic endpoints (USEPA, 1989).

It should be noted that HQs or HIs greater than 1 do not necessarily mean that adverse health effects will be observed. A substantial margin of safety has been incorporated into some of the RfDs and RfCs used to develop the risk-based SSLs for the COPCs. Therefore, for these chemicals, adverse health effects may not be observed even if the HQ or HI is much larger than 1.

The HQs and HIs for residential and commercial/industrial receptors are presented in Tables 5 and 6, respectively. HQs and HIs were developed using noncancer-based SSLs from USEPA's RSLs (USEPA, 2013b), TCEQ's PCLs (TCEQ, 2012), and using the lowest noncancer-based SSL between the two.

Receptor	USEPA RSL HI	TCEQ PCL HI	Lowest Noncancer-Based SSL HI
Residential	0.2	0.5	0.5
Commercial/Industrial	0.3	0.02	0.3

The HIs are below the significance threshold for both receptors, indicating there is no need for further evaluation of noncarcinogenic COPC.

6.6 Cancer Risk Evaluation

Carcinogenic risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. The SF converts estimated daily intakes averaged over a lifetime of exposure to incremental risk of an individual developing cancer (USEPA, 1989). This carcinogenic risk estimate is generally an upper-bound value since the slope factor is often a 95% UCL of probability of response based on experimental animal data. Cancer risk for COPCs were calculated as follows:

$$CR_i = \frac{EPC_i}{SSL_{C_i}} \times TCR$$

where:
CR_i = Cancer risk for chemical "i" (unitless);
EPC_i = Exposure point concentration for chemical "i" (mg/kg);
SSL_{C_i} = Cancer Health-based soil screening level for chemical "i" (mg/kg); and
TCR = Target cancer risk (unitless).
The estimated excess cancer risks for each chemical are summed regardless of toxic endpoint to estimate the total excess cancer risk for the exposed individual:

$$CR = \sum_{i=1}^{n} CR_i$$

where: i = specific health endpoint

The USEPA has defined what is considered to be an acceptable level of risk. The USEPA considers one in one-million (1×10^{-6}) to one in ten thousand (1×10^{-4}) to be the target range for acceptable risk (USEPA, 1990a, 1990b). Estimates of lifetime excess cancer risk associated with exposure to chemicals of less than 1×10^{-6} are considered *de minimis*, a risk level that is so low as to not warrant any further investigation or analysis (USEPA, 1990a).

It should be noted that cancer risks in the 1×10^{-6} to 1×10^{-4} range or higher do not necessarily mean that adverse health effects will be observed. To further characterize carcinogenic health risks for commercial/industrial receptors, a target risk of $1x10^{-5}$ was also used for comparison.

The cancer risk for residential and commercial/industrial receptors are presented in Tables 7 and 8, respectively. The cancer risks were developed using cancer-based SSLs from USEPA's RSLs (USEPA, 2013b), TCEQ's PCLs (TCEQ, 2012), and using the lowest cancer-based SSL between the two.

Receptor	USEPA RSL Cancer Risk	TCEQ PCL Cancer Risk	Lowest Cancer-Based SSL Cancer Risk
Residential	2E-05	5E-07	2E-05
Commercial/Industrial	1E-07	1E-06	1E-06

The residential cancer risk is within USEPA's cancer risk range for EPCs evaluated using USEPA's cancer-based RSLs (USEPA, 2013b) and lowest cancer-based SSL, and below the cancer risk range for EPCs evaluated using TCEQ cancer-based PCLs (TCEQ, 2012). The commercial/industrial cancer risk is below the target risk of $1x10^{-5}$ and also at and below the *de minimis* level. The results of this assessment indicate that no further action is necessary for carcinogenic COPC.

6.7 Ecological Soil Evaluation

The ecological soil evaluation compared the EPCs to earthworm and plant ecological benchmarks (Table 9). Mercury and zinc are the only two COPCs that exceed ecological benchmarks (earthworm and plant).

6.8 Uncertainties

There is a certain degree of uncertainty in estimating exposures to chemicals in the environment. To account for these uncertainties, the risk assessment methodology was designed to be conservative. Specific sources of conservatism associated with this SRE are discussed below:

- The use of the human health risk-based and ecological SSLs are intended to provide a reasonable upper-bound estimate of exposure for the receptors considered. The exposure assumptions used to develop the human health risk-based and ecological SSLs are default values that develop a generic screening level that can be used at any location. However, the actual period of time that a residential or commercial/industrial receptor would be involved in direct contact with surface soil is anticipated to be substantially less than the exposure frequency and duration utilized in development of the SSLs. The assumptions neglect the effects of engineered surfaces, restrictive fencing, and the presence of vegetation across the site.
- Some of the toxicity values utilized in developing the risk-based SSLs involve the extrapolation of results from animal studies. When the results of these animal studies are extrapolated to humans, safety factors or other conservative assumptions are typically applied to ensure that human health effects are not underestimated. For carcinogenic effects, the risk assessment methodology assumes the absence of a threshold dose.

- Exposures and associated risks resulting from contact with multiple COPCs were conservatively assumed to be additive. Furthermore, the additivity of risk was assumed to apply without regard to health effects endpoints (e.g., target organs, tumor type, toxic endpoint, or mode of action). This is very conservative, leading to an over estimation of risk.

6.9 Soil-to-Groundwater Migration Potential

Soil-to-groundwater migration potential was not quantitatively evaluated for several reasons. Groundwater is identified as having no beneficial use and is brackish and non-potable. The organic COPCs in soil were not detected in groundwater, and the one organic chemical detected in groundwater was not detected in soil. The only analytes exceeding the groundwater benchmarks were non-detect analytes that had a reporting limit greater than the chronic saltwater benchmark.

6.10 Risk Assessment Conclusions

This SRE evaluated the potential for adverse human health and ecological effects that may result from exposure to the chemicals analyzed in soil and groundwater at the Site. The SRE evaluated noncancer health effects and theoretical cancer risks for residential and commercial/industrial receptors using default human health risk-based SSLs from USEPA and TCEQ. The HIs are below the significance threshold for both receptors. The residential cancer risk is within USEPA's cancer risk range for EPCs evaluated using USEPA's cancer-based RSLs (USEPA, 2013b) and lowest cancer-based screening level (USEPA RSL or TCEQ PCL), and below the cancer risk range for EPCs evaluated using TCEQ cancer-based PCLs (TCEQ, 2012). The commercial/industrial cancer risk is at and below the *de minimis* level. Mercury and zinc are the only two COPCs in soil that exceed ecological benchmarks. Mercury and zinc exceed both the earthworm and plant ecological benchmarks.

The uncertainties in this SRE generally result in an overestimation to the exposure and risk. It is believed that results presented in this document are based on conservative estimates.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The Falcon Refinery Superfund Site in Ingleside, Texas has been divided into seven AOCs. With the exception of the barge dock facility (AOC-4) each of the remaining AOCs have either had releases of hydrocarbons or hydrocarbons have migrated onto the AOC.

- The sole reason for including the barge dock facility into the superfund site is ownership of the property. The barge dock facility is located approximately one mile from any portion of the former refinery.
- The barge dock facility, is currently used to load barges with crude oil for transport to refineries along the Gulf of Mexico, had significant value especially with the need to get crude oil from Texas fields to market.

- There have been no reported releases nor is there evidence of spills associated with the AOC.

- Since the barge dock facility is located on the intercoastal waterway, which is on the Gulf of Mexico, groundwater beneath the site is saline and not fit for consumption.

- Soil and groundwater sampling performed during 2007 at the AOC for VOCs, SVOCs, metals, PCBs and pesticides and herbicides indicated no risk to human health or ecological parameters.

- This SRE evaluated the potential for adverse human health and ecological effects that may result from exposure to the chemicals analyzed in soil and groundwater at the Site. The SRE evaluated noncancer health effects and theoretical cancer risks for residential and commercial/industrial receptors using default human health risk-based SSLs from USEPA and TCEQ. The HIs are below the significance threshold for both receptors. The residential cancer risk is within USEPA's cancer risk range for EPCs evaluated using USEPA's cancer-based RSLs (USEPA, 2013b) and lowest cancer-based screening level (USEPA RSL or TCEQ PCL), and below the cancer risk range for EPCs evaluated using TCEQ cancer-based PCLs (TCEQ, 2012). The commercial/industrial cancer risk is at and below the *de minimis* level. Mercury and zinc are the only two COPCs in soil that exceed ecological benchmarks.
- Mercury and zinc are not COPCs associated with activities at the barge dock facility and likely metals naturally occurring in native soil at the site.

- The uncertainties in this SRE generally result in an overestimation to the exposure and risk. It is believed that results presented in this document are based on conservative estimates

- By obtaining a notice of no further action at the barge dock facility Lazarus will be able to obtain a "bridge loan" until additional permanent funding can be secured. Lazarus has indicated that the bridge loan will lead to employment expansion, allow further finance development of the site including additional remedial actions and upgrades to the site.

- TRC recommends that the EPA provide a notice of no further action for the barge dock property as shown on Figure 4 and described in Appendix A.

8.0 REFERENCES

Texas Commission on Environmental Quality (TCEQ), 2006. Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas RG-263 (Revised).

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United States Environmental Protection Agency (USEPA), 1989. Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part A), Interim Final, Report No. EPA/540/1-89/002, Office of Emergency and Remedial Response, Washington, DC, December, 1989.

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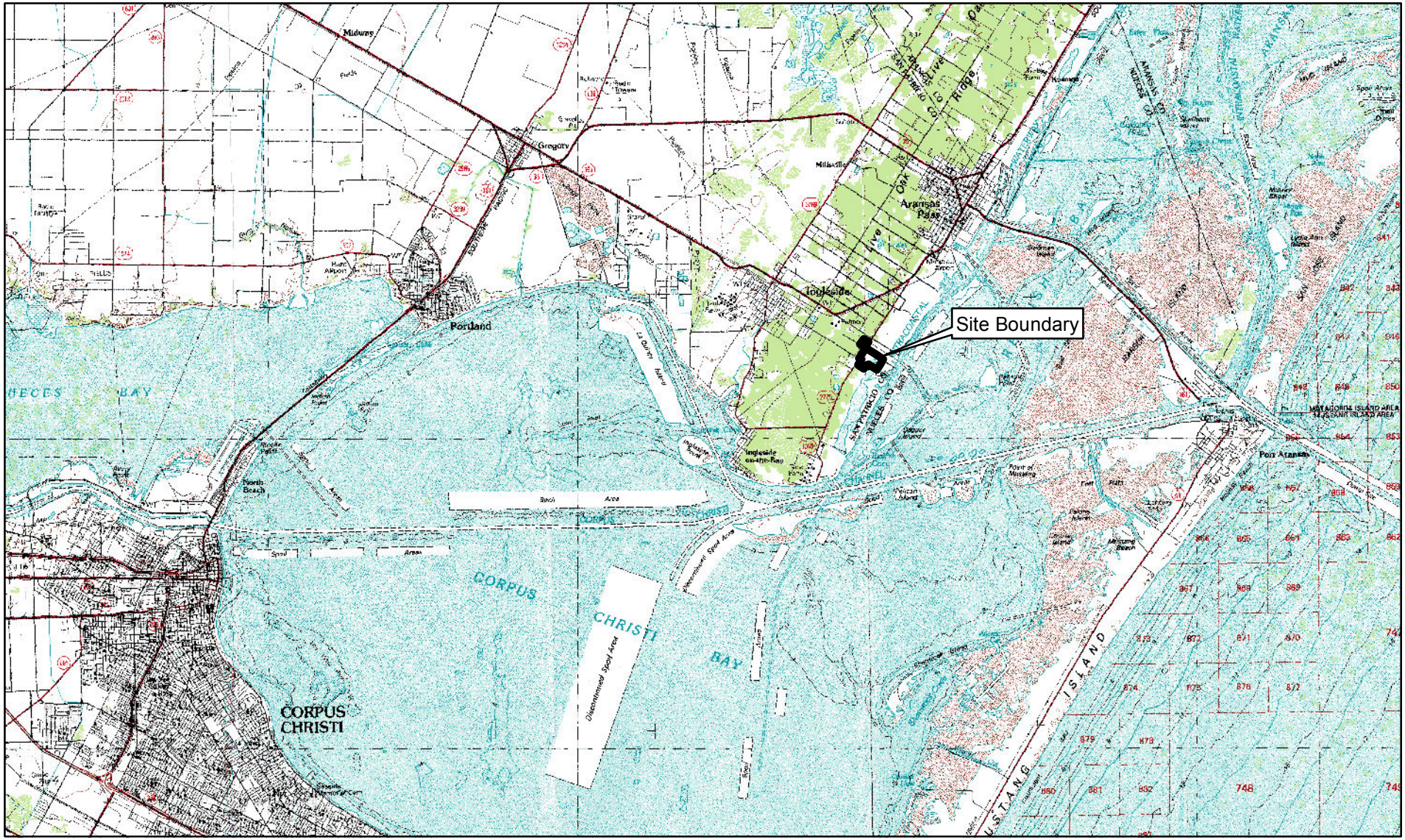
USEPA, 2013b. Regional Screening Levels. Region 6. http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm.

FIGURES

FIGURE 1. Area Map
FIGURE 2. Map of AOCs
FIGURE 3. Map of Barge Dock and Vicinity
FIGURE 4. Map of Barge Dock Area Property
FIGURE 5. Map Showing 2007 Sampling Locations
FIGURE 6. Map Showing 2013 Sampling Locations



LEGEND

Site Boundary

Reference: U.S.G.S. 1:100,000-Scale Topographic Map, Driscoll, Texas (1980).

N

10,000 0 10,000

Feet

AREA MAP

FALCON REFINERY
INGELSIDE, SAN PATRICIO COUNTY, TEXAS

PROJECT NO.: 182978

DATE: 4/29/2011

TRC

505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
512-329-6080

FIGURE
1

Legend

- Area of Concern (AOC) Boundary

Active NORCO Pipeline

- Above Ground
- Underground

Abandoned NORCO Pipeline

- Above Ground
- Underground

Outside Operations

- Gulf South Pipeline
- Boss Pipeline
- Gathering Line 2'
- Plains Marketing Pipeline

Source: National Agriculture Imagery Program (NAIP), 2009.

N

400 0 400

Feet

AREA OF CONCERN MAP

FALCON REFINERY
INGELSIDE, SAN PATRICIO COUNTY, TEXAS

PROJECT NO.: 182978 | DATE: 3/10/2011

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
512-329-6080

FIGURE 2

Pipline Cut Point
Proposed Monitoring Well Location
AOC-4 Soil Sample 2007
AOC-4 Soil Sample 2013
Pipeline Area 4

FalconRefinerySite
Area of Concern 4 Boundary
Property Line

SOURCES:Microsoft and their data partners

N

0 250 500
Feet

Map of Barge Dock and Vicinity

Overview
Ingleside, San Patricio

AUTHOR: MLOVELACE	SAVED: 12/30/2013	MXD: 182978-3

TRC
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

FIGURE
3

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Pipline Cut Point
Proposed Monitoring Well Location
AOC-4 Soil Sampling 2009
AOC-4 Soil Sampling 2013
Pipeline Area 4
Area of Concern 4 Boundary
Property Line

SOURCES:Microsoft and their data partners

N

0 75 150
Feet

Map of Barge Dock Area Property

No Further Action Needed
Ingleside, San Patricio

AUTHOR: MLOVELACE	SAVED: 12/30/2013	MXD: 182978-4

TRC
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

FIGURE
4

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Service Layer Credits: Image courtesy of ImagePatch.com © AND

Soil Samples 2007

Area of Concern 4 Boundary

Property Line

SOURCES:Microsoft and their data partners

N

0 25 50

Feet

Map Showing 2007 Sampling Locations

Falcon Refinery
Ingleside, San Patricio

AUTHOR: MLOVELACE	SAVED: 12/30/2013	MXD: 182978-5

TRC
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

FIGURE
5

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Service Layer Credits: Image courtesy of ImagePatch.com © AND

AOC-4 Soil Sampling 2013

MonitoringWell

Area of Concern 4 Boundary

Property Line

SOURCES:Microsoft and their data partners

N

0 25 50

Feet

Map Showing 2013 Sampling Locations

Falcon Refinery
Ingleside, San Patricio

AUTHOR: MLOVELACE	SAVED: 12/30/2013	MXD: 182978-6

TRC
505 E. HUNTLAND DR.
SUITE 250
AUSTIN, TX 78752
PH:512-329-6080

FIGURE
6

TABLES

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SR-West_5'	EXC-1	FRA-133A	FRA-135	MW-17-0.0-0.5	MW-17-0.5-2.0	MW-17-2.0-3.5	SO4-01-0.0-0.5	SO4-01-0.0-0.5 Dup	SO4-01-0.5-2.0	SO4-01-2.0-3.0	SO4-02-0.0-0.5	SO4-02-0.5-2.0	SO4-02-2.0-3.0
	Background	USEPA		TCEQ																	
		Res	C/I	Res	C/I	Earthworms	Plants	06/26/06	05/08/07	12/10/07	12/10/07	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Inorganics																					
Aluminum	30000	990000	77000	64000	570000	NA	NA	--	--	2920	3790	2430	2980	1210	13300	17000	1980	818	2000	1320	1870
Antimony	1	410	31	15	310	78	5	--	--	0.45	<0.31	<0.83	<1	<1	<1	<1.3	<0.88	<0.96	<1.2	<0.89	<1
Arsenic	5.9	2.4	0.61	24	200	60	18	--	--	1.1	0.94	2	2.1	0.5	5.7	5.4	1.9	0.41	0.94	0.84	0.83
Barium	300	190000	15000	8100	120000	330	500	--	--	422	11.5	325	162	146	727	809	203	5.3	81.4	25.4	6.3
Beryllium	1.5	2000	160	38	250	40	10	--	--	0.17	0.24	<0.41	<0.5	<0.52	<0.51	<0.66	<0.44	<0.48	<0.58	<0.44	<0.5
Cadmium	NA	800	70	52	850	140	32	--	--	0.18	<0.12	<0.41	<0.5	<0.52	0.71	0.9	<0.44	<0.48	<0.58	<0.44	<0.5
Calcium	NA	NA	NA	NA	NA	NA	NA	--	--	184000	2400	180000	67200	20200	199000	184000	140000	574	21700	19700	5010
Chromium	30	1500000	120000	27000	75000	0.4	1	--	--	4.5	4.4	4.4	2.7	1.7	16.2	14.3	1.6	0.58	2	1.1	1.6
Chromium, Hexavalent	30	5.6	0.29	120	1000	0.4	1	--	--	<1.1	<1.2	--	--	--	--	--	--	--	--	--	--
Cobalt	7	300	23	21	270	NA	13	--	--	0.77	0.52	0.89	0.97	<0.52	3.6	3.8	0.56	<0.48	0.72	0.47	0.56
Copper	15	41000	3100	550	39000	60	100	--	--	5.3	1.6	5.1	2.2	1.2	37.9	23.8	4.1	<0.96	2.8	1	0.59
Iron	15000	720000	55000	NA	NA	NA	NA	--	--	2130	2520	3770	2830	1140	11500	13000	1650	761	2250	1220	1750
Lead	15	800	400	500	1600	1700	120	--	--	16.1	2.9	13.1	6.8	15.8	31.1	43	8.5	0.77	12.9	11.7	1.6
Magnesium	NA	NA	NA	NA	NA	NA	NA	--	--	1840	825	2470	884	626	5660	6010	1200	188	1160	449	1190
Manganese	300	23000	1800	3400	24000	NA	500	--	--	116	28.2	108	59.1	21.3	259	250	93.9	7.5	65	30.3	56.8
Mercury	0.04	43	10	2.1	3.3	0.1	0.3	--	--	*0.29*	0.0098	***0.47***	*0.15*	0.071	***1.5***	***0.97***	*0.11*	<0.11	*0.24*	***2.3***	0.012
Nickel	10	9900	820	840	8600	200	30	--	--	1.8	1.4	2.6	1.7	0.78	18.5	11.1	0.89	0.34	1.7	0.76	1.2
Potassium	NA	NA	NA	NA	NA	NA	NA	--	--	665	738	852	665	<463	3340	4000	518	<408	605	354	577
Selenium	0.3	5100	390	310	4900	70	1	--	--	0.93	0.29	**<2.1**	**<2.5**	**<2.6**	**<2.5**	**<3.3**	**<2.2**	**<2.4**	**<2.9**	**<2.2**	**<2.5**
Silver	NA	5100	390	97	2300	NA	2	--	--	<0.081	<0.093	<0.41	<0.5	<0.52	<0.51	<0.66	<0.44	<0.48	<0.58	<0.44	<0.5
Sodium	NA	NA	NA	NA	NA	NA	NA	--	--	1710	285	4230	1330	495	1280	1460	1120	<408	<449	651	321
Thallium	NA	10	0.78	6.3	78	NA	1	--	--	<0.51	<0.58	<0.41	<0.5	<0.52	<0.51	<0.66	<0.44	<0.48	<0.58	<0.44	<0.5
Vanadium	50	5100	390	75	610	NA	2	--	--	3.9	5.7	5.5	5.1	<2.6	17.5	21.3	3.2	<2.4	3.4	1.6	2.4
Zinc	30	310000	23000	9900	250000	120	190	--	--	57.6	7.5	*121*	51.5	10.1	***560***	478	16.6	<0.96	99.6	79.1	4.2
Volatile Organic Compounds																					
1,1,1,2-Tetra chloroethane	NA	1.9	9.3	39	73	NA	NA	--	--	<0.0015	<0.0016	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	8700	38000	32000	55000	NA	NA	<0.0004	<0.00058	<0.0012	<0.0014	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,1,2,2-Tetra chloroethane	NA	0.56	2.8	30	140	NA	NA	<0.0004	<0.00058	<0.0015	<0.0017	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	43000	180000	220000	330000	NA	NA	<0.0004	<0.00031	--	--	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,1,2-Trichloroethane	NA	1.1	5.3	10	19	NA	NA	<0.0004	<0.00058	<0.0014	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,1-Dichloroethane	NA	3.3	17	8800	23000	NA	NA	<0.0004	<0.00058	<0.0014	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,1-Dichloroethene	NA	240	1100	1600	3500	NA	NA	<0.0004	<0.00058	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,1-Dichloro propene	NA	NA	NA	26	61	NA	NA	<0.0004	<0.00058	<0.0012	<0.0014	--	--	--	--	--	--	--	--	--	--
1,2,3-Tri chlorobenzene	NA	49	490	87	200	20	NA	<0.0004	<0.00058	<0.0012	<0.0014	<0.0053	<0.0051	<0.0051	<0.012	<0.0088	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,2,3-Tri chloropropane	NA	0.005	0.095	0.2	0.95	NA	NA	<0.0004	<0.00058	<0.0015	<0.0016	--	--	--	--	--	--	--	--	--	--
1,2,4-Tri chlorobenzene	NA	22	99	70	110	20	NA	<0.046	<0.054	<0.047	<0.051	<0.0053	<0.0051	<0.0051	<0.012	<0.0088	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,2,4-Trimethyl benzene	NA	62	260	79	110	NA	NA	0.0014	0.038	<0.0012	<0.0013	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	NA	0.0054	0.069	0.08	0.14	NA	NA	--	--	<0.0015	<0.0016	<0.0053	<0.0051	<0.0051	<0.012	<0.0088	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,2-Dibromoethane	NA	0.034	0.17	0.43	0.79	NA	NA	<0.0004	<0.00058	<0.0015	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,2-Dichloro benzene	NA	1900	9800	390	570	NA	NA	<0.052	<0.061	<0.061	<0.066	<0.0053	<0.0051	<0.0051	<0.012	<0.0088	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,2-Dichloroethane	NA	0.43	2.2	6.4	11	NA	NA	<0.0004	<0.00058	<0.0014	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,2-Dichloropropane	NA	0.94	4.7	31	44	700	NA	<0.0004	<0.00058	<0.0015	<0.0017	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,3,5-Trimethyl benzene	NA	780	10000	59	83	NA	NA	0.00086	0.012	<0.0011	<0.0013	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	NA	NA	NA	62	88	NA	NA	<0.044	<0.051	<0.056	<0.061	<0.0053	<0.0051	<0.0051	<0.012	<0.0088	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,3-Dichloropropane	NA	1600	20000	26	61	NA	NA	<0.0004	<0.00058	<0.0015	<0.0017	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NA	2.4	12	250	1200	20	NA	<0.046	<0.054	<0.05	<0.054	<0.0053	<0.0051	<0.0051	<0.012	<0.0088	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
1,4-Dioxane	NA	4.9	17	61	290	NA	NA	<0.01	<0.011	<0.025	<0.028	<0.11	<0.1	<0.1	<0.16	<0.17	<0.15	<0.1	<0.1	<0.1	<0.12
2,2-Dichloropropane	NA	NA	NA	31	44	NA	NA	<0.0004	<0.00058	<0.0011	<0.0013	--	--	--	--	--	--	--	--	--	--
2-Butanone	NA	28000	200000	33000	120000	NA	NA	0.0082	0.002	<0.007	<0.0078	<0.011	<0.01	<0.01	0.018	<0.017	<0.015	<0.01	<0.01	<0.01	<0.012
2-Hexanone	NA	210	1400	210	530	NA	NA	<0.0004	<0.00029	<0.0071	<0.0079	<0.011	<0.01	<0.01	<0.016	<0.017	<0.015	<0.01	<0.01	<0.01	<0.012
2-Nitropropane	NA	0.013	0.064	0.068	0.11	NA	NA	<0.001	<0.0012	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	NA	5300	53000	5400	28000	NA	NA	<0.00064	<0.00058	<0.0073	<0.0081	<0.011	<0.01	<0.01	<0.016	<0.017	<0.015	<0.01	<0.01	<0.01	<0.012
Acetone	NA	61000	630000	59000	290000	NA	NA	0.055	<0.0058	<0.0075	0.0091	<0.011	<0.01	<0.01	0.014	<0.017	0.0075	0.006	<0.01	<0.01	<0.012
Acetonitrile	NA	870	3700	530	910	NA	NA	<0.005	<0.0058	--	--	--	--	--	--	--	--	--	--	--	--
Acrolein	NA	0.15	0.65	11	20	NA	NA	<0.005	<0.0058	--	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NA	0.24	1.2	2.2	4.2	NA	NA	<0.005	<0.0058	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	NA	1.1	5.4	69	130	NA	NA	<0.0004	0.024	<0.0014	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Bromobenzene	NA	300	1800	280	640	NA	NA	--	--	<0.0013	<0.0015	--	--	--	--	--	--	--	--	--	--
Bromo chloromethane	NA	160	680	3300	4100	NA	NA	--	--	<0.0015	<0.0017	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Bromodi chloromethane	NA	0.27	1.4	98	460	NA	NA	--	--	<0.0015	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Bromoform	NA	62	220	280	600	NA	NA	<0.001	<0.00058	<0.0013	<0.0014	<0.0053	<0.0051	<0.0051	<0.012	<0.0088	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Bromomethane	NA	7.3	32	29	53	NA	NA	<0.00075	<0.00058	<0.0021	<0.0023	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Carbon disulfide	NA	820	3700	3300	7200	NA	NA	<0.0004	0.00081	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	0.00039	<0.0051	<0.0052	<0.0062
Carbon tetrachloride	NA	0.61	3	23	46	NA	NA	<0.0004	<0.00058	<0.0011	<0.0013	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Chlorobenzene	NA	290	1400	320	540	40	NA	<0.0004	<0.00058	<0.0015	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Chloroethane	NA	15000	61000	23000	87000	NA	NA	<0.0004	<0.00058	<0.0015	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Chloroform	NA	0.29	1.5	8	13	NA	NA	<0.0004	<0.00058	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	0.00061	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Chloromethane	NA	120	500	84	160	NA	NA	<0.0004	<0.00031	<0.0015	<0.0017	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
cis-1,2-Dichloroethene	NA	160	2000	120	500	NA	NA	<0.0004	<0.00058	<0.0014	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
cis-1,3-Dichloro propene	NA	1.7	8.3	7.8	53	NA	NA	<0.001	<0.00058	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Cyclohexane	NA	7000	29000	42000	65000	NA	NA	--	--	<0.0012	<0.0013	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SR-West_5'	EXC-1	FRA-133A	FRA-135	MW-17-0.0-0.5	MW-17-0.5-2.0	MW-17-2.0-3.5	SO4-01-0.0-0.5	SO4-01-0.0-0.5 Dup	SO4-01-0.5-2.0	SO4-01-2.0-3.0	SO4-02-0.0-0.5	SO4-02-0.5-2.0	SO4-02-2.0-3.0
	Background	USEPA		TCEQ																	
		Res	C/I	Res	C/I	Earthworms	Plants	06/26/06	05/08/07	12/10/07	12/10/07	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Dibromo chloromethane	NA	0.68	3.3	72	340	NA	NA	<0.001	<0.00058	<0.0014	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Dibromo methane	NA	25	110	42	59	NA	NA	<0.0004	<0.00058	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodi fluoromethane	NA	94	400	750	1100	NA	NA	<0.0004	<0.00058	<0.0011	<0.0012	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Ethyl acetate	NA	670	2800	74000	920000	NA	NA	<0.001	<0.00039	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl ether	NA	16000	200000	16000	200000	NA	NA	<0.0004	<0.00058	<0.0052	<0.0058	--	--	--	--	--	--	--	--	--	--
Ethyl methacrylate	NA	1500	7500	2400	4800	NA	NA	<0.001	<0.00058	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	NA	5.4	27	5300	17000	NA	NA	0.00048	0.011	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	0.0037	0.0016	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Hexachloro butadiene	NA	6.2	22	12	23	NA	NA	--	--	<0.0012	<0.0014	--	--	--	--	--	--	--	--	--	--
Hexane	NA	570	2600	2500	6600	NA	NA	--	--	<0.0011	<0.0012	--	--	--	--	--	--	--	--	--	--
Iodomethane	NA	NA	NA	110	1400	NA	NA	<0.0004	<0.00058	--	--	--	--	--	--	--	--	--	--	--	--
Isopropyl benzene	NA	2100	11000	3000	6300	NA	NA	--	--	<0.0012	<0.0014	<0.0053	<0.0051	<0.0051	0.00033	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Methyl acetate	NA	78000	1000000	82000	1000000	NA	NA	--	--	--	--	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Methyl methacrylate	NA	4800	21000	5300	7700	NA	NA	<0.0004	<0.00058	--	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether	NA	43	220	590	1100	NA	NA	0.00077	<0.00058	--	--	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Methyl cyclohexane	NA	NA	NA	22000	33000	NA	NA	--	--	--	--	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Methylene Chloride	NA	56	960	470	4300	NA	NA	0.0044	<0.0058	<0.0025	0.0035	<0.0053	<0.0051	<0.0051	0.001	0.00056	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
n-Butyl Alcohol	NA	6100	62000	8200	100000	NA	NA	--	--	<0.052	<0.058	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NA	3900	51000	3300	34000	NA	NA	--	--	<0.001	<0.0011	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	NA	3400	21000	1600	4100	NA	NA	--	--	<0.0012	<0.0013	--	--	--	--	--	--	--	--	--	--
o-Chlorotoluene	NA	1600	20000	1100	5600	NA	NA	--	--	<0.0012	<0.0014	--	--	--	--	--	--	--	--	--	--
p-Chlorotoluene	NA	1600	20000	1600	20000	NA	NA	--	--	<0.0012	<0.0013	--	--	--	--	--	--	--	--	--	--
p-Isopropyl toluene	NA	NA	NA	8200	100000	NA	NA	--	--	<0.0012	<0.0014	--	--	--	--	--	--	--	--	--	--
Styrene	NA	6300	36000	4300	7800	NA	300	<0.001	<0.00058	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
tert-Butylbenzene	NA	7800	100000	3300	41000	NA	NA	--	--	<0.001	<0.0012	--	--	--	--	--	--	--	--	--	--
Tetra chloroethene	NA	22	110	420	770	NA	NA	<0.0004	<0.00058	<0.0014	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Toluene	NA	5000	45000	5400	29000	NA	200	0.0066	0.0024	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	0.00033	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
trans-1,2-Dichloroethene	NA	150	690	370	640	NA	NA	<0.0004	<0.00058	<0.0014	<0.0015	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
trans-1,3-Di chloropropene	NA	1.7	8.3	26	61	NA	NA	<0.001	<0.00058	<0.0014	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Trichloroethene	NA	0.91	6.4	11	21	NA	NA	<0.0004	<0.00058	<0.0013	<0.0015	<0.0053	<0.0051	<0.0051	0.0012	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Trichloro fluoromethane	NA	790	3400	25000	310000	NA	NA	<0.0004	<0.00036	<0.001	<0.0012	0.00025	0.00033	0.00027	0.00072	0.00048	0.00035	0.00014	<0.0051	<0.0052	<0.0062
Vinyl acetate	NA	970	4100	1500	2200	NA	NA	<0.00044	<0.00058	<0.0079	<0.0088	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	NA	0.06	1.7	3.4	13	NA	NA	<0.0004	<0.00058	<0.0014	<0.0016	<0.0053	<0.0051	<0.0051	<0.0079	<0.0087	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
m,p-Xylene	NA	590	2500	4700	6700	NA	NA	--	--	--	--	0.00015	0.00016	<0.0051	0.035	0.014	0.00017	<0.0051	<0.0051	<0.0052	<0.0062
o-Xylene	NA	690	3000	29000	48000	NA	NA	--	--	--	--	<0.0053	<0.0051	<0.0051	0.012	0.0042	<0.0076	<0.0051	<0.0051	<0.0052	<0.0062
Xylenes, Total	NA	630	2700	3700	6500	NA	NA	0.0023	0.023	<0.0039	<0.0044	0.00015	0.00016	<0.0051	0.047	0.0182	0.00017	<0.0051	<0.0051	<0.0052	<0.0062
Semi-Volatile Organic Compounds																					
1,1'-Biphenyl	NA	51	210	3300	34000	NA	60	--	--	--	--	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
1,2,4,5-Tetra chlorobenzene	NA	18	180	20	200	10	NA	--	--	--	--	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
1,2-Cyclohexanediol	NA	NA	NA	NA	NA	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
1,3&1,4-Cyclohexanediol	NA	NA	NA	NA	NA	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
1-Methyl naphthalene	NA	16	53	150	600	NA	NA	--	--	<0.043	<0.047	--	--	--	--	--	--	--	--	--	--
1-Phenylethanol	NA	NA	NA	NA	NA	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2,2'-oxybis(2-chloropropane)	NA	NA	NA	NA	NA	NA	NA	<0.041	<0.048	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetra chlorophenol	NA	1800	18000	180	2000	NA	NA	--	--	--	--	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2,4,5-Trichlorophenol	NA	6100	62000	6700	68000	9	4	<0.017	<0.059	<0.05	<0.055	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2,4,6-Trichlorophenol	NA	44	160	67	680	10	NA	<0.017	<0.059	<0.048	<0.052	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2,4-Dichlorophenol	NA	180	1800	200	2000	NA	NA	<0.023	<0.059	<0.061	<0.066	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2,4-Dimethylphenol	NA	1200	12000	1300	14000	NA	NA	<0.02	<0.059	<0.057	<0.062	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2,4-Dinitrophenol	NA	120	1200	130	1400	NA	20	<0.33	<0.39	<0.061	<0.066	<1.8	<0.37	<0.38	<2.3	<2.2	<0.4	<0.38	<0.77	<0.37	<0.4
2,4-Dinitrotoluene	NA	1.6	5.5	6.9	28	NA	NA	<0.17	<0.2	<0.079	<0.086	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2,6-Dinitrotoluene	NA	0.33	1.2	6.9	28	NA	NA	<0.017	<0.059	<0.046	<0.05	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2-Chloro naphthalene	NA	6300	82000	5000	50000	NA	NA	<0.017	<0.059	<0.05	<0.054	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2-Chlorophenol	NA	390	5100	410	5100	NA	NA	<0.028	<0.033	<0.055	<0.06	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2-Methyl naphthalene	NA	230	2200	250	2500	NA	NA	<0.031	0.079	<0.048	<0.052	<0.036	0.0019	<0.0038	<0.046	<0.022	<0.004	<0.0038	<0.0077	<0.0037	<0.004
2-Methylphenol	NA	3100	31000	3300	34000	NA	NA	<0.033	<0.039	<0.039	<0.043	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
2-Nitroaniline	NA	610	6000	11	29	NA	NA	<0.022	<0.059	<0.047	<0.051	<1.8	<0.37	<0.38	<2.3	<2.2	<0.4	<0.38	<0.77	<0.37	<0.4
2-Nitrophenol	NA	NA	NA	130	1400	NA	NA	<0.017	<0.059	--	--	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
3,3'-Dichloro benzidine	NA	1.1	3.8	10	42	NA	NA	<0.17	<0.2	<0.073	<0.079	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
3-Nitroaniline	NA	NA	NA	12	36	NA	NA	<0.026	<0.2	<0.067	<0.073	<1.8	<0.37	<0.38	<2.3	<2.2	<0.4	<0.38	<0.77	<0.37	<0.4
4,6-Dinitro-2-methylphenol	NA	4.9	49	6.7	68	NA	NA	<0.17	<0.2	<0.11	<0.12	<1.8	<0.37	<0.38	<2.3	<2.2	<0.4	<0.38	<0.77	<0.37	<0.4
4-Bromophenyl-phenylether	NA	NA	NA	0.27	1.1	NA	NA	<0.017	<0.059	<0.069	<0.075	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
4-Chloro-3-methylphenol	NA	NA	NA	330	3400	NA	NA	<0.017	<0.059	<0.041	<0.045	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
4-Chloroaniline	NA	2.4	8.6	23	95	NA	NA	<0.047	<0.2	<0.051	<0.055	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
4-Chlorophenyl-phenylether	NA	NA	NA	0.15	0.8	NA	NA	<0.17	<0.059	<0.055	<0.06	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
4-Methylphenol	NA	6100	62000	330	3400	NA	NA	<0.017	<0.059	<0.059	<0.064	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
4-Nitroaniline	NA	24	86	190	660	NA	NA	<0.028	<0.033	<0.099	<0.11	<1.8	<0.37	<0.38	<2.3	<2.2	<0.4	<0.38	<0.77	<0.37	<0.4
4-Nitrophenol	NA	NA	NA	130	1400	7	NA	<0.33	<0.2	<0.071	<0.077	<1.8	<0.37	<0.38	<2.3	<2.2	<0.4	<0.38	<0.77	<0.37	<0.4
7,12-Dimethylbenz(a)anthrace	NA	0.00043	0.0062	0.017	0.069	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
Acenaphthene	NA	3400	33000	3000	37000	NA	20	<0.017	<0.059	<0.044	<0.047	0.021	0.013	<0.0038	<0.046	<0.022	<0.004	<0.0038	0.0051	<0.0037	<0.004
Acenaphthylene	NA	NA	NA	3800	37000	NA	NA	<0.017	<0.059	<0.049	<0.053	<0.036	0.0038	0.0027	<0.046	0.013	<0.004	<0.0038	0.009	0.0047	<0.004
Acetophenone	NA	7800	100000	6700	68000	NA	NA	--	--	--	--	<0.92	0.022	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	0.02	<0.2
Anthracene	NA	17000	170000	18000	190000	NA	NA	<0.017	<0.059	<0.059	<0.064	0.063	0.039	0.0037	<0.046	0.013	0.0023	<0.0038	0.019	0.0064	<0.004

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SR-West_5'	EXC-1	FRA-133A	FRA-135	MW-17-0.0-0.5	MW-17-0.5-2.0	MW-17-2.0-3.5	SO4-01-0.0-0.5	SO4-01-0.0-0.5 Dup	SO4-01-0.5-2.0	SO4-01-2.0-3.0	SO4-02-0.0-0.5	SO4-02-0.5-2.0	SO4-02-2.0-3.0
	Background	USEPA		TCEQ																	
		Res	C/I	Res	C/I	Earthworms	Plants	06/26/06	05/08/07	12/10/07	12/10/07	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Atrazine	NA	2.1	7.5	21	86	NA	NA	--	--	--	--	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Benzaldehyde	NA	7800	100000	8200	10000	NA	NA	--	--	--	--	<0.92	0.023	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	0.03	<0.2
Benzenethiol	NA	78	1000	82	1000	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
Benzo(a) anthracene	NA	0.15	2.1	5.6	24	NA	NA	<0.017	0.41	0.194	<0.073	0.62	0.19	0.0098	0.081	0.054	0.008	<0.0038	0.073	0.015	<0.004
Benzo(a)pyrene	NA	0.015	0.21	0.56	2.4	NA	NA	<0.017	0.3	0.186	<0.064	0.52	0.17	0.01	0.099	0.071	0.007	<0.0038	0.065	0.023	<0.004
Benzo(b) fluoranthene	NA	0.15	2.1	5.7	24	NA	NA	<0.017	0.26	0.227	<0.082	0.85	0.27	0.023	0.23	0.17	0.011	<0.0038	0.11	0.04	<0.004
Benzo(g,h,i) perylene	NA	NA	NA	1800	19000	NA	NA	<0.017	0.19	0.221	<0.11	0.25	0.078	0.005	0.066	0.052	0.0017	<0.0038	0.022	0.0077	<0.004
Benzo(k) fluoranthene	NA	1.5	21	57	240	NA	NA	<0.017	<0.059	0.0884	<0.09	0.27	0.085	0.0053	0.055	0.043	0.0034	<0.0038	0.035	0.01	<0.004
Benzoic acid	NA	240000	2500000	270000	2700000	NA	NA	--	--	<0.045	<0.049	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	NA	6100	62000	6700	68000	NA	NA	<0.025	<0.059	<0.064	<0.069	--	--	--	--	--	--	--	--	--	--
Bis(2-chloro ethoxy)methane	NA	180	1800	2.5	6.2	NA	NA	<0.017	<0.059	<0.067	<0.073	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Bis(2-chloro ethyl)ether	NA	0.21	1	1.4	2.8	NA	NA	<0.037	<0.044	<0.038	<0.042	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
bis(2-Ethylhexyl) phthalate	NA	35	120	43	560	NA	NA	<0.017	0.64	0.192	0.133	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Butyl benzyl phthalate	NA	260	910	1600	10000	NA	NA	<0.017	<0.059	<0.086	<0.093	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Caprolactam	NA	30000	300000	33000	41000	NA	NA	--	--	--	--	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Carbazole	NA	NA	NA	230	950	NA	NA	--	--	<0.077	<0.084	<0.92	0.032	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Chrysene	NA	15	210	560	2400	NA	NA	<0.017	0.99	0.285	<0.064	0.66	0.2	0.011	0.13	0.09	0.0088	<0.0038	0.085	0.023	<0.004
Dibenz(a,h) acridine	NA	NA	NA	3.7	16	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h) anthracene	NA	0.015	0.21	0.55	2.4	NA	NA	<0.017	0.064	<0.063	<0.068	0.078	0.028	0.002	0.022	0.016	<0.004	<0.0038	0.01	0.0047	<0.004
Dibenzofuran	NA	78	1000	270	2700	NA	NA	<0.017	<0.059	<0.05	<0.054	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Diethylphthalate	NA	49000	490000	53000	550000	NA	100	<0.017	<0.059	<0.05	<0.054	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Dimethyl phthalate	NA	NA	NA	53000	550000	200	NA	<0.017	<0.059	<0.045	<0.048	<0.92	<0.19	0.022	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Di-n-butylphthalate	NA	49000	490000	6200	68000	NA	200	<0.017	<0.059	<0.088	<0.096	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Di-n-octylphthalate	NA	610	6200	2600	27000	NA	NA	<0.017	0.18	<0.17	<0.18	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Diphenylamine	NA	1500	15000	1700	17000	NA	NA	--	--	<0.079	<0.086	--	--	--	--	--	--	--	--	--	--
Fluoranthene	NA	2300	22000	2300	25000	NA	NA	<0.017	0.1	0.244	<0.088	1.4	0.39	0.025	0.19	0.098	0.014	<0.0038	0.16	0.032	<0.004
Fluorene	NA	2300	22000	2300	25000	30	NA	<0.017	0.096	<0.055	<0.059	0.015	0.0076	<0.0038	<0.046	<0.022	<0.004	<0.0038	0.0037	<0.0037	<0.004
Hexachloro benzene	NA	0.3	1.1	1	6.9	NA	NA	<0.017	<0.059	<0.059	<0.064	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Hexachloro butadiene	NA	6.2	22	12	23	NA	NA	<0.045	<0.053	<0.055	<0.059	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Hexachloro cyclopentadiene	NA	370	3700	7.2	10	NA	10	<0.17	<0.078	<0.065	<0.071	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Hexachloro ethane	NA	12	43	46	420	NA	NA	<0.05	<0.059	<0.053	<0.057	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Indene	NA	NA	NA	56	80	NA	NA	--	--	<0.9	<0.98	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NA	0.15	2.1	5.7	24	NA	NA	<0.017	<0.059	0.169	<0.076	0.37	0.12	0.009	0.12	0.082	0.0058	<0.0038	0.054	0.024	<0.004
Isophorone	NA	510	1800	4900	20000	NA	NA	<0.017	<0.059	<0.047	<0.051	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Naphthalene	NA	3.6	18	120	190	NA	NA	<0.042	0.11	<0.044	<0.047	<0.036	0.0025	<0.0038	<0.046	<0.022	<0.004	<0.0038	<0.0077	<0.0037	<0.004
Nitrobenzene	NA	4.8	24	34	57	NA	NA	<0.036	<0.043	<0.05	<0.055	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
N-Nitroso-di-n-propylamine	NA	0.069	0.25	0.4	1.4	NA	NA	<0.017	<0.059	<0.072	<0.079	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
N-Nitrosodi phenylamine	NA	99	350	570	1900	20	NA	<0.017	<0.059	<0.079	<0.086	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Pentachlorophenol	NA	NA	NA	0.73	32	31	5	<0.025	<0.2	<0.047	<0.052	<0.073	<0.0075	<0.0077	<0.094	<0.045	<0.008	<0.0076	<0.016	<0.0076	<0.008
Phenanthrene	NA	NA	NA	1700	19000	NA	NA	<0.017	0.3	0.129	<0.073	0.39	0.19	0.014	0.043	0.026	0.0066	<0.0038	0.059	0.011	<0.004
Phenol	NA	18000	180000	2000	20000	30	70	<0.017	<0.059	<0.072	<0.079	<0.92	<0.19	<0.2	<1.2	<1.1	<0.2	<0.19	<0.4	<0.19	<0.2
Pyrene	NA	1700	17000	1700	19000	NA	NA	<0.017	0.35	0.358	<0.095	1.1	0.31	0.021	0.17	0.09	0.014	<0.0038	0.13	0.025	<0.004
Quinoline	NA	0.16	0.57	1.6	6.4	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (TPH)																					
TPH (C6-C12)	NA	NA	NA	1,100	2,100	NA	NA	--	<7	--	--	--	--	--	--	--	--	--	--	--	--
TPH (>C12-C28)	NA	NA	NA	2,000	7,800	NA	NA	--	210	--	--	--	--	--	--	--	--	--	--	--	--
TPH (>C28-C35)	NA	NA	NA	2,000	7,800	NA	NA	--	120	--	--	--	--	--	--	--	--	--	--	--	--
TPH (C6-C35)	NA	NA	NA	1,100	2,100	NA	NA	--	330	--	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Byphenols																					
Aroclor 1016	NA	3.9	21.0	1.1	7.1	NA	40	--	--	<0.012	<0.013	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NA	0.1	0.5	1.1	7.1	NA	40	--	--	<0.018	<0.02	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NA	0.1	0.5	1.1	7.1	NA	40	--	--	<0.011	<0.012	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NA	0.2	0.7	1.1	7.1	NA	40	--	--	<0.016	<0.017	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NA	0.2	0.7	1.1	7.1	NA	40	--	--	<0.015	<0.016	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NA	0.2	0.7	1.1	7.1	NA	40	--	--	<0.015	<0.017	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NA	0.2	0.7	1.1	7.1	NA	40	--	--	<0.0076	<0.0083	--	--	--	--	--	--	--	--	--	--
Pesticides																					
Aldrin	NA	0.029	0.1	0.05	0.97	NA	NA	--	--	<0.00044	<0.00048	--	--	--	--	--	--	--	--	--	--
alpha-BHC	NA	0.077	0.27	0.25	2.9	NA	NA	--	--	<0.0004	<0.00044	--	--	--	--	--	--	--	--	--	--
beta-BHC	NA	0.27	0.96	0.92	11	NA	NA	--	--	<0.00058	<0.00064	--	--	--	--	--	--	--	--	--	--
delta-BHC	NA	NA	NA	2.9	12	NA	NA	--	--	<0.00058	<0.00064	--	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	NA	0.52	2.1	1.1	18	NA	NA	--	--	<0.0008	<0.00087	--	--	--	--	--	--	--	--	--	--
alpha-Chlordane	NA	1.6	6.5	13	54	NA	NA	--	--	<0.00036	<0.0004	--	--	--	--	--	--	--	--	--	--
gamma-Chlordane	NA	1.6	6.5	7.3	51	NA	NA	--	--	<0.00036	<0.0004	--	--	--	--	--	--	--	--	--	--
Dieldrin	NA	0.03	0.11	0.15	1.1	NA	NA	--	--	<0.00098	<0.0011	--	--	--	--	--	--	--	--	--	--
4,4'-DDD	NA	2	7.2	14	100	NA	NA	--	--	<0.0011	<0.0012	--	--	--	--	--	--	--	--	--	--
4,4'-DDE	NA	1.4	5.1	10	73	NA	NA	--	--	<0.0014	<0.0015	--	--	--	--	--	--	--	--	--	--
4,4'-DDT	NA	1.7	7	5.4	68	NA	NA	--	--	<0.0016	<0.0017	--	--	--	--	--	--	--	--	--	--
Endrin	NA	18	180	9	200	NA	NA	--	--	<0.0012	<0.0014	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	NA	NA	NA	380	4100	NA	NA	--	--	<0.0011	<0.0012	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	NA	NA	NA	19	200	NA	NA	--	--	<0.0015	<0.0017	--	--	--	--	--	--	--	--	--	--
Endrin ketone	NA	NA	NA	19	200	NA	NA	--	--	<0.00098	<0.0011	--	--	--	--	--	--	--	--	--	--
Endosulfan-I	NA	370	3700	91	1400	NA	NA	--	--	<0.00051	<0.00056	--	--	--	--	--	--	--	--	--	--

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SR-West_5'	EXC-1	FRA-133A	FRA-135	MW-17-0.0-0.5	MW-17-0.5-2.0	MW-17-2.0-3.5	SO4-01-0.0-0.5	SO4-01-0.0-0.5 Dup	SO4-01-0.5-2.0	SO4-01-2.0-3.0	SO4-02-0.0-0.5	SO4-02-0.5-2.0	SO4-02-2.0-3.0
	Background	USEPA		TCEQ																	
		Res	C/I	Res	C/I	Earthworms	Plants	06/26/06	05/08/07	12/10/07	12/10/07	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Endosulfan-II	NA	370	3700	270	4100	NA	NA	--	--	<0.00091	<0.00099	--	--	--	--	--	--	--	--	--	--
Heptachlor	NA	0.11	0.38	0.13	2.8	NA	NA	--	--	<0.00051	<0.00056	--	--	--	--	--	--	--	--	--	--
Heptachlor epoxide	NA	0.053	0.19	0.24	1.9	NA	NA	--	--	<0.00036	<0.0004	--	--	--	--	--	--	--	--	--	--
Methoxychlor	NA	310	3100	270	3400	NA	NA	--	--	<0.008	<0.0087	--	--	--	--	--	--	--	--	--	--
Toxaphene	NA	0.44	1.6	1.2	17	NA	NA	--	--	<0.014	<0.015	--	--	--	--	--	--	--	--	--	--
Herbicides																					
2,4-Dichlorophenoxy Acetic Acid	NA	690	7700	730	8200	NA	NA	--	--	<0.014	<0.016	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenoxypropionic acid (Silvex)	NA	490	4900	530	5500	NA	NA	--	--	<0.013	<0.014	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenoxyacetic Acid	NA	610	6100	670	6800	NA	NA	--	--	<0.0036	<0.004	--	--	--	--	--	--	--	--	--	--
Dicamba	NA	1800	18000	2000	20000	NA	NA	--	--	<0.0054	<0.0059	--	--	--	--	--	--	--	--	--	--
Dinoseb	NA	61	620	67	680	NA	NA	--	--	<0.0047	<0.0051	--	--	--	--	--	--	--	--	--	--
Dalapon	NA	1800	18000	2000	20000	NA	NA	--	--	<0.025	<0.028	--	--	--	--	--	--	--	--	--	--
Dichloroprop	NA	NA	NA	670	6800	NA	NA	--	--	<0.0098	<0.011	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenoxy)butyric Acid	NA	490	4900	530	5500	NA	NA	--	--	<0.059	<0.064	--	--	--	--	--	--	--	--	--	--
MCPP	NA	61	620	67	680	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
MCPA	NA	31	310	33	340	NA	NA	--	--	<0.18	<0.2	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	NA	0.89	2.7	0.73	32	NA	NA	--	--	<0.0011	<0.0012	--	--	--	--	--	--	--	--	--	--

Notes:
Yellow highlights indicates value exceeds residential soil screening levels.
Orange highlights indicate value exceeds both residential and commercial/industrial soil screening levels
Italic values indicate value exceeds soil screening levels protective of earthworms.
Bold values indicate value exceeds soil screening levels protective of plants.

Abbreviations:
-- = not analyzed
<# = not detected above the reporting limit
C/I = commercial/industrial
Dup = duplicate sample
NA = not available
Res = residential
TCEQ = Texas Commission on Environmental Quality
USEPA = United States Environmental Protection Agency

Footnotes:
[a] The soil screening Levels were compiled from the following locations:
Background: Texas Specific Median Background concentrations from Texas Risk Reduction Program rule at Section 350.51(m) accessed December 2013.
(http://www.tceq.texas.gov/assets/public/remediation/trrp/background.pdf)
USEPA_Res and _C/I: USEPA Region 6 Regional Screening Levels published November 2013.
(http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm)
TCEQ_Res and _C/I: TCEQ Protective Concentration Limit Texas Risk Reduction Program published June 2012.
(http://www.tceq.texas.gov/remediation/trrp/trrppcls.html)
TCEQ_Earthworms and _Plants: Benchmarks from Table 3-4 of the TCEQ January 2006 Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas RG-263 (Revised).

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SO4-03-0.0-0.5	SO4-03-0.5-2.0	SO4-04-0.0-0.5	SO4-04-0.0-0.5 Dup	SO4-04-0.5-2.0	SO4-04-2.0-3.0	SO4-05-0.0-0.5	SO4-05-0.5-2.0	SO4-05-2.0-3.0
	Background	USEPA		TCEQ												
		Res	C/I	Res	C/I	Earthworms	Plants	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Inorganics																
Aluminum	30000	990000	77000	64000	570000	NA	NA	2210	1140	3930	3920	2720	1950	3450	2190	3630
Antimony	1	410	31	15	310	78	5	<1.1	<0.83	<1.1	<0.79	<1	<0.9	<0.93	<1.1	<1
Arsenic	5.9	2.4	0.61	24	200	60	18	1.2	0.98	1.4	2	0.86	1	1.6	0.82	1
Barium	300	190000	15000	8100	120000	330	500	113	68.4	360	352	94.9	165	174	17.4	8.5
Beryllium	1.5	2000	160	38	250	40	10	<0.55	<0.42	<0.54	<0.4	<0.52	<0.45	<0.46	<0.54	<0.52
Cadmium	NA	800	70	52	850	140	32	<0.55	<0.42	<0.54	<0.4	<0.52	<0.45	<0.46	<0.54	<0.52
Calcium	NA	NA	NA	NA	NA	NA	NA	264000	146000	48300	56200	34900	67500	87700	17400	7660
Chromium	30	1500000	120000	27000	75000	0.4	1	4.3	1.3	4.9	17.6	2	1.8	4	2.3	3.4
Chromium, Hexavalent	30	5.6	0.29	120	1000	0.4	1	--	--	--	--	--	--	--	--	--
Cobalt	7	300	23	21	270	NA	13	1.5	0.58	1.1	1.7	0.53	<0.45	0.85	<0.54	0.75
Copper	15	41000	3100	550	39000	60	100	5.8	2.6	10.4	39.8	1.6	1.2	5	<1.1	<1
Iron	15000	720000	55000	NA	NA	NA	NA	2620	1340	4940	5160	2890	1650	7060	2010	3130
Lead	15	800	400	500	1600	1700	120	11.6	6.5	8.6	7.9	3.3	3.4	12.2	5.7	1.9
Magnesium	NA	NA	NA	NA	NA	NA	NA	2370	1210	1880	1860	1330	1340	1820	1100	2090
Manganese	300	23000	1800	3400	24000	NA	500	137	120	89.7	97.8	68.8	74.6	106	54	79.7
Mercury	0.04	43	10	2.1	3.3	0.1	0.3	***0.43***	0.074	*0.27*	*0.2*	0.052	0.032	*0.13*	0.016	0.006
Nickel	10	9900	820	840	8600	200	30	2.3	1.1	3.1	13	1.1	0.88	2.6	1.1	1.8
Potassium	NA	NA	NA	NA	NA	NA	NA	804	302	753	854	706	552	840	679	1110
Selenium	0.3	5100	390	310	4900	70	1	**<2.7**	**<2.1**	**<2.7**	**<2**	**<2.6**	**<2.2**	**<2.3**	**<2.7**	**<2.6**
Silver	NA	5100	390	97	2300	NA	2	<0.55	<0.42	<0.54	<0.4	<0.52	<0.45	<0.46	<0.54	<0.52
Sodium	NA	NA	NA	NA	NA	NA	NA	2380	1010	549	625	1130	1050	979	443	471
Thallium	NA	10	0.78	6.3	78	NA	1	<0.55	<0.42	<0.54	<0.4	<0.52	<0.45	<0.46	<0.54	<0.52
Vanadium	50	5100	390	75	610	NA	2	6.5	1.7	6.8	4.7	4.2	3.3	5.1	3.2	5.5
Zinc	30	310000	23000	9900	250000	120	190	***231***	21.7	*135*	105	30.6	13.9	71.8	66.1	5.7
Volatile Organic Compounds																
1,1,1,2-Tetra chloroethane	NA	1.9	9.3	39	73	NA	NA	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	8700	38000	32000	55000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,1,2,2-Tetra chloroethane	NA	0.56	2.8	30	140	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	43000	180000	220000	330000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,1,2-Trichloroethane	NA	1.1	5.3	10	19	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,1-Dichloroethane	NA	3.3	17	8800	23000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,1-Dichloroethene	NA	240	1100	1600	3500	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,1-Dichloro propene	NA	NA	NA	26	61	NA	NA	--	--	--	--	--	--	--	--	--
1,2,3-Tri chlorobenzene	NA	49	490	87	200	20	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,2,3-Tri chloropropane	NA	0.005	0.095	0.2	0.95	NA	NA	--	--	--	--	--	--	--	--	--
1,2,4-Tri chlorobenzene	NA	22	99	70	110	20	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,2,4-Trimethyl benzene	NA	62	260	79	110	NA	NA	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	NA	0.0054	0.069	0.08	0.14	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,2-Dibromoethane	NA	0.034	0.17	0.43	0.79	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,2-Dichloro benzene	NA	1900	9800	390	570	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,2-Dichloroethane	NA	0.43	2.2	6.4	11	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,2-Dichloropropane	NA	0.94	4.7	31	44	700	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,3,5-Trimethyl benzene	NA	780	10000	59	83	NA	NA	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	NA	NA	NA	62	88	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,3-Dichloropropane	NA	1600	20000	26	61	NA	NA	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NA	2.4	12	250	1200	20	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
1,4-Dioxane	NA	4.9	17	61	290	NA	NA	<0.097	<0.11	<0.12	<0.12	<0.15	<0.11	<0.11	<0.1	<0.1
2,2-Dichloropropane	NA	NA	NA	31	44	NA	NA	--	--	--	--	--	--	--	--	--
2-Butanone	NA	28000	200000	33000	120000	NA	NA	<0.0097	<0.011	<0.012	<0.012	<0.015	<0.011	<0.011	<0.01	<0.01
2-Hexanone	NA	210	1400	210	530	NA	NA	<0.0097	<0.011	<0.012	<0.012	<0.015	<0.011	<0.011	<0.01	<0.01
2-Nitropropane	NA	0.013	0.064	0.068	0.11	NA	NA	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	NA	5300	53000	5400	28000	NA	NA	<0.0097	<0.011	<0.012	<0.012	<0.015	<0.011	<0.011	<0.01	<0.01
Acetone	NA	61000	630000	59000	290000	NA	NA	<0.0097	<0.011	<0.012	<0.012	<0.015	<0.011	<0.011	0.0069	0.0069
Acetonitrile	NA	870	3700	530	910	NA	NA	--	--	--	--	--	--	--	--	--
Acrolein	NA	0.15	0.65	11	20	NA	NA	--	--	--	--	--	--	--	--	--
Acrylonitrile	NA	0.24	1.2	2.2	4.2	NA	NA	--	--	--	--	--	--	--	--	--
Benzene	NA	1.1	5.4	69	130	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Bromobenzene	NA	300	1800	280	640	NA	NA	--	--	--	--	--	--	--	--	--
Bromo chloromethane	NA	160	680	3300	4100	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Bromodi chloromethane	NA	0.27	1.4	98	460	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Bromoform	NA	62	220	280	600	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Bromomethane	NA	7.3	32	29	53	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Carbon disulfide	NA	820	3700	3300	7200	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Carbon tetrachloride	NA	0.61	3	23	46	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Chlorobenzene	NA	290	1400	320	540	40	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Chloroethane	NA	15000	61000	23000	87000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Chloroform	NA	0.29	1.5	8	13	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	0.00055	<0.0056	<0.0052	<0.005
Chloromethane	NA	120	500	84	160	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
cis-1,2-Dichloroethene	NA	160	2000	120	500	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
cis-1,3-Dichloro propene	NA	1.7	8.3	7.8	53	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Cyclohexane	NA	7000	29000	42000	65000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SO4-03-0.0-0.5	SO4-03-0.5-2.0	SO4-04-0.0-0.5	SO4-04-0.0-0.5 Dup	SO4-04-0.5-2.0	SO4-04-2.0-3.0	SO4-05-0.0-0.5	SO4-05-0.5-2.0	SO4-05-2.0-3.0
	Background	USEPA		TCEQ												
		Res	C/I	Res	C/I	Earthworms	Plants	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Dibromo chloromethane	NA	0.68	3.3	72	340	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Dibromo methane	NA	25	110	42	59	NA	NA	--	--	--	--	--	--	--	--	--
Dichlorodi fluoromethane	NA	94	400	750	1100	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Ethyl acetate	NA	670	2800	74000	920000	NA	NA	--	--	--	--	--	--	--	--	--
Ethyl ether	NA	16000	200000	16000	200000	NA	NA	--	--	--	--	--	--	--	--	--
Ethyl methacrylate	NA	1500	7500	2400	4800	NA	NA	--	--	--	--	--	--	--	--	--
Ethylbenzene	NA	5.4	27	5300	17000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Hexachloro butadiene	NA	6.2	22	12	23	NA	NA	--	--	--	--	--	--	--	--	--
Hexane	NA	570	2600	2500	6600	NA	NA	--	--	--	--	--	--	--	--	--
Iodomethane	NA	NA	NA	110	1400	NA	NA	--	--	--	--	--	--	--	--	--
Isopropyl benzene	NA	2100	11000	3000	6300	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Methyl acetate	NA	78000	1000000	82000	1000000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Methyl methacrylate	NA	4800	21000	5300	7700	NA	NA	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether	NA	43	220	590	1100	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	0.00096
Methyl cyclohexane	NA	NA	NA	22000	33000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Methylene Chloride	NA	56	960	470	4300	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
n-Butyl Alcohol	NA	6100	62000	8200	100000	NA	NA	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NA	3900	51000	3300	34000	NA	NA	--	--	--	--	--	--	--	--	--
n-Propylbenzene	NA	3400	21000	1600	4100	NA	NA	--	--	--	--	--	--	--	--	--
o-Chlorotoluene	NA	1600	20000	1100	5600	NA	NA	--	--	--	--	--	--	--	--	--
p-Chlorotoluene	NA	1600	20000	1600	20000	NA	NA	--	--	--	--	--	--	--	--	--
p-Isopropyl toluene	NA	NA	NA	8200	100000	NA	NA	--	--	--	--	--	--	--	--	--
Styrene	NA	6300	36000	4300	7800	NA	300	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
tert-Butylbenzene	NA	7800	100000	3300	41000	NA	NA	--	--	--	--	--	--	--	--	--
Tetra chloroethene	NA	22	110	420	770	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Toluene	NA	5000	45000	5400	29000	NA	200	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
trans-1,2-Dichloroethene	NA	150	690	370	640	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
trans-1,3-Di chloropropene	NA	1.7	8.3	26	61	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Trichloroethene	NA	0.91	6.4	11	21	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Trichloro fluoromethane	NA	790	3400	25000	310000	NA	NA	<0.0049	<0.0053	0.00027	0.00018	0.00018	0.00019	0.00023	0.00034	0.00015
Vinyl acetate	NA	970	4100	1500	2200	NA	NA	--	--	--	--	--	--	--	--	--
Vinyl chloride	NA	0.06	1.7	3.4	13	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
m,p-Xylene	NA	590	2500	4700	6700	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	0.00067	0.00016	<0.0056	0.00014	<0.005
o-Xylene	NA	690	3000	29000	48000	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	<0.0077	<0.0054	<0.0056	<0.0052	<0.005
Xylenes, Total	NA	630	2700	3700	6500	NA	NA	<0.0049	<0.0053	<0.0059	<0.0059	0.00067	0.00016	<0.0056	0.00014	<0.005
Semi-Volatile Organic Compounds																
1,1'-Biphenyl	NA	51	210	3300	34000	NA	60	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
1,2,4,5-Tetra chlorobenzene	NA	18	180	20	200	10	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
1,2-Cyclohexanediol	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
1,3&1,4-Cyclohexanediol	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
1-Methyl naphthalene	NA	16	53	150	600	NA	NA	--	--	--	--	--	--	--	--	--
1-Phenylethanol	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2,2'-oxybis(2-chloropropane)	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetra chlorophenol	NA	1800	18000	180	2000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2,4,5-Trichlorophenol	NA	6100	62000	6700	68000	9	4	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2,4,6-Trichlorophenol	NA	44	160	67	680	10	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2,4-Dichlorophenol	NA	180	1800	200	2000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2,4-Dimethylphenol	NA	1200	12000	1300	14000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2,4-Dinitrophenol	NA	120	1200	130	1400	NA	20	<1.9	<0.73	<1.8	<1.8	<0.36	<2	<0.36	<0.37	<0.39
2,4-Dinitrotoluene	NA	1.6	5.5	6.9	28	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2,6-Dinitrotoluene	NA	0.33	1.2	6.9	28	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2-Chloro naphthalene	NA	6300	82000	5000	50000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2-Chlorophenol	NA	390	5100	410	5100	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2-Methyl naphthalene	NA	230	2200	250	2500	NA	NA	<0.057	<0.0073	<0.073	<0.074	<0.018	<0.02	<0.072	<0.11	<0.0039
2-Methylphenol	NA	3100	31000	3300	34000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
2-Nitroaniline	NA	610	6000	11	29	NA	NA	<1.9	<0.73	<1.8	<1.8	<0.36	<2	<0.36	<0.37	<0.39
2-Nitrophenol	NA	NA	NA	130	1400	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
3,3'-Dichloro benzidine	NA	1.1	3.8	10	42	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
3-Nitroaniline	NA	NA	NA	12	36	NA	NA	<1.9	<0.73	<1.8	<1.8	<0.36	<2	<0.36	<0.37	<0.39
4,6-Dinitro-2-methylphenol	NA	4.9	49	6.7	68	NA	NA	<1.9	<0.73	<1.8	<1.8	<0.36	<2	<0.36	<0.37	<0.39
4-Bromophenyl-phenylether	NA	NA	NA	0.27	1.1	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
4-Chloro-3-methylphenol	NA	NA	NA	330	3400	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
4-Chloroaniline	NA	2.4	8.6	23	95	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
4-Chlorophenyl-phenylether	NA	NA	NA	0.15	0.8	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
4-Methylphenol	NA	6100	62000	330	3400	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
4-Nitroaniline	NA	24	86	190	660	NA	NA	<1.9	<0.73	<1.8	<1.8	<0.36	<2	<0.36	<0.37	<0.39
4-Nitrophenol	NA	NA	NA	130	1400	7	NA	<1.9	<0.73	<1.8	<1.8	<0.36	<2	<0.36	<0.37	<0.39
7,12-Dimethylbenz(a)anthrace	NA	0.00043	0.0062	0.017	0.069	NA	NA	--	--	--	--	--	--	--	--	--
Acenaphthene	NA	3400	33000	3000	37000	NA	20	<0.057	<0.0073	<0.073	0.032	<0.018	0.11	<0.072	0.028	<0.0039
Acenaphthylene	NA	NA	NA	3800	37000	NA	NA	0.028	0.009	0.061	<0.074	0.0098	0.012	<0.072	<0.11	<0.0039
Acetophenone	NA	7800	100000	6700	68000	NA	NA	<0.98	<0.38	<0.94	<0.95	0.025	<1	0.062	0.078	0.046
Anthracene	NA	17000	170000	18000	190000	NA	NA	0.036	0.011	0.065	0.063	0.014	0.028	0.026	0.13	0.0016

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SO4-03-0.0-0.5	SO4-03-0.5-2.0	SO4-04-0.0-0.5	SO4-04-0.0-0.5 Dup	SO4-04-0.5-2.0	SO4-04-2.0-3.0	SO4-05-0.0-0.5	SO4-05-0.5-2.0	SO4-05-2.0-3.0
	Background	USEPA		TCEQ												
		Res	C/I	Res	C/I	Earthworms	Plants	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Atrazine	NA	2.1	7.5	21	86	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Benzaldehyde	NA	7800	100000	8200	10000	NA	NA	<0.98	<0.38	<0.94	<0.95	0.031	<1	0.066	0.074	0.062
Benzenethiol	NA	78	1000	82	1000	NA	NA	--	--	--	--	--	--	--	--	--
Benzo(a) anthracene	NA	0.15	2.1	5.6	24	NA	NA	0.1	0.0086	0.33	0.57	0.052	0.05	0.11	0.33	0.0045
Benzo(a)pyrene	NA	0.015	0.21	0.56	2.4	NA	NA	0.16	0.012	0.41	0.56	0.054	0.053	0.098	0.25	0.0033
Benzo(b) fluoranthene	NA	0.15	2.1	5.7	24	NA	NA	0.26	0.029	0.61	0.9	0.092	0.11	0.16	0.39	0.0048
Benzo(g,h,i) perylene	NA	NA	NA	1800	19000	NA	NA	0.15	0.0043	0.21	0.23	0.024	0.021	0.034	0.089	<0.0039
Benzo(k) fluoranthene	NA	1.5	21	57	240	NA	NA	0.072	0.0086	0.19	0.31	0.032	0.029	0.05	0.13	0.0017
Benzoic acid	NA	240000	2500000	270000	2700000	NA	NA	--	--	--	--	--	--	--	--	--
Benzyl alcohol	NA	6100	62000	6700	68000	NA	NA	--	--	--	--	--	--	--	--	--
Bis(2-chloro ethoxy)methane	NA	180	1800	2.5	6.2	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Bis(2-chloro ethyl)ether	NA	0.21	1	1.4	2.8	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
bis(2-Ethylhexyl) phthalate	NA	35	120	43	560	NA	NA	<0.98	<0.38	0.22	0.13	0.022	<1	0.094	<0.19	<0.2
Butyl benzyl phthalate	NA	260	910	1600	10000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Caprolactam	NA	30000	300000	33000	41000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Carbazole	NA	NA	NA	230	950	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	0.019	0.026	<0.2
Chrysene	NA	15	210	560	2400	NA	NA	0.19	0.015	0.36	0.67	0.06	0.055	0.12	0.3	0.0042
Dibenz(a,h) acridine	NA	NA	NA	3.7	16	NA	NA	--	--	--	--	--	--	--	--	--
Dibenzo(a,h) anthracene	NA	0.015	0.21	0.55	2.4	NA	NA	0.053	0.0031	0.064	0.082	0.01	0.01	<0.072	0.025	<0.0039
Dibenzofuran	NA	78	1000	270	2700	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Diethylphthalate	NA	49000	490000	53000	550000	NA	100	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Dimethyl phthalate	NA	NA	NA	53000	550000	200	NA	<0.98	<0.38	0.15	<0.95	<0.19	<1	0.02	<0.19	<0.2
Di-n-butylphthalate	NA	49000	490000	6200	68000	NA	200	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Di-n-octylphthalate	NA	610	6200	2600	27000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Diphenylamine	NA	1500	15000	1700	17000	NA	NA	--	--	--	--	--	--	--	--	--
Fluoranthene	NA	2300	22000	2300	25000	NA	NA	0.25	0.0087	0.48	0.95	0.08	0.1	0.21	0.77	0.0094
Fluorene	NA	2300	22000	2300	25000	30	NA	<0.057	<0.0073	<0.073	<0.074	<0.018	<0.02	<0.072	<0.11	<0.0039
Hexachloro benzene	NA	0.3	1.1	1	6.9	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Hexachloro butadiene	NA	6.2	22	12	23	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Hexachloro cyclopentadiene	NA	370	3700	7.2	10	NA	10	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Hexachloro ethane	NA	12	43	46	420	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Indene	NA	NA	NA	56	80	NA	NA	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NA	0.15	2.1	5.7	24	NA	NA	0.15	0.016	0.32	0.38	0.048	0.046	0.07	0.2	0.0025
Isophorone	NA	510	1800	4900	20000	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Naphthalene	NA	3.6	18	120	190	NA	NA	<0.057	<0.0073	<0.073	<0.074	<0.018	<0.02	<0.072	<0.11	0.0019
Nitrobenzene	NA	4.8	24	34	57	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
N-Nitroso-di-n-propylamine	NA	0.069	0.25	0.4	1.4	NA	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
N-Nitrosodi phenylamine	NA	99	350	570	1900	20	NA	<0.98	<0.38	<0.94	<0.95	<0.19	<1	<0.19	<0.19	<0.2
Pentachlorophenol	NA	NA	NA	0.73	32	31	5	<0.12	<0.015	<0.15	<0.15	<0.037	<0.041	<0.15	<0.23	<0.008
Phenanthrene	NA	NA	NA	1700	19000	NA	NA	0.089	<0.0073	0.2	0.27	0.021	0.033	0.1	0.45	0.007
Phenol	NA	18000	180000	2000	20000	30	70	<0.98	<0.38	<0.94	<0.95	<0.19	<1	0.033	<0.19	<0.2
Pyrene	NA	1700	17000	1700	19000	NA	NA	0.19	0.012	0.43	0.87	0.073	0.089	0.18	0.54	0.009
Quinoline	NA	0.16	0.57	1.6	6.4	NA	NA	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (TPH)																
TPH (C6-C12)	NA	NA	NA	1,100	2,100	NA	NA	--	--	--	--	--	--	--	--	--
TPH (>C12-C28)	NA	NA	NA	2,000	7,800	NA	NA	--	--	--	--	--	--	--	--	--
TPH (>C28-C35)	NA	NA	NA	2,000	7,800	NA	NA	--	--	--	--	--	--	--	--	--
TPH (C6-C35)	NA	NA	NA	1,100	2,100	NA	NA	--	--	--	--	--	--	--	--	--
Polychlorinated Byphenols																
Aroclor 1016	NA	3.9	21.0	1.1	7.1	NA	40	--	--	--	--	--	--	--	--	--
Aroclor 1221	NA	0.1	0.5	1.1	7.1	NA	40	--	--	--	--	--	--	--	--	--
Aroclor 1232	NA	0.1	0.5	1.1	7.1	NA	40	--	--	--	--	--	--	--	--	--
Aroclor 1242	NA	0.2	0.7	1.1	7.1	NA	40	--	--	--	--	--	--	--	--	--
Aroclor 1248	NA	0.2	0.7	1.1	7.1	NA	40	--	--	--	--	--	--	--	--	--
Aroclor 1254	NA	0.2	0.7	1.1	7.1	NA	40	--	--	--	--	--	--	--	--	--
Aroclor 1260	NA	0.2	0.7	1.1	7.1	NA	40	--	--	--	--	--	--	--	--	--
Pesticides																
Aldrin	NA	0.029	0.1	0.05	0.97	NA	NA	--	--	--	--	--	--	--	--	--
alpha-BHC	NA	0.077	0.27	0.25	2.9	NA	NA	--	--	--	--	--	--	--	--	--
beta-BHC	NA	0.27	0.96	0.92	11	NA	NA	--	--	--	--	--	--	--	--	--
delta-BHC	NA	NA	NA	2.9	12	NA	NA	--	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	NA	0.52	2.1	1.1	18	NA	NA	--	--	--	--	--	--	--	--	--
alpha-Chlordane	NA	1.6	6.5	13	54	NA	NA	--	--	--	--	--	--	--	--	--
gamma-Chlordane	NA	1.6	6.5	7.3	51	NA	NA	--	--	--	--	--	--	--	--	--
Dieldrin	NA	0.03	0.11	0.15	1.1	NA	NA	--	--	--	--	--	--	--	--	--
4,4'-DDD	NA	2	7.2	14	100	NA	NA	--	--	--	--	--	--	--	--	--
4,4'-DDE	NA	1.4	5.1	10	73	NA	NA	--	--	--	--	--	--	--	--	--
4,4'-DDT	NA	1.7	7	5.4	68	NA	NA	--	--	--	--	--	--	--	--	--
Endrin	NA	18	180	9	200	NA	NA	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	NA	NA	NA	380	4100	NA	NA	--	--	--	--	--	--	--	--	--
Endrin aldehyde	NA	NA	NA	19	200	NA	NA	--	--	--	--	--	--	--	--	--
Endrin ketone	NA	NA	NA	19	200	NA	NA	--	--	--	--	--	--	--	--	--
Endosulfan-I	NA	370	3700	91	1400	NA	NA	--	--	--	--	--	--	--	--	--

Table 1
Soil Analytical Data
Area of Concern 4

Concentrations in milligrams per kilogram (mg/kg)

Sample Location	Human-Health and Ecological Screening Levels [a]							SO4-03-0.0-0.5	SO4-03-0.5-2.0	SO4-04-0.0-0.5	SO4-04-0.0-0.5 Dup	SO4-04-0.5-2.0	SO4-04-2.0-3.0	SO4-05-0.0-0.5	SO4-05-0.5-2.0	SO4-05-2.0-3.0
	Background	USEPA		TCEQ												
		Res	C/I	Res	C/I	Earthworms	Plants	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13	09/10/13
Endosulfan-II	NA	370	3700	270	4100	NA	NA	--	--	--	--	--	--	--	--	--
Heptachlor	NA	0.11	0.38	0.13	2.8	NA	NA	--	--	--	--	--	--	--	--	--
Heptachlor epoxide	NA	0.053	0.19	0.24	1.9	NA	NA	--	--	--	--	--	--	--	--	--
Methoxychlor	NA	310	3100	270	3400	NA	NA	--	--	--	--	--	--	--	--	--
Toxaphene	NA	0.44	1.6	1.2	17	NA	NA	--	--	--	--	--	--	--	--	--
Herbicides																
2,4-Dichlorophenoxy Acetic Acid	NA	690	7700	730	8200	NA	NA	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenoxypropionic acid (Silvex)	NA	490	4900	530	5500	NA	NA	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenoxyacetic Acid	NA	610	6100	670	6800	NA	NA	--	--	--	--	--	--	--	--	--
Dicamba	NA	1800	18000	2000	20000	NA	NA	--	--	--	--	--	--	--	--	--
Dinoseb	NA	61	620	67	680	NA	NA	--	--	--	--	--	--	--	--	--
Dalapon	NA	1800	18000	2000	20000	NA	NA	--	--	--	--	--	--	--	--	--
Dichloroprop	NA	NA	NA	670	6800	NA	NA	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenoxy)butyric Acid	NA	490	4900	530	5500	NA	NA	--	--	--	--	--	--	--	--	--
MCPP	NA	61	620	67	680	NA	NA	--	--	--	--	--	--	--	--	--
MCPA	NA	31	310	33	340	NA	NA	--	--	--	--	--	--	--	--	--
Pentachlorophenol	NA	0.89	2.7	0.73	32	NA	NA	--	--	--	--	--	--	--	--	--

Notes:
Yellow highlights indicates value exceeds residential soil screening levels.
Orange highlights indicate value exceeds both residential and commercial/industrial soil screening levels
Italic values indicate value exceeds soil screening levels protective of earthworms.
Bold values indicate value exceeds soil screening levels protective of plants.

Abbreviations:
-- = not analyzed
<# = not detected above the reporting limit
C/I = commercial/industrial
Dup = duplicate sample
NA = not available
Res = residential
TCEQ = Texas Commission on Environmental Quality
USEPA = United States Environmental Protection Agency

Footnotes:
[a] The soil screening Levels were compiled from the following locations:
Background: Texas Specific Median Background concentrations from Texas Risk Reduction Program rule at Section 350.51(m) accessed December 2013.
(http://www.tceq.texas.gov/assets/public/remediation/trrp/background.pdf)
USEPA_Res and _C/I: USEPA Region 6 Regional Screening Levels published November 2013.
(http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm)
TCEQ_Res and _C/I: TCEQ Protective Concentration Limit Texas Risk Reduction Program published June 2012.
(http://www.tceq.texas.gov/remediation/trrp/trrppcls.html)
TCEQ_Earthworms and _Plants: Benchmarks from Table 3-4 of the TCEQ January 2006 Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas RG-263 (Revised).

Table 2
Descripitve Statistical Summary for Soil
Area of Concern 4

Chemicals of Potential Concern [a]	Number Detected / Number Analyzed	Frequency of Detection	Minimum	Maximum	Background [b]	Does Maximum Concentration Exceed Background? [c]	Further Evaluation of COPC?	95% Upper Confidence Limit [d]		Exposure Point Concentration [e]	
			(mg/kg)	(mg/kg)	(mg/kg)			(mg/kg)	Basis	(mg/kg)	Basis
Metals											
Mercury	18 / 19	95%	0.006	2.3	0.04	Yes	Yes	0.91	1	0.91	95UCL
Zinc	18 / 19	95%	4.2	560	30	Yes	Yes	213	1	213	95UCL
Semi-Volatile Organic Compounds											
Benzo(a)anthracene	17 / 21	81%	0.0045	0.62	NA	NA	Yes	0.32	1	0.32	95UCL
Benzo(a)pyrene	17 / 21	81%	0.0033	0.56	NA	NA	Yes	0.19	2	0.19	95UCL
Benzo(b)fluoranthene	17 / 21	81%	0.0048	0.9	NA	NA	Yes	0.43	1	0.43	95UCL
Dibenzo(a,h)anthracene	13 / 21	62%	0.002	0.082	NA	NA	Yes	0.032	2	0.032	95UCL
Indeno(1,2,3-cd)pyrene	16 / 21	76%	0.0025	0.38	NA	NA	Yes	0.13	2	0.13	95UCL

Abbreviations:
-- = Not evaluated
ISD = Insufficient data
Max = Maximum concentration
mg/kg = milligrams per kilogram
NA = Not available
NFE = not further evaluated
UCL = Upper confidence limit

Footnotes:
[a] The chemicals of potential concern (COPCs) only include analytes that were detected in at least one soil sample. The soil analytical data are provided in Table 1. The chemicals that were non-detect are qualitatively evaluated. Samples that were collected with a duplicate sample were treated as one sample. The value that was selected for the COPC followed the following duplicate rules: (1) if both samples were detected, then the maximum concentration was selected; (2) if one had a detection and the other was non-detect, then the detection was selected; and (3) if both samples were non-detect, then the lowest non-detect value was selected.
[b] Texas Specific Median Background concentrations from Texas Risk Reduction Program rule at Section 350.51(m) accessed December 2013 (http://www.tceq.texas.gov/assets/public/remediation/trrp/background.pdf).
[c] The maximum detected concentrations were compared to the background concentrations. If the maximum concentration was detected below the background concentration, then the COPC was not further evaluated in the risk evaluation.
[d] The 95% UCL calculated using United States Environmental Protection Agency (USEPA) ProUCL Model Version 5.0.00 published September 2013. ProUCL outputs for the soil are provided in Table 3.
Basis:
1 = 95% KM (Chebyshev) UCL
2 = 95% KM (t) UCL
[e] The EPC is the 95% UCL.

Table 3
Groundwater Evaluation
Area of Concern 4

Analyte [a]	Analytical Method	Groundwater Concentration	Texas Commission on Environmental Quality Saltwater (SWRBEL) [b]	Groundwater Concentration Greater Than SWRBEL?
		µg/L	µg/L	
Metals				
Aluminum	MF2C81	<200	--	No SWRBEL
	MF2C30	165		No SWRBEL
Antimony	MF2C81	<10.0	--	No SWRBEL
	MF2C30	<10.0		No SWRBEL
Arsenic	MF2C81	60.8	78	No
	MF2C30	60.4		No
Barium	MF2C81	124	25000	No
	MF2C30	124		No
Beryllium	MF2C81	<5.0	--	No SWRBEL
	MF2C30	<5.0		No SWRBEL
Cadmium	MF2C81	<5.0	8.75	No
	MF2C30	<5.0		No
Calcium	MF2C81	80400	--	No SWRBEL
	MF2C30	91300		No SWRBEL
Chromium	MF2C81	<10.0	103	No
	MF2C30	<10.0		No
Cobalt	MF2C81	<5.0	--	No SWRBEL
	MF2C30	<5.0		No SWRBEL
Copper	MF2C81	***<10.0***	3.6	Non-Detect Exceeds SWRBEL
	MF2C30	***<10.0***		Non-Detect Exceeds SWRBEL
Iron	MF2C81	319	--	No SWRBEL
	MF2C30	479		No SWRBEL
Lead	MF2C81	<5.0	5.3	No
	MF2C30	<5.0		No
Magnesium	MF2C81	128000	--	No SWRBEL
	MF2C30	121000		No SWRBEL
Manganese	MF2C81	133	--	No SWRBEL
	MF2C30	134		No SWRBEL
Mercury	MF2C81	<0.20	1.1	No
	MF2C30	<0.20		No
Nickel	MF2C81	5.8	13.1	No
	MF2C30	4.2		No
Potassium	MF2C81	107000	--	No SWRBEL
	MF2C30	116000		No SWRBEL
Selenium	MF2C81	<25.0	136	No
	MF2C30	2.9		No
Silver	MF2C81	***<5.0***	0.19	Non-Detect Exceeds SWRBEL
	MF2C30	***<5.0***		Non-Detect Exceeds SWRBEL
Sodium	MF2C81	1470000	--	No SWRBEL
	MF2C30	1290000		No SWRBEL
Thallium	MF2C81	<5.0	21.3	No
	MF2C30	<5.0		No
Vanadium	MF2C81	<25.0	--	No SWRBEL
	MF2C30	<25.0		No SWRBEL
Zinc	MF2C81	<10.0	84.2	No
	MF2C30	<10.0		No
Volatile Organic Compounds				
1,1,1-Trichloroethane	F2D34	<0.50	1560	No
1,1,2,2-Tetrachloroethane	F2D34	<0.50	451	No
1,1,2-Trichloro-1,2,2-trifluoroethane	F2D34	<0.50	--	No SWRBEL
1,1,2-Trichloroethane	F2D34	<0.50	275	No
1,1-Dichloroethane	F2D34	<0.50	--	No SWRBEL
1,1-Dichloroethene	F2D34	<0.50	12500	No
1,2,3-Trichlorobenzene	F2D34	<0.50	--	No SWRBEL
1,2,4-Trichlorobenzene	F2D34	<0.50	22	No
1,2-Dibromo-3-chloropropane	F2D34	<0.50	--	No SWRBEL
1,2-Dibromoethane	F2D34	<0.50	--	No SWRBEL
1,2-Dichlorobenzene	F2D34	<0.50	99	No
1,2-Dichloroethane	F2D34	<0.50	5650	No
1,2-Dichloropropane	F2D34	<0.50	2400	No
1,3-Dichlorobenzene	F2D34	<0.50	142	No
1,4-Dichlorobenzene	F2D34	0.14	99	No
2-Butanone	F2D34	<5.0	--	No SWRBEL
2-Hexanone	F2D34	<5.0	--	No SWRBEL
4-Methyl-2-Pentanone	F2D34	<5.0	61500	No
Acetone	F2D34	<5.0	282000	No

Table 3
Groundwater Evaluation
Area of Concern 4

Analyte [a]	Analytical Method	Groundwater Concentration	Texas Commission on Environmental Quality Saltwater (SWRBEL) [b]	Groundwater Concentration Greater Than SWRBEL?
		µg/L	µg/L	
Benzene	F2D34	<0.50	109	No
Bromochloromethane	F2D34	<0.50	--	No SWRBEL
Bromodichloromethane	F2D34	<0.50	--	No SWRBEL
Bromoform	F2D34	<0.50	1220	No
Bromomethane	F2D34	<0.50	600	No
Carbon disulfide	F2D34	<0.50	--	No SWRBEL
Carbon tetrachloride	F2D34	<0.50	1500	No
Chlorobenzene	F2D34	<0.50	105	No
Chloroethane	F2D34	<0.50	--	No SWRBEL
Chloroform	F2D34	<0.50	4100	No
Chloromethane	F2D34	<0.50	13500	No
cis-1,2-Dichloroethene	F2D34	<0.50	680	No
cis-1,3-Dichloropropene	F2D34	<0.50	40	No
Cyclohexane	F2D34	<0.50	--	No SWRBEL
Dibromochloromethane	F2D34	<0.50	--	No SWRBEL
Dichlorodifluoromethane	F2D34	<0.50	--	No SWRBEL
Ethylbenzene	F2D34	<0.50	249	No
Isopropylbenzene	F2D34	<0.50	--	No SWRBEL
m,p-Xylene	F2D34	<0.50	850	No
Methyl acetate	F2D34	<0.50	--	No SWRBEL
Methyl tert-butyl ether	F2D34	<0.50	--	No SWRBEL
Methylcyclohexane	F2D34	<0.50	--	No SWRBEL
Methylene chloride	F2D34	<0.50	5420	No
o-Xylene	F2D34	<0.50	850	No
Styrene	F2D34	<0.50	455	No
Tetrachloroethene	F2D34	<0.50	1450	No
Toluene	F2D34	<0.50	480	No
trans-1,2-Dichloroethene	F2D34	<0.50	680	No
trans-1,3-Dichloropropene	F2D34	<0.50	400	No
Trichloroethene	F2D34	<0.50	970	No
Trichlorofluoromethane	F2D34	<0.50	--	No SWRBEL
Vinyl chloride	F2D34	<0.50	--	No SWRBEL
Semi-Volatile Organic Compounds				
1,1'-Biphenyl	F2D35	<25	--	No SWRBEL
1,2,4,5-Tetrachlorobenzene	F2D35	<25	129	No
2,2'-Oxybis(1-chloropropane)	F2D35	<25	--	No SWRBEL
2,3,4,6-Tetrachlorophenol	F2D35	<25	--	No SWRBEL
2,4,5-Trichlorophenol	F2D35	***<25***	12	Non-Detect Exceeds SWRBEL
2,4,6-Trichlorophenol	F2D35	<25	61	No
2,4-Dichlorophenol	F2D35	<25	--	No SWRBEL
2,4-Dimethylphenol	F2D35	<25	--	No SWRBEL
2,4-Dinitrophenol	F2D35	<50	670	No
2,4-Dinitrotoluene	F2D35	<25	--	No SWRBEL
2,6-Dinitrotoluene	F2D35	<25	--	No SWRBEL
2-Chloronaphthalene	F2D35	<25	--	No SWRBEL
2-Chlorophenol	F2D35	<25	265	No
2-Methylnaphthalene	F2D35	<25	30	No
	F2D35 (SIM)	<0.50		No
2-Methylphenol	F2D35	<25	510	No
2-Nitroaniline	F2D35	<50	--	No SWRBEL
2-Nitrophenol	F2D35	<25	1470	No
3,3'-Dichlorobenzidine	F2D35	<25	37	No
3-Nitroaniline	F2D35	<50	--	No SWRBEL
4,6-Dinitro-2-methylphenol	F2D35	<50	--	No SWRBEL
4-Bromophenyl-phenylether	F2D35	<25	--	No SWRBEL
4-Chloro-3-methylphenol	F2D35	<25	--	No SWRBEL
4-Chloroaniline	F2D35	<25	--	No SWRBEL
4-Chlorophenyl-phenylether	F2D35	<25	--	No SWRBEL
4-Methylphenol	F2D35	<25	--	No SWRBEL
4-Nitroaniline	F2D35	<50	--	No SWRBEL
4-Nitrophenol	F2D35	<50	359	No

Table 3
Groundwater Evaluation
Area of Concern 4

Analyte [a]	Analytical Method	Groundwater Concentration	Texas Commission on Environmental Quality Saltwater (SWRBEL) [b]	Groundwater Concentration Greater Than SWRBEL?
		µg/L	µg/L	
Acenaphthene	F2D35	<25	40.4	No
	F2D35 (SIM)	<0.50		No
Acenaphthylene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Acetophenone	F2D35	<25	--	No SWRBEL
Anthracene	F2D35	***<25***	0.18	Non-Detect Exceeds SWRBEL
	F2D35 (SIM)	***<0.50***		Non-Detect Exceeds SWRBEL
Atrazine	F2D35	<25	--	No SWRBEL
Benzaldehyde	F2D35	<25	--	No SWRBEL
Benzo(a)anthracene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Benzo(a)pyrene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Benzo(b)fluoranthene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Benzo(g,h,i)perylene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Benzo(k)fluoranthene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Bis(2-chloroethoxy)methane	F2D35	<25	--	No SWRBEL
Bis(2-chloroethyl)ether	F2D35	<25	--	No SWRBEL
Bis(2-ethylhexyl)phthalate	F2D35	<25	--	No SWRBEL
Butylbenzylphthalate	F2D35	<25	147	No
Caprolactam	F2D35	<25	--	No SWRBEL
Carbazole	F2D35	<25	--	No SWRBEL
Chrysene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Dibenzo(a,h)anthracene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Dibenzofuran	F2D35	<25	65	No
Diethylphthalate	F2D35	<25	442	No
Dimethylphthalate	F2D35	<25	580	No
Di-n-butylphthalate	F2D35	<25	--	No SWRBEL
Di-n-octylphthalate	F2D35	<25	--	No SWRBEL
Fluoranthene	F2D35	***<25***	2.96	Non-Detect Exceeds SWRBEL
	F2D35 (SIM)	<0.50		No
Fluorene	F2D35	<25	50	No
	F2D35 (SIM)	<0.50		No
Hexachlorobenzene	F2D35	<25	--	No SWRBEL
Hexachlorobutadiene	F2D35	<25	0.32	Non-Detect Exceeds SWRBEL
Hexachlorocyclopentadiene	F2D35	<25	--	No SWRBEL
Hexachloroethane	F2D35	<25	9.4	Non-Detect Exceeds SWRBEL

Table 3
Groundwater Evaluation
Area of Concern 4

Analyte [a]	Analytical Method	Groundwater Concentration	Texas Commission on Environmental Quality Saltwater (SWRBEL) [b]	Groundwater Concentration Greater Than SWRBEL?
		µg/L	µg/L	
Indeno(1,2,3-cd)pyrene	F2D35	<25	--	No SWRBEL
	F2D35 (SIM)	<0.50		No SWRBEL
Isophorone	F2D35	<25	650	No
Naphthalene	F2D35	<25	125	No
	F2D35 (SIM)	<0.50		No
Nitrobenzene	F2D35	<25	--	No SWRBEL
N-Nitroso-di-n-propylamine	F2D35	<25	120	No
N-Nitrosodiphenylamine	F2D35	<25	165000	No
Pentachlorophenol	F2D35	***<50***	9.6	Non-Detect Exceeds SWRBEL
	F2D35 (SIM)	<1.0		No
Phenanthrene	F2D35	***<25***	4.6	Non-Detect Exceeds SWRBEL
	F2D35 (SIM)	<0.50		No
Phenol	F2D35	<25	2750	No
Pyrene	F2D35	***<25***	0.24	Non-Detect Exceeds SWRBEL
	F2D35 (SIM)	***<0.50***		Non-Detect Exceeds SWRBEL

Note: ***Bold and italic*** values exceed the SWRBEL.

Abbreviations:
<# = not detected above reporting limit
SWRBEL = Surface Water Risk-Based Exposure Limits
µg/L = micrograms per liter

Footnotes:

[a] Groundwater samples collected from monitoring well MW-17 on September 17, 2013.

[b] Saltwater values are the chronic January 2011 Aquatic Life Surface Water Risk-Based

Exposure Limits (SWRBELs) published by Texas Commission on Environmental Quality.

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	12/19/2013 10:56:34 AM
From File	ProUCL_Data_c.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Mercury

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	4
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	0.006	Minimum Non-Detect	0.11
Maximum Detect	2.3	Maximum Non-Detect	0.11
Variance Detects	0.36	Percent Non-Detects	5.263%
Mean Detects	0.342	SD Detects	0.6
Median Detects	0.12	CV Detects	1.752
Skewness Detects	2.694	Kurtosis Detects	7.113
Mean of Logged Detects	-2.246	SD of Logged Detects	1.678

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.585	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.313	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.326	Standard Error of Mean	0.135
SD	0.572	95% KM (BCA) UCL	0.535
95% KM (t) UCL	0.56	95% KM (Percentile Bootstrap) UCL	0.58
95% KM (z) UCL	0.548	95% KM Bootstrap t UCL	1.102
90% KM Chebyshev UCL	0.731	95% KM Chebyshev UCL	0.914
97.5% KM Chebyshev UCL	1.169	99% KM Chebyshev UCL	1.669

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.532	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.797	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.142	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.535	k star (bias corrected MLE)	0.483
Theta hat (MLE)	0.64	Theta star (bias corrected MLE)	0.709
nu hat (MLE)	19.27	nu star (bias corrected)	17.39
MLE Mean (bias corrected)	0.342	MLE Sd (bias corrected)	0.493

Gamma Kaplan-Meier (KM) Statistics

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

k hat (KM)	0.326	nu hat (KM)	12.37
Approximate Chi Square Value (12.37, α)	5.474	Adjusted Chi Square Value (12.37, β)	5.077
95% Gamma Approximate KM-UCL (use when n>=50)	0.737	95% Gamma Adjusted KM-UCL (use when n<50)	0.795

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.006	Mean	0.325
Maximum	2.3	Median	0.11
SD	0.588	CV	1.81
k hat (MLE)	0.509	k star (bias corrected MLE)	0.463
Theta hat (MLE)	0.639	Theta star (bias corrected MLE)	0.701
nu hat (MLE)	19.32	nu star (bias corrected)	17.61
MLE Mean (bias corrected)	0.325	MLE Sd (bias corrected)	0.477
		Adjusted Level of Significance (β)	0.0369
Approximate Chi Square Value (17.61, α)	9.107	Adjusted Chi Square Value (17.61, β)	8.575
95% Gamma Approximate UCL (use when n>=50)	0.628	95% Gamma Adjusted UCL (use when n<50)	0.667

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0921	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.326	Mean in Log Scale	-2.319
SD in Original Scale	0.587	SD in Log Scale	1.662
95% t UCL (assumes normality of ROS data)	0.559	95% Percentile Bootstrap UCL	0.562
95% BCA Bootstrap UCL	0.673	95% Bootstrap t UCL	1.136
95% H-UCL (Log ROS)	1.64		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.325	95% H-UCL (KM -Log)	1.499
KM SD (logged)	1.635	95% Critical H Value (KM-Log)	3.615
KM Standard Error of Mean (logged)	0.389		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.327	Mean in Log Scale	-2.28
SD in Original Scale	0.587	SD in Log Scale	1.637
95% t UCL (Assumes normality)	0.561	95% H-Stat UCL	1.579

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.914	95% GROS Adjusted Gamma UCL	0.667
95% Adjusted Gamma KM-UCL	0.795		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Zinc

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
		Number of Missing Observations	4
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	4.2	Minimum Non-Detect	0.96
Maximum Detect	560	Maximum Non-Detect	0.96
Variance Detects	17316	Percent Non-Detects	5.263%
Mean Detects	87.94	SD Detects	131.6
Median Detects	54.55	CV Detects	1.496
Skewness Detects	3.043	Kurtosis Detects	10.46
Mean of Logged Detects	3.686	SD of Logged Detects	1.345

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.619	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	83.37	Standard Error of Mean	29.74
SD	126	95% KM (BCA) UCL	138.1
95% KM (t) UCL	134.9	95% KM (Percentile Bootstrap) UCL	134.2
95% KM (z) UCL	132.3	95% KM Bootstrap t UCL	208.8
90% KM Chebyshev UCL	172.6	95% KM Chebyshev UCL	213
97.5% KM Chebyshev UCL	269.1	99% KM Chebyshev UCL	379.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.376	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.778	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.107	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.211	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.756	k star (bias corrected MLE)	0.667
Theta hat (MLE)	116.3	Theta star (bias corrected MLE)	131.8
nu hat (MLE)	27.22	nu star (bias corrected)	24.02
MLE Mean (bias corrected)	87.94	MLE Sd (bias corrected)	107.7

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.438	nu hat (KM)	16.64
Approximate Chi Square Value (16.64, α)	8.416	Adjusted Chi Square Value (16.64, β)	7.908
95% Gamma Approximate KM-UCL (use when n>=50)	164.8	95% Gamma Adjusted KM-UCL (use when n<50)	175.4

Gamma ROS Statistics using Imputed Non-Detects

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	83.32
Maximum	560	Median	51.5
SD	129.5	CV	1.554
k hat (MLE)	0.536	k star (bias corrected MLE)	0.486
Theta hat (MLE)	155.5	Theta star (bias corrected MLE)	171.4
nu hat (MLE)	20.36	nu star (bias corrected)	18.48
MLE Mean (bias corrected)	83.32	MLE Sd (bias corrected)	119.5
		Adjusted Level of Significance (β)	0.0369
Approximate Chi Square Value (18.48, α)	9.736	Adjusted Chi Square Value (18.48, β)	9.184
95% Gamma Approximate UCL (use when n>=50)	158.1	95% Gamma Adjusted UCL (use when n<50)	167.6

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.209	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	83.39	Mean in Log Scale	3.511
SD in Original Scale	129.4	SD in Log Scale	1.514
95% t UCL (assumes normality of ROS data)	134.9	95% Percentile Bootstrap UCL	135.2
95% BCA Bootstrap UCL	159.5	95% Bootstrap t UCL	208.5
95% H-UCL (Log ROS)	355.6		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	3.49	95% H-UCL (KM -Log)	354.5
KM SD (logged)	1.52	95% Critical H Value (KM-Log)	3.421
KM Standard Error of Mean (logged)	0.359		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	83.34	Mean in Log Scale	3.453
SD in Original Scale	129.4	SD in Log Scale	1.654
95% t UCL (Assumes normality)	134.8	95% H-Stat UCL	514.5

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	213	95% GROS Adjusted Gamma UCL	167.6
95% Adjusted Gamma KM-UCL	175.4		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)anthracene

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

General Statistics

Total Number of Observations	21	Number of Distinct Observations	20
		Number of Missing Observations	2
Number of Detects	17	Number of Non-Detects	4
Number of Distinct Detects	17	Number of Distinct Non-Detects	4
Minimum Detect	0.0045	Minimum Non-Detect	0.0038
Maximum Detect	0.62	Maximum Non-Detect	0.073
Variance Detects	0.0394	Percent Non-Detects	19.05%
Mean Detects	0.166	SD Detects	0.198
Median Detects	0.081	CV Detects	1.194
Skewness Detects	1.395	Kurtosis Detects	0.854
Mean of Logged Detects	-2.691	SD of Logged Detects	1.584

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.785	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.215	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.136	Standard Error of Mean	0.0414
SD	0.184	95% KM (BCA) UCL	0.211
95% KM (t) UCL	0.208	95% KM (Percentile Bootstrap) UCL	0.208
95% KM (z) UCL	0.204	95% KM Bootstrap t UCL	0.236
90% KM Chebyshev UCL	0.26	95% KM Chebyshev UCL	0.317
97.5% KM Chebyshev UCL	0.395	99% KM Chebyshev UCL	0.548

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.339	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.783	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.132	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.218	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.677	k star (bias corrected MLE)	0.597
Theta hat (MLE)	0.245	Theta star (bias corrected MLE)	0.278
nu hat (MLE)	23.02	nu star (bias corrected)	20.29
MLE Mean (bias corrected)	0.166	MLE Sd (bias corrected)	0.215

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.546	nu hat (KM)	22.95
Approximate Chi Square Value (22.95, α)	13.05	Adjusted Chi Square Value (22.95, β)	12.48
95% Gamma Approximate KM-UCL (use when n>=50)	0.239	95% Gamma Adjusted KM-UCL (use when n<50)	0.25

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0045	Mean	0.136
Maximum	0.62	Median	0.052

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

SD	0.188	CV	1.38
k hat (MLE)	0.583	k star (bias corrected MLE)	0.532
Theta hat (MLE)	0.234	Theta star (bias corrected MLE)	0.257
nu hat (MLE)	24.49	nu star (bias corrected)	22.33
MLE Mean (bias corrected)	0.136	MLE Sd (bias corrected)	0.187
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (22.33, α)	12.58	Adjusted Chi Square Value (22.33, β)	12.02
95% Gamma Approximate UCL (use when n>=50)	0.242	95% Gamma Adjusted UCL (use when n<50)	0.253

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.136	Mean in Log Scale	-3.234
SD in Original Scale	0.189	SD in Log Scale	1.862
95% t UCL (assumes normality of ROS data)	0.207	95% Percentile Bootstrap UCL	0.201
95% BCA Bootstrap UCL	0.221	95% Bootstrap t UCL	0.234
95% H-UCL (Log ROS)	1.135		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.166	95% H-UCL (KM -Log)	0.755
KM SD (logged)	1.718	95% Critical H Value (KM-Log)	3.666
KM Standard Error of Mean (logged)	0.39		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.137	Mean in Log Scale	-3.157
SD in Original Scale	0.188	SD in Log Scale	1.809
95% t UCL (Assumes normality)	0.208	95% H-Stat UCL	1.024

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.317	95% GROS Adjusted Gamma UCL	0.253
95% Adjusted Gamma KM-UCL	0.25		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	21
		Number of Missing Observations	2
Number of Detects	17	Number of Non-Detects	4
Number of Distinct Detects	17	Number of Distinct Non-Detects	4

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

Minimum Detect	0.0033	Minimum Non-Detect	0.0038
Maximum Detect	0.56	Maximum Non-Detect	0.064
Variance Detects	0.0292	Percent Non-Detects	19.05%
Mean Detects	0.151	SD Detects	0.171
Median Detects	0.098	CV Detects	1.13
Skewness Detects	1.507	Kurtosis Detects	1.601
Mean of Logged Detects	-2.695	SD of Logged Detects	1.534

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.208	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.215	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.124	Standard Error of Mean	0.0359
SD	0.16	95% KM (BCA) UCL	0.186
95% KM (t) UCL	0.186	95% KM (Percentile Bootstrap) UCL	0.184
95% KM (z) UCL	0.183	95% KM Bootstrap t UCL	0.221
90% KM Chebyshev UCL	0.232	95% KM Chebyshev UCL	0.28
97.5% KM Chebyshev UCL	0.348	99% KM Chebyshev UCL	0.481

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.204	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.777	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.106	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.217	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.744	k star (bias corrected MLE)	0.652
Theta hat (MLE)	0.203	Theta star (bias corrected MLE)	0.232
nu hat (MLE)	25.29	nu star (bias corrected)	22.16
MLE Mean (bias corrected)	0.151	MLE Sd (bias corrected)	0.187

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.603	nu hat (KM)	25.32
Approximate Chi Square Value (25.32, α)	14.86	Adjusted Chi Square Value (25.32, β)	14.24
95% Gamma Approximate KM-UCL (use when n>=50)	0.211	95% Gamma Adjusted KM-UCL (use when n<50)	0.22

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0033	Mean	0.124
Maximum	0.56	Median	0.054
SD	0.163	CV	1.312
k hat (MLE)	0.63	k star (bias corrected MLE)	0.572
Theta hat (MLE)	0.197	Theta star (bias corrected MLE)	0.217
nu hat (MLE)	26.46	nu star (bias corrected)	24.02
MLE Mean (bias corrected)	0.124	MLE Sd (bias corrected)	0.164
		Adjusted Level of Significance (β)	0.0383

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

Approximate Chi Square Value (24.02, α)	13.86	Adjusted Chi Square Value (24.02, β)	13.27
95% Gamma Approximate UCL (use when n>=50)	0.215	95% Gamma Adjusted UCL (use when n<50)	0.225

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.124	Mean in Log Scale	-3.16
SD in Original Scale	0.164	SD in Log Scale	1.706
95% t UCL (assumes normality of ROS data)	0.185	95% Percentile Bootstrap UCL	0.182
95% BCA Bootstrap UCL	0.193	95% Bootstrap t UCL	0.22
95% H-UCL (Log ROS)	0.73		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.192	95% H-UCL (KM -Log)	0.732
KM SD (logged)	1.717	95% Critical H Value (KM-Log)	3.664
KM Standard Error of Mean (logged)	0.391		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.125	Mean in Log Scale	-3.167
SD in Original Scale	0.163	SD in Log Scale	1.774
95% t UCL (Assumes normality)	0.186	95% H-Stat UCL	0.904

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.186	95% KM (Percentile Bootstrap) UCL	0.184

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
		Number of Missing Observations	2
Number of Detects	17	Number of Non-Detects	4
Number of Distinct Detects	15	Number of Distinct Non-Detects	4
Minimum Detect	0.0048	Minimum Non-Detect	0.0038
Maximum Detect	0.9	Maximum Non-Detect	0.082
Variance Detects	0.0708	Percent Non-Detects	19.05%
Mean Detects	0.233	SD Detects	0.266
Median Detects	0.16	CV Detects	1.14
Skewness Detects	1.804	Kurtosis Detects	2.771
Mean of Logged Detects	-2.187	SD of Logged Detects	1.459

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.215	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.19	Standard Error of Mean	0.0559
SD	0.249	95% KM (BCA) UCL	0.282
95% KM (t) UCL	0.287	95% KM (Percentile Bootstrap) UCL	0.286
95% KM (z) UCL	0.282	95% KM Bootstrap t UCL	0.352
90% KM Chebyshev UCL	0.358	95% KM Chebyshev UCL	0.434
97.5% KM Chebyshev UCL	0.54	99% KM Chebyshev UCL	0.747

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.28	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.774	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.13	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.217	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.81	k star (bias corrected MLE)	0.706
Theta hat (MLE)	0.288	Theta star (bias corrected MLE)	0.33
nu hat (MLE)	27.53	nu star (bias corrected)	24.01
MLE Mean (bias corrected)	0.233	MLE Sd (bias corrected)	0.278

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.585	nu hat (KM)	24.58
Approximate Chi Square Value (24.58, α)	14.29	Adjusted Chi Square Value (24.58, β)	13.69
95% Gamma Approximate KM-UCL (use when n>=50)	0.327	95% Gamma Adjusted KM-UCL (use when n<50)	0.342

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0048	Mean	0.191
Maximum	0.9	Median	0.11
SD	0.254	CV	1.333
k hat (MLE)	0.62	k star (bias corrected MLE)	0.564
Theta hat (MLE)	0.308	Theta star (bias corrected MLE)	0.339
nu hat (MLE)	26.06	nu star (bias corrected)	23.67
MLE Mean (bias corrected)	0.191	MLE Sd (bias corrected)	0.254
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (23.67, α)	13.6	Adjusted Chi Square Value (23.67, β)	13.01
95% Gamma Approximate UCL (use when n>=50)	0.332	95% Gamma Adjusted UCL (use when n<50)	0.347

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.19	Mean in Log Scale	-2.732
SD in Original Scale	0.255	SD in Log Scale	1.759
95% t UCL (assumes normality of ROS data)	0.286	95% Percentile Bootstrap UCL	0.28
95% BCA Bootstrap UCL	0.309	95% Bootstrap t UCL	0.366
95% H-UCL (Log ROS)	1.326		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.77	95% H-UCL (KM -Log)	1.343
KM SD (logged)	1.774	95% Critical H Value (KM-Log)	3.759
KM Standard Error of Mean (logged)	0.403		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.191	Mean in Log Scale	-2.744
SD in Original Scale	0.254	SD in Log Scale	1.845
95% t UCL (Assumes normality)	0.287	95% H-Stat UCL	1.749

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.434	95% GROS Adjusted Gamma UCL	0.347
95% Adjusted Gamma KM-UCL	0.342		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	18
		Number of Missing Observations	2
Number of Detects	13	Number of Non-Detects	8
Number of Distinct Detects	11	Number of Distinct Non-Detects	7
Minimum Detect	0.002	Minimum Non-Detect	0.0038
Maximum Detect	0.082	Maximum Non-Detect	0.072
Variance Detects	8.4445E-4	Percent Non-Detects	38.1%
Mean Detects	0.0301	SD Detects	0.0291
Median Detects	0.022	CV Detects	0.964
Skewness Detects	0.868	Kurtosis Detects	-0.805
Mean of Logged Detects	-4.076	SD of Logged Detects	1.234

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.222	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.246	Detected Data appear Normal at 5% Significance Level

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0214	Standard Error of Mean	0.00604
SD	0.0257	95% KM (BCA) UCL	0.0314
95% KM (t) UCL	0.0318	95% KM (Percentile Bootstrap) UCL	0.0316
95% KM (z) UCL	0.0313	95% KM Bootstrap t UCL	0.0342
90% KM Chebyshev UCL	0.0395	95% KM Chebyshev UCL	0.0477
97.5% KM Chebyshev UCL	0.0591	99% KM Chebyshev UCL	0.0815

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.358	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.243	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.005	k star (bias corrected MLE)	0.824
Theta hat (MLE)	0.03	Theta star (bias corrected MLE)	0.0366
nu hat (MLE)	26.13	nu star (bias corrected)	21.44
MLE Mean (bias corrected)	0.0301	MLE Sd (bias corrected)	0.0332

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.696	nu hat (KM)	29.23
Approximate Chi Square Value (29.23, α)	17.89	Adjusted Chi Square Value (29.23, β)	17.21
95% Gamma Approximate KM-UCL (use when n>=50)	0.035	95% Gamma Adjusted KM-UCL (use when n<50)	0.0364

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.002	Mean	0.0225
Maximum	0.082	Median	0.01
SD	0.0246	CV	1.097
k hat (MLE)	1.177	k star (bias corrected MLE)	1.04
Theta hat (MLE)	0.0191	Theta star (bias corrected MLE)	0.0216
nu hat (MLE)	49.41	nu star (bias corrected)	43.69
MLE Mean (bias corrected)	0.0225	MLE Sd (bias corrected)	0.022
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (43.69, α)	29.53	Adjusted Chi Square Value (43.69, β)	28.64
95% Gamma Approximate UCL (use when n>=50)	0.0332	95% Gamma Adjusted UCL (use when n<50)	0.0343

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.129	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.246	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0205	Mean in Log Scale	-4.602
SD in Original Scale	0.0258	SD in Log Scale	1.225

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

95% t UCL (assumes normality of ROS data)	0.0302	95% Percentile Bootstrap UCL	0.0296
95% BCA Bootstrap UCL	0.0311	95% Bootstrap t UCL	0.0335
95% H-UCL (Log ROS)	0.0468		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-4.627	95% H-UCL (KM -Log)	0.0537
KM SD (logged)	1.294	95% Critical H Value (KM-Log)	2.989
KM Standard Error of Mean (logged)	0.318		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0243	Mean in Log Scale	-4.422
SD in Original Scale	0.0256	SD in Log Scale	1.347
95% t UCL (Assumes normality)	0.0339	95% H-Stat UCL	0.0751

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0318	95% KM (Percentile Bootstrap) UCL	0.0316

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	21	Number of Distinct Observations	20
		Number of Missing Observations	2
Number of Detects	16	Number of Non-Detects	5
Number of Distinct Detects	15	Number of Distinct Non-Detects	5
Minimum Detect	0.0025	Minimum Non-Detect	0.0038
Maximum Detect	0.38	Maximum Non-Detect	0.076
Variance Detects	0.0144	Percent Non-Detects	23.81%
Mean Detects	0.112	SD Detects	0.12
Median Detects	0.062	CV Detects	1.074
Skewness Detects	1.402	Kurtosis Detects	1.27
Mean of Logged Detects	-2.931	SD of Logged Detects	1.477

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.814	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.222	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0876	Standard Error of Mean	0.0249
SD	0.11	95% KM (BCA) UCL	0.124
95% KM (t) UCL	0.131	95% KM (Percentile Bootstrap) UCL	0.129
95% KM (z) UCL	0.129	95% KM Bootstrap t UCL	0.153

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

90% KM Chebyshev UCL	0.162	95% KM Chebyshev UCL	0.196
97.5% KM Chebyshev UCL	0.243	99% KM Chebyshev UCL	0.335

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.184	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.772	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.108	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.223	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.804	k star (bias corrected MLE)	0.695
Theta hat (MLE)	0.139	Theta star (bias corrected MLE)	0.16
nu hat (MLE)	25.73	nu star (bias corrected)	22.24
MLE Mean (bias corrected)	0.112	MLE Sd (bias corrected)	0.134

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.631	nu hat (KM)	26.5
Approximate Chi Square Value (26.50, α)	15.76	Adjusted Chi Square Value (26.50, β)	15.13
95% Gamma Approximate KM-UCL (use when n>=50)	0.147	95% Gamma Adjusted KM-UCL (use when n<50)	0.153

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0025	Mean	0.0873
Maximum	0.38	Median	0.046
SD	0.113	CV	1.292
k hat (MLE)	0.68	k star (bias corrected MLE)	0.615
Theta hat (MLE)	0.128	Theta star (bias corrected MLE)	0.142
nu hat (MLE)	28.58	nu star (bias corrected)	25.83
MLE Mean (bias corrected)	0.0873	MLE Sd (bias corrected)	0.111
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (25.83, α)	15.25	Adjusted Chi Square Value (25.83, β)	14.62
95% Gamma Approximate UCL (use when n>=50)	0.148	95% Gamma Adjusted UCL (use when n<50)	0.154

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.222	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0869	Mean in Log Scale	-3.426
SD in Original Scale	0.113	SD in Log Scale	1.602
95% t UCL (assumes normality of ROS data)	0.13	95% Percentile Bootstrap UCL	0.128
95% BCA Bootstrap UCL	0.139	95% Bootstrap t UCL	0.144
95% H-UCL (Log ROS)	0.407		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.484	95% H-UCL (KM -Log)	0.483
KM SD (logged)	1.678	95% Critical H Value (KM-Log)	3.599

Table 4
95% Upper Confidence Limit - ProUCL Output
Area of Concern 4

KM Standard Error of Mean (logged)	0.392

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0888	Mean in Log Scale	-3.378
SD in Original Scale	0.112	SD in Log Scale	1.647
95% t UCL (Assumes normality)	0.131	95% H-Stat UCL	0.489

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.131	95% KM (Percentile Bootstrap) UCL	0.129

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Table 5
Soil Noncancer Hazards - Residential Receptor
Area of Concern 4

Chemicals of Potential Concern	Exposure Point Concentration [a]	United States Environmental Protection Agency		Texas Commission on Environmental Quality		Conservative Evaluation	
		Noncancer-Based RSL [b]	Hazard Quotient [c]	Noncancer-Based PCL [d]	Hazard Quotient [c]	Noncancer-Based Screening Level [e]	Hazard Quotient [c]
	(mg/kg)	(mg/kg)		(mg/kg)		(mg/kg)	
Metals							
Mercury	0.91	1.0E+01	9.1E-02	2.1E+00	4.4E-01	2.1E+00	4.4E-01
Zinc	213	2.3E+04	9.3E-03	9.9E+03	2.1E-02	9.9E+03	2.1E-02
Semi-Volatile Organic Compounds							
Benzo(a)anthracene	0.32	NA	--	NA	--	NA	--
Benzo(a)pyrene	0.19	NA	--	NA	--	NA	--
Benzo(b)fluoranthene	0.43	NA	--	NA	--	NA	--
Dibenzo(a,h)anthracene	0.032	NA	--	NA	--	NA	--
Indeno(1,2,3-cd)pyrene	0.13	NA	--	NA	--	NA	--
Total Noncancer Hazard Index [f] =			1.E-01		5.E-01		5.E-01

Abbreviations:
-- = not evaluated
mg/kg = milligrams per kilogram
NA = not available
PCL = protective concentration limit
RSL = Regional Screening Levels

Footnotes:
[a] Values from Table 2.
[b] RSLs from United States Environmental Protection Agency Region 6 published November 2013 (http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm), which assumes a target hazard quotient of 1.0.
[c] The hazard quotient is calculated by dividing the exposure point concentration (EPC) by the *noncancer based screening level* (NBSL) and multipling the quotient by a target noncancer hazard of 1 ([EPC/NBSL] x 1). The NBSL is either the RSL or the PCL.
[d] PCL from Texas Commission on Environmental Quality Texas Risk Reduction Program published June 2012 (http://www.tceq.texas.gov/remediation/trrp/trrppcls.html).
[e] The conservative evaluation is based on the lower of the RSL and PCL.
[f] The total noncancer hazard index is the sum of the chemical-specific noncancer hazard quotient.

Table 6
Soil Noncancer Hazards - Commercial/Industrial Receptor
Area of Concern 4

Chemicals of Potential Concern	Exposure Point Concentration [a]	United States Environmental Protection Agency		Texas Commission on Environmental Quality		Conservative Evaluation	
		Noncancer-Based RSL [b]	Hazard Quotient [c]	Noncancer-Based PCL [d]	Hazard Quotient [c]	Noncancer-Based Screening Level [e]	Hazard Quotient [c]
	(mg/kg)	(mg/kg)		(mg/kg)		(mg/kg)	
Metals							
Mercury	0.91	3.3E+00	2.8E-01	4.3E+01	2.1E-02	3.3E+00	2.8E-01
Zinc	213	2.5E+05	8.7E-04	3.1E+05	6.9E-04	2.5E+05	8.7E-04
Semi-Volatile Organic Compounds							
Benzo(a)anthracene	0.32	NA	--	NA	--	NA	--
Benzo(a)pyrene	0.19	NA	--	NA	--	NA	--
Benzo(b)fluoranthene	0.43	NA	--	NA	--	NA	--
Dibenzo(a,h)anthracene	0.032	NA	--	NA	--	NA	--
Indeno(1,2,3-cd)pyrene	0.13	NA	--	NA	--	NA	--
Total Noncancer Hazard Index [f] =			3.E-01		2.E-02		3.E-01

Abbreviations:
-- = not evaluated
mg/kg = milligrams per kilogram
NA = not available
PCL = protective concentration limit
RSL = Regional Screening Levels

Footnotes:
[a] Values from Table 2.
[b] RSLs from United States Environmental Protection Agency Region 6 published November 2013 (http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm), which assumes a target hazard quotient of 1.0.
[c] The hazard quotient is calculated by dividing the exposure point concentration (EPC) by the *noncancer based screening level* (NBSL) and multipling the quotient by a target noncancer hazard of 1 ([EPC/NBSL] x 1). The NBSL is either the RSL or the PCL.
[d] PCL from Texas Commission on Environmental Quality Texas Risk Reduction Program published June 2012 (http://www.tceq.texas.gov/remediation/trrp/trrppcls.html).
[e] The conservative evaluation is based on the lower of the RSL and PCL.
[f] The total noncancer hazard index is the sum of the chemical-specific noncancer hazard quotient.

Table 7
Soil Cancer Risks - Residential Receptor
Area of Concern 4

Chemicals of Potential Concern	Exposure Point Concentration [a]	United States Environmental Protection Agency		Texas Commission on Environmental Quality		Conservative Evaluation	
		Cancer-Based RSL [b]	Cancer Risk [c]	*Cancer-Based* PCL [d]	Cancer Risk [c]	*Cancer-Based* Screening Level [e]	Cancer Risk [c]
	(mg/kg)	(mg/kg)		(mg/kg)		(mg/kg)	
Metals							
Mercury	0.91	NA	--	NA	--	NA	--
Zinc	213	NA	--	NA	--	NA	--
Semi-Volatile Organic Compounds							
Benzo(a)anthracene	0.32	1.5E-01	2.1E-06	5.6E+00	5.6E-08	1.5E-01	2.1E-06
Benzo(a)pyrene	0.19	1.5E-02	1.2E-05	5.6E-01	3.3E-07	1.5E-02	1.2E-05
Benzo(b)fluoranthene	0.43	1.5E-01	2.9E-06	5.7E+00	7.6E-08	1.5E-01	2.9E-06
Dibenzo(a,h)anthracene	0.032	1.5E-02	2.1E-06	5.5E-01	5.8E-08	1.5E-02	2.1E-06
Indeno(1,2,3-cd)pyrene	0.13	1.5E-01	8.7E-07	5.7E+00	2.3E-08	1.5E-01	8.7E-07
Total Cancer Risk [f] =			2.E-05		5.E-07		2.E-05

Abbreviations:
-- = not evaluated
mg/kg = milligrams per kilogram
NA = not available
PCL = protective concentration limit
RSL = Regional Screening Level

Footnotes:
[a] Values from Table 2.
[b] RSLs from United States Environmental Protection Agency Region 6 published November 2013 (http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm).
[c] The cancer risk is calculated by dividing the exposure point concentration (EPC) by the *cancer-based screening level (CBSL)* and multiplying it by a target cancer risk of 1x10-6 ([EPC/CBSL] x 0.000001). The CBSL is either the RSL or the PCL.
[d] PCL from Texas Commission on Environmental Quality Texas Risk Reduction Program published June 2012 (http://www.tceq.texas.gov/remediation/trrp/trrppcls.html).
[e] The conservative evaluation is based on the lower of the RSL and PCL.
[f] The total cancer risk is the sum of the chemical-specific cancer risks.

Table 8
Soil Cancer Risks - Commercial/Industrial Receptor
Area of Concern 4

Chemicals of Potential Concern	Exposure Point Concentration [a]	United States Environmental Protection Agency		Texas Commission on Environmental Quality		Conservative Evaluation	
		Cancer-Based RSL [b]	Cancer Risk [c]	*Cancer-Based* PCL [d]	Cancer Risk [c]	*Cancer-Based* Screening Level [e]	Cancer Risk [c]
	(mg/kg)	(mg/kg)		(mg/kg)		(mg/kg)	
Metals							
Mercury	0.91	NA	--	NA	--	NA	--
Zinc	213	NA	--	NA	--	NA	--
Semi-Volatile Organic Compounds							
Benzo(a)anthracene	0.32	2.4E+01	1.3E-08	2.1E+00	1.5E-07	2.1E+00	1.5E-07
Benzo(a)pyrene	0.19	2.4E+00	7.9E-08	2.1E-01	8.9E-07	2.1E-01	8.9E-07
Benzo(b)fluoranthene	0.43	2.4E+01	1.8E-08	2.1E+00	2.1E-07	2.1E+00	2.1E-07
Dibenzo(a,h)anthracene	0.032	2.4E+00	1.3E-08	2.1E-01	1.5E-07	2.1E-01	1.5E-07
Indeno(1,2,3-cd)pyrene	0.13	2.4E+01	5.5E-09	2.1E+00	6.2E-08	2.1E+00	6.2E-08
Total Cancer Risk [f] =			1.E-07		1.E-06		1.E-06

Abbreviations:
-- = not evaluated
mg/kg = milligrams per kilogram
NA = not available
PCL = protective concentration limit
RSL = Regional Screening Levels

Footnotes:
[a] Values from Table 2.
[b] RSLs from United States Environmental Protection Agency Region 6 published November 2013 (http://www.epa.gov/region6/6pd/rcra_c/pd-n/screen.htm).
[c] The cancer risk is calculated by dividing the exposure point concentration (EPC) by the *cancer-based screening level (CBSL)* and multiplying it by a target cancer risk of 1x10-6 ([EPC/CBSL] x 0.000001). The CBSL is either the RSL or the PCL.
[d] PCL from Texas Commission on Environmental Quality Texas Risk Reduction Program published June 2012 (http://www.tceq.texas.gov/remediation/trrp/trrppcls.html).
[e] The conservative evaluation is based on the lower of the RSL and PCL.
[f] The total cancer risk is the sum of the chemical-specific cancer risks.

Table 9
Soil Ecological Evaluation
Area of Concern 4

Chemicals of Potential Concern	Exposure Point Concentration [a] (mg/kg)	Earthworms		Plants	
		Benchmark [a] (mg/kg)	EPC Exceeds Benchmark ?	Benchmark [b] (mg/kg)	EPC Exceeds Benchmark ?
Metals					
Mercury	0.91	0.1	Yes	0.3	Yes
Zinc	213	120	Yes	190	Yes
Semi-Volatile Organic Compounds					
Benzo(a)anthracene	0.32	NA	--	NA	--
Benzo(a)pyrene	0.19	NA	--	NA	--
Benzo(b)fluoranthene	0.43	NA	--	NA	--
Dibenzo(a,h)anthracene	0.032	NA	--	NA	--
Indeno(1,2,3-cd)pyrene	0.13	NA	--	NA	--

Abbreviations:
-- = not evaluated
EPC = exposure point concentration
mg/kg = milligrams per kilogram
NA = not available

Footnotes:
[a] Values from Table 2.
[b] The benchmarks for earthworms and plants are from Table 3-4 from Texas Commission on Environmental Quality January 2006 Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas RG-263 (Revised).

APPENDIX A

PROPERTY DESCRIPTION

EXHIBIT "C"

FIELDNOTES for a 14.24 acre tract of land being all of Lot 1, Bay Block B, the West 509.29 feet of Lot 2, Bay Block 8, the South 130 feet of Lot 4, Bay Block 7, a portion of Ocean Drive and a tract of land between the East boundary of Ocean Drive and Redfish Bay, all as shown on the Burton & Danforth Subdivision map as recorded in Volume 1, Page 3, Plat Records of Aransas County, Texas and a certified copy of such map is recorded in Volume 152, Page 1 of the San Patricio County, Texas Deed Records;

BEGINNING at a 1/2 inch iron rod found (marked R.P.L.S. 1523) at the West corner of said Lot 2 on the Southeast right-of-way line of Bay Avenue (60 foot wide right-of-way with variable width caliche surface) for the West corner of this survey;

THENCE North 34° 37' 00" East, along said Southeast right-of-way line, at 330.00 feet pass a 1/2 inch iron rod found (marked R.P.L.S. 1523) at the North corner of said Lot 2 and the West corner of said Lot 1, in all a distance of 640.00 feet to a 1/2 inch iron rod found (marked R.P.L.S. 1523) on the Southwest right-of-way line of Sun Ray Road (40 foot wide right-of-way with 22 foot wide asphalt surface) for the North corner of said Lot 1 and a corner of this survey;

THENCE South 55° 30' 35" East along said Southwest right-of-way line at 901.00 feet a 1/2 inch iron rod found (marked R.P L.S. 1523) bears South 34° 29' 25" West 2.0 feet, in all a distance of 913.24 feet to the West right-of-way line of Ocean Drive for the East corner of said Lot 1 and inside corner of this survey;

THENCE North 16° 32 55" East, along the West right-of-way line of Ocean Drive (80 foot wide right-of-way unimproved) 42.04 feet across Sun Ray Road to a 5/8 inch iron rod found at the South corner of Lot 4, Block 7 for an inside corner of this survey;

THENCE North 55° 30' 35" West along the Northeast right-of-way line of Sun Ray Road, at 13.46 feet a 1/2 inch iron rod found (marked R.P.L.S. 1523) bears South 34° 29' 25" West 2.0 feet in all a distance of 900.19 feet to a 1/2 inch iron rod found (marked R.P.L.S. 1523) at the West corner of said Lot 4 on the Southeast right-of-way line of Bay Avenue, for a corner of this survey;

THENCE North 34° 37' 00" East along said Southeast right-of-way line 130.00 feet to a 3/4 inch iron rod with flattened top found for the North corner of this survey;

THENCE South 55° 30' 35" East, parallel to the Northeast right-of-way line of Sun Ray Road and 130 feet distant therefrom measured at right angles thereto, at 840.41 feet a 1/2 inch iron rod found (marked R.P.L.S. 1523) bears South 34° 29' 25" West, 1.85 feet at 857.83 feet cross the West right-of-way line of Ocean Drive, at 861.02 feet pass a 5/8 inch iron rod in concrete found, at 941.92 feet cross the East right-of-way line of Ocean Drive in all a distance of 1,038.69 feet to the shoreline of Red Fish Bay;

THENCE along the shoreline of Red Fish Bay, South 20° 50' 26" West at 1.81 feet a 1/2 inch iron rod found (marked R.P.L.S. 1523) bears North 69° 09' 34" West 2.24 feet, in all a distance of 89.75 feet to an angle point in said shoreline;

THENCE continuing along said shoreline South 00° 40' 20" West 80.69 feet and thence South 13° 50' 36" East 48.81 feet to the beginning of a concrete bulkhead;

THENCE along the outside face of said concrete bulkhead as follows:

South 73° 37' 00" East 15.96 feet;
South 20° 16' 30" West 29.72 feet;
North 71° 29' 02" West 48.32 feet;
South 18° 17' 15" West 78.59 feet;
South 71° 03' 51" East 53.00 feet and South 18° 42' 11" West 193.54 feet to the end of said concrete bulkhead;

THENCE continuing with the shoreline of Red Fish Bay as follows:

South 40° 43' 53" West 74.95 feet;
South 50° 50' 46" West 42.44 feet;
South 11° 18' 15" West 141.77 feet and South 24° 58' 51" West 93.85 feet to a point on the Southeasterly extension of the common boundary of Lots 2 and 3 Bay Block 8 for the South corner of this survey;

THENCE with a wire fence along said Southeasterly extension, North 55° 30' 35" West at 82.04 feet a 1/2 inch iron rod found (marked R.P.L.S. 1523) bears South 34° 29' 25" West 2.69 in all a distance of 132.15 feet to the centerline of Ocean Drive for a corner of this survey, from which corner a 2 inch iron pipe found on the West right-of-way line of Ocean Drive bears North 55° 30' 35" West 42.04 feet and thence South 16° 32' 55" West 1.47 feet;

THENCE with the centerline of Ocean Drive North 16° 32' 55" East, 346.87 feet to a point on the Southeasterly extension of the common boundary of Lots 1 and 2, Bay Block 8, for an inside corner of this survey;

THENCE along last mentioned Southeasterly extension North 55° 30' 35" West 42.04 feet to the South corner of said Lot 1 and the East corner of said Lot 2, on the West right-of-way line of Ocean Drive;

THENCE North 55° 30' 35" West along the common boundary of said Lots 1 and 2 at 2.64 feet, a 1/2 inch iron rod found (marked R.P.L.S. 1523) bears South 34° 29' 25" West 2.77 feet in all a distance of 505.01 feet for an inside corner of this survey;

THENCE South 34° 37' 00" West at 1.12 feet pass a 1/2 inch iron rod found (marked R.P.L.S. 1523) in all a distance of 330.0 feet to a wire fence on the common boundary of said Lots 2 and 3, Bay Block 8 for a corner of this survey, from which corner a 1/2 inch iron rod found (marked R.P.L.S. 1523) bears South 34° 37' 00" West 1.12 feet;

THENCE North 55° 30' 35" West with said wire fence on the common boundary of said Lots 2 and 3,509.29 feet to the POINT OF BEGINNING, save and except 2.5 acres conveyed from National Oil Recovery Corporation to Pi Energy Corporation, by Special Warranty Deed, dated August 17, 1998, to which Special Warranty Deed reference is hereby made for a description of said 2.5 acres of land.