FIELD REPORT FOR SURFACTANT SAMPLING AND HABITAT SURVEYS OF THE TRINITY RIVER IN DALLAS, TEXAS

Prepared for

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

EA Engineering, Science, and Technology, Inc. (EA) and the University of North Texas (UNT) have been contracted to provide surfactant sampling support and habitat survey support for the Soap and Detergent Association (SDA), which is performing a study of the Trinity River in Dallas, Texas. This sampling effort uses newly developed analytical methods to quantify field concentrations of alkylethoxylates (AE), alkylethoxyl sulfates/alkyl sulfates (AES/AS), and laurel alkyl sulfates (LAS) in sediment, surface water, and sediment interstitial water throughout the Trinity River as it passes through the Dallas-Fort Worth metroplex. This sampling builds upon previous work conducted by SDA in 2003. Sampling was conducted in late September and early October of 2005.

This report is a collaborative effort between EA and UNT; the purpose of this report is to:

- Document field activities and sampling/survey methods;
- Provide a narrative account of the sampling and record relevant field observations;
- Report results of habitat surveys conducted at each sampling site by UNT;
- Report results of general chemistry analyses conducted on sediment, surface water, and sediment interstitial water.

This report also includes preliminary analyses and discussion of both habitat survey and general chemical analytical results. Results of the surfactant analyses and the synthesis of surfactant, general chemistry, habitat, and benthic taxonomy data will be presented in a separate document.

1.1 PROJECT OBJECTIVES

A workshop and series of conference calls were conducted to determine the general goals for this project and selection of the study sites. Minutes of the workshop, which was held at the University of North Texas in Denton, Texas on August 17-18, 2005, are provided as **Appendix A**. The workshop included presentations by the UNT and local authorities on the general characteristics of the Trinity River watershed, inputs to the watershed from Dallas-Fort Worth wastewater treatment plants (WWTPs), and recent or on-going studies of the watershed.

A number of study locations and sample designs were considered. By the end of the workshop, several conclusions were reached, as follows:

- The purpose of the study is to examine the concentration and distribution of surfactants – specifically AE, AES/AS, and LAS – in a system where these chemicals are likely to be present at elevated concentrations due to WWTP effluent.
- The goal is to look at sources of surfactants, fate, and possible indicators of effects due to surfactants in environmental media.
- The Trinity River is an ideal study site due to the high ratio of WWTP effluent to river flow (>95%) during late summer months; this provides a reasonable "worst case scenario" for surfactant inputs and exposures to a major metropolitan area.

- Trinity River flow is dominated by 4 major WWTP in the Dallas area; WWTP inputs are relatively well understood.
- The Trinity River is a major metropolitan area; urban land use and environmental factors will have to be factored into any analysis of the system.
- Model predictions show that surfactant concentrations are likely to be consistent throughout the Trinity River within the Dallas-Fort Worth metroplex; therefore, it is valid to look at the metroplex as a single source of surfactants.
- Data and expertise are available for assessing habitat quality and benthic community health within the Trinity River from UNT.
- Analysis of the general physical and chemical properties of the environmental media are helpful in understanding surfactant environmental chemistry.

Based on the above information, a study design was developed that examines the Dallas-Fort Worth area as a single, internally variable source of surfactants to the Trinity River. Section 2.0 discusses the study design and sampling methods.

2.0 METHODS

The following sections discuss the methods used in this study, including the general study design; sediment, surface water, effluent, and sediment interstitial water sampling techniques; targeted chemical analyses; habitat survey methods; and benthic community assessment methods.

2.1 STUDY DESIGN

Based on the above information, a study design was developed that examines the Dallas-Fort Worth area as a single, internally variable source of surfactants to the Trinity River. The study therefore looks at reference sites upstream of Dallas WWTP inputs; effluent and mixing zone sites within the metroplex; and downstream sites where inputs and concentrations are expected to decrease. Sample locations are shown in **Figure 2-1**; sample names and the rationale for their selection are presented in **Table 2-1**. Sample analyses for each media are presented in **Table 2-2**.

2.1.1 Sampling Locations

As presented in **Table 2-1**, a single sample location (SDA05-01) was selected at the headwaters of Clear Creek, which is over 80 miles north of Dallas. This sample was chosen to represent pristine reference conditions outside the influence of WWTP effluent and urban land use. Four additional reference samples were selected at locations on the Elm Fork, West Fork, and East Fork upstream of any major inputs from WWTP. Samples SDA05-02 and –03 were selected to characterize baseline (i.e. before addition of effluent) river conditions in less urbanized areas, and SDA05-04 was selected to represent baseline river conditions in urban areas. Sample SDA05-12 was selected to characterize inputs from the East Fork before its confluence with the Trinity River.

To characterize potential surfactant inputs to the river from Dallas' four major WWTPs, a sample of effluent was collected from each plant. SDA05-05 was collected from the Village Creek WWTP; SDA05-07 was collected from the Trinity River Authority (TRA) WWTP; SDA05-09 was collected from the Dallas Central WWTP; and SDA05-11 was collected from the Dallas Southside WWTP.

Four samples were collected to characterize the mixing of effluent and river water as the Trinity River passes through the Dallas-Fort Worth Area. Each sample was collected downstream from a major WWTP and immediately upstream of inputs from the next WWTP. These sample locations are SDA05-06, -08, and -10.

Finally, the study design includes collection of three samples downstream of Dallas. These are samples SDA05-13, -14 and –15. Sample SDA05-15 is over 100 miles southeast of Dallas.

2.1.2 Sample Media

The study design includes collection of sediment, sediment interstitial water, and surface water from each riverine location and effluent from each of four WWTPs. Samples of sediment, interstitial water and surface water are collected to better understand partitioning of surfactants among media as well as likely mechanisms of transport and potential routes of exposure for aquatic life. Effluent samples are collected to better understand sources of surfactants within the Trinity River watershed.

2.1.3 Sample Analyses

Targeted analyses for each media are presented in **Table 2-2**, and samples collected and analyzed for each media are presented in **Table 2-3**. The primary focus of the study is the distribution and concentration of surfactants in environmental media and their possible effects. Therefore sediment, surface water, interstitial water, and effluent were selected for analysis for AE, AES/AS, and LAS. Samples were sent to Shell Laboratories in the United Kingdom, which will produce a separate report detailing the analytical results.

In addition, samples of these media were analyzed for the general physical and chemical parameters to aid in understanding the environmental chemistry of surfactants. Samples for general chemistry parameters were submitted to Accutest Laboratories; results of these analyses are reported in Section 4.0 of this document.

To examine potential indicators of impacts, habitat surveys were conducted at each site, and samples were collected for benthic taxonomic analysis by UNT.

2.1.4 Quality Assurance Samples

In addition to the samples discussed above, material was collected for surfactant analyses of matrix spikes and matrix spike duplicates. Additional volume was collected from sites SDA05-02, -05, and –08 as indicated in **Table 2-3**.

2.2 SAMPLING METHODS

At each of the 4 WWTP locations, a grab sample of effluent was collected. Also, sediment, surface water, and sediment interstitial water were collected from 11 locations in Trinity River or its tributaries. Habitat assessment and benthic invertebrate sampling was conducted from at all 11 locations. All sampling for surfactants was conducted in accordance with the sample collection and preparation standard operating procedures (SOPs) provided by the SDA. These are included as **Appendix B**. A copy of EA's field log entries for the sample effort is included as **Appendix C**.

2.2.1 Water Quality Measurements

Water quality measurements were collected immediately upon arrival at each location. Water temperature, dissolved oxygen, pH, conductivity, oxidation/reduction potential (ORP), and turbidity were measured using a YSI-556 water quality meter. The time of collection, water depth, and weather conditions were also recorded at each location. Water quality measurements were recorded in the field log, a copy of which is included as **Appendix C**.

2.2.2 Effluent Sample Collection

Effluent samples were collected as a single grab sample. In some cases, effluent was accessed from inside the plant at a point immediately before discharge; at others, it was collected from the point of discharge immediately before mixing with the Trinity River. This is described further in the sampling narrative. Where possible, decontaminated bottles were filled directly from the effluent source. Where access was an issue, a decontaminated bucket was filled and used to transfer effluent to the sample containers. The bucket was decontaminated by thorough rinsing with tap water. A total of 5 liters were collected from each location for surfactant analyses, and approximately 1 liter was collected for general chemistry analyses. Effluent samples for surfactant were preserved with 8% formalin in the field per SDA SOPs. Samples for general chemistry parameters were placed in pre-preserved bottles provided by the lab; general chemistry analytical parameters are listed in **Table 2-2**. After collection, samples were packed in coolers with ice to achieve a temperature of 4 degrees Celsius; they were then transported to UNT where they were placed in cold storage until shipping.

2.2.3 Surface Water Collection

Surface water samples were collected from each riverine location for chemical analyses. Surface water samples were collected immediately upon arrival at the site to avoid interference from disturbed sediment. A decontaminated bucket was filled and used to transfer water to the sample containers; the bucket was decontaminated by thorough rinsing with tap water and then site water. A total of 5 liters were collected from each location for surfactant analyses, and approximately 1 liter was collected for general chemistry analyses. Surface water samples for surfactant were preserved with 8% formalin in the field per SDA SOPs. Samples for general chemistry parameters were placed in pre-preserved bottles provided by the lab; general chemistry analytical parameters are listed in **Table 2-2**. After collection, samples were packed in coolers with ice to achieve a temperature of 4 degrees Celsius; they were then transferred to UNT where they were placed in cold storage until shipping.

2.2.4 Sediment and Interstitial Water Collection

Sediment samples were collected from each sample location for sediment and interstitial water analyses. Sampling was biased towards areas of fine, recently deposited sediments, since these are most likely to contain surfactants. In water too deep for

wading, sediment samples were collected using a Ponar grab sampler, and any overlying surface water was decanted from the Ponar; only the top 6 inches of the sediment were sampled. In areas shallow enough for wading, a decontaminated shovel was used to sample the top 6 inches. The sample was then placed in a decontaminated bucket; buckets were decontaminated by thorough rinsing with tap water followed by rinsing with site water.

Interstitial water collection - Sediment was transferred to the rotating drum separator; the sediment was spun at high speeds to extract interstitial water. Use of this instrument is described in the SOPs in **Appendix B**. Approximately 2 L of sediment were placed in the drum and spun at one time; when no more interstitial water could be extracted, sediment in the drum was transferred to a decontaminated bucket and new sediment loaded into the device. **Figure 2-2** shows the rotating drum separator.

A total of 5 liters of interstitial water were collected from each location for surfactant analyses, and approximately 0.5 liters was collected for the general chemistry analyses listed in **Table 2-2**. Interstitial water samples for surfactants were preserved on ice in the field with 3% formalin per SDA SOPs and held for centrifuging at UNT. Interstitial water for general chemistry parameters was placed in an unpreserved container and held for centrifuging at UNT. After collection, samples were packed in coolers with ice to achieve a temperature of 4 degrees Celsius; they were then transferred to UNT where they were placed in cold storage until centrifuging.

Interstitial water samples for both surfactants and general chemistry parameters were centrifuged in the laboratory at UNT due to the high concentration of suspended solids that were not removed by the rotating drum separator. Samples were centrifuged at 4°C at 3500rpm (1600G) for 15 minutes and preserved within 24 hours of the initial sample collection. For surfactant samples, the supernatant was decanted to decontaminated bottles and additional formalin added to achieve 8% preservation. For general chemistry samples, unpreserved supernatant was transferred to pre-preserved bottles provided by the analytical laboratory.

Sediment collection - After field collection of all of the required interstitial water, the spun sediment was homogenized and a 500 mL sample was collected for surfactant analyses and preserved using 8% formalin. An additional 2 L of spun sediment was collected for general chemistry analyses as listed in **Table 2-2**. After centrifugation of interstitial water, the residual solids were collected and added to the field collected sediment sample. The weight of the original sample and the collected residual solids was recorded and is presented in **Table 2-4**. Additional formalin was added to residual solids to achieve 8% formalin preservation.

It is important to note that sediment collection was conducted differently for one site; at Site SDA05-01, insufficient sediment was available for collection of interstitial water. Therefore, interstitial water was not collected, and a sample of whole sediment was preserved and submitted for analysis.

2.2.5 Sample Shipment

Samples for surfactants were sent to Shell Laboratories in the United Kingdom via an international shipper. They were packed on ice and shipped on October 5th and were received on October 7th, 2005. Methods and results of these analyses will be reported in a separate document by Shell Laboratories.

Samples for general physical and chemical property analyses were packed on ice and shipped on October 5th, 2005 and arrived October 7th, 2005. Samples were submitted for analysis for the parameters listed in **Table 2-2**. Results of general chemistry analyses are discussed further in Section 4.0. It is important to note that, due to warm temperatures and delays during shipping, several samples were received outside of holding times, and some samples were received outside of standard temperature limits (above 4 degrees C). After discussion with SDA, it was agreed to proceed with the analyses and consider this information in interpretation of results.

2.2.6 Benthic Invertebrate Collection

Information on benthic invertebrate collection methods is to be provided by UNT.

2.2.7 Habitat Assessment

Information on habitat assessment methods is to be provided by UNT.

3.0 SAMPLE NARRATIVE

Field sampling and lab centrifugation was conducted from September 30th through October 5th, 2005. Sampling time varied between sites due to differences in sediment consistency and interstitial water yield. Low flow conditions were observed throughout the Trinity River. The following sections provide a description of each site in chronological order of sampling. The order of sampling was determined by site access logistics.

3.1 SDA05-04: WEST FORK UPSTREAM OF VILLAGE CREEK

Sampling began the morning of 30 September 2005 at site SDA05-04, which is located on the west Fork of the Trinity River upstream of inputs from the Village Creek WWTP. Weather was overcast. The river was accessed at the point where Precinct Line Road crosses the Trinity River. Sampling was conducted immediately downstream of the road crossing in an area where loose sediments had been deposited among areas of cobble. Sediment at this location was silty sand containing some crushed shells and gravel. There was a significant amount of trash and man-made debris present in the river and along the banks. **Figure 3-1** shows several pictures of the site.

3.2 SDA05-06: UPSTREAM OF TRA CENTRAL WWTP

Site SDA05-06 was sampled in late morning on 30 September 2005; this site is located immediately upstream of the outfall from the Trinity River Authority Central WWTP, and several miles downstream of the outfall from the Village Creek WWTP. The river was accessed where Beltsville Road crosses the Trinity River. Sampling was conducted along the bank immediately downstream of the road crossing in a depositional area after a large riffle. Sediment at this location was silty sand deposited over a cobble substrate. **Figure 3-2** shows several pictures of the site.

3.3 SDA05-05: VILLAGE CREEK WWTP EFFLUENT

Site SDA05-05 was sampled in the afternoon on 30 September 2005. Access was gained to the Village Creek WWTP facility by prior correspondence. Effluent samples were collected from a spigot which provided direct access to the final aerated effluent.

3.4 SDA05-08: UPSTREAM OF DALLAS CENTRAL WWTP

Site SDA05-08 was sampled the morning of 1 October 2005 where the Trinity River passes under Route I-45. This site was located immediately upstream of the Dallas Central WWTP, and several miles downstream of the TRA Central WWTP. A sample replicate and sample volume for use in matrix spikes were collected from this location. Sediment consisted of silty sand deposited among a cobble and gravel bottom. Photographs of the sampling location are shown in **Figure 3-3.**

3.5 SDA05-09: DALLAS CENTRAL WWTP EFFLUENT

Site SDA05-09 was sampled in late morning on 1 October 2005 at a location approximately 0.5 miles downstream from site SDA05-08. Effluent samples were collected directly from the outfall, which is shown in **Figure 3-4**.

3.6 SDA05-10: UPSTREAM OF DALLAS SOUTH WWTP

The first attempt to sample Site SDA05-10 was conducted the afternoon of 1 October 2005. This site is located several miles downstream of inputs from the Dallas Central WWTP, and upstream of inputs from the Dallas South WWTP. The site was accessed where Route 12 crosses the Trinity River. Photographs of the sampling location are shown in **Figure 3-5.** Water quality measurements were taken and a surface water sample was collected; however, difficulty was encountered during sampling of sediment and interstitial water.

Sediments at the site consisted of unconsolidated clay. It was soon discovered that this material was too fine for separation of sediment and interstitial water using the rotating drum separator; 100% of the sample volume loaded into the drum passed through the screens and formed a colloidal clay suspension. Attempts were made to find beds of sediment more comparable to that from the other sites. Investigations several thousand feet downstream identified similar clayey sediments; investigations upstream found a gravely cobble bottom. The field team traveled to a different access point at Dowd's Ferry, but found similar clayey sediments.

Sampling of the site was temporarily put on hold. After discussions with the SDA Sediment Task Force, it was agreed that a 10 L sediment sample would be collected and preserved in the field at the original sample location, and that interstitial water would be obtained by centrifugation in the lab. This sample was collected the morning of 4 October 2005.

3.7 SDA05-15: PALASTINE

Site SDA05-15 was sampled the morning of 2 October 2005 where the Trinity River passes under Route 84. This site is located over 100 miles southeast of Dallas, and represents a far downstream sample. Sediments at the site were clayey silts with some fine grit and sand. Photographs of the sampling location are shown in **Figure 3-6.**

3.8 SDA05-14: DOWNSTREAM OF THE EAST FORK AND TRINITY RIVER CONFLUENCE

Site SDA05-14 was sampled the afternoon of 2 October 2005. This site is located downstream of the confluence of the East Fork and Trinity River mainstem. Sediments consisted of loose clayey silt containing numerous pebbles, small shells, and pebble-sized pieces of consolidated massive clay. During spinning, the massive clay would compact

and jam the screens; it was necessary to wash the drum several times. The site was being used for recreational target practice prior to the field team's arrival, and numerous shell casings were found along the river bank. Photographs of the sampling location are shown in **Figure 3-7.**

3.9 SDA05-12: UPSTREAM OF THE CONFLUENCE OF THE EAST FORK AND TRINITY RIVERS

Site SDA05-12 was sampled the evening of 2 October 2005. This site is located on the Trinity River upstream of the confluence of the East Fork and Trinity River mainstem. Several junked cars and large pieces of metallic debris were present in the riverbed. Sediments consisted of sand grain-sized pieces of consolidated massive clay mixed with small amounts of shell and coarse sand. During spinning, the massive clay would compact and jam the screens; it was necessary to wash the drum several times. Photographs of the sampling location are shown in **Figure 3-8.**

3.10 SDA05-01: HEADWATERS OF CLEAR CREEK NEAR ST. JO

Site SDA05-01 was sampled the morning of 3 October 2005. This site is located on Clear Creek approximately 1 mile downstream from the dry gully that forms its headwaters. Sampling was conducted immediately downstream of the two large concrete culverts that carry the stream under the road. The stream bottom consists mostly of cobbles and gravel with areas of accumulated leaf litter and organic debris. Very little fine sediment was available for collection; an adequate volume was collected for general chemistry and surfactant analysis of whole sediment, but insufficient volume was available for collection of interstitial water. A trowel was used to collect sediment from between rocks and in small areas of deposition. Photographs of the sampling location are shown in **Figure 3-9.**

3.11 SDA05-02: ELM FORK BELOW LAKE LEWISVILLE DAM

Site SDA05-02 was sampled the morning of 3 October 2005. This site is located on the Elm Fork approximately 0.5 miles downstream of Lake Lewisville Dam. Sampling was conducted in a depositional area along the outer edge of a curve in the river. Sediments consisted primarily of sandy and gravelly silts. Photographs of the sampling location are shown in **Figure 3-10.**

3.12 SDA05-03: WEST FORK DOWNSTREAM OF LAKE WORTH

Site SDA05-03 was sampled the afternoon of 3 October 2005. This site is located on the West Fork downstream of Lake Worth. Site SDA05-03 is located within the YMCA property. Sampling was conducted in a depositional area behind a small concrete dam. Sediments consisted primarily of sandy and gravelly silts. Photographs of the sampling location are shown in **Figure 3-11.**

It is important to note that the sample volume for general chemistry analyses for interstitial water sample SDA05-PW-03 was lost during centrifugation; therefore general chemistry parameters could not be analyzed for this sample.

3.13 SDA05-13: DOWNSTREAM OF DALLAS SOUTH WWTP

Site SDA05-13 was sampled the morning of 4 October 2005. This site is located downstream of the Dallas South WWTP. Site SDA05-13 was accessed through a sand and gravel quarry located on Bois d'Arc Road. Sampling was conducted in depositional areas along the banks. During sampling, an area of potential petroleum accumulation was encountered directly below an abandoned drain pipe; sediments gave off an odor of petroleum when disturbed and produced a visible sheen on the water surface. Sediments were sampled upstream of this area to avoid interferences and contamination. Sediments consisted primarily of gravelly silty clay. Photographs of the sampling location are shown in **Figure 3-12.**

3.14 SDA05-11: DALLAS SOUTHSIDE WWTP EFFLUENT

Site SDA05-11 was sampled the morning of 4 October 2005 from within the Dallas South WWTP. Effluent samples were collected from a hose receiving water from the final effluent immediately before discharge. The outfall is shown in **Figure 3-13**.

3.15 SDA05-07: TRA CENTRAL WWTP EFFLUENT

Site SDA05-07 was sampled the afternoon of 4 October 2005 from within the TRA Central WWTP. Effluent samples were collected from the outfall flume using a dipper provided for this purpose by the WWTP; the dipper is designated for this purpose, remains outside at the flume location, and was the only means of collecting the sample. The outfall is shown in **Figure 3-14**.

4.0 RESULTS

This section presents the results of water quality measurements in the field, sediment physical and chemical analyses, surface water and effluent physical and chemical analyses, interstitial water chemical and physical analyses, and habitat surveys.

4.1 FIELD WATER QUALITY MEASUREMENTS

Water quality measurements including temperature, dissolved oxygen, pH, conductivity, and ORP are reported in **Table 4-1** and **Figures 4-1** through **4-6**.

Water temperature ranged from 23.46°C to 29.87°C. Lowest temperatures were recorded at the pristine reference site (SDA05-01) and highest temperatures were recorded in the effluent samples (**Figure 4-1**).

Conductivity ranged from 0.274 mS/cm to 0.788mS/cm. The lowest values were found in the West Fork and Elm Fork reference samples (**Figure 4-2**). There was a notable increase in conductivity coinciding with effluent inputs into the Trinity River starting at Sample SDA05-05.

Dissolved oxygen concentrations were highest in the West Fork and Elm Fork reference sample locations and sample SDA05-12 (**Figure 4-3**). They ranged from 5.5 to 9.77 mg/L. Lowest concentrations occurred at SDA05-04, where sampling was conducted in a quiescent portion of the West Fork; reduced flow in the immediate vicinity of sampling may account for the low values.

The pH ranged from 6.7 to 8.28. Lowest values were found in effluent and highest values in West Fork and Elm Fork reference samples (**Figure 4-4**).

The oxidation-reduction potential ranged from 23.7 to 387, with the highest value occurring at SDA05-12 (**Figure 4-5**).

Turbidity values ranged from non-detect to 68 NTU, with lowest values recorded for the effluent and West Fork and Elm Fork reference sites (**Figure 4-6**).

4.2 SEDIMENT ANALYSIS RESULTS

For the 10 sediment samples evaluated, grain size can be characterized in two groups. As shown in **Table 4-2** and **Figure 4-7**, sediments at samples SDA05-01, -02, -03, -04, -06, -08, -13, and –15 consist primarily of sand, with a significant but lesser proportion of fines and trace amounts of gravel. Samples SDA05-10, -12, and –14 consist primarily of fines; this is consistent with field observations that noted high proportions of clay in these samples. Highest moisture contents were found in SDA05-10 and –12 (**Figure 4-8**).

Table 4-3 and **Figures 4-9** through **4-12** present the results of sediment chemical analyses. Cation exchange capacity ranged from 780 mg/kg to 10,300 mg/kg, with

highest values occurring in the sediments with the highest percentage of fines (SDA05-10, -12, and –14) (**Figure 4-9**).

Total Kjeldahl nitrogen ranged from 138 mg/kg to 918 mg/kg; concentrations were highest in sample SDA05-12 (**Figure 4-10**). Total phosphorus ranged from 70.7 mg/kg to 906 mg/kg (**Figure 4-11**). Highest concentrations of both phosphorus and nitrogen occurred in the sediments with the highest percentage of fines (SDA05-10, -12, and –14).

Sulfides were detected in only one sample (SDA05-01); this may be due to the fact that sampling focused primarily on recently deposited sediments.

Total organic carbon ranged from less than 1300 mg/kg to 8450 mg/kg (**Figure 4-12**). The highest concentration was found in sample SDA05-10. This is consistent with field observations which indicate that the sample consists of highly organic clays.

4.3 SURFACE WATER CHEMISTRY RESULTS

Results of the surface water chemistry analyses are presented in **Table 4-4** and **Figures 4-13** to **4-16**. It is important to note that, due to difficulties during shipping, several samples for biological oxygen demand (BOD) and total dissolved solids were received outside of recommended holding times and at temperatures above recommended limits. This must be considered when interpreting analytical results.

Results for BOD were below reportable limits in all samples. A combination of factors may have contributed to a lack of detections; these include the fact that, due to difficulties in shipping, samples arrived beyond holding time and above acceptable temperature range. Also, the laboratory analytical narrative indicates that blank analysis revealed a low bias. The reporting limit for BOD was 4 mg/L.

Results for chemical oxygen demand (COD) varied widely. COD was below the reporting limit of 20 mg/L in 4 samples; in the remaining samples, results varied from 20.5 to 30.7 (**Figure 4-13**). Highest COD was found in sample SDA05-15.

Hardness ranged from 122 mg/L to 276 mg/L as CaCO3 (**Figure 4-14**). Hardness was highest in samples SDA05-01 and SDA05-15. Total dissolved solids (TDS) ranged from 20 mg/L to 579 mg/L (**Figure 4-15**). The reported value of 20 mg/L is considered suspect since this sample was received out of holding time. Among the remaining samples, lowest TDS values were found in the West Fork and Elm Fork reference samples. The highest value was found in effluent sample SDA05-05.

Total organic carbon values varied widely, ranging from 1.8 to 10 mg/L (**Figure 4-16**); lowest values were found in SDA05-01, and highest values were found in SDA05-03. This may be because the sample at this location was collected from an impounded area behind a concrete dam.

4.4 INTERSTITIAL WATER CHEMISTRY RESULTS

Results of the sediment interstitial water chemistry analyses are presented in **Table 4-5** and **Figures 4-17** to **4-19**. As noted above, some TDS samples were analyzed outside of recommended holding times.

Hardness in interstitial water ranged from 108 mg/L to 204 mg/L as CaCO3. Hardness was lowest in SDA05-15 (**Figure 4-17**). TDS ranged from 339 mg/L to 555 mg/L, with lowest TDS in SDA05-02 (**Figure 4-18**). Total organic carbon in all samples but one ranged from 5.1 mg/L to 15.7 mg/L; sample SDA05- 13 contained 1200 mg/L (**Figure 4-19**). This value is considered an outlier; while there is no indication of the cause for this high value, it is important to note that interstitial water samples were centrifuged before analysis. A likely explanation would be that some sediment residue was transferred to the sample container with the supernatant.

4.5 HABITAT SURVEY RESULTS

Information on habitat survey results is to be provided by UNT.

4.6 BENTHIC TAXONOMY RESULTS

Information on benthic taxonomy results is to be provided by UNT.

5.0 CONCLUSIONS

The field sampling and habitat surveys conducted by EA and UNT provide data that will be useful in evaluating the conditions under which AE, AES/AS, and LAS persist in sediments and potential impacts from these chemicals.

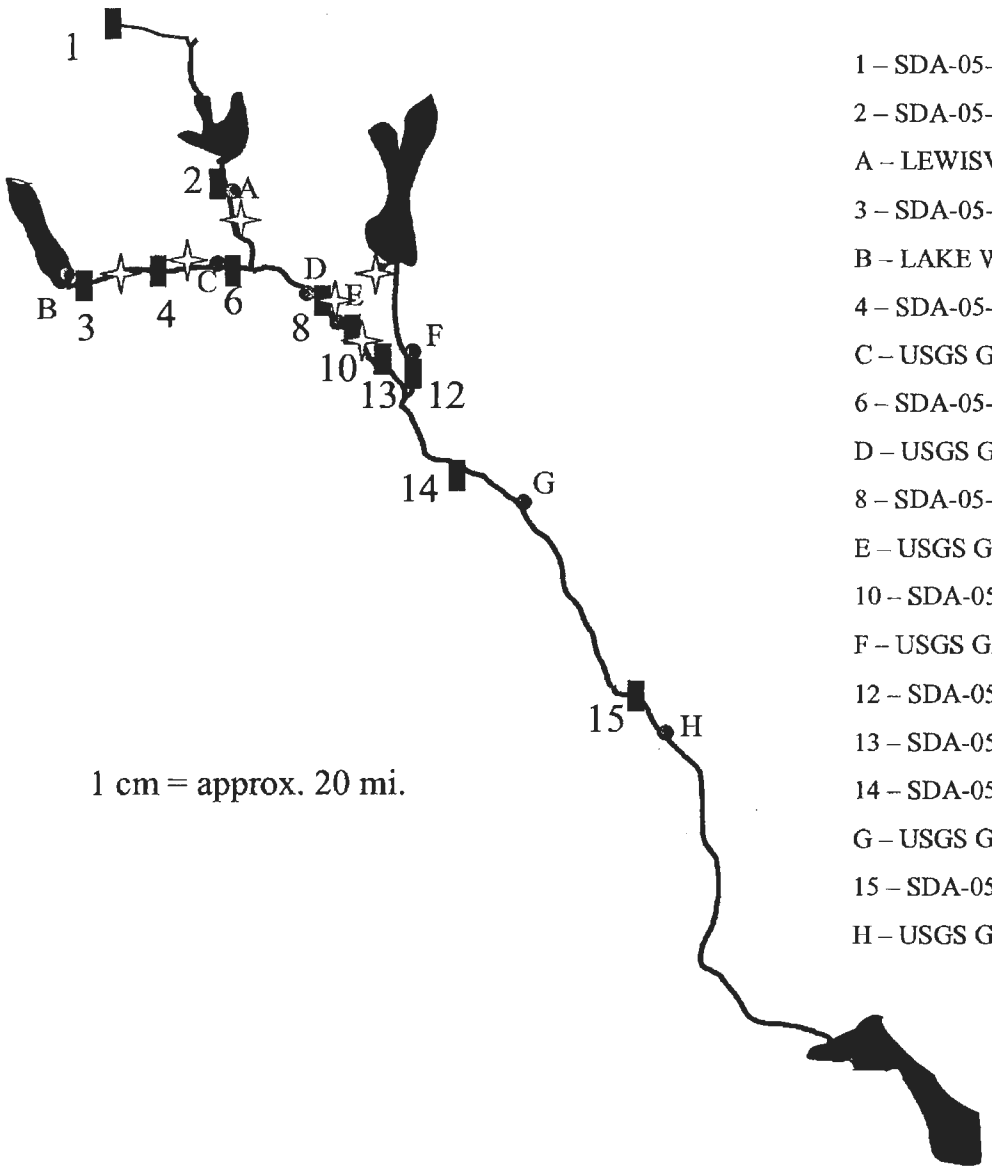
Field measurements of water quality parameters identify changes that occur due to inputs from WWTPS in the Dallas-Fort Worth Metroplex. Most notably, pH decreases and conductivity increases after inputs from the WWTPs. Dissolved oxygen and temperature also decrease from upstream to downstream; while this could be related to inputs from WWTPs, it is more likely related to changes in the topography and flow of the river as it widens and slows. Changes in turbidity appear related to site-related factors. An important factor that should be considered is that, while sample SDA05-12 shares some characteristics with the other reference sites, conductivity and pH at this site are more similar to those in mixing zone samples. This indicates that there may be significant WWTP inputs to the East Fork.

Sediment chemistry analyses identify differences between sites based on grain size, with two distinct types of sediments: those dominated by fines, and those dominated by sand. Samples containing fines tended to contain higher concentrations of nutrients and a higher percentage moisture.

Surface water chemistry analyses identify lower TDS in West Fork and Elm Fork reference samples. Trends were not identified for other parameters. BOD was below reporting limits in all samples; this is likely to be due to a low analytical bias and the fact that samples were analyzed outside of holding times. Interstitial water samples show no clear trends in TDS, hardness, or total organic carbon.

FIGURES

FIGURE 2-1
TRINITY RIVER SAMPLING LOCATIONS



1 – SDA-05-01- CLEAR CREEK
2 – SDA-05-02 – LAKE LEWISVILLE
A – LEWISVILLE LAKE DAM FOR SDA-05-02
3 – SDA-05-03 – DOWNSTREAM LAKE WORTH
B – LAKE WORTH FOR SDA-05-03
4 – SDA-05-04 – UPSTREAM VILLAGE CREEK
C – USGS GAGING STATION FOR SDA-05-06
6 – SDA-05-06 – UPSTREAM TRA CENTRAL
D – USGS GAGING STATION FOR SDA-05-08
8 – SDA-05-08 – UPSTREAM DALLAS CENTRAL
E – USGS GAGING STATION FOR SDA-05-10
10 – SDA-05-10 – UPSTREAM DALLAS SOUTH
F – USGS GAGING STATION FOR SDA-05-12
12 – SDA-05-12 – E. FORK OF TRINITY
13 – SDA-05-13 – UPSTREAM CONFLUENCE
14 – SDA-05-14 – DOWNSTREAM CONFLUENCE
G – USGS GAGING STATION FOR SDA-05-14
15 – SDA-05-15 – PALESTINE
H – USGS GAGING STATION FOR SDA-05-15

FIGURE 2-2
PHOTOGRAPHS OF ROTATING DRUM SEPARATOR IN USE

Loading the rotating drum separator.

Tailgate setup for collection of interstitial water.

Sediment loading on screens of rotating drum separator at a site with sediments containing abundant clay.

Transferring spun sediment to buckets for homogenization and later sampling.

FIGURE 3-1
PHOTOGRAPHS OF SITE SDA05-04

View upstream along West Fork showing trash and debris.

View downstream along West Fork showing quiescent area of sediment sampling.

FIGURE 3-2
PHOTOGRAPHS OF SITE SDA05-06

View upstream along Trinity River below Beltline Road overpass.

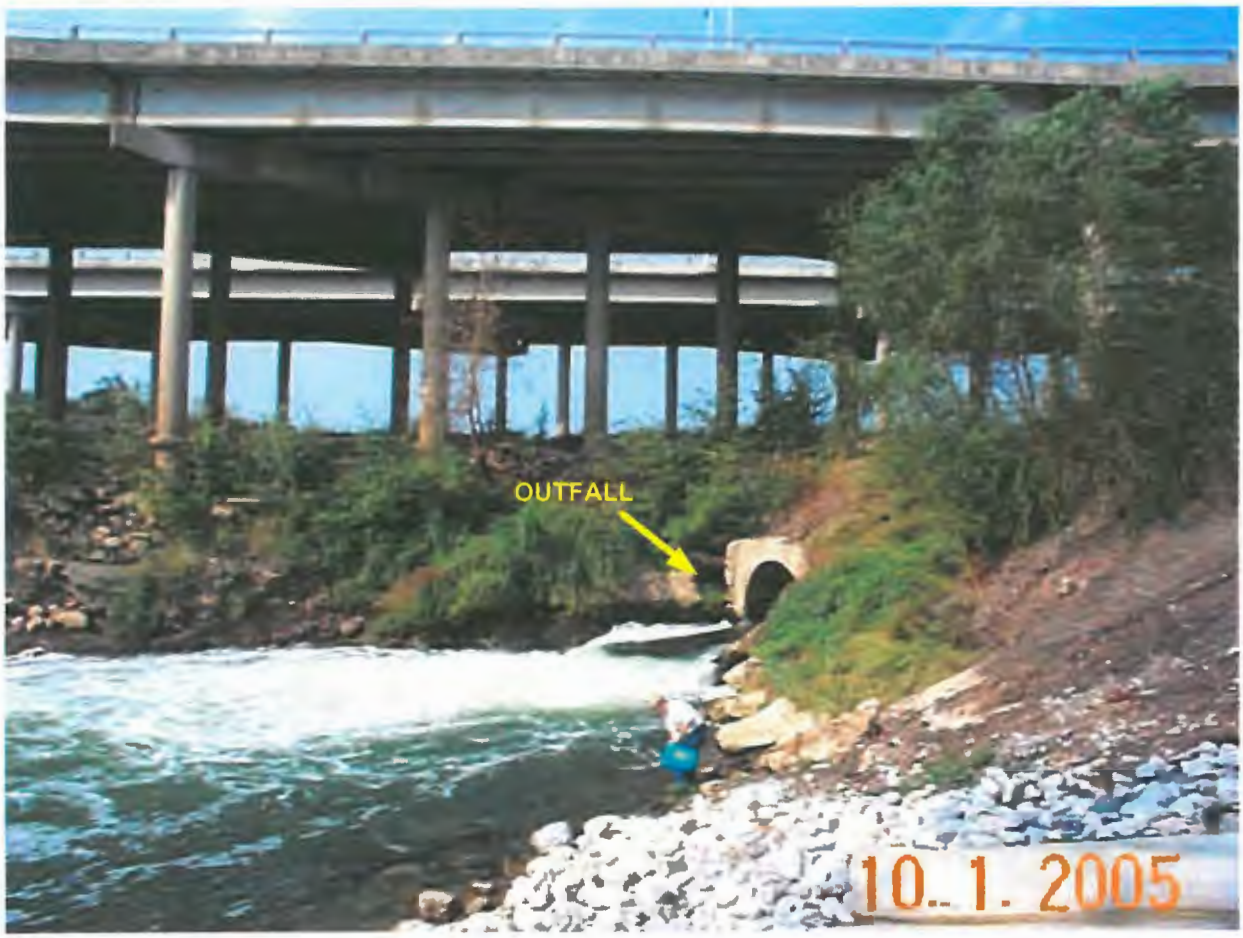
View downstream along Trinity River showing quiescent area of sediment sampling beyond riffle.

FIGURE 3-3
PHOTOGRAPHS OF SITE SDA05-08

View upstream along Trinity River below Route I-45.

View downstream along Trinity River showing quiescent area of sediment sampling.

FIGURE 3-4
PHOTOGRAPHS OF SITE SDA05-09



Outfall of Dallas Central WWTP

FIGURE 3-5
PHOTOGRAPHS OF SITE SDA05-10

View upstream along Trinity River below Route 12.

View downstream along Trinity River showing area of sediment sampling.

FIGURE 3-6
PHOTOGRAPHS OF SITE SDA05-15

View upstream along Trinity River below Route 84 showing area of sediment sampling.

View downstream along Trinity River.

FIGURE 3-7
PHOTOGRAPHS OF SITE SDA05-14

View upstream along Trinity River.

View downstream along Trinity River showing area of sediment sampling.

FIGURE 3-8
PHOTOGRAPHS OF SITE SDA05-12

View of sampling location showing submerged cars and debris.

View downstream along Trinity River showing area of sediment sampling.

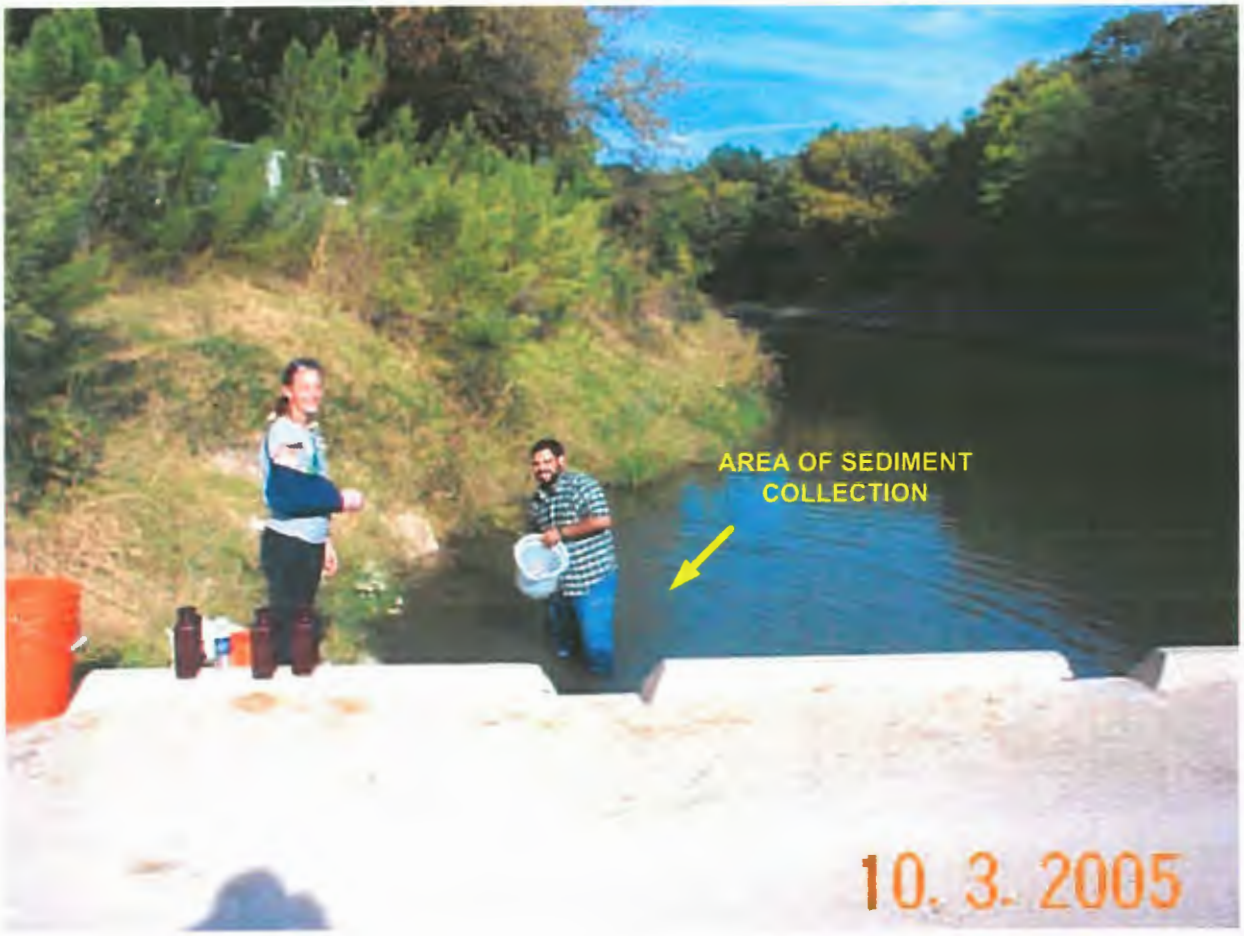
FIGURE 3-9
PHOTOGRAPHS OF SITE SDA05-01

View downstream along Trinity River showing area of sediment sampling.

FIGURE 3-10
PHOTOGRAPHS OF SITE SDA05-02

View of sampling location downstream of Lake Lewisville Dam.

FIGURE 3-11
PHOTOGRAPHS OF SITE SDA05-03



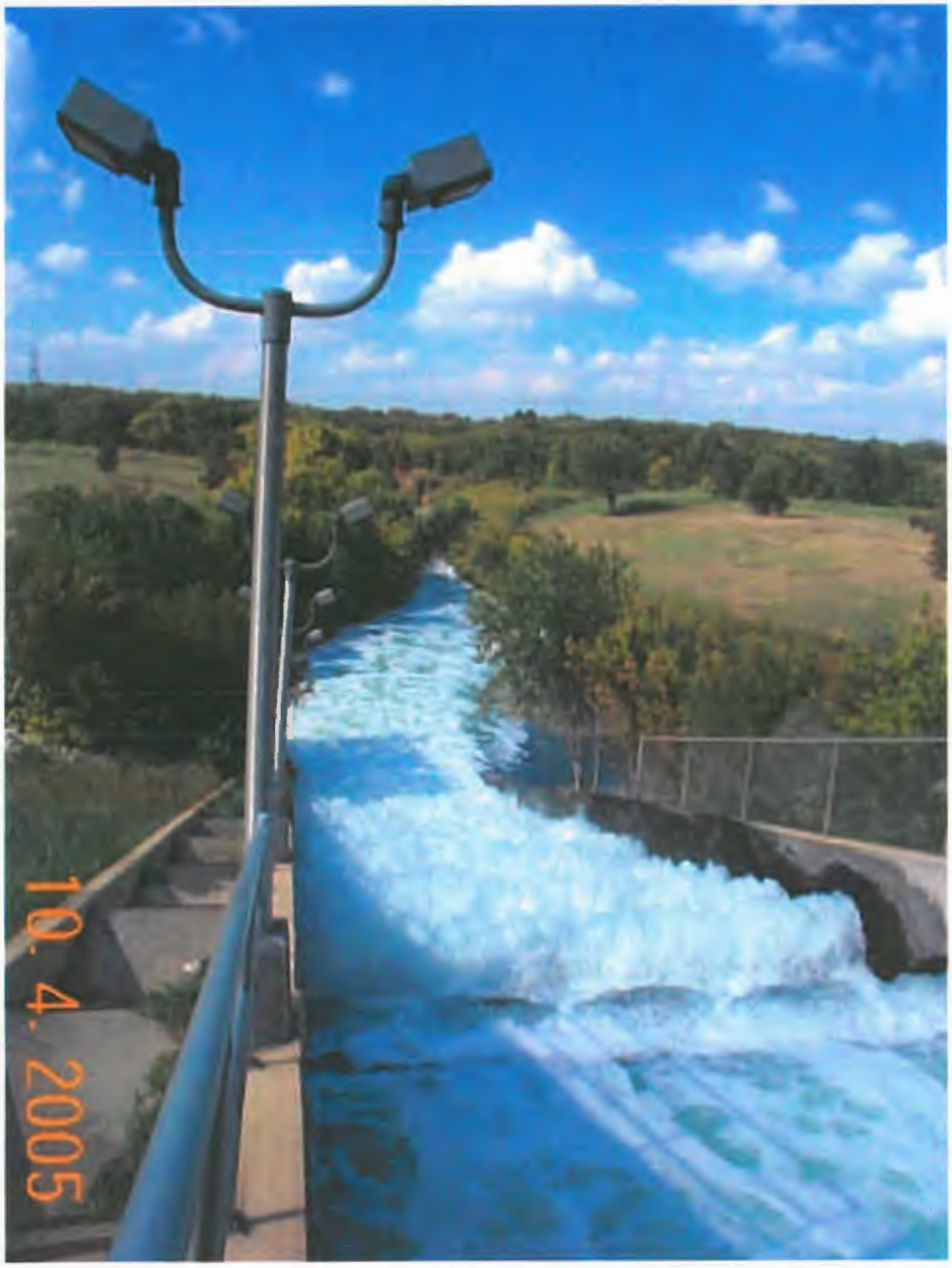
View of sampling location upstream of dam.

FIGURE 3-12
PHOTOGRAPHS OF SITE SDA05-13

View of sampling location and area of petroleum contamination.

View downstream along Trinity River .

FIGURE 3-14
PHOTOGRAPHS OF SITE SDA05-07



Effluent sampling location at TRA Central WWTP.

FIGURE 3-13
PHOTOGRAPHS OF SITE SDA05-11

View of Dallas Southside WWTP outfall below sampling point.

TABLES

Table 2-2
Sample and Site Evaluation Methods

Media/Analysis Type	Specific parameter (Standard method)
Overall Site Parameters	
Habitat Survey	Habitat survey information is to be provided by University of North Texas.
Benthic community/taxonomy analysis	Habitat survey information is to be provided by University of North Texas.
Effluent	
Surfactants	Alkyl ethoxylates
	Alkyl ethoxyl Sulfates
	Lauryl Alkyl Sulfates
General Chemistry and Physical Parameters	Total dissolved solids (EPA 160.1)
	Total organic carbon (EPA 415.1)
	Biological oxygen demand (EPA 405.1)
	Chemical oxygen demand (EPA 410.1)
	Hardness (EPA 130.1)
Sediment	
Surfactants	Alkyl ethoxylates
	Alkyl ethoxyl Sulfates
	Lauryl Alkyl Sulfates
General Chemistry and Physical Parameters	Moisture content (ASTM D2216)
	Grain size (ASTM D422)
	Total organic carbon (EPA 415.1)
	Total sulfide (EPA 376.1)
	Kjeldahl nitrogen (EPA 351.2)
	Total phosphorous (EPA 365.1)
	Cation exchange capacity (EPA SW846 9080)
Surface water	
Surfactants	Alkyl ethoxylates
	Alkyl ethoxyl Sulfates
	Lauryl Alkyl Sulfates
General Chemistry and Physical Parameters	Total dissolved solids (EPA 160.1)
	Total organic carbon (EPA 415.1)
	Biological oxygen demand (EPA 405.1)
	Chemical oxygen demand (EPA 410.1)
	Hardness (EPA 130.1)
Field measured parameters	Temperature
	Dissolved oxygen
	pH
	Conductivity
	Oxidation-reduction potential
	Turbidity
Sediment Interstitial Water	
Surfactants	Alkyl ethoxylates
	Alkyl ethoxyl Sulfates
	Lauryl Alkyl Sulfates
General Chemistry and Physical Parameters	Total dissolved solids (EPA 160.1)
	Total organic carbon (EPA 415.1)
	Hardness (EPA 130.1)

Table 2-3
Sampling Dates, Times and Analyses

Location ID	Sample Media	Sample name	Date collected	Time Collected	Analyses			
					AE/AES/LAS Samples	General Chemistry and Physical Parameters	Habitat Survey	Benthic taxonomy analysis
SDA05-01[A]	Whole sediment	SDA05-SD-01	10/03/05	950	X	X	X	X
	Surface water	SDA05-SW-01	10/03/05	920	X	X		
SDA05-02	Interstitial water	SDA05-PW-02	10/03/05	1340	X	X	X	X
	Interstitial water	SDA05-PW-02MS	10/03/05	1340	X			
	Interstitial water	SDA05-PW-02REP	10/03/05	1340	X			
	Centrifuged sediment	SDA05-SD-02	10/03/05	1357	X	X		
	Centrifuged sediment	SDA05-SD-02MS	10/03/05	1357	X			
	Centrifuged sediment	SDA05-SD-02REP	10/03/05	1357	X			
	Surface water	SDA05-SW-02	10/03/05	1210	X	X		
	Surface water	SDA05-SW-02MS	10/03/05	1210	X			
	Surface water	SDA05-SW-02REP	10/03/05	1210	X			
SDA05-03	Interstitial water	SDA05-PW-03[B]	10/03/05	1700	X		X	X
	Centrifuged sediment	SDA05-SD-03	10/03/05	1645	X	X		
	Surface water	SDA05-SW-03	10/03/05	1645	X	X		
SDA05-04	Interstitial water	SDA05-PW-04	09/30/05	835	X	X	X	X
	Centrifuged sediment	SDA05-SD-04	09/30/05	945	X	X		
	Surface water	SDA05-SW-04	09/30/05	800	X	X		
SDA05-05	Effluent	SDA05-SW-05	09/30/05	1710	X	X		
	Effluent	SDA05-SW-05MS	09/30/05	1710	X			
	Effluent	SDA05-SW-05REP	09/30/05	1710	X			
SDA05-06	Interstitial water	SDA05-PW-06	09/30/05	1250	X	X	X	X
	Centrifuged sediment	SDA05-SD-06	09/30/05	1245	X	X		
	Surface water	SDA05-SW-06	09/30/05	1150	X	X		
SDA05-07	Effluent	SDA05-SW-07	10/04/05	1540	X	X		
SDA05-08	Interstitial water	SDA05-PW-08	10/01/05	915	X	X	X	X
	Interstitial water	SDA05-PW-08MS	10/01/05	915	X			
	Interstitial water	SDA05-PW-08REP	10/01/05	915	X			
	Centrifuged sediment	SDA05-SD-08	10/01/05	815	X	X		
	Centrifuged sediment	SDA05-SD-08MS	10/01/05	815	X			
	Centrifuged sediment	SDA05-SD-08REP	10/01/05	815	X			
	Surface water	SDA05-SW-08	10/01/05	815	X	X		
	Surface water	SDA05-SW-08MS	10/01/05	815	X			
	Surface water	SDA05-SW-08REP	10/01/05	815	X			
SDA05-09	Effluent	SDA05-SW-09	10/01/05	1050	X	X		
SDA05-10	Surface water	SDA05-PW-10	10/07/05	1000	X	X	X	X
	Centrifuged sediment	SDA05-SD-10	10/07/05	1000	X	X		
	Surface water	SDA05-SW-10	10/01/05	1215	X	X		
SDA05-11	Effluent	SDA05-SW-11	10/04/05	1120	X	X		
SDA05-12	Interstitial water	SDA05-PW-12	10/02/05	1805	X	X	X	X
	Centrifuged sediment	SDA05-SD-12	10/02/05	1840	X	X		
	Surface water	SDA05-SW-12	10/02/05	1750	X	X		
SDA05-13	Interstitial water	SDA05-PW-13	10/04/05	900	X	X	X	X
	Centrifuged sediment	SDA05-SD-13	10/04/05	1005	X	X		
	Surface water	SDA05-SW-13	10/04/05	840	X	X		
SDA05-14	Interstitial water	SDA05-PW-14	10/02/05	1525	X	X	X	X
	Centrifuged sediment	SDA05-SD-14	10/02/05	1620	X	X		
	Surface water	SDA05-SW-14	10/02/05	1500	X	X		
SDA05-15	Interstitial water	SDA05-PW-15	10/02/05	1045	X	X	X	X
	Centrifuged sediment	SDA05-SD-15	10/02/05	1145	X	X		
	Surface water	SDA05-SW-15	10/02/05	1030	X	X		

A - Insufficient sediment was available at site SDA05-01 to collect sufficient interstitial water for analysis.
B - Sample volume was lost due to difficulty during centrifugation and general chemical parameters could not be analyzed.

Table 2-4

Volumes and masses of separated and centrifuged sediment

Sample Jar ID	Approximate volume of sediment spun in rotating drum seperator to produce 5.5 L of Interstitial Water (Liters)	Weight of Empty Bottle, kg	Weight of bottle and field collected sediment together, kg	Weight of bottle, field collected sediment, and fine grained centrifuge residue, kg	Estimated weight of field collected sediment, kg	Estimated weight of fine grained centrifuge residue, kg, kg
SD-02	11	*0.274*	0.9085	1.0251	0.6345	0.1166
SD-02MS		*0.274*	0.8433	0.9519	0.5693	0.1086
SD-02Rep		*0.274*	0.9877	1.2072	0.7137	0.2195
SD-03	23	*0.274*	0.9461	1.1028	0.6721	0.1567
SD-04a	26	*0.274*	1.149	1.298	0.875	0.149
SD-04b		NA	NA	NA	0	0.1166
SD-06 jar 1	32	*0.274*	1.1548	1.3052	0.8808	0.1504
SD-06 jar 2		*0.274*	0.2971	0.7364	0.0231	0.4393
SD-08a	8	*0.274*	0.8402	1.1764	0.5662	0.3362
SD-08b		0.27382	0.27382	0.5949	0	0.32108
SD-08MSa		*0.274*	1.0329	1.2542	0.7589	0.2213
SD-08MSb		0.27301	0.27301	0.4675	0	0.19449
SD-08Repa		*0.274*	1.0465	1.2447	0.7725	0.1982
SD-08Repb		NA	NA	NA	0	0.15083
SD-10 bottle 1	NA	0.2757	NA	0.8483	0	0.5726
SD-10 bottle 2		0.2739	NA	0.9751	0	0.7012
SD-10 bottle 3		0.2741	NA	0.9883	0	0.7142
SD-10 bottle 4		0.2741	NA	0.957	0	0.6829
SD-10 bottle 5		0.1277	NA	0.282	0	0.1543
SD-10 bottle 6		NA	NA	NA	0	0.7185
SD-12a	19	*0.274*	0.8127	1.121	0.5387	0.3083
SD-12b		NA	NA	NA	0	0.18995
SD-13	19	*0.274*	Not measured	1.1367	Not measured	Not measured
SD-13 bottle 2		0.273	0.273	0.6073	0	0.3343
SD-13 bottle 3		*0.274*	0.6204	0.8771	0.3464	0.2567
SD-14	15	*0.274*	Not measured	Not measured	Not measured	Not measured
SD-14 bottle 2		0.4201	1.47	NA	1.0499	1.0499
SD-14 bottle 3		0.2734	0.8169	NA	0.5435	0.5435
SD-14 bottle 4		0.2735	0.6274	NA	0.3539	0.3539
SD-15	11	*0.274*	1.042	1.2314	0.768	0.1894
SD-15b		NA	NA	NA	0	0.5757
SD-15c		NA	NA	NA	0	0.6067
SD-15d		NA	NA	NA	0	1.2939

Italicized bottle weights are estimated.

Table 2-1
Sample Locations and Rationale

Sample Name	Geographic Location	Rationale for Site Selection	Latitude	Longitude
SDA05-01	Headwaters of Clear Creek near St. Jo	Selected as a **pristine reference** site upstream of WWTP inputs and away from urban land use	NA	NA
SDA05-02	Elm Fork below Lake Lewisville Dam	Selected as an **upstream reference** site because it is upstream of the influence of the Dallas WWTPs on the Elm Fork.	NA	NA
SDA05-03	West Fork downstream of Lake Worth	Selected as an **upstream reference** site because it is upstream of the influence of the Dallas WWTPs on the West Fork.	NA	NA
SDA05-04	West Fork upstream of Village Creek	Selected as an **upstream reference** site because it is upstream of the influence of the Dallas WWTPs on the West Fork; distinct from SDA05-03 because it may receive inputs from urban land use.	N32°46'53.7"	W097°10'43.6"
SDA05-05	Village Creek WWTP Effluent	Selected as a source of surfactants to the Trinity River via WWTP **effluent.**	NA	NA
SDA05-06	Upstream of TRA Central WWTP	Selected to characterize the effect of transport and urban land use on effluent inputs within the Dallas-Forth Worth **mixing zone**.	N32°46'57.1"	W097°10'45.5"
SDA05-07	TRA Central WWTP Effluent	Selected as a source of surfactants to the Trinity River via WWTP **effluent.**	NA	NA
SDA05-08	Upstream of Dallas Central WWTP	Selected to characterize the effect of transport and urban land use on effluent inputs within the Dallas-Forth Worth **mixing zone**.	N32°44'16.1"	W096°45'55.4"
SDA05-09	Dallas Central WWTP Effluent	Selected as a source of surfactants to the Trinity River via WWTP **effluent.**	NA	NA
SDA05-10	Upstream of Dallas South WWTP	Selected to characterize the effect of transport and urban land use on effluent inputs within the Dallas-Forth Worth **mixing zone.**	N32°42'24.6"	W096°44'7.5"
SDA05-11	Dallas South WWTP Effluent	Selected as a source of surfactants to the Trinity River via WWTP **effluent.**	NA	NA
SDA05-12	Upstream of the confluence of the East Fork and Trinity Rivers	Selected as an **upstream reference** site because it is located upstream of the confluence of the East Fork and Trinity Rivers; site aids in characterizing any surfactant inputs from WWTPs on the East Fork.	N32°35'55.7"	W096°29'05.4"
SDA05-13	Downstream of Dallas South WWTP	Selected to identify conditions immediately **downstream** of the Dallas-Fort Worth mixing zone before inputs from the East Fork.	N33°20'09.4"	W097°10'39.1"
SDA05-14	Downstream of the East Fork and Trinity River confluence	Selected to identify conditions **downstream** of the Dallas-Fort Worth mixing zone after inputs from the East Fork.	N32°19'00.4"	W096°21'33.6"
SDA05-15	Palastine	Selected to identify conditions **far downstream** of the Dallas-Fort Worth mixing zone.	N31°38'53.7"	W095°47'22.9"

Figure 4-1
Surface water/effluent temperature measured at each sample location

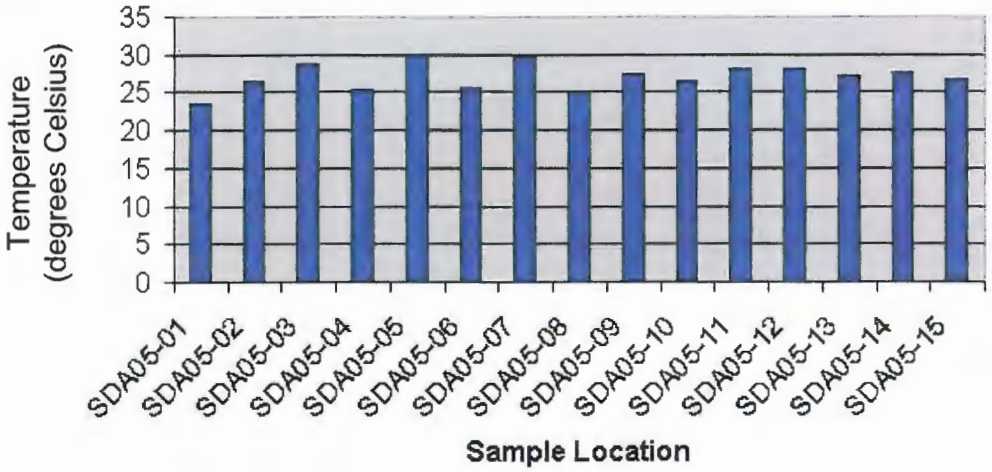


Figure 4-2
Surface water/effluent conductivity measured at each sample location

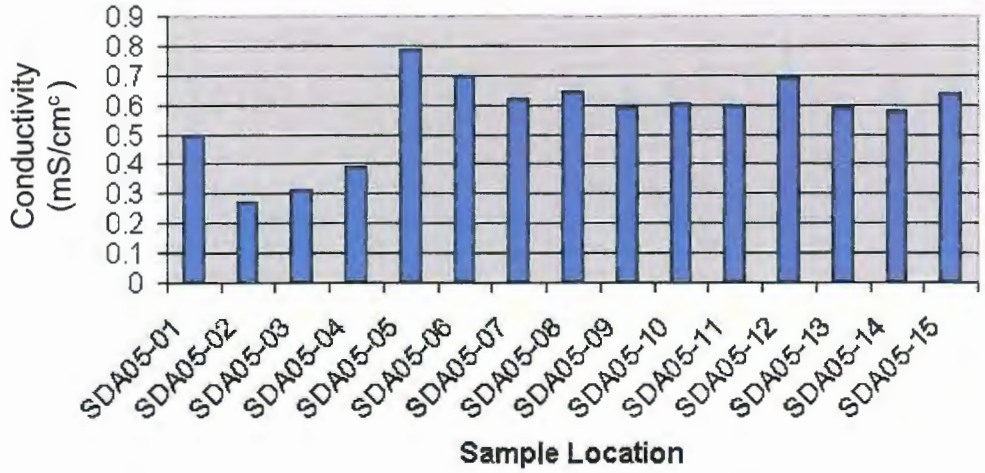


Figure 4-3
Surface water/effluent dissolved oxygen measured at each sample location

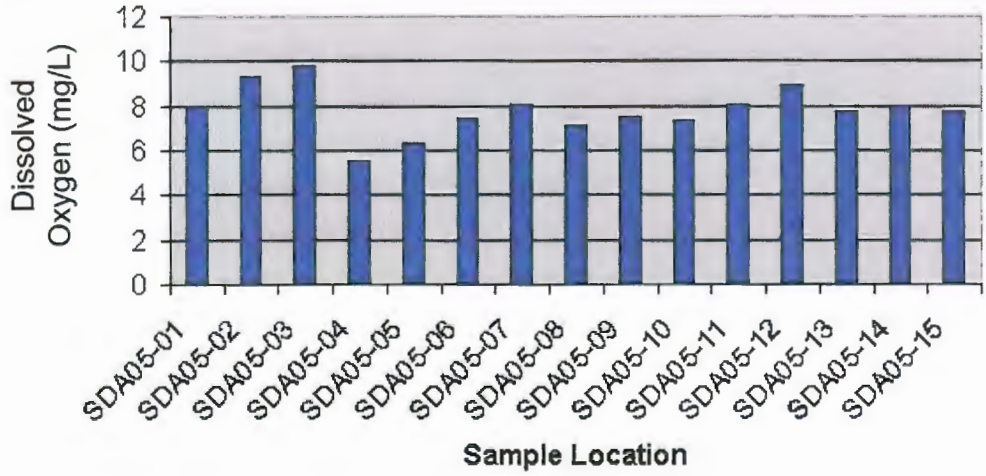


Figure 4-4
Surface water/effluent pH measured at each sample location

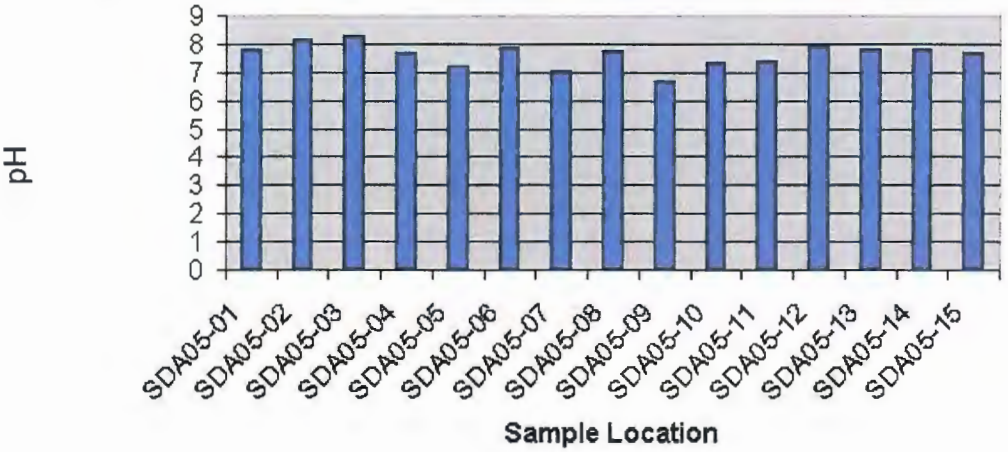


Figure 4-5
Surface water/effluent oxidation-reduction potential measured at each sample location

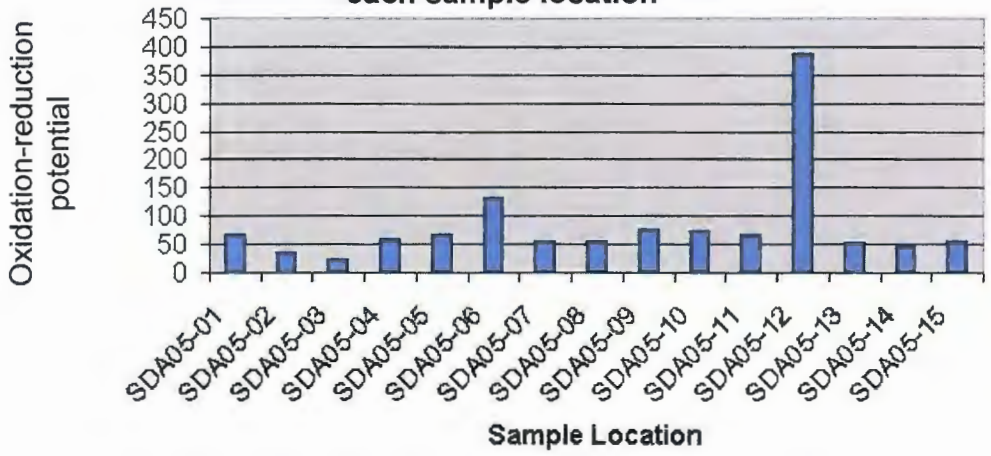


Figure 4-6
Surface water/effluent turbidity measured at each sample location

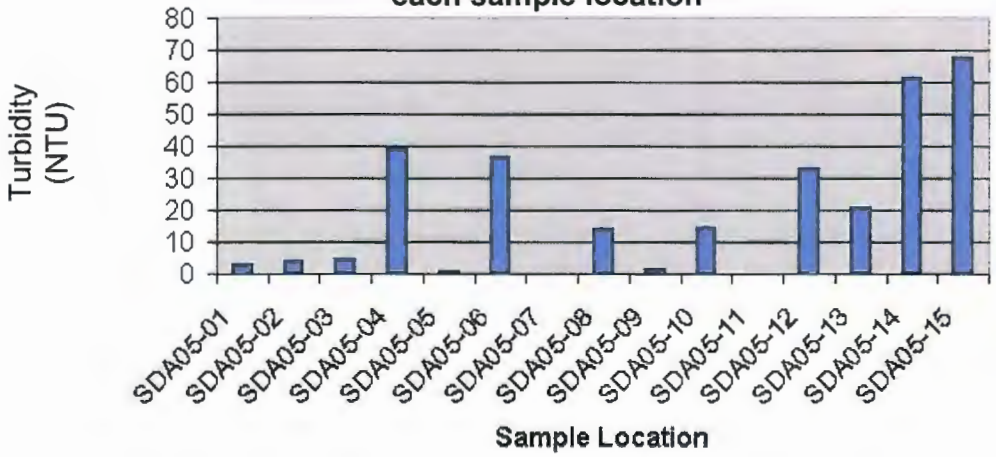


Figure 4-7
Sediment grain size at each sample location

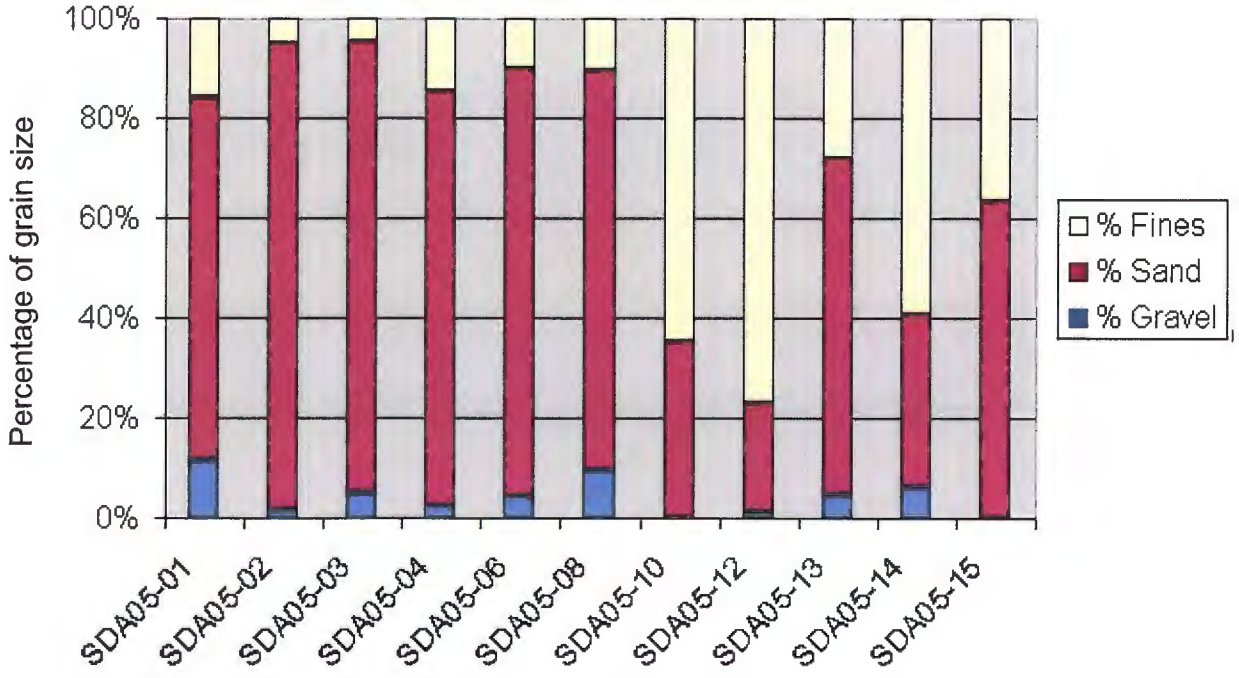


Figure 4-8
Moisture content in sediment at each location

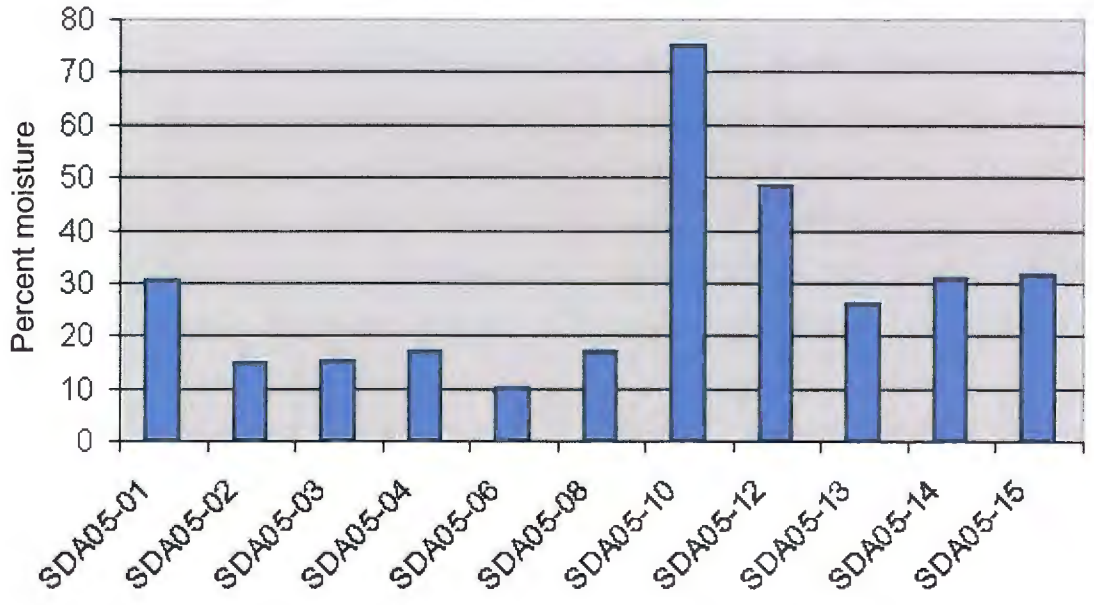


Figure 4-9
Sediment cation exchange capacity at each sample location

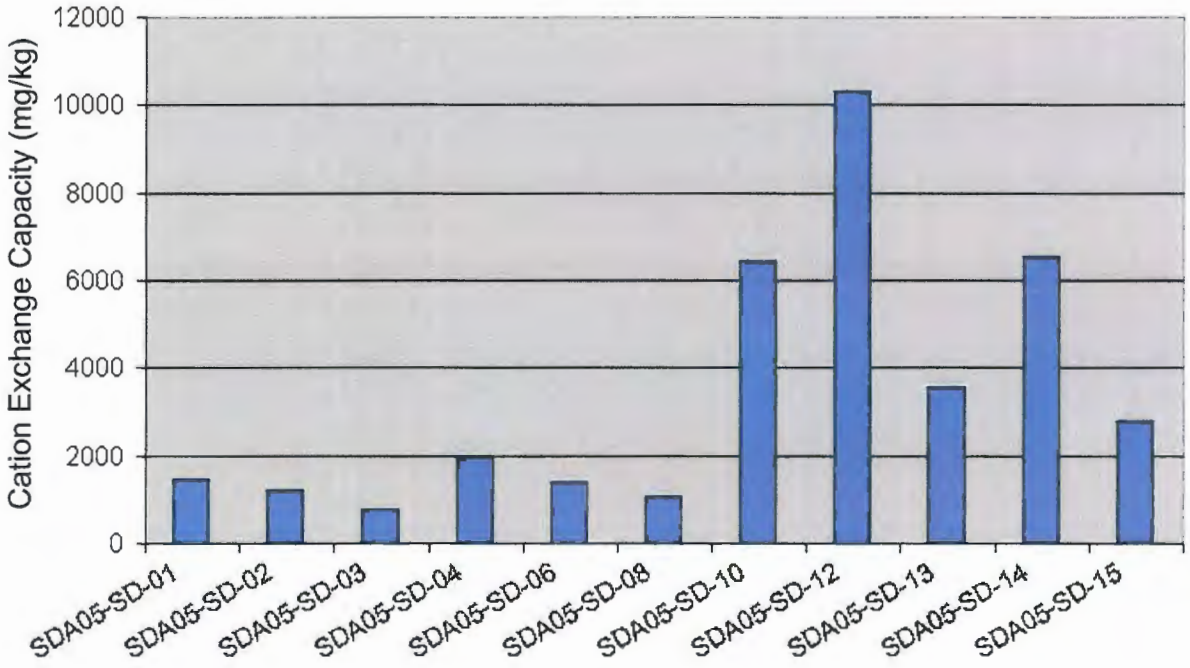


Figure 4-10
Total Kjeldahl Nitrogen in sediment at each location

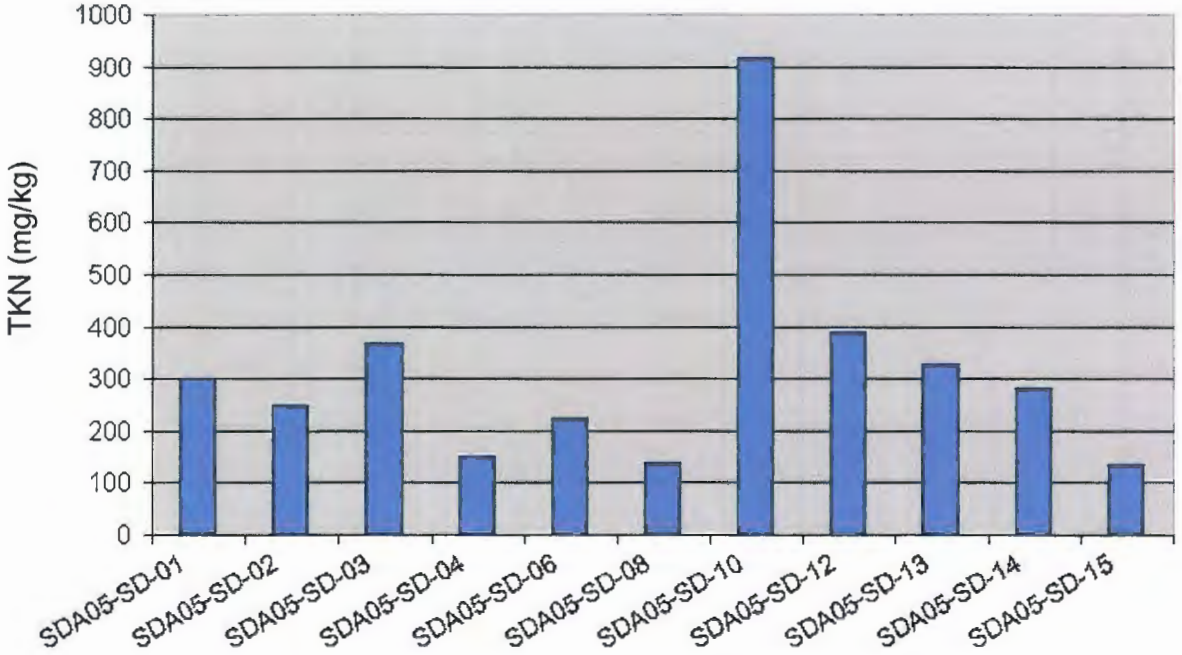


Figure 4-11
Total phosphorus at each sample location

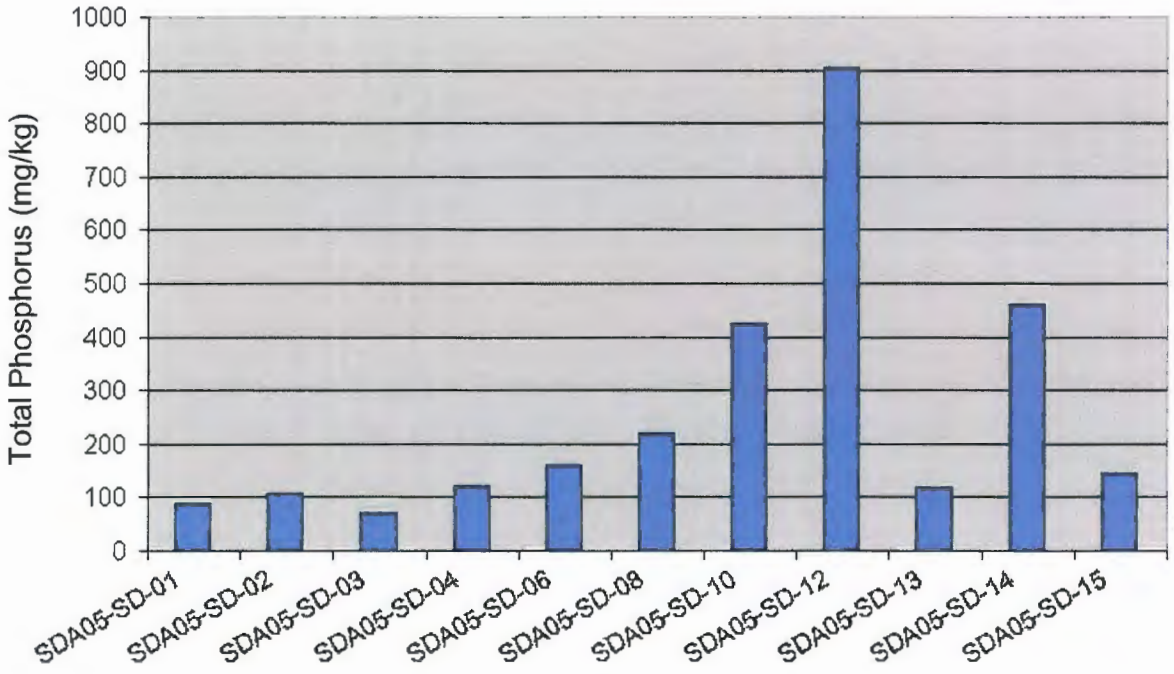


Figure 4-12
Total Organic Carbon in sediment at each location

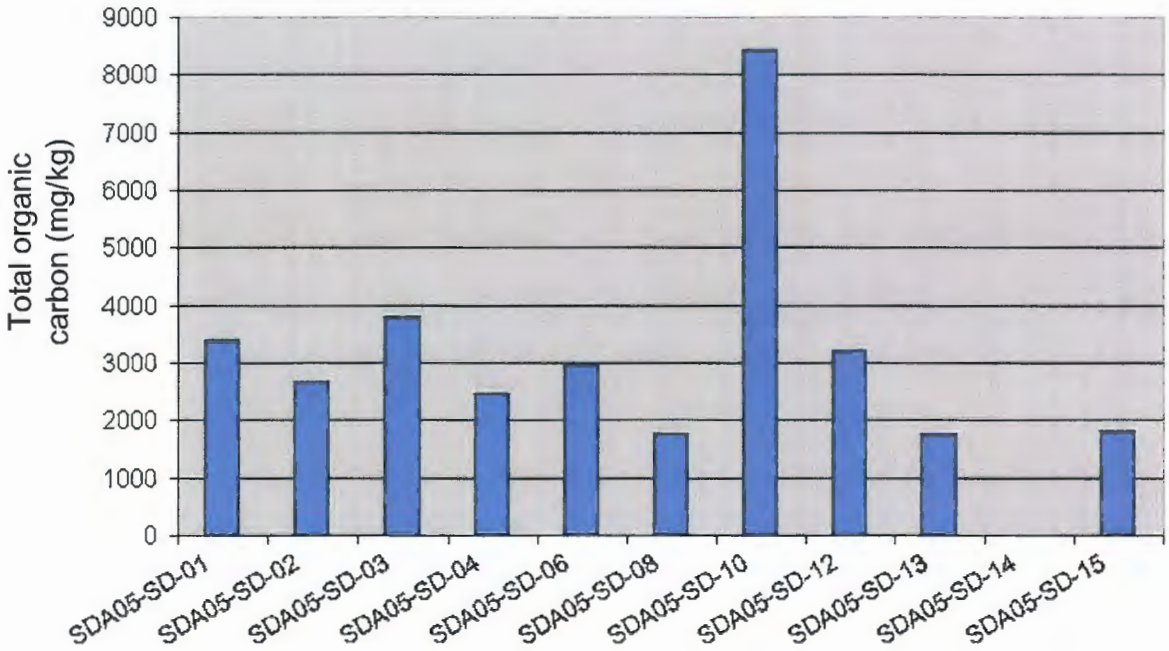


Figure 4-13
Chemical oxygen demand in surface water and effluent at each sample location

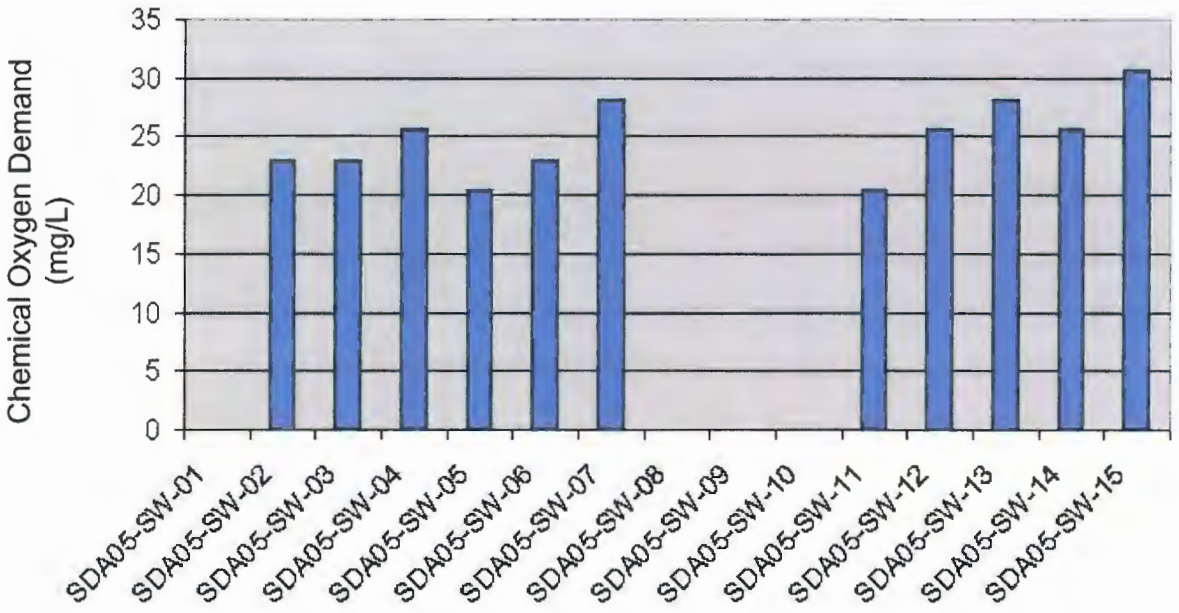


Figure 4-14
Hardness in surface water and effluent at each sample location

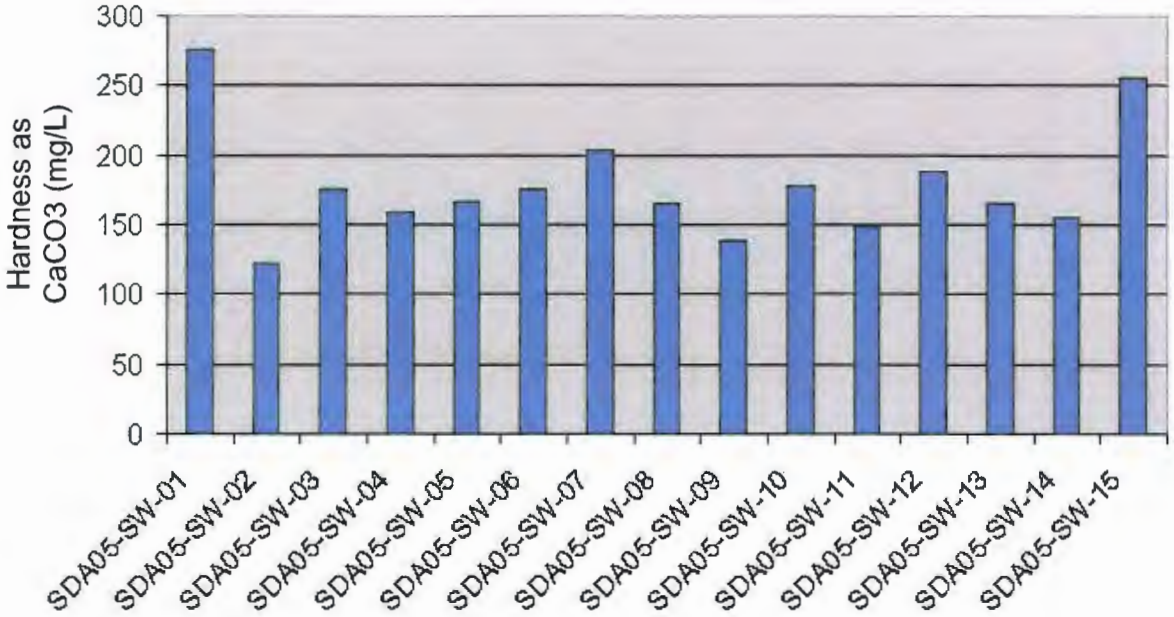


Figure 4-15
Total Dissolved Solids in surface water and effluent at each sample location

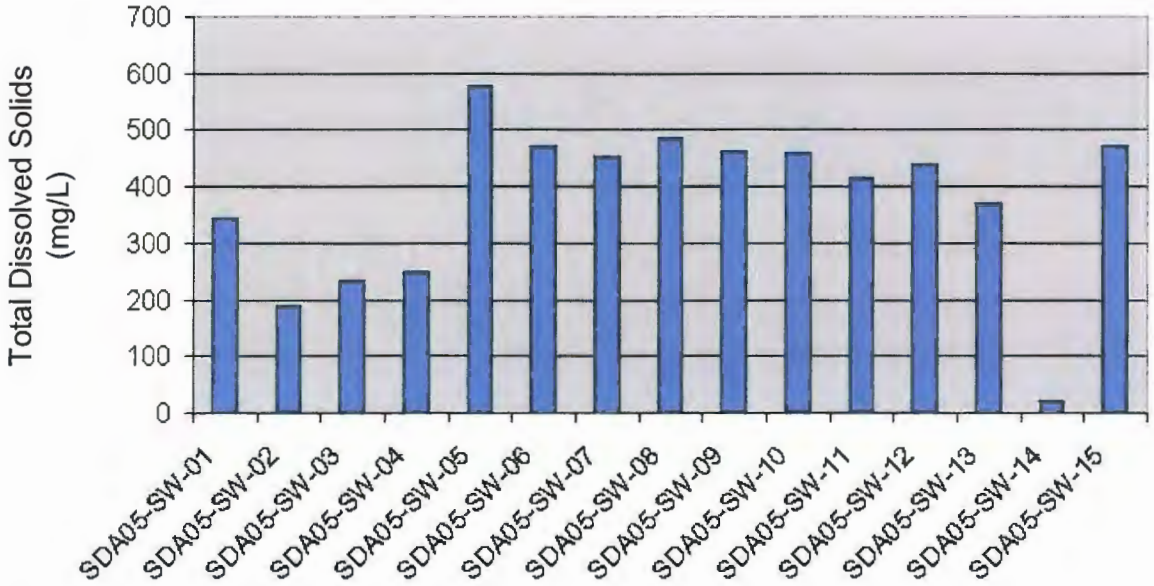


Figure 4-16
Total organic carbon in surface water and effluent at each sample location

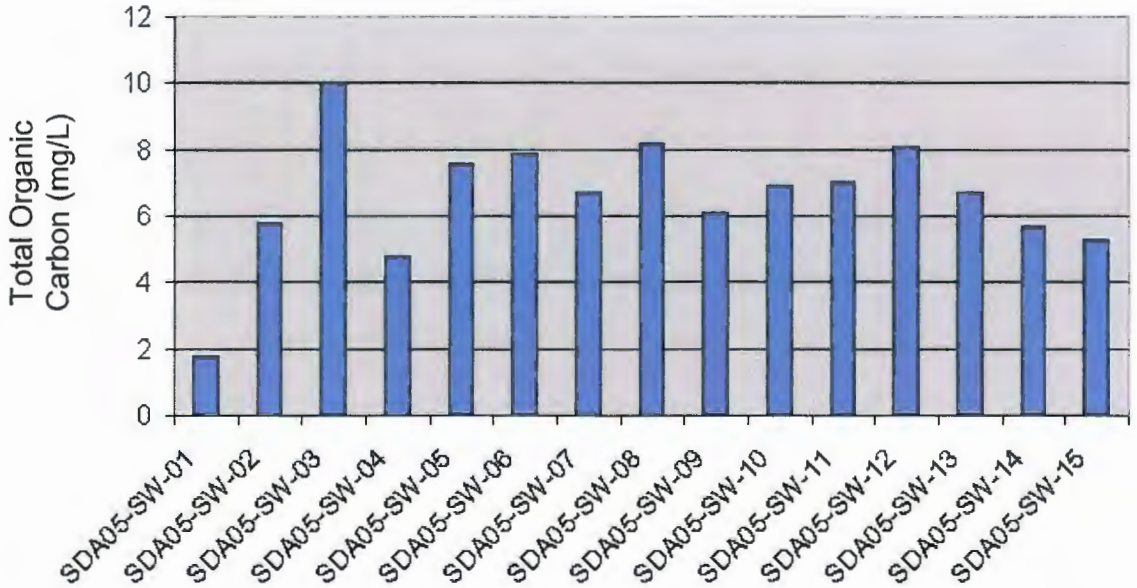


Figure 4-17
Hardness in sediment interstitial water at each sample location

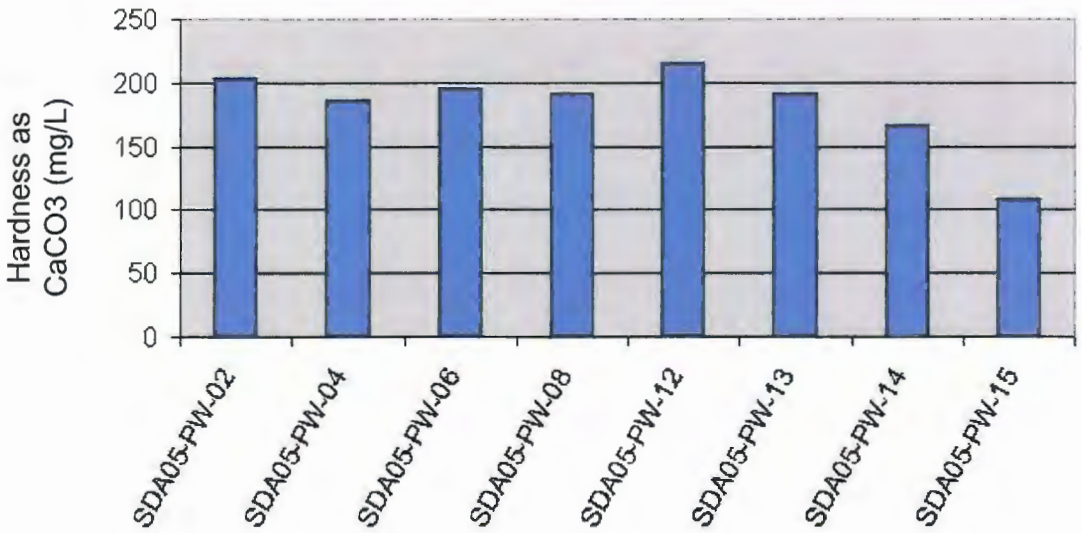


Figure 4-18
Total dissolved solids in interstitial water at each sample location

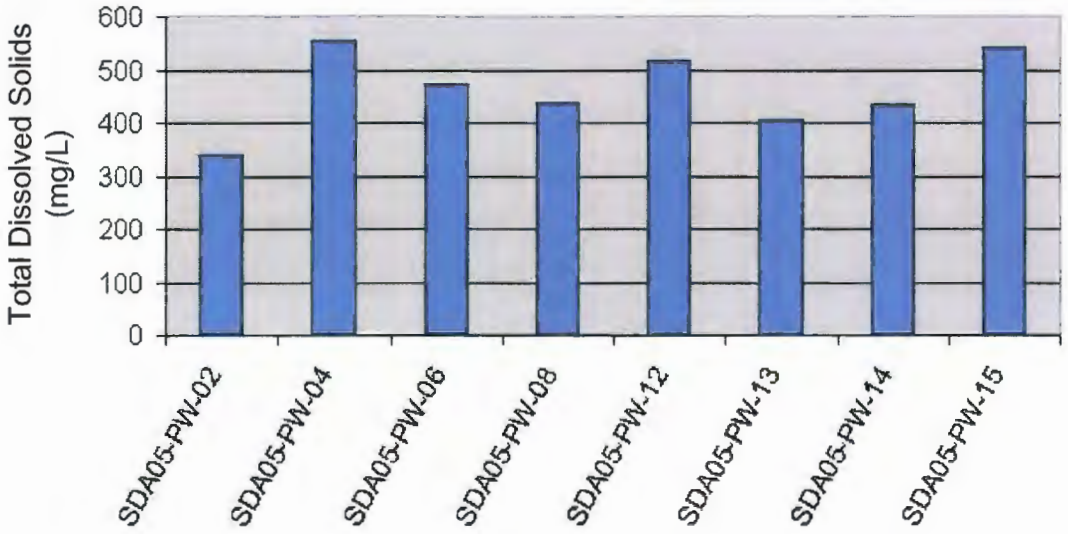


Figure 4-19
Total organic carbon in sediment interstitial water at each sample location

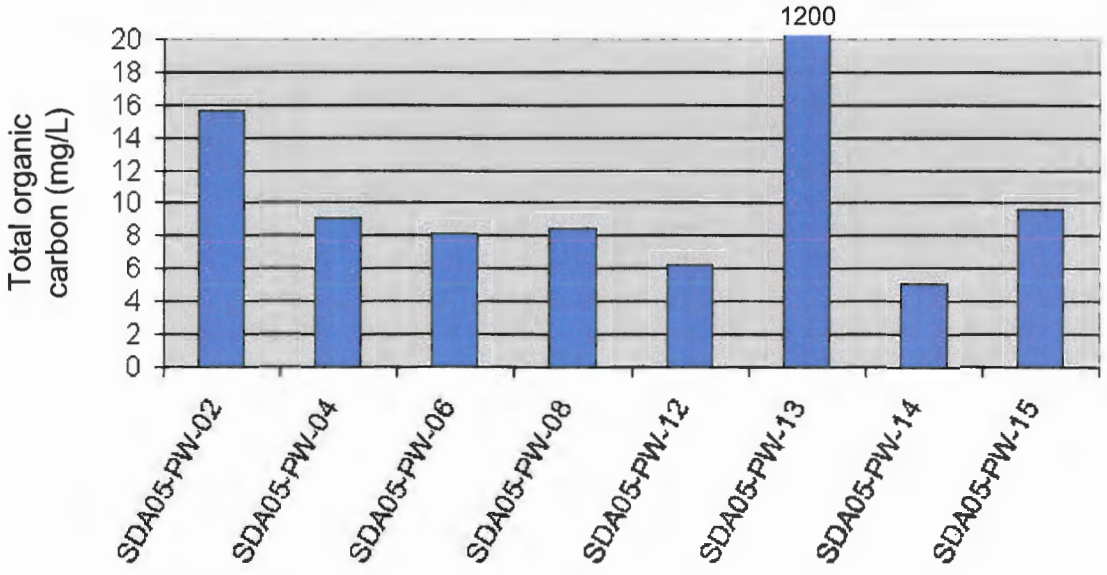


Table 4-1
Field Water Quality Measurements

Sample	Temperature (degrees Celsius)	Conductivity (mS/cmc)	Dissolved Oxygen (mg/l)	pH	Oxidation-Reduction Potential	Turbidity (NTU)
SDA05-01	23.46	0.498	7.94	7.84	68.5	2.9
SDA05-02	26.5	0.274	9.34	8.15	36.1	4.4
SDA05-03	28.67	0.316	9.77	8.28	23.7	4.6
SDA05-04	25.35	0.392	5.5	7.71	58.1	39.5
SDA05-05	29.87	0.788	6.3	7.21	69.1	1.3
SDA05-06	25.47	0.701	7.44	7.88	134.6	36.8
SDA05-07	29.67	0.621	8.07	7.05	57.2	0
SDA05-08	25.15	0.648	7.11	7.76	56	14.1
SDA05-09	27.32	0.593	7.52	6.7	77.9	1.4
SDA05-10	26.45	0.606	7.31	7.32	75.4	14.7
SDA05-11	27.98	0.598	8.04	7.38	67.2	0
SDA05-12	27.98	0.694	8.91	7.95	387	32.9
SDA05-13	27.16	0.593	7.72	7.84	52.6	21
SDA05-14	27.72	0.578	7.97	7.84	48.3	61.5
SDA05-15	26.68	0.637	7.73	7.7	55.4	68

Table 4-2
Sediment Physical Properties

Client ID	Percent Gravel	Percent Sand	Percent Fines	Percent Moisture
SDA05-01	11.7	72.6	15.6	30.6
SDA05-02	1.4	93.5	5	14.8
SDA05-03	5.1	90.4	4.5	15.4
SDA05-04	2.4	83.2	14.5	17.1
SDA05-06	4.1	85.8	10.1	10.2
SDA05-08	9.6	79.9	10.5	17
SDA05-10	0	35.5	64.5	75.4
SDA05-12	1.2	22	76.9	48.5
SDA05-13	4.6	67.3	28.1	26.4
SDA05-14	6.1	34.8	59.1	30.9
SDA05-15	0	63.3	36.7	31.9

Table 4-3
Sediment Chemical Properties

Sample name	Cation Exchange Capacity (mg/kg)	Nitrogen, Total Kjeldahl (mg/kg)	Phosphorus, Total (mg/kg)	Sulfide (mg/kg)	Total Organic Carbon (mg/kg)
SDA05-SD-01	1490	300	90.4	7.2	3410
SDA05-SD-02	1230	247	106	<4.5	2680
SDA05-SD-03	780	368	70.7	<4.5	3800
SDA05-SD-04	1940	151	122	<4.6	2470
SDA05-SD-06	1400	223	162	<4.4	2970
SDA05-SD-08	1070	138	219	<4.5	1770
SDA05-SD-10	6450	918	425	<6.7	8450
SDA05-SD-12	10300	390	906	<5.9	3220
SDA05-SD-13	3580	328	119	<4.8	1770
SDA05-SD-14	6570	281	460	<5.4	<1300
SDA05-SD-15	2780	135	147	<5.5	1820

Table 4-4

Surface Water and Effluent Chemical Properties[A]

Sample name	Chemical Oxygen Demand (mg/L)	Hardness, Total as CaCO3 (mg/L)	Solids, Total Dissolved (mg/L)	Total Organic Carbon (mg/L)
SDA05-SW-01	<20	276	344	1.8
SDA05-SW-02	23	122	191	5.8
SDA05-SW-03	23	176	235	10
SDA05-SW-04	25.6	159	248	4.8
SDA05-SW-05	20.5	167	579	7.6
SDA05-SW-06	23	176	471	7.9
SDA05-SW-07	28.2	204	454	6.7
SDA05-SW-08	<20	165	487	8.2
SDA05-SW-09	<20	139	464	6.1
SDA05-SW-10	<20	178	460	6.9
SDA05-SW-11	20.5	149	415	7
SDA05-SW-12	25.6	188	440	8.1
SDA05-SW-13	28.2	165	370	6.7
SDA05-SW-14	25.6	155	20	5.7
SDA05-SW-15	30.7	255	472	5.3

A - Biological Oxygen demand was analyzed for but is not reported. BOD was below reportable limits in all samples. A combination of factors may have contributed to a lack of detections; these include the fact that, due to difficulties in shipping, samples arrived beyond holding time and above acceptable temperature range. Also, the laboratory analytical narrative indicates that blank analysis revealed a low bias.

Table 4-5
Interstitial Water Chemical Properties

Sample name	Hardness, Total as CaCO3 (mg/L)	Solids, Total Dissolved (mg/L)	Total Organic Carbon (mg/L)
SDA05-PW-02	204	339	15.7
SDA05-PW-04	186	555	9.1
SDA05-PW-06	196	473	8.2
SDA05-PW-08	192	439	8.5
SDA05-PW-12	216	517	6.2
SDA05-PW-13	192	406	1200
SDA05-PW-14	167	436	5.1
SDA05-PW-15	108	544	9.6

APPENDIX A
MINUTES OF THE STUDY DESIGN WORKSHOP

MINUTES
SURFACTANT SEDIMENT TASK FORCE MEETING

Houston, TX August 17-18, 2005

Committee Participants

The Procter & Gamble Company	Scott Dyer
The Procter & Gamble Company	Brad Price
Sasol North America	Allen Nielsen
Shell Global Solutions	Remi van Compernolle

Other Participants

City of Denton	Kenny Banks
EA Associates	Mike Ciarlo
The Soap and Detergent Association	Hans Sanderson
The Soap and Detergent Association	Kathleen Stanton
Trinity River Authority	Glenn Clingenpeel
University of North Texas	Tom LaPoint
University of North Texas	Barney Venables
University of North Texas	Jaime Svadlenka
University of North Texas	David Johnson
University of North Texas	Jim Kennedy

Call To Order and Introductions

The meeting was called to order August 17, 2005 at 8:20 AM CT.

Antitrust Policy Review

Dr. Sanderson reviewed the SDA Antitrust Policy.

Aims of Monitoring Efforts

Dr. Sanderson reviewed the aims of the workshop which include the finalization of the aims of studying the Trinity River system, the decision of the sampling locations and methodologies, and preparing a timeline and delineating tasks.

Site selection

Dr. Dyer explained to workshop participants the factors considered for the selection of the sampling sites for the 2003 sampling event, which included size of population serviced, compliance history of the wastewater treatment plant (WWTP), and inputs from industrial sources. Mr. Ciarlo detailed the sampling methods for surface and pore waters, and sediments.

Analytical methods

Dr. Price reviewed the analytical methods used to assay for surfactants in the surface and pore waters and sediments.

Preliminary results

The Task Force shared the preliminary results from the sampling, including environmental surfactant concentrations, benthic distribution across the sites, and a preliminary environmental risk assessment.

GIS-ROUT modeling and geographic extrapolation

Participants discussed the overlay of the Trinity River.

UNT Background Information

The UNT faculty described the advantages to sampling the Trinity River, and informed the Task Force of their various expertises in performing the sampling event with the support of the University. Participants discussed the TEAM approach to watershed management, the GIS capabilities at the University, an ongoing triclosan study, the water and land use in the Trinity River basin, and the overall use and function of the Trinity River system.

Sampling Sites

The following sites/samples were agreed upon:

Sample Location	Water	Pore	Sediment	Biota habitat	Wet chemistry
Clear Creek headwaters St. Jo	x		x	x	x
Elm Fork below Lake Lewisville dam	x	x	x	x	x
West Fork TR1 (down stream Lake Worth)	x	x	x	x	x
West Fork (upstream Village Creek)	x	x	x	x	x
Village Creek effluent	x				x
Upstream TRA Central (TR 3)	x	x	x	x	x
TRA Central effluent	x				x
Above Dallas Central effluent	x	x	x	x	x
Dallas Central effluent	x				x
Above Dallas South effluent	x	x	x	x	x
Dallas South effluent	x				x
E. Fork Trinity upstream confluence	x	x	x	x	x
Downstream Dallas South (TR 7)	x	x	x	x	x
Downstream E. Fork, Main confluence (TR 8)	x	x	x	x	x
Palastine (TR 10)	x	x	x	x	x

Work Plans

The Task Force discussed future plans. The Task Force decided on the following action items:

EA:

- Sampling for surface water, pore water and sediment concentrations of surfactants.
- Water chemistry (assistance from UNT student Tech)

UNT:

- Centrifuge samples for surfactant analyses

- Biological habitat assessment (EPA RBP, etc)
- Sampling benthos
- PCA analysis and other statistical evaluation of biota
- GIS
- Synthesis and history
- Local logistics and shipments

Shell:

- If need shipment of samples to the UK
- Analysis of surfactants
- QA/QC e.g. field spiked protocol and recovery work

P&G:

- Send bottles, mudslinger and formalin to UNT

Site Visits

August 18 concluded with visits to selected monitoring sites along the Trinity River.

Adjournment

There being no further business, and upon motion duly made and seconded, the meeting was adjourned August 18, 2005, 16:10 PM CT.

Minutes prepared by: Kathleen Stanton, Associate Director, Scientific Affairs
Approved by Committee on: [Click and type Approval Date]

APPENDIX B
STANDARD OPERATING PROCEDURES FOR SURFACTANT SAMPLING

Procedure for Sediment Interstitial Water Separation

Overview:

This protocol describes the method for separating interstitial water from a large volume (2-4Liter) sediment sample. The procedure involves a two-step separation using a rotating drum to remove the interstitial water from the sediment sample and a final clarification using a high speed centrifuge.

Equipment Required

Note: All equipment that will come in contact with samples must be cleaned as described in the separate apparatus cleaning procedures. Avoid use of detergent-based cleaners at all times during the sampling and handling of samples.

Field Equipment:

1) Rotating Drum Separator (Figure 1 &2) : Equipped with screens (coarse= 60 mesh, middle = 200mesh Fine = 325 mesh, 43micron opening, 316SS McMaster-Carr woven wire cloth) to retain sediment and teflon tubing to transfer liquid directly to sample bottle. *Note: Requires 24V power supply (2 auto batteries in series)*
2) Battery Chargers (2): Trickle charge for recharging the drum separator's batteries.
3) Sample Bottles: Pre-cleaned 1 Liter glass bottle with polyseal screw closure
4) Sample Jar – Solids: Pre-cleaned 16 oz. wide-mouth polyethylene jar with poly-lined closure
5) Intermediate Sample Containers(2): 1-2 Gallon Polyethylene or Stainless Steel bucket
6) Coolers (2) with ice: One for sample storage, the second for holding sample bottle during collection.
7) Formalin (37-38% Formaldehyde Solution): For sample preservation
8) Spatula (1-2" wide) or large metal spoon: For transferring sediment to drum
9) Sediment Collection Equipment: Hand corer (Wildlife Supply Company - Buffalo, New York 14216 or KC Denmark - Holmbladsvej 19 - DK-8600 Silkeborg - Denmark), Petite Ponar grab sampler (Wildlife Supply Company - Buffalo, New York 14216), manual draw-scoop sampler or other device.

Laboratory Equipment:

1) Centrifuge: Sorvall RC5 with GSA rotor(or equivalent) and refrigeration capable of centrifuging 150mL Pyrex / Corex centrifuge bottles at 1600G.

	GSA	GS-3
Max Compartment Mass	580g	780g
Max Rotor Speed (rpm)	13000 rpm	9000 rpm
Critical Speed on RC-5, 5B & 5C (max imbalance – avoid this speed!)	800 rpm	600 rpm

2) Corex C1265 Centrifuge Bottle with screw closure(150mL nominal capacity, max speed 5000rpm) *Note: Larger (or smaller) bottles may be used if they will withstand 1600G. Or Sorvall #00522 Stainless Steel Bottles (310mL capacity, 13000rpm max speed) Do not use plastic, especially not polycarbonate*
3) Top-Load balance: 1500g minimum capacity

Safety Considerations

- The rotating drum centrifuge is a prototype piece of equipment which should be used by trained, experienced personnel. The unit has energized mechanical parts which pose a pinch hazard. All covers must be secured before operating. Interlocks are in place on all covers and must not be

disabled. In addition, the apparatus is powered by two twelve volt batteries which are a potential electrical hazard. Never touch more than one battery terminal at a time.

- Laboratory centrifugation will be performed using a standard laboratory centrifuge which must be balanced and operated in accordance with the manufacturer's safety guidelines.
- Formalin is used as a preservative and is irritating to skin, eyes and is a suspect cancer hazard. Read the material safety data sheet before use. Use only in a well-ventilated area, using appropriate personal protective equipment. Individual containers of formalin must not contain more than 30mL of formalin (or the solution must be <=10% buffered formalin).

Sample Collection

Locate a region in the stream that has suitable sediment and is expected to fit the experiment design criteria. A field conductivity probe is helpful in identifying regions where wastewater treatment plant effluent is well-mixed into the stream.

Collection of an appropriate sediment sample should minimize the potential co-mingling of overlying water. In addition, the sample should emphasize surface sediment (top 1-3 inches) rather than deep sediment cores. These samples may be collected using either a hand corer (decanting overlying water and discarding deep sediment core sections), a ponar grab sampler (decanting overlying water and deep sediment) or other available current best practices.

At each sampling location, collect a 4 Liter and a 1 Liter sample of overlying stream water and preserve immediately with formalin (320mL/4Liters=8% v/v 80mL/1L = 8% v/v).

Separating Interstitial Water

Field Procedure

1) Connect the battery jumper from the positive pole of the first battery to the negative pole of the second battery (NOT ACROSS THE SAME BATTERY!). The batteries are now connected in series and will provide 24 volt power for the motor.
2) Connect the motor of the drum separator to the appropriate poles of the two batteries.
3) Place a clean intermediate sample bottle (1Liter glass bottle containing 30mL formalin or 4Liter bottle with 120mL formalin) in a cooler with ice. Locate the cooler near the separator so the collection tube can be placed directly into the sample bottle. The 3% volume of formalin is to minimize degradation but also minimize impact of formalin on partitioning between particulate and aqueous phases.
4) Connect the collection tube to the separator. At each new site, discard the first portion of interstitial water to pass through the tube then place the end of the tube in a sample bottle.
5) Collect a sample of sediment for processing. The optimum sample size is 2-6 Liters. ~~Place a small portion (25-50g) of composite sediment into a 500mL widemouth sediment sample jar (containing 40mL formalin)~~. Place a second portion into a widemouth sediment sample jar without preservative for additional characterization.
6) On the rotating drum separator, remove the drum and open the endcap by unscrewing the thumb-screws and removing the endplate.
7) Add enough sediment to the center of the drum to fill it at least half full.
8) Re-fasten the endplate using all four thumbscrews.
9) Place the drum into the holder, making sure the bearings sit in the appropriate positions and the drive gear is engaged with the motor gear.
10) Secure the bearing clamps and all safety covers
11) Switch on the motor and either discard (first use) or collect the separated water directly into the sample bottle. Continue until no significant water is seen moving to the sample bottle (1-2minutes)

12) Replace the sample bottle as needed, placing filled bottles in a cooler with ice.

13) When done, switch off the separator, allow to stop spinning and remove the drum. Remove a small portion (25-50g) of the separated solids into a widemouth sediment sample jar (containing 25mL formalin). Rinse the separator drum in stream water upstream from any discharge point or significantly below the field sampling location. Alternatively, the device may be rinsed with clean tap water(no detergents!) to remove residual sediment.

14) Repeat steps 5-13 until 4L + 1L sample bottles have been filled with interstitial water.

Laboratory Procedure

1) Transfer a portion of the separated interstitial water sample to a 150mL centrifuge bottle. Repeat for an even number of bottles. Following filling the bottles should be balanced (by weight) for centrifugation. BALANCING IS VERY IMPORTANT!

2) Centrifuge the samples at 4°C at 1600G (3500rpm on Sorvall GSA rotor) for 15 minutes. The resulting water should be free of visible particles.

3) Often, small floating particles are observed so it may be appropriate to discard the first few mLs. Decant the clear water into a pre-clean sample bottle containing 50mL/Liter capacity of formalin (total sample to 8% v/v formalin). Leave a small air-space above the sample to permit expansion which may occur during transport. Label the bottle, tape cap to prevent leakage and place in a plastic bag to contain any possible breakage. Ship on ice to the laboratory for analysis.

4) For preserved sediment samples, estimate the final volume of sediment and add sufficient formalin to make to a total of 8% v/v (recall each container initially had 30mL formalin/Liter capacity). Do not add preservative to the unpreserved subsample.

Sample Preparation

NO DETERGENTS! No Paper Towels!

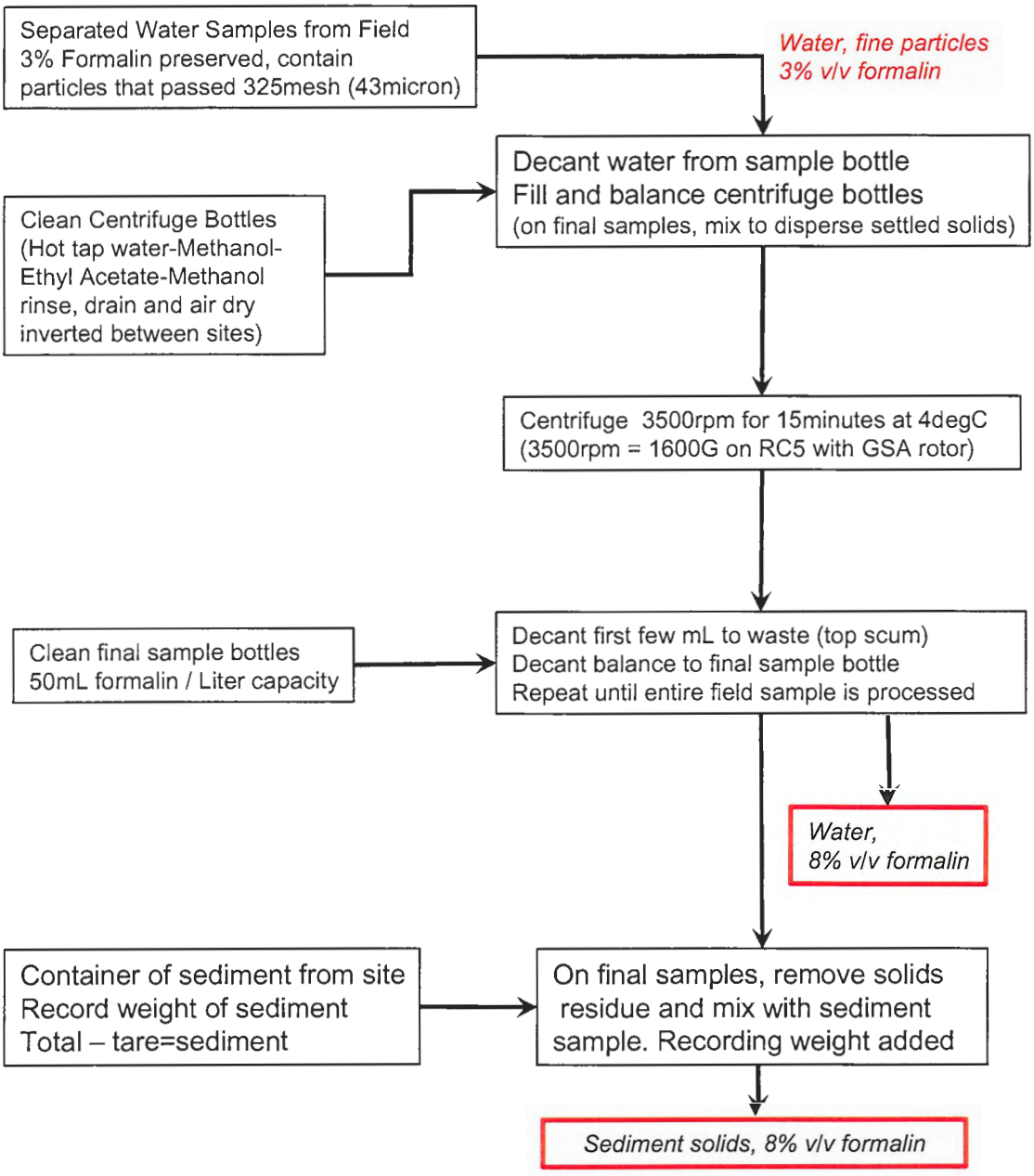


Figure 1: Rotating Drum Separator

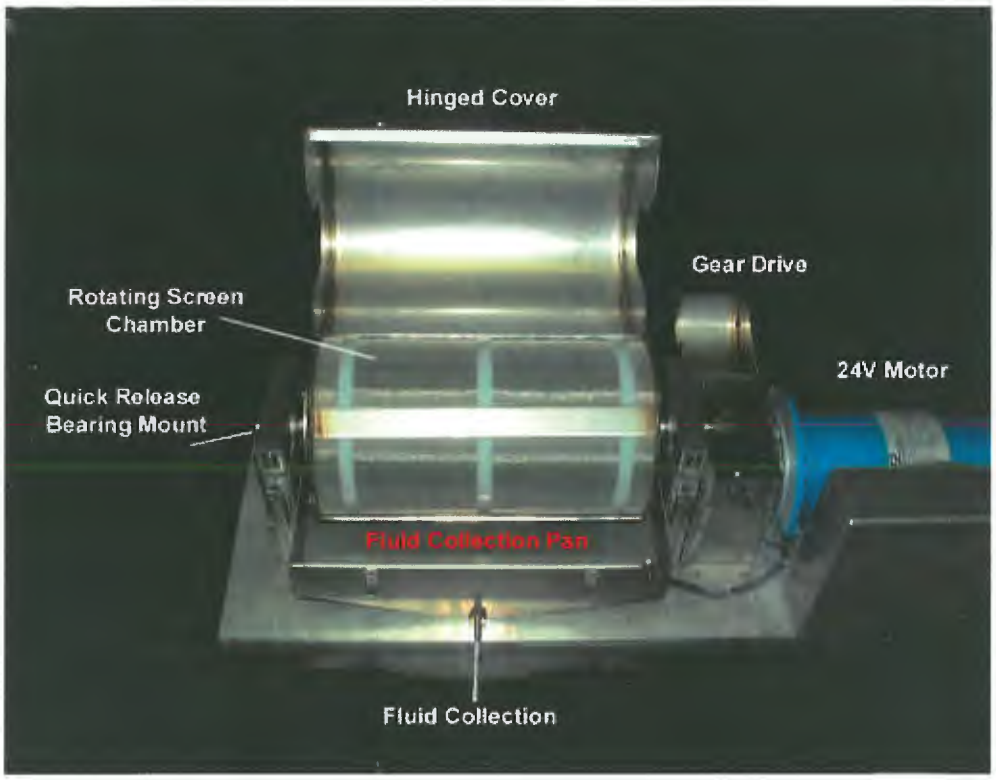


Figure 2: Drum Separator, End View of Chamber

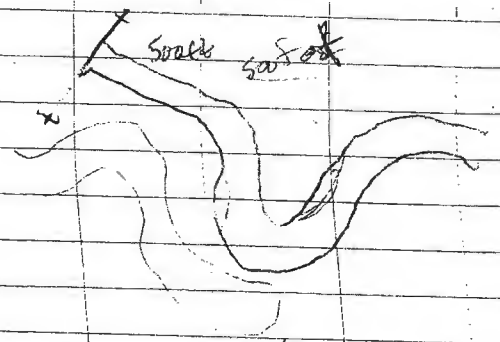
APPENDIX C
FIELD LOG ENTRIES

8-18-05

SDA site visits prior to sample effort w/ UNT & SDA Task force members

2:30 Downstream of Lewisville Lake ~~Swift flow~~ access via dirt road ~2 gates sample point ≈ 200 ft downstream of dam ~gravel bottom

Traveled by road ≈ 500 ft downstream end of erosion ~access



9-30-05

~~PRECINCT LI~~ SDA05-04

SDA SAMPLING - TRINITY RIVER

0530 Met & mobilize
TRAVEL TO SITE
SDA05-04
PRECINCT LINE ROAD

0750 ARRIVE
- COBBLE & GRAVEL SUBSTRATE UNDER BRIDGE W/ AREAS OF DEPOSITION
- EXTENSIVE TRASH & DEBRIS

Temp: ~~24~~	25.35 °C
MS/CMC	0.392
DO %	68.7%
DO mg/L	5.50
pH	7.71
ORP	58.1
NTU	39.5

Collected SW 0800

0825 Sediment sampled
Whole sed package
Collected -8oz

Two buckets sed - scooped
w/ 1 cup measure

0835 Started spinning
- preserved tow to 3oz

0945 Bottled spun sediment
7 gallons spun

Took 3 pics of
site

Spinning time = 1 hr

Sediment - silty sand
& sandy silt w/
crushed shells
& gravel

Made decision to hold some for unpres. to centrifuge at lab & then bottle for Accutest Gen chem

9-30-05

1130 Arrived at upstream
of TRA
SDA-06
Under overpass Beltline Rd
river is 60 feet wide
rock & silty sand substrate

°C 25.47
mS/cm^c 0.701
mS/cm 0.708
DO% 92.5 DO%
DO mg/L 7.44
pH 7.88
ORP 134.6
387 36.8

1150 Sampled [illegible]

1215 Sampled sediment w/ P. Pon[illegible]

Commercial & Highway Area

1250 started spinning
2 hrs to spin
8.5 gal. sediment after spin

1600 TRIED TRACENTRAL DENIED ACCESS

500 VILLAGE EFFLUENT
SDA 05-05

29.87 °C
0.788 mS/cm C
0.861 mS/cm
84.4 DO%
6.30 DO mg/L
7.21 pH
69.1 ORP
1.3 NTU

SAMPLED 1310 from OUTFALL SPIGOT
ACC SAMPLES FROM PRE-AERATED

~~1~~ 1900 Return to UNT

Sort sample bottles, centrifuge

Tile Review & PACK

~~TTAT~~

SAMP	TIME	LAB	MEDIA
SDA05-06	1160	AC	SW
05	1710	AC	SW
04	0800	AC	SW
08	0945	AC	SD
06	1245	AC	SD

1000 PM left UNT

10-01-05

SDA TRINITY RIVER

0600 meet at UNT & mobilize

0730 Arrive SDA05-08
UPSTREAM DALLAS South
UNDER I 45 OVERPASS
CHANNELIZED w/COBBLE
45 feet across & deep

~~0800~~ 755 – Sampled SW & Sed
m.c. – Sed is ~~silty~~ sandy silt deposited in eddy

PONAR BROKE – JIM & SAMIE LEFT TO GET NEW

SW: Temp 25.15 °C
Cond 0.648 mS/cm
Cond 0.649 mS/cm
DO 86.5%
DO 7.11 mg/L
pH 7.76
ORP 56.0
NTU 14.1

0815 Began spinning
2 Gallons seal to
get 5 liters
0915 Finished 08
Began spin of
REP & MS
PW
1030 FINISHED ALL
SPINNING
CLEANED EQUIP

MOVED
10MS REP
TO 08
SILTSANDY

1050 Arrive SDA05-09
Dallas Central
Collected
Sampled effluent
at out fall
below Route 45
High flow
Temp 27.32 °C
0.593 mS/cm
0.620 mS/cm
95.2 DO%
7.52 DO mg/L
6.70 pH
77.9 ORP
14 NTU

10-01-05

1205 Arrive at SDA5-10

1215 Collect SW

26.45°C
0.606 mS/cm^c
0.623 mS/cm
91.4 %DO
7.31 mg/L
7.72 pH
75.4 ORP
14.7 NTU

Site located under
Rte 12 - clayey
banks & clayey
Rocky substrate
Steep banks
Channelized

Waited for benthos crew
to finish last site -
had a broken pump

4:00 COLLECT
SED - CLAYEY SILT

4:15 TRIED TO SPIN
- NO SED LEFT IN
DRUM -
ALL SUSPENDED IN
PW sample

4:00 After finding
no comparable sed
to others sites approp
for centrifuge,
moved to Dowd's
Ferry for Site U32

5:00 Dowd's Ferry - sediment
is clayey - not good
for IW collection - Access issues

6:00 Mobilized for UNT

7:30 Prepped bottles & material
for 10/2

10:00 Left UNT

OCTOBER 2ND 2005

SDA TRINITY RIVER

0700 MOBILIZE AT UNT, PACK & LEAVE FOR PALASTINE

80°, CLEAR

0730 Leave

1015 Arrive at Trinity under 84 SDA05-15

5 ft banks, eroding

1030 Sampled SW-15

1045 Sampled whole sed

Temp 26.68
Cond 0.637
Cond 0.657
DO% 96.9
DO 7.73 mg/L
pH 7.70
ORP 55.4
NTU 68.0

1045 Began spinning labeled porewater bottles

~~Sediment~~ clayey silts w/ fine sand

~ ~~2~~ 3 gallons of SPW sediment

collected from bed - eddy near shore - same place as other sed for bulk

Finished spin - 11:47

1145 - ~~collected~~ SPW sed samples

Waited for RBP to complete flow measurements

Left site 12:30

1245 stopped on road - RBP crew secure load

1300 Mobilized

1430 Arrived SDA05-14
Dealt w/Access issues
people conducting
target practice
1500 Sampled SW

Temp	27.72°C
corr Cond	~~[illegible]~~ 0.578
non Cond	0.556
O_2 sat.	103%
DO	7.97
pH	7.84
ORP	48.3
turbidity	61.5 ntu

1520 Collected whole sed
Sediment - loose clayey silt w/
small clumps of massive clay & pebbles
1525 Began spinning

Sediment contained
high clay & gravel
- when spun gravel
moisture [illegible]
IW was very
viscous -
Finished ~~4~~ 1620
spinning
1620 Collected
Spun sed
4 Gallons spun sed
Left ~~[illegible]~~ 4:50

1730 Arrived SDA05-~~8~~ 12
Scouted Access
1730 Sampled SW

6 PM

Temp 27.98°C

~~0.76~~ 0.694

0.734

DO 114.2

8.91

7.95

387

32.9

1805 Began spinning ~~clay, particles in clay~~ ~~soft~~ sand, in beds behind Suburban Cars

1805 Whole sediment

1840 Finished spinning coarse sand & shells ~~with~~ mixed into small 2mm belly of clay

& silt

1840 collected spun sediment

Decanted & prepped bottles

1920 Left site

~~2000~~ 2100 Arrive UNT, UNPACK & SLEEP

~~2400~~ 2200 Leave

10-03-05

0700 Meet at lab, pack & prep, gear up UNT vehicle

0800 Leave for Clear Creek

Arrive

0945 Clear creek 1 mile downstream from dry gully headwaters

SDA05-01

0970 Sampled SW

Cobble bottom creek - small areas of either sand/gravel accum or clay accum over cobbles <2in deep

Temp	23.46°
Cond	0.498
Cond	0.484
DO%	94.2%
DO mg/L	7.94
PH	7.84
ORP	68.5
NTU	2.9

0950 Collected whole sed - used trowel to remove leaf litter & scrape from bottom rocks across a 40 ft length of creek to get ~3 liters

1020 Left for site SDA05-02

1200 Arrived SDA05-02

S-turn in creek - sandy & gravel silts

1210 Collected SW

26.5°C
0.274 Cond C
0.283 Cond
116.4 %
9.34 mg/L
8.15 pH
36.1 ORP
4.4 NTU

1250 Collected whole sediment

340 Collected PW

3 gallons PW
5L

1443 Finish

[illegible] Collected
Sediments

1640 Arrive SDA05-03
Yuma CA - Dammed area
w/ boulder banks

1645 Collect SW

1645 Whole sed

1700 Start spiking
Gallons

1800 Finish spiking
- Sqm sed.

28.67°C
0.316 mS/cm C
0.339 mS/cm
126.6 DO %
9.77 DO mg/L
8.28 pH
23.7 ORP
4.6 NTU

10.4.05

SDA TRINITY RIVER

0600 Meet & mobilize from UNT

0800 Arrive near SDA05-13, Scout different access points, access at gravel property off ~~[illegible]~~ Bois d'arc Road

0840 Collected SW

27.16°C
0.593 (corrected) Cond
0.618 (uncorr) Cond.
97.9% DO
7.72 mg/L
7.84 pH
526 orp
21.0 ntu

0900 Started sampling

Collected [illegible] whole [illegible]

1005 [illegible] [illegible] soil

Gravelly loam

- possible [illegible] outfall & site w/ petroleum products - slick on water - [illegible]

[illegible]

upstream

1020 Finished - decon

1115 Arrive Dallas Southside WWTP

SDA05-11

1120 - sampled effluent

27.98°
0.598 Cond C
0.623
103.3%
8.04 mg/L
7.38 pH
67.2 ORP
0 NTU

1140 Left
Sampler sat sed after spin

1205 Arrive SDA05-10
Collect ~ 3 L of
whole sed
for Accutest,
Backup &
Shelf

1230 Complete & decon
Waited for JL
to finish BioTe
Left, 1400

1415 - 1515 Lunch

1520 Arrive
SD TKA Central

1530 Arrange Access

1540 Sample SDA05-07

Temp 20.67°
Cond 0.621
Cond 0.677
DO% 106.7
DO 8.07 mg/L
pH 7.05
57.2 ORP
0 NTU

1550 Loft plan

APPENDIX E
LABORATORY CHEMICAL ANALYTICAL DATA SHEETS

e-Hardcopy 2.0
Automated Report

New Jersey
ACCUTEST.
Laboratories

11/23/05

Technical Report for

EA Engineering

1431702 SDA Trinity River Study

1431702

Accutest Job Number: J11972

Sampling Dates: 09/30/05 - 10/04/05

Report to:

EA Engineering
15 Loveton Circle
Sparks, MD 21152

ATTN: Mike Ciarlo

Total number of pages in report: **48**

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Vincent J. Pugliese
President

Certifications: NJ(12129), NY(10983), CA, CT, DE, FL, IL, IN, KS, KY, LA, MA, MD, MI, MT, NC, PA, RI, SC, TN, VA, WV

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-12		
Lab Sample ID:	J11972-2	Date Sampled:	10/02/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	67.9
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	10300	450	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	32.1		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl	390	29	mg/kg	1	10/28/05 10:21	NR	EPA 351.2 M
Phosphorus, Total	906	180	mg/kg	50	10/27/05	JA	EPA 365.3 M
Sulfide	< 5.9	5.9	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	3220	1500	mg/kg	1	10/26/05 10:33	MO	CORP ENG 81M/SW9060M
Total Organic Content	26.2	0.010	%	1	10/27/05	HBA	ASTM D2974-87

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-13		
Lab Sample ID:	J11972-3	Date Sampled:	10/04/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	82.5
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	3580	380	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	17.5		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl	328	24	mg/kg	1	10/28/05 10:22	NR	EPA 351.2 M
Phosphorus, Total	119	30	mg/kg	10	10/27/05	JA	EPA 365.3 M
Sulfide	< 4.8	4.8	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	1770	1200	mg/kg	1	10/26/05 10:43	MO	CORP ENG 81M/SW9060M
Total Organic Content	34.5	0.010	%	1	10/27/05	HBA	ASTM D2974-87

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-14		
Lab Sample ID:	J11972-4	Date Sampled:	10/02/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	25.6	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	155	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	20.0	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	5.7	1.0	mg/l	1	10/21/05 15:08	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-12		
Lab Sample ID:	J11972-5	Date Sampled:	10/02/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 10	10	mg/l	1	10/11/05 11:55	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	25.6	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	188	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	440	10	mg/l	1	10/18/05	MR	EPA 160.1
Total Organic Carbon	8.1	1.0	mg/l	1	10/21/05 15:16	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time. Method blank and dilution water indicate possible low bias. Good recoveries (87% and 86%) on associated glucose spikes.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-13		
Lab Sample ID:	J11972-6	Date Sampled:	10/04/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	<2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	28.2	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	165	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	370	10	mg/l	1	10/11/05	MR	EPA 160.1
Total Organic Carbon	6.7	1.0	mg/l	1	10/21/05 15:23	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	DSA05-PW-14		
Lab Sample ID:	J11972-7	Date Sampled:	10/02/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	167	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [a]	436	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	5.1	1.0	mg/l	1	10/21/05 15:30	SJG	415.1/9060 M/5310B M

(a) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-PW-12		
Lab Sample ID:	J11972-8	Date Sampled:	10/02/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	216	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [a]	517	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	6.2	1.0	mg/l	1	10/21/05 16:28	SJG	415.1/9060 M/5310B M

(a) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-PW-13		
Lab Sample ID:	J11972-9	Date Sampled:	10/04/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	192	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	406	10	mg/l	1	10/11/05	MR	EPA 160.1
Total Organic Carbon	1200	100	mg/l	100	10/26/05 13:04	SJG	415.1/9060 M/5310B M

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-01		
Lab Sample ID:	J11972-10	Date Sampled:	10/03/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	67.9
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	1490	470	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	32.1		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl	300	28	mg/kg	1	10/25/05 18:48	NR	EPA 351.2 M
Phosphorus, Total	90.4	14	mg/kg	4	10/27/05	JA	EPA 365.3 M
Sulfide	7.2	5.7	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	3410	1500	mg/kg	1	10/26/05 10:55	MO	CORP ENG 81M/SW9060M
Total Organic Content	18.0	0.010	%	1	10/27/05	HBA	ASTM D2974-87

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-02		
Lab Sample ID:	J11972-11	Date Sampled:	10/03/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	88.0
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	1230	360	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	12		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl	247	21	mg/kg	1	10/28/05 10:20	NR	EPA 351.2 M
Phosphorus, Total	106	27	mg/kg	10	10/27/05	JA	EPA 365.3 M
Sulfide	< 4.5	4.5	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	2680	1100	mg/kg	1	10/26/05 11:06	MO	CORP ENG 81M/SW9060M
Total Organic Content	29.8	0.010	%	1	10/27/05	HBA	ASTM D2974-87

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-03		
Lab Sample ID:	J11972-12	Date Sampled:	10/03/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	88.8
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	780	350	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	11.2		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl	368	17	mg/kg	1	10/29/05 01:11	HBA	EPA 351.2 M
Phosphorus, Total	70.7	11	mg/kg	4	10/27/05	JA	EPA 365.3 M
Sulfide	< 4.5	4.5	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon [a]	3800	1100	mg/kg	1	10/26/05 11:59	MO	CORP ENG 81M/SW9060M
Total Organic Content	12.5	0.010	%	1	10/27/05	HBA	ASTM D2974-87

(a) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-04		
Lab Sample ID:	J11972-13	Date Sampled:	09/30/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	84.5
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	1940	370	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	15.5		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl [a]	151	19	mg/kg	1	10/29/05 01:06	HBA	EPA 351.2 M
Phosphorus, Total	122	29	mg/kg	10	10/27/05	JA	EPA 365.3 M
Sulfide	<4.6	4.6	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	2470	1200	mg/kg	1	10/26/05 12:12	MO	CORP ENG 81M/SW9060M
Total Organic Content	17.8	0.010	%	1	10/27/05	HBA	ASTM D2974-87

(a) Analyzed 28 days and 15 hours after sample collection. (28 day holding time).

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-PW-02		
Lab Sample ID:	J11972-14	Date Sampled:	10/03/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	204	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	339	10	mg/l	1	10/10/05	HBA	EPA 160.1
Total Organic Carbon	15.7	1.0	mg/l	1	10/26/05 13:12	SJG	415.1/9060 M/5310B M

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-PW-04		
Lab Sample ID:	J11972-15	Date Sampled:	09/30/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	186	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [a]	555	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	9.1	1.0	mg/l	1	10/21/05 17:04	SJG	415.1/9060 M/5310B M

(a) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-01		
Lab Sample ID:	J11972-16	Date Sampled:	10/03/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	<2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	<20	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	276	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	344	10	mg/l	1	10/10/05	HBA	EPA 160.1
Total Organic Carbon	1.8	1.0	mg/l	1	10/21/05 17:11	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-02		
Lab Sample ID:	J11972-17	Date Sampled:	10/03/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	23.0	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	122	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	191	10	mg/l	1	10/10/05	HBA	EPA 160.1
Total Organic Carbon	5.8	1.0	mg/l	1	10/21/05 17:19	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-03		
Lab Sample ID:	J11972-18	Date Sampled:	10/03/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	<10	10	mg/l	1	10/11/05 11:55	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	23.0	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	176	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	235	10	mg/l	1	10/10/05	HBA	EPA 160.1
Total Organic Carbon	10	1.0	mg/l	1	10/21/05 17:48	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time. Method blank and dilution water indicate possible low bias. Good recoveries (87% and 86%) on associated glucose spikes.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-04		
Lab Sample ID:	J11972-19	Date Sampled:	09/30/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	25.6	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	159	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	248	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	4.8	1.0	mg/l	1	10/21/05 17:55	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-15		
Lab Sample ID:	J11972-20	Date Sampled:	10/02/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	70.4
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	2780	440	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	29.6		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl	135	21	mg/kg	1	10/29/05 01:11	HBA	EPA 351.2 M
Phosphorus, Total	147	32	mg/kg	10	10/27/05	JA	EPA 365.3 M
Sulfide	< 5.5	5.5	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	1820	1400	mg/kg	1	10/26/05 12:27	MO	CORP ENG 81M/SW9060M
Total Organic Content	13.2	0.010	%	1	10/27/05	HBA	ASTM D2974-87

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-PW-15		
Lab Sample ID:	J11972-21	Date Sampled:	10/02/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	108	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [a]	544	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	9.6	1.0	mg/l	1	10/21/05 18:02	SJG	415.1/9060 M/5310B M

(a) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-15		
Lab Sample ID:	J11972-22	Date Sampled:	10/02/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	<2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	30.7	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	255	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	472	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	5.3	1.0	mg/l	1	10/21/05 18:09	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-7		
Lab Sample ID:	J11972-23	Date Sampled:	10/04/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	<2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	28.2	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	204	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	454	10	mg/l	1	10/11/05	MR	EPA 160.1
Total Organic Carbon	6.7	1.0	mg/l	1	10/21/05 18:17	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-9		
Lab Sample ID:	J11972-24	Date Sampled:	10/01/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 2.0	2.0	mg/l	1	10/10/05 12:05	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	< 20	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	139	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	464	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	6.1	1.0	mg/l	1	10/21/05 18:17	SJC	415.1/9060 M/5310B M

(a) Sample received outside the holding time.Dilution water and spike blank results indicate low bias.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-11		
Lab Sample ID:	J11972-25	Date Sampled:	10/04/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	<4.0	4.0	mg/l	1	10/11/05 11:55	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	20.5	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	149	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	415	10	mg/l	1	10/11/05	MR	EPA 160.1
Total Organic Carbon	7.0	1.0	mg/l	1	10/21/05 18:24	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time. Method blank and dilution water indicate possible low bias. Good recoveries (87% and 86%) on associated glucose spikes.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-06		
Lab Sample ID:	J11972-26	Date Sampled:	09/30/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 4.0	4.0	mg/l	1	10/11/05 11:55	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	23.0	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	176	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	471	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	7.9	1.0	mg/l	1	10/21/05 18:31	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time. Method blank and dilution water indicate possible low bias. Good recoveries (87% and 86%) on associated glucose spikes.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-05		
Lab Sample ID:	J11972-27	Date Sampled:	09/30/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 4.0	4.0	mg/l	1	10/11/05 11:55	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	20.5	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	167	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	579	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	7.6	1.0	mg/l	1	10/21/05 18:38	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time. Method blank and dilution water indicate possible low bias. Good recoveries (87% and 86%) on associated glucose spikes.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-06		
Lab Sample ID:	J11972-28	Date Sampled:	09/30/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	89.8
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	1400	350	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	10.2		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl [a]	223	22	mg/kg	1	10/29/05 01:07	HBA	EPA 351.2 M
Phosphorus, Total	162	130	mg/kg	50	10/27/05	JA	EPA 365.3 M
Sulfide	<4.4	4.4	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	2970	1100	mg/kg	1	10/26/05 13:21	MO	CORP ENG 81M/SW9060M
Total Organic Content	11.8	0.010	%	1	10/27/05	HBA	ASTM D2974-87

(a) Analyzed 28 days and 12 hours after sample collection. (28 day holding time).

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-06		
Lab Sample ID:	J11972-28R	Date Sampled:	09/30/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	89.8
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Particle Size Analysis (Sieve and Hydrometer Testing)							
3 Inch Sieve	100		%	1	11/22/05	TM	ASTM D422-63
1.5 Inch Sieve	100		%	1	11/22/05	TM	ASTM D422-63
0.75 Inch Sieve	100		%	1	11/22/05	TM	ASTM D422-63
0.375 Inch Sieve	98.7		%	1	11/22/05	TM	ASTM D422-63
No.4 Sieve (4.75 mm)	95.9		%	1	11/22/05	TM	ASTM D422-63
No.8 Sieve (2.36 mm)	89.1		%	1	11/22/05	TM	ASTM D422-63
No.10 Sieve (2.00 mm)	87.1		%	1	11/22/05	TM	ASTM D422-63
No.16 Sieve (1.18 mm)	77.4		%	1	11/22/05	TM	ASTM D422-63
No.30 Sieve (0.60 mm)	56.9		%	1	11/22/05	TM	ASTM D422-63
No.50 Sieve (0.30 mm)	36.8		%	1	11/22/05	TM	ASTM D422-63
No.100 Sieve (0.15 mm)	14.2		%	1	11/22/05	TM	ASTM D422-63
No.200 Sieve (0.075 mm)	10.1		%	1	11/22/05	TM	ASTM D422-63
0.030 mm (Hydrometer) [a]	10		%	1	11/22/05	TM	ASTM D422-63
0.005 mm (Hydrometer)	8.0		%	1	11/22/05	TM	ASTM D422-63
0.0015 mm (Hydrometer)	7.4		%	1	11/22/05	TM	ASTM D422-63
% Gravel	4.1		%	1	11/22/05	TM	ASTM D422-63
% Sand	85.8		%	1	11/22/05	TM	ASTM D422-63
% Silt, Clay, Colloids	10.1		%	1	11/22/05	TM	ASTM D422-63

(a) Data extrapolated from higher and lower data points due to possible analytical problem with hydrometer analysis at short analysis times.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-PW-06		
Lab Sample ID:	J11972-29	Date Sampled:	09/30/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	196	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [a]	473	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	8.2	1.0	mg/l	1	10/21/05 18:46	SJG	415.1/9060 M/5310B M

(a) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-PW-08		
Lab Sample ID:	J11972-30	Date Sampled:	10/01/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Hardness, Total as CaCO3	192	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [a]	439	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	8.5	1.0	mg/l	1	10/21/05 19:14	SJG	415.1/9060 M/5310B M

(a) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-08		
Lab Sample ID:	J11972-31	Date Sampled:	10/01/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	87.7
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	1070	350	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	12.3		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl	138	18	mg/kg	1	10/29/05 01:08	HBA	EPA 351.2 M
Phosphorus, Total	219	140	mg/kg	50	10/27/05	JA	EPA 365.3 M
Sulfide	< 4.5	4.5	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	1770	1100	mg/kg	1	10/26/05 13:36	MO	CORP ENG 81M/SW9060M
Total Organic Content	13.2	0.010	%	1	10/27/05	HBA	ASTM D2974-87

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-08		
Lab Sample ID:	J11972-32	Date Sampled:	10/01/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 4.0	4.0	mg/l	1	10/11/05 11:55	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	< 20	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	165	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved [b]	487	10	mg/l	1	10/14/05	MR	EPA 160.1
Total Organic Carbon	8.2	1.0	mg/l	1	10/21/05 19:22	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time. Method blank and dilution water indicate possible low bias. Good recoveries (87% and 86%) on associated glucose spikes.
(b) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-10		
Lab Sample ID:	J11972-33	Date Sampled:	10/01/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	59.7
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Cation Exchange Capacity	6450	530	mg/kg	1	10/24/05	LH	SW846 9081
Moisture, Percent	40.3		%	1	10/23/05	SS	EPA 160.3 M
Nitrogen, Total Kjeldahl [a]	918	65	mg/kg	2	10/31/05 10:46	NR	EPA 351.2 M
Phosphorus, Total	425	210	mg/kg	50	10/27/05	JA	EPA 365.3 M
Sulfide	<6.7	6.7	mg/kg	1	10/12/05	ST	EPA 376.1 M
Total Organic Carbon	8450	1700	mg/kg	1	10/26/05 13:49	MO	CORP ENG 81M/SW9060M
Total Organic Content	33.8	0.010	%	1	10/27/05	HBA	ASTM D2974-87

(a) Analysis done out of holding time.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SW-10		
Lab Sample ID:	J11972-34	Date Sampled:	10/04/05
Matrix:	AQ - Surface Water	Date Received:	10/07/05
		Percent Solids:	n/a
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
BOD, 5 Day [a]	< 4.0	4.0	mg/l	1	10/11/05 11:55	MJC	EPA 405.1/SM19 5210B
Chemical Oxygen Demand	< 20	20	mg/l	1	10/26/05	ST	HACH 8000/EPA 410.1M
Hardness, Total as CaCO3	178	4.0	mg/l	1	10/25/05	JA	SM19 2340C
Solids, Total Dissolved	460	10	mg/l	1	10/11/05	MR	EPA 160.1
Total Organic Carbon	6.9	1.0	mg/l	1	10/21/05 19:29	SJG	415.1/9060 M/5310B M

(a) Sample received outside the holding time. Method blank and dilution water indicate possible low bias. Good recoveries (87% and 86%) on associated glucose spikes.

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

CHAIN OF CUSTODY

ACCUTEST Laboratories

2235 Route 130, Dayton NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking # | Bottle Order Control #

Accutest Quote # | Accutest Job # J11972

Client / Reporting Information | **Project Information** | **Requested Analyses** | **Matrix Codes**

Company Name: EA Engineering
Address: 15 LOVETON CIRCLE
City: SPARKS State: MD Zip: 21152
Project Contact: Mike Ciarlo E-mail: mciarlo@eaest.com
Phone #: 410-771-4950
Sampler's Name: Mike Ciarlo & Dave Johnson

Project Name: SDA TRINITY RIVER
Street:
City: State:
Project #: 1431702
Fax #:
Client Purchase Order #:

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles	BOD	COD	TOC	TDS	HARD	GRAIN SIZE	TKN, SULFIDE, TOTAL P, SEC, MANGANESE, TOC	LAB USE ONLY
-1 A	SDA05-SD-14		10.2.05	1620	SC	SOL	2						X	X	X	EXBO
-2	SDA05-SD-12		10.2.05	1840			2						X	X	X	WC FLR
-3 A	SDA05-SD-13		10.2.05	1005			2						X	X	X	WC4
-4	SDA05-SW-11		10.2.05	1500		SW	5	X X X	X	X	X	X	Y			WC1
~5 X	SDA05-SW-12		10.2.05	1350			5	X X X								
-6	SDA05-SW-13		10.2.05	0840			5	X X X								
-7	SDA05-PW-14		10.2.05	1525			3	X X			X	X	X			
-8	SDA05-PW-12		10.2.05	1805			3	X X			X	X	X			
-9	SDA05-PW-13		10.4.05	0900			3	X X			X	X	X			
8 ~~-10~~	~~SDA05-~~															

Turnaround Time (Business Days)

- X Std. 15 Business Days — Approved By: / Date:
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format

Commercial "A" = Results Only

* proceed w/ testing even though temp + holding time criteria NOT met - corrected as per KB 10/7/05

Comments / Remarks

* 1 x 500 n/p rec'd empty w/ broken cap 10/7/05
- 2 of 2 250 rec'd about 1/3 full
Δ 1 of 2 950's rec'd w/ broken CAP
CAP replaced @ lab 10/7/05

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1 Michael C. Ciarlo	10.5.05 1500	1 UPS	2 UPS	10/7/05 @1100	2
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable	On Ice ☐ Cooler Temp: 18.2

DMD NO ICE @ 10/7/05

CHAIN OF CUSTODY

ACCUTEST Laboratories

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TEL. 732-329-0200 FAX: 732-329-3499/3480
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FED-EX Tracking # | Bottle Order Control # | Accutest Quote # | Accutest Job # J11972

Client / Reporting Information

Company Name: EA Engineering
Address: 15 Loveton Circle
City: Sparks State: MD Zip: 21152
Project Contact: Mike Ciarlo E-mail: mciarlo@eaest.com
Phone #: 410-771-4950
Sampler's Name: Mike Ciarlo

Project Information

Project Name: SDA TRINITY RIVER
Street:
City: DALLAS State: TX
Project #: 1431703
Fax #:
Client Purchase Order #:

Requested Analyses: BOD, COD, TOC, TDS, HARD, GRAIN SIZE, TKN, TP, TS, pH, Hg, CEC, TOC, Moisture

Accutest Sample #	Field ID / Point of Collection	Date	Time	Sampled By	Matrix	# of bottles	Preserved	BOD	COD	TOC	TDS	HARD	GRAIN SIZE	TKN, TP, TS, pH, Hg, CEC, TOC, Moisture
-10	SDA05-SD-01	10-3-05	950	MC	SOL	2							X	X
-11	SDA05-SD-02	10-3-05	1357	↓	↓	2							↓	↓
-12	SDA05-SD-03	10-3-05	1645			2							↓	↓
-13	SDA05-SD-04	9-30-05	945			2							↓	↓
-14	SDA05-PW-02	10-3-05	1340		SW	3	X X X			X	X	X		
-15	SDA05-PW-04	9-30-05	835			3				X	X	X		
-16	SDA05-SW-01	10-3-05	920			5	X	X	X	X	X	X		
-17	SDA05-SW-02	10-3-05	1210			5		↓	↓	↓	↓	↓		
~ -18 *	SDA05-SW-03	10-3-05	1645			5		↓	↓	↓	↓	↓		
-19	SDA05-SW-04	9-30-05	800			5		↓	↓	↓	↓	↓		

Turnaround Time (Business Days)

- [X] Std. 15 Business Days
- [ ] 10 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] NJ Reduced
- [ ] NJ Full
- [ ] Other
- [ ] FULL CLP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format

Commercial "A" = Results Only

Comments / Remarks

* 1 x 500 n/p rec'd empty w/ broken cap 10/7/05
~ run BOD and TDS from container 250 as per KB 10/7/05

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler	Date Time	Received by	Relinquished by	Date Time	Received by
1 Mike C. Ciarlo	10-5-05 1500	1 FedEx UPS	2 FedEx UPS	10/7/05 1000	2 [signature]
3		3	4		4
5		5	Custody Seal #	Preserved where applicable	On Ice ☐ Cooler Temp. 20.8

10/7/05

J11972: Chain of Custody
Page 2 of 7

CHAIN OF CUSTODY

ACCUTEST Laboratories

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www.accutest.com

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job # J11972

Client / Reporting Information	Project Information
Company Name: EA Engineering	Project Name: ~~SDA~~ TRINITY RIVER
Address: 15 LOVETON CIRCLE	Street: DALLAS TX
City: SPARKS State: MD Zip: 2152	City / State
Project Contact: MIKE CIARLO E-mail: mciarlo@eaest.com	Project #: 143170 2
Phone #: 410-771-4950	Fax #
Sampler's Name: Mike Ciarlo & Dave Johnson	Client Purchase Order #

Requested Analysis: 8260 ☐ BTEX ☐ / 624 ☐ MTBE ☐ / 8021 ☐ TBA ☐ / 602 ☐ MAP ☐ / 8015 ☐ PAL C ☐; 8260 ☐ TBA ☐ / 624 ☐ MAP ☐ / TCL ☐ +10 ☐ / PPL ☐ +15 ☐ / STARS ☐ M18F ☐; 8270 ☐ ABN ☐ / 625 ☐ 3N ☐ / TCL ☐ PAH ☐ / PPL ☐ PADF ☐ / STARS ☐ +TICS ☐

Matrix Codes: DW - Drinking Water, GW - Ground Water, WW - Water, SW - Surface Water, SO - Soil, SL - Sludge, OI - Oil, LIQ - Other Liquid, AIR - Air, SOL - Other Solid, WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	8260/624/8021/602/8015	8260/624/TCL/PPL/STARS	8270/625/TCL/PPL/STARS	BOD	COD	TOC	TDS	HARD	GRAIN SIZE	TKN, TP, TSS(?), VA, TOC, CEC, Moisture		LAB USE ONLY
-20	SDA05 - SD - 15		10-7-05	1145		SOL	2																	X	X		
-21	SDA05 - PW - 15		10-7-05	1045		SW	3	X		X	X	X									~~X~~	~~X~~	X				
-22	SDA05 - SW - 15		10-7-05	1030			5	X											X	X	X	X	X				
-23	SDA05 - SW - 7		10-4-05	1540				X																			
-24	SDA05 - SW - 9		10-4-05	1050				X																			
-25	SDA05 - SW - 11		10-4-05	1120				X																			
	~~SDA05~~ -																										
	~~SDA05~~ -																										
	~~SDA05~~ -																										
	~~SDA05~~ -																										

Turnaround Time (Business Days)

- ☒ Std 15 Business Days
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Approved By / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format

Commercial "A" = Results Only

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler	Date Time	Received by	Relinquished by	Date Time	Received by
1 Michael C. Ciarlo	10.5.05 1500	1 UPS	2 UPS	10/6/05 @1100	2 [signature]
Relinquished by: 3	Date Time	Received by: 3	Relinquished by: 4	Date Time	Received by: 4
Relinquished by: 5	Date Time	Received by: 5	Custody Seal #	Preserved where applicable: [initials]	On Ice ☐ Cooler Temp. 20.4°C

NO ICE remaining

J11972: Chain of Custody
Page 3 of 7

CHAIN OF CUSTODY

ACCUTEST Laboratories

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TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job # J11972

Client / Reporting Information

Company Name	EA Engineering
Address	15 Loveton Circle
City / State / Zip	Sparks MD 21152
Project Contact / E-mail	Mike Ciarlo mciarlo@eaest.com
Phone #	410-771-4950
Sampler's Name	Dave Johnson & Mike Ciarlo

Project Information

Project Name	SDA Trinity River Study
Street	
City / State	Dallas TX
Project #	14317.02.0001
Fax #	
Client Purchase Order #	14317.02.0001

Requested Analysis

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	BOD	COD	TDS	TOC	HARD	GRAIN SIZE	MOISTURE, TOC, SULFIDE, TKN, TP, CEC	LAB USE ONLY
-26	SDA05-SW-06		9-30-05	1150	DJ/MC	SW	5	1		1	1	1		1		X	X	X	X	X			
-27	SDA05-SW-05		↓	1710	↓	SW	5	↓	↓	↓	↓	↓		↓		X↓	X↓	X↓	X↓	X↓			
~~-C~~	~~SDA05-SW-04~~			~~0800~~		~~SW~~	~~5~~																
*	SDA05-SD-05			0945		SOL	2					2									X↓	X↓	
-28	SDA05-SD-06			1245		SOL	2					2											
*	SDA05-PW-05		9-30-05	1710		SW	3	1		1		1						X	X	X			
-29	SDA05-PW-06		9-30-05	1245		SW	3	1		1		1						X	X	X			
-30	SDA05-PW-08		10-01-05	0915		SW	3	1		1		1						X	X	X			
-31 Δ	SDA05-SD-08		10-01-05	0815		SOL	2					2									X	X	
-32	SDA05-SW-08		10-01-05	0815		SW	5	1		1	1	1		1		X	X	X	X	X			

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe

Turnaround Time (Business Days)

- ☒ Std. 15 Business Days
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☒ EDD Format

Commercial "A" = Results Only

Comments / Remarks

~~I only want an EDD if it does not change the price.~~

Δ 1 of 2 500 rec'd w/ broken cap, cap replaced 10/7/05

* Samples not rec'd @ 10/7/05

Sample Custody must be documented below each time samples change possession, including courier delivery

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1 [signature]	10-4-05 1500	1 UPS	2 UPS	10/7/05 0900	2 [signature]
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☒	On Ice ☐ / Cooler Temp. 20.2°C

No ice remaining

J11972: Chain of Custody

Page 4 of 7

ACCUTEST Laboratories

CHAIN OF CUSTODY

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www.accutest.com

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job # J11972

Client / Reporting Information

Company Name	EA Engineering
Address	15 Loveton Circle
City / State / Zip	SPARKS MD 2052
Project Contact	Mike Ciarlo
E-mail	mciarlo@eaest.com
Phone #	410-771-4950
Sampler's Name	Mike Ciarlo & Dave Johnson

Project Information

Project Name	SDA TRINITY RIVER STUDY
Street	
City / State	DALLAS TX
Project #	1431702
Fax #	
Client Purchase Order #	

Requested Analysis

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	8260 ☐ 624 ☐ 8021 ☐ 602 ☐ PALIG ☐ / BTEX ☐ MTBE ☐ TBA ☐ MAP ☐ PALS ☐	8260 ☐ 624 ☐ TCL ☐ PPL ☐ STARS ☐ MTBE ☐ / TBA ☐ MAP ☐ +10 ☐ +15 ☐	8270 ☐ 625 ☐ TCL ☐ PPL ☐ STARS ☐ / ABN ☐ BN ☐ PAH ☐ PADF ☐ +TCs ☐	BOD	COD	TDS	TOC	HARD	GRAIN SIZE	MOISTURE, TOC, SULFIDE, TKN, TP, CEC		Matrix Codes
-33	SDA05-SD-10		10-1-05	1215	RC																			X	X		
-34	SDA05-SW-10		10-1-05	1205	RC														X	X	X	X	X				

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe

LAB USE ONLY

Turnaround Time (Business Days) — Approved By / Date:

- ☐ Std 15 Business Days
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other ______
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format ______

Commercial "A" = Results Only

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by	Date Time	Received by	Relinquished by	Date Time	Received by
1 [signature]	10-5-05 1500	1 UPS	2 UPS	10/7/05 8:00	2 [signature]
3		3	4		4
5		5	Custody Seal #	Preserved where applicable [initials]	On Ice ☐

Cooler Temp. 20.2°C
NO ICE [illegible]

EA

J11972: Chain of Custody
Page 5 of 7

3.1

Job Change Order: J11972_11/10/2005

Requested Date:	11/10/2005	**Received Date:**	10/7/2005
Account Name:	EA Engineering	**Due Date:**	10/28/2005
Project Description:	1431702 SDA Trinity River Study	**Deliverable:**	COMMA
CSR:	DK	**TAT (Days):**	5

Sample #: J11972-28

Change: Relog for GRAINS, this test was originally requested on the COC and missed during log in, Do not bill client for RUSH Surcharge.

SDA05-SD-06

J11972: Chain of Custody
Page 6 of 7

Above Changes Per: Mike Ciarlo **Date:** 11/10/2005

To Client: This Change Order is confirmation of the revisions, previously discussed with the Accutest Client Service Representative.

Page 1 of 1

Job Change Order: J11972_11/10/2005

Requested Date:	11/10/2005	**Received Date:**	10/7/2005
Account Name:	EA Engineering	**Due Date:**	10/28/2005
Project Description:	1431702 SDA Trinity River Study	**Deliverable:**	COMMA
CSR:	DK	**TAT (Days):**	1

Sample #: J11972-1 - 11

Change: Remove TOCNT, this test was not requested on the COC.

J11972: Chain of Custody
Page 7 of 7

Above Changes Per: Mike Clarlo **Date:** 11/10/2005

To Client: This Change Order is confirmation of the revisions, previously discussed with the Accutest Client Service Representative.

Page 1 of 1

New Jersey
ACCUTEST.
Laboratories

10/28/05

Technical Report for

EA Engineering

1431702 SDA Trinity River Study

1431702

Accutest Job Number: J11972X

Sampling Dates: 09/30/05 - 10/04/05

Report to:

EA Engineering
15 Loveton Circle
Sparks, MD 21152

ATTN: Mike Ciarlo

Total number of pages in report:

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Vincent J. Pugliese
President

Certifications: NJ(12129), NY(10983), CA, CT, DE, FL, IL, IN, KS, KY, LA, MA, MD, MI, MT, NC, PA, RI, SC, TN, VA, WV

Accutest Laboratories

Report of Analysis

Client Sample ID:	SDA05-SD-06		
Lab Sample ID:	J11972-28R	Date Sampled:	09/30/05
Matrix:	SO - Soil	Date Received:	10/07/05
		Percent Solids:	89.8
Project:	1431702 SDA Trinity River Study		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Particle Size Analysis (Sieve and Hydrometer Testing)							
3 Inch Sieve	100		%	1	11/22/05	TM	ASTM D422-63
1.5 Inch Sieve	100		%	1	11/22/05	TM	ASTM D422-63
0.75 Inch Sieve	100		%	1	11/22/05	TM	ASTM D422-63
0.375 Inch Sieve	98.7		%	1	11/22/05	TM	ASTM D422-63
No.4 Sieve (4.75 mm)	95.9		%	1	11/22/05	TM	ASTM D422-63
No.8 Sieve (2.36 mm)	89.1		%	1	11/22/05	TM	ASTM D422-63
No.10 Sieve (2.00 mm)	87.1		%	1	11/22/05	TM	ASTM D422-63
No.16 Sieve (1.18 mm)	77.4		%	1	11/22/05	TM	ASTM D422-63
No.30 Sieve (0.60 mm)	56.9		%	1	11/22/05	TM	ASTM D422-63
No.50 Sieve (0.30 mm)	36.8		%	1	11/22/05	TM	ASTM D422-63
No.100 Sieve (0.15 mm)	14.2		%	1	11/22/05	TM	ASTM D422-63
No.200 Sieve (0.075 mm)	10.1		%	1	11/22/05	TM	ASTM D422-63
0.030 mm (Hydrometer) [a]	10		%	1	11/22/05	TM	ASTM D422-63
0.005 mm (Hydrometer)	8.0		%	1	11/22/05	TM	ASTM D422-63
0.0015 mm (Hydrometer)	7.4		%	1	11/22/05	TM	ASTM D422-63
% Gravel	4.1		%	1	11/22/05	TM	ASTM D422-63
% Sand	85.8		%	1	11/22/05	TM	ASTM D422-63
% Silt, Clay, Colloids	10.1		%	1	11/22/05	TM	ASTM D422-63

(a) Data extrapolated from higher and lower data points due to possible analytical problem with hydrometer analysis at short analysis times.

RL = Reporting Limit

Accutest Laboratories

Sample Summary

EA Engineering

Job No: J11972X

1431702 SDA Trinity River Study
Project No: 1431702

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
J11972-1X	10/02/05	16:20	MC	10/07/05	SO	Soil	SDA05-SD-14
J11972-2X	10/02/05	18:40	MC	10/07/05	SO	Soil	SDA05-SD-12
J11972-3X	10/04/05	10:05	MC	10/07/05	SO	Soil	SDA05-SD-13
J11972-10X	10/03/05	09:50	MC	10/07/05	SO	Soil	SDA05-SD-01
J11972-11X	10/03/05	13:57	MC	10/07/05	SO	Soil	SDA05-SD-02
J11972-12X	10/03/05	16:45	MC	10/07/05	SO	Soil	SDA05-SD-03
J11972-13X	09/30/05	09:45	MC	10/07/05	SO	Soil	SDA05-SD-04
J11972-20X	10/02/05	11:45	MC	10/07/05	SO	Soil	SDA05-SD-15
J11972-31X	10/01/05	08:15	MC	10/07/05	SO	Soil	SDA05-SD-08
J11972-33X	10/01/05	12:15	MC	10/07/05	SO	Soil	SDA05-SD-10

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

50
GW

e

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FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job # J11972

Client / Reporting Information	Project Information
Company Name: EA Engineering	Project Name: SDA TRINITY RIVER
Address: 15 LOVETON CIRCLE	Street
City: SPARKS State: MD Zip: 21152	City State
Project Contact: Mike Ciarlo E-mail: mciarlo@eaest.com	Project #: 1431702
Phone #: 410-771-4950	Fax #
Sampler's Name: Mike Ciarlo & Dave Johnson	Client Purchase Order #

Requested Analysis: 8260 ☐ 624 ☐ 8021 ☐ 602 ☐ PALG ☐ / BTEX ☐ MTBE ☐ TBA ☐ NAP ☐ PALG ☐; 8260 ☐ 624 ☐ TCL ☐ PPL ☐ STARS ☐ MTBE ☐ / TBA ☐ NAP ☐ +10 ☐ +15 ☐; 8270 ☐ 625 ☐ TCL ☐ PPL ☐ STARS ☐ / ABN ☐ BN ☐ PAH ☐ PAOF ☐ +TICs ☐

Matrix Codes: DW - Drinking Water, GW - Ground Water, WW - Water, SW - Surface Water, SO - Soil, SL - Sludge, OI - Oil, LIQ - Other Liquid, AIR - Air, SOL - Other Solid, WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	BOD	COD	TOC	TDS	HARD	GRAIN SIZE	TKN, SULFIDE, TOC, CEC, MOISTURE	LAB USE ONLY
-1 Δ	SDA05-SD-14		10-2-05	1620	SC	SOL	2					X				~~[illegible]~~					X	X	EX80
-2	SDA05-SD-12		10-2-05	1840	|	|	2					X									X	X	WC FLR
-3 Δ	SDA05-SD-13		10-4-05	1005			2					X									X	X	WC4
-4	SDA05-SW-14		10-2-05	1500		SW	5	X		X	X					X	X	X	X	X			WC1
-5 *	SDA05-SW-12		10-2-05	1730			5	X		X	X					|	|	|	|	|			
-6	SDA05-SW-13		10-4-05	0840			5	X		X	X					|	|	|	|	|			
-7 •	SDA05-PW-14		10-2-05	1525			3	X		X								X	X	X			
-8	SDA05-PW-12		10-2-05	1805			3	X		X								X	X	X			
-9	SDA05-PW-13		10-4-05	0900			3	X		X								X	X	X			
~~-10~~	~~SDA05-~~																						

8

Turnaround Time (Business Days) — Approved By: / Date:

- ☒ Std. 15 Business Days
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other ______
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format ______

Commercial "A" = Results Only

Comments / Remarks

* 1x500 n/p rec'd empty w/ broken cap 8 10/7/05
• 2 of 2 250 rec'd about 1/3 full
Δ 1 of 2 950's rec'd w/ broken cap
CAP replaced 8 10/7/05

* proceed w/ testing even though temp + holding time criteria NOT correct as per KB 8 10/7/05

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1 Michael C. Ciarlo	10-5-05 1500	1 UPS	2 UPS	10/7/05 @1100	2 [signature]
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☒ On Ice ☐	Cooler Temp. 18.2

1B

DWB NO ICE 8 10/7/05

CHAIN OF CUSTODY

ACCUTEST. Laboratories

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www.accutest.com

FED-EX Tracking #
Bottle Order Control #
Accutest Quote #
Accutest Job # J 11972

Client / Reporting Information

Company Name: EA Engineering
Address: 15 Loveton Circle
City: SPARKS State: MD Zip: 21152
Project Contact: Mike Ciarlo E-mail: mciarlo@eaest.com
Phone #: 410-771-4950
Sampler's Name: Mike Ciarlo

Project Information

Project Name: SDA TRINITY RIVER
Street:
City: DALLAS State: TX
Project #: 1431703
Fax #:
Client Purchase Order #:

Requested Analysis: 8260 □ BTEX □ / 624 □ MTBE □ / 8021 □ TBA □ / 602 □ MAP □ / PALG □ PALG □; 8260 □ TBA □ / 624 □ NAP □ / TCL □ +10 □ / PPL □ +15 □ / STARS □ MTBE □; 8270 □ ABN □ / 625 □ BN □ / TCL □ PAH □ / PPL □ PAOF □ / STARS □ +TICs □; BOD; COD; TOC; TDS; HARD; GRAIN SIZE; TKN, TP, TSS, Alk, Cl; TOC, MOISTURE

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	8260/624/8021/602	8260/624/TCL/PPL	8270/625/TCL/PPL	BOD	COD	TOC	TDS	HARD	GRAIN SIZE	TKN, TP, TSS, Alk, Cl; TOC, MOISTURE		LAB USE ONLY
-10	SDA05-SD-01		10-3-05	950	MC	SOL	2																	X	X		
-11	SDA05-SD-02		10-3-05	1357	↓	↓	2																	↓	↓		
-12	SDA05-SD-03		10-3-05	1645	↓	↓	2																	↓	↓		
-13	SDA05-SD-04		9-30-05	945	↓	↓	2																	↓	↓		
-14	SDA05-PW-02		10-3-05	1340	↓	SW	3	X		X		X									X	X	X				
-15	SDA05-PW-04		9-30-05	835	↓	↓	3	↓		↓		↓									X	X	X				
-16	SDA05-SW-01		10-3-05	920	↓	↓	5	↓		↓	X	↓							X	X	X	X	X				
-17	SDA05-SW-02		10-3-05	1210	↓	↓	5	↓		↓	↓	↓							↓	↓	↓	↓	↓				
~ -18 *	SDA05-SW-03		10-3-05	1645	↓	↓	5	↓		↓	↓	↓							↓	↓	↓	↓	↓				
-19	SDA05-SW-04		9-30-05	800	↓	↓	5	↓		↓	↓	↓							↓	↓	↓	↓	↓				

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe

Turnaround Time (Business Days)

- ☒ Std. 15 Business Days
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other ______
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format ______

Commercial "A" = Results Only

Comments / Remarks

* 1x500 n/p rcvd empty w/ broken cap 8 10/7/05
~ run BOD and TDS from remaining 250 as per KB 8 10/7/05

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1 [signature]	10-5-05 / 1500	1 ~~FedEx~~ UPS	2 ~~FedEx~~ UPS	10/7/05 1000	2 [signature]
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☒	On Ice ☐ / Cooler Temp. 20.8

8 10/7/05

CHAIN OF CUSTODY

ACCUTEST Laboratories

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www.accutest.com

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job # J11972

Client / Reporting Information

Company Name: EA Engineering
Address: 15 Loveton Circle
City: Sparks State: MD Zip: 21152
Project Contact: Mike Ciarlo E-mail: mciarlo@eaest.com
Phone #: 410-771-4950
Sampler's Name: Mike Ciarlo & Dave Johnson

Project Information

Project Name: SDA Trinity River
Street: Dallas TX
City: State:
Project #: 143170Z
Fax #:
Client Purchase Order #:

Requested Analysis

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	8260 ☐ 624 ☐ 8021 ☐ 802 ☐ PAL/G ☐ BTEX ☐ MTBE ☐ TBA ☐ NAP ☐ PALG ☐	8260 ☐ 624 ☐ TCL ☐ PPL ☐ STARS ☐ MTBE ☐ TBA ☐ NAP ☐ +10 ☐ +15 ☐	8270 ☐ 625 ☐ TCL ☐ PPL ☐ STARS ☐ ABN ☐ BN ☐ PAH ☐ PADF ☐ +TICs ☐	BOD	COD	TOC	TDS	HARD	GRAIN SIZE	TKN, TP, TS, 14, TOC, CEC, KOM, STUKE	
-20	SDA05 - SD - 15		10-2-05	1145		SOL	2																	X	X	
-21	SDA05 - PW - 15		10-2-05	1045		SW	3	X		X	X	X									~~X~~	~~X~~	X			
-22	SDA05 - SW - 15		10-2-05	1030		"	5	X		"	"	"							X	X	X	X	X			
-23	SDA05 - SW - 7		10-4-05	1540		"	"	X		"	"	"							"	"	"	"	"			
-24	SDA05 - SW - 9		10-4-05	1050		"	"	X											"	"	"	"	"			
-25	SDA05 - SW - 11		10-4-05	1120		"	"	X											"	"	"	"	"			
	~~SDA05~~ -																									
	~~SDA05~~ -																									
	~~SDA05~~ -																									
	~~SDA05~~ -																									

Matrix Codes

- DW - Drinking Water
- GW - Ground Water
- WW - Water
- SW - Surface Water
- SO - Soil
- SL - Sludge
- OI - Oil
- LIQ - Other Liquid
- AIR - Air
- SOL - Other Solid
- WP - Wipe

LAB USE ONLY

Turnaround Time (Business Days)

- ☒ Std. 15 Business Days
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other ______
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format ______

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Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1 Michael C. Ciarlo	10-5-05 1500	1 UPS	2 UPS	10/7/05 @ 1100	2 [signature]
Relinquished by: 3	**Date Time:**	**Received by:** 3	**Relinquished by:** 4	**Date Time:**	**Received by:** 4
Relinquished by: 5	**Date Time:**	**Received by:** 5	**Custody Seal #**	Preserved where applicable ☒	On Ice ☐ Cooler Temp. 20.4°C

NO ICE remaining

ACCUTEST. Laboratories

CHAIN OF CUSTODY

2235 Route 130, Dayton NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest Job # J11972

Client / Reporting Information

- Company Name: EA Engineering
- Address: 15 LOVETON CIRCLE
- City: SPARKS State: MD Zip: 21152
- Project Contact: Mike Ciarlo E-mail: mciarlo@eaest.com
- Phone #: 410-771-4950
- Sampler's Name: DAVE JOHNSON & MIKE CIARLO

Project Information

- Project Name: SDA TRINITY RIVER STUDY
- Street:
- City: DALLAS State: TX
- Project #: 14317.02.0001
- Fax #:
- Client Purchase Order #: 14317.02.0001

Requested Analysis (8260 ☐ BTEX ☐ 624 ☐ MTBE ☐ 8021 ☐ TBA ☐ 602 ☐ NAP ☐ PALG ☐ PALG ☐; 8260 ☐ TBA ☐ 624 ☐ NAP ☐ TCL ☐ +10 ☐ PPL ☐ +15 ☐ STARS ☐ MTBE ☐; 8270 ☐ ABN ☐ 625 ☐ BN ☐ TCL ☐ PAH ☐ PPL ☐ PADF ☐ STARS ☐ +TICS ☐)

Matrix Codes: DW - Drinking Water, GW - Ground Water, WW - Water, SW - Surface Water, SO - Soil, SL - Sludge, OI - Oil, LIQ - Other Liquid, AIR - Air, SOL - Other Solid, WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	BOD	COD	TDS	TOC	HARD	GRAIN SIZE	MOISTURE, TOC, SULFIDE, TKN, TP, CEC		LAB USE ONLY
-26	SDA05-SW-06		9-30-05	1150	[illegible]	SW	5	1		1	1	1		1		X	X	X	X	X				
-27	SDA05-SW-05		↓	1710	↓	SW	5	↓	↓	↓	↓	↓		↓		X	X	X	X	X				
~~[illegible]~~	~~SDA05-SW-04~~			~~0800~~		~~SW~~	~~5~~																	
*	SDA05-SD-05			0945		SOL	2					2									X	X		
-28	SDA05-SD-06			1245		SOL	2					2									↓	↓		
*	SDA05-PW-05		9-30-05	1710		SW	3	1		1		1						X	X	X				
-29	SDA05-PW-06		9-30-05	1245		SW	3	1		1		1						X	X	X				
-30	SDA05-PW-08		10-01-05	0915		SW	3	1		1		1						X	X	X				
-31 A	SDA05-SD-08		10-01-05	0815		SOL	2					2									X	X		
-32	SDA05-SW-08		10-01-05	0815	↓	SW	5	1		1	1	1		1		X	X	X	X	X				

Turnaround Time (Business Days)

- ☒ Std. 15 Business Days
- ☐ 10 Day RUSH
- ☐ 5 Day RUSH
- ☐ 3 Day EMERGENCY
- ☐ 2 Day EMERGENCY
- ☐ 1 Day EMERGENCY
- ☐ Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☒ EDD Format

Commercial "A" = Results Only

Comments / Remarks

~~I only want an EDD if it does not change the price.~~

A 1st 250s rec'd w/ bkly cap, cap replaced 10/7/05

* Samples not rec'd 10/7/05

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1 [signature]	10.4.05 1500	UPS	2 UPS	10/5/05 0900	2 [signature]
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☒ / On Ice ☐	Cooler Temp. 20.2°C

NO ICE remaining

CHAIN OF CUSTODY

ACCUTEST. Laboratories

2235 Route 130, Dayton NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #:

Bottle Order Control #:

Accutest Quote #:

Accutest Job #: J11972

Client / Reporting Information

Company Name: EA Engineering

Address: 15 Loreton Circle

City: SPARKS State: MD Zip: 21152

Project Contact: Mike Ciarlo E-mail: mciarlo@eaest.com

Phone #: 410-771-4950

Sampler's Name: Mike Ciarlo & Dave Johnson

Project Information

Project Name: SDA TRINITY RIVER STUDY

Street:

City: DALLAS State: TX

Project #: [illegible] 1431702

Fax #:

Client Purchase Order #:

Requested Analysis

8260 ☐ 624 ☐ 8021 ☐ 602 ☐ PAUG ☐
BTEX ☐ MTBE ☐ TBA ☐ NAP ☐ PALG ☐

8260 ☐ 624 ☐ TCL ☐ PPL ☐ STARS ☐ MTBE ☐
TBA ☐ NAP ☐ +10 ☐ +15 ☐

8270 ☐ 625 ☐ TCL ☐ PPL ☐ STARS ☐
ABN ☐ BN ☐ PAH ☐ PADF ☐ +TICs ☐

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles	BOD	COD	TDS	TOC	HARD	GRAIN SIZE	MOISTURE, TOC, SULFIDES, TKN, TP, CSC		
-33	SDA05-SD-10		10.1.05	1245	2C									X	X		
-34	SDA05-SW-10		10.1.05	1200	2C				X	X	X	X	X				

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

LAB USE ONLY

Turnaround Time (Business Days)

- ☐ Std. 15 Business Days
- ☐ 10 Day *RUSH*
- ☐ 5 Day *RUSH*
- ☐ 3 Day *EMERGENCY*
- ☐ 2 Day *EMERGENCY*
- ☐ 1 Day *EMERGENCY*
- ☐ Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- ☐ Commercial "A"
- ☐ Commercial "B"
- ☐ NJ Reduced
- ☐ NJ Full
- ☐ Other _____
- ☐ FULL CLP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format _____

Commercial "A" = Results Only

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1 Michael M. Ciarlo	10-5-05 1500	1 UPS	2 UPS	10/7/05 @ 1100	2
Relinquished by:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
3		3	4		4
Relinquished by:	Date Time:	Received by:	Custody Seal #	Preserved where applicable	On Ice	Cooler Temp
5		5			☐	20.2°C

NO ICE / [illegible]

SA

CHAIN OF CUSTODY

Fresh Ponds Corporate Village, Building B
2235 Route 130, Dayton, NJ 08810
908-329-0200 FAX: 908-329-3499/3480

ACCUTEST

Accutest Job #:	
Accutest Quote #:	

Client Information

Accutest

Name: 2235 Route 130

Address: Dayton NJ 08810

City State Zip

Send Report to: Diane Komar

Phone #: (732) 329-0200 x212

Facility Information

Project Name: SDA Trinity River Study

Location:

Project No.: J11972

FAX #: (732) 329-3499

Analytical Information

Field ID / Point of Collection	Collection Date	Time	Sampled By	Matrix	# of bottles	Preservation HCL	NaOH	HNO3	H2So4	None	Grain Size						
J11972 -1	10/2	16:20		Soil	1					X	X						
-2	10/2	18:40		Soil	1					X	X						
-3	10/4	10:05		Soil	1					X	X						
-10	10/3	9:50		Soil	1					X	X						
-11	10/3	13:57		Soil	1					X	X						
-12	10/3	16:45		Soil	1					X	X						
-13	9/30	9:45		Soil	1					X	X						
-20	10/2	11:45		Soil	1					X	X						
-31	10/1	8:15		Soil	1					X	X						
-33	10/1	12:15		Soil	1					X	X						

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [ ] 14 Day
- [ ] 7 Days *EMERGENCY*
- [X] Other 21 (Days)

21 Day Turnaround Hardcopy, Emergency or RUSH is FAX Data unless previously approved.

Data Deliverable Information

- [X] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] State Forms

Comments / Remarks

Sample Custody must be documented below each time samples change possesion, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	10/17/05 1700	1 FedX	2		2
Relinquished by Sampler: 3	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by Sampler: 5	Date Time:	Received By: 5	Seal #	Preserved where applicable ☐	On Ice ☐

Accutest
Subcontractor Order

Date/Time:	10/17/05 10:43 AM	**Sub Lab:**	Golder	
Accutest Job No.	J11972	**Address:**	1951 Old Cuthbert Rd	
Client Project:	SDA Trinity River Study		Cherry Hill NJ	8034
CSR:	DJM	**Contact:**	Bob Wilkinson	
		Phone:	(856) 616-8166	

Sample #:	Analyses
J11972 - 1	Grain Size
2	Grain Size
3	Grain Size
10	Grain Size
11	Grain Size
12	Grain Size
13	Grain Size
20	Grain Size
31	Grain Size
33	Grain Size
Turn Around	21

Sample Managment receipt: _____ **Date:** 10/17/05

(Print form and sign/date. Submit this form to Login Dept. with the SUB COC.)

e/sop_new/subform

J11972

Golder Associates Inc.

1951 Old Cuthbert Road, Suite 301
Cherry Hill, NJ 08034
Telephone (856) 616-8166
Fax (856) 616-1874

October 24, 2005

993-6504-002

Diane Komar
AccuTest
Fresh Ponds Corporate Village
Building B
2235 Route 130
Dayton, NJ 08810

RE: GEOTECHNICAL SOIL TEST DATA

Dear Ms. Komar:

Please find enclosed Particle-Size Distribution (ASTM D 422) test results for submitted samples J11972-1 to J11972-3, J11972-10 to J11972-13, J11972-20, J11972-31 and J11972-33.

If you have any questions, please contact us at (856) 616-8166.

Very truly yours,

GOLDER ASSOCIATES INC.

Robert M. Wilkinson
Laboratory Manager and Associate

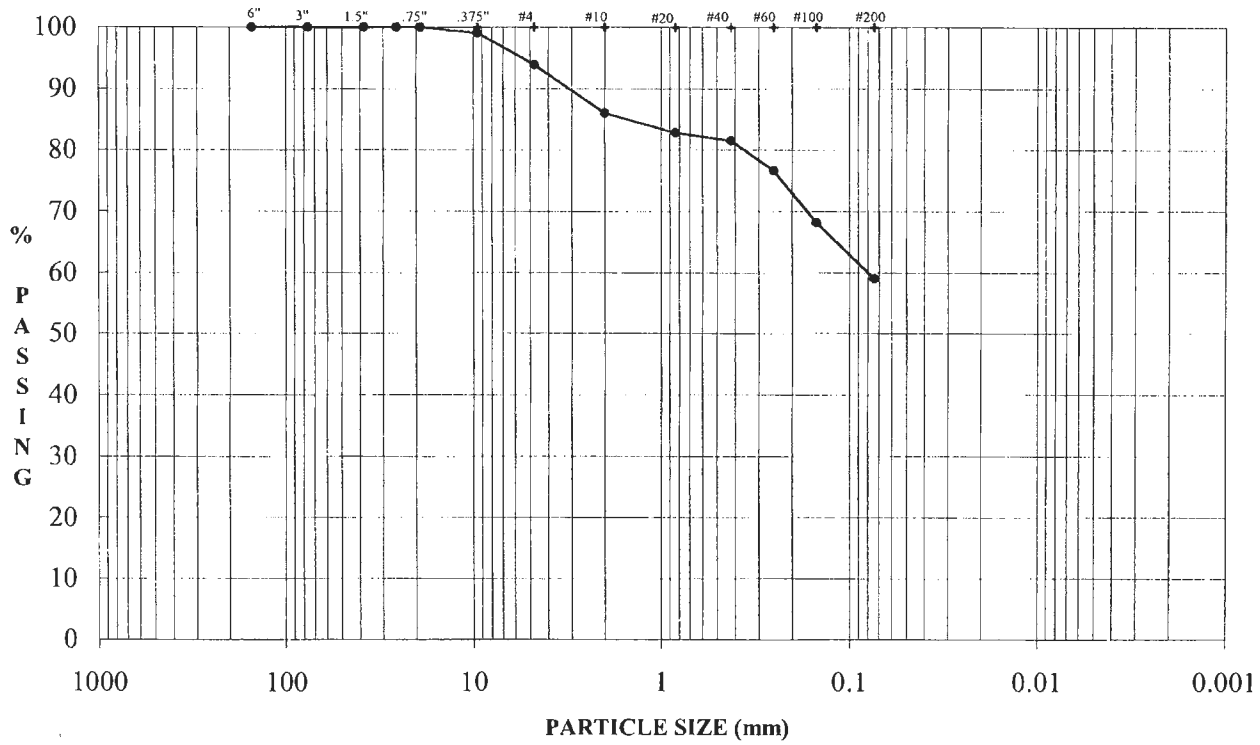
This Report Has Been
Spot-Check Reviewed By
The Accutest QA Staff.

Reviewer _____

Review Date 10/27/05

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



COBBLE	Coarse	Fine	Cor	Med	Fine	Silt or Clay
	GRAVEL		SAND			FINES

Sample Data	
% Gravel	6.1
% Sand	34.8
% Fines	59.1
C_C	N/A
C_U	N/A
LL	-
PL	-
PI	-
USCS	-
w (%)	30.9

Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	99.1%
#4	93.9%
#10	86.0%
#20	82.8%
#40	81.5%
#60	76.6%
#100	68.2%
#200	59.1%

COMMENTS:

DESCRIPTION

Sample: J11972-1

Depth: -

Wet Color: Olive brown

Description: Fines and f Sand, little gravel

Date: 10/24/05

Technician: RDD

Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY

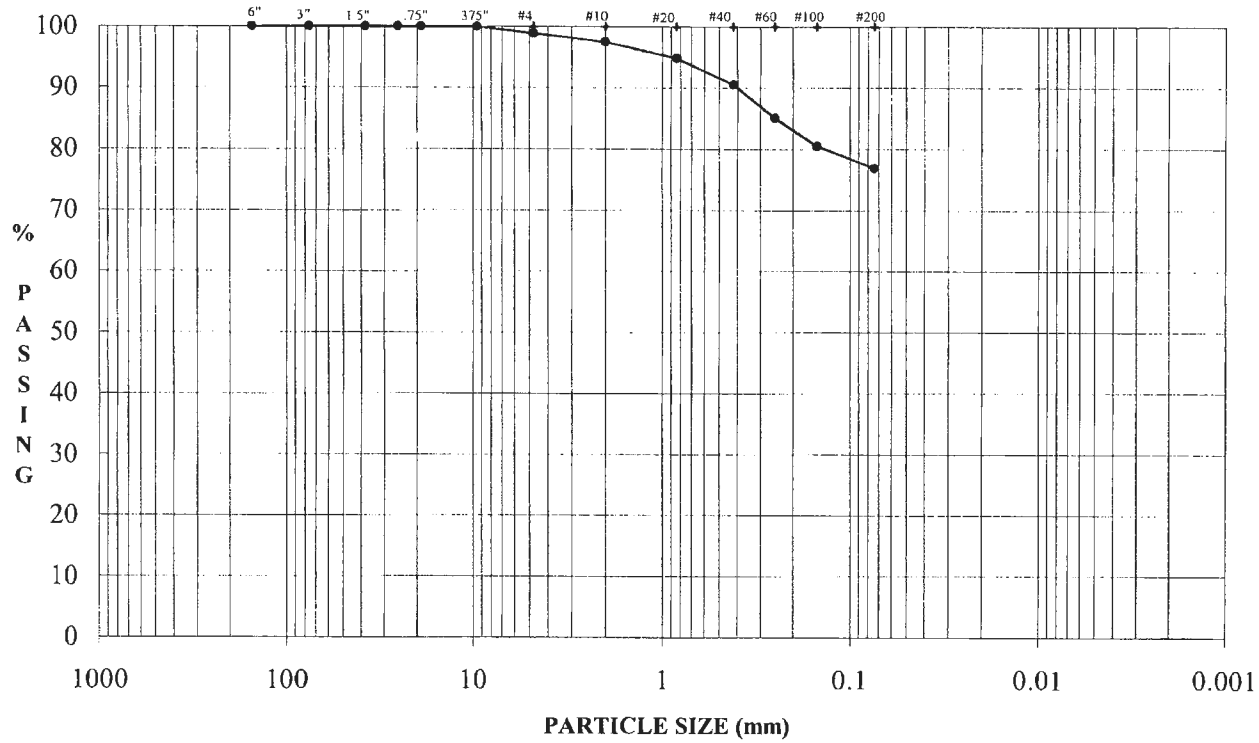
J11972

GOLDER ASSOCIATES INC.

CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	Silt or Clay
COBBLE	GRAVEL		SAND			FINES

Sample Data	
% Gravel	1.2
% Sand	22.0
% Fines	76.9
C_C	N/A
C_U	N/A
LL	-
PL	-
PI	-
USCS	-
w (%)	48.5

Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	100.0%
#4	98.8%
#10	97.5%
#20	94.8%
#40	90.5%
#60	85.1%
#100	80.5%
#200	76.9%

COMMENTS:

DESCRIPTION

Sample: J11972-2

Depth: -

Wet Color: Light olive

Description: Fines, some f sand, trace gravel

Date: 10/24/05

Technician: RDD

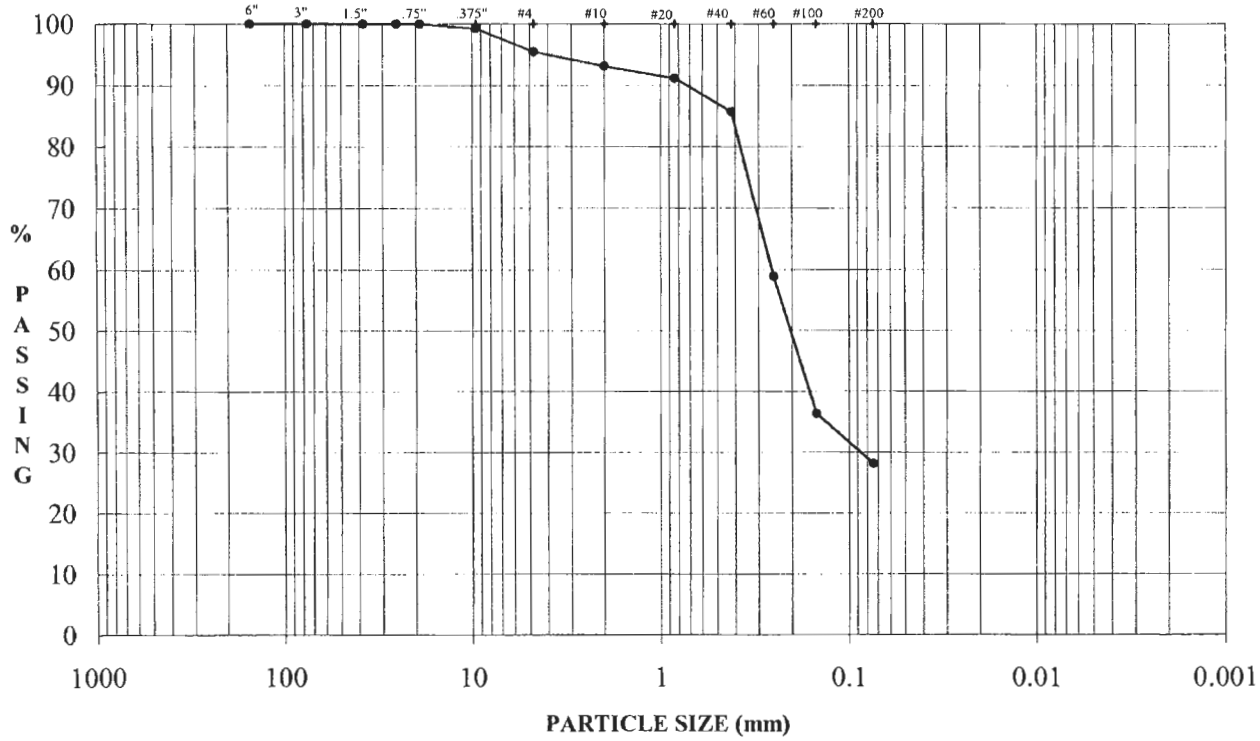
Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY
J11972

GOLDER ASSOCIATES INC.
CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



COBBLE	Coarse	Fine	Cor	Med	Fine	Silt or Clay
	GRAVEL		SAND			FINES

Sample Data	
% Gravel	4.6
% Sand	67.3
% Fines	28.1
C_C	N/A
C_U	N/A
LL	-
PL	-
PI	-
USCS	-
w (%)	26.4

Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	99.3%
#4	95.4%
#10	93.1%
#20	91.1%
#40	85.7%
#60	58.8%
#100	36.3%
#200	28.1%

COMMENTS:

DESCRIPTION

Sample: J11972-3

Depth: -

Wet Color: Olive brown

Description: f Sand, some fines, trace gravel

Date: 10/24/05

Technician: RDD

Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY

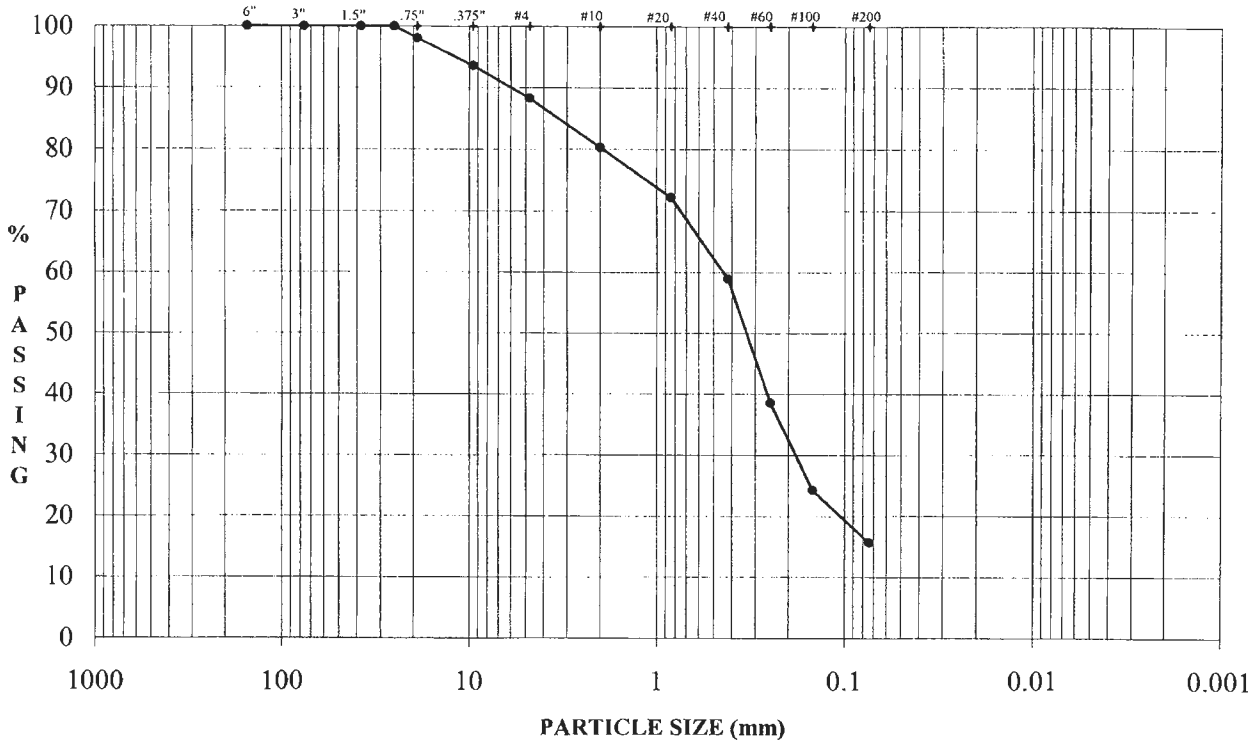
J11972

GOLDER ASSOCIATES INC.

CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	Silt or Clay
COBBLE	GRAVEL		SAND			FINES

Sample Data	
% Gravel	11.7
% Sand	72.6
% Fines	15.6
C_C	N/A
C_U	N/A
LL	-
PL	-
PI	-
USCS	-
w (%)	30.6
Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	98.1%
3/8"	93.5%
#4	88.3%
#10	80.3%
#20	72.2%
#40	58.9%
#60	38.6%
#100	24.3%
#200	15.6%

COMMENTS:

DESCRIPTION

Sample: J11972-10

Depth: -

Wet Color: Black

Description: m-f Sand, some fines, little gravel

Date: 10/24/05

Technician: RDD

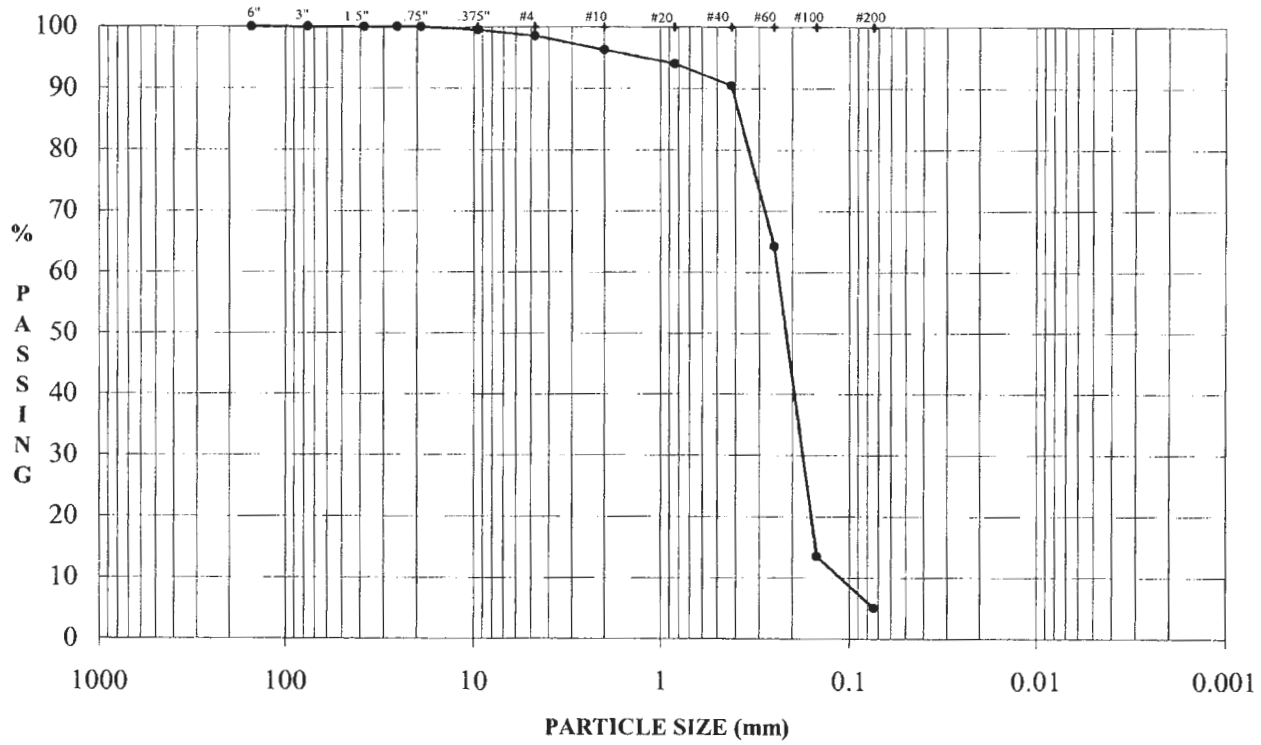
Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY
J11972

GOLDER ASSOCIATES INC.
CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



COBBLE	Coarse	Fine	Cor	Med	Fine	Silt or Clay
	GRAVEL		SAND			FINES

Sample Data	
% Gravel	1.4
% Sand	93.5
% Fines	5.0
C_C	1.0
C_U	2.0
LL	-
PL	-
PI	-
USCS	SP
w (%)	14.8

Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	99.5%
#4	98.6%
#10	96.3%
#20	94.0%
#40	90.4%
#60	64.2%
#100	13.5%
#200	5.0%

COMMENTS:

DESCRIPTION

Sample: J11972-11

Depth: -

Wet Color: Brown

Description: Poorly graded sand

Date: 10/24/05

Technician: RDD

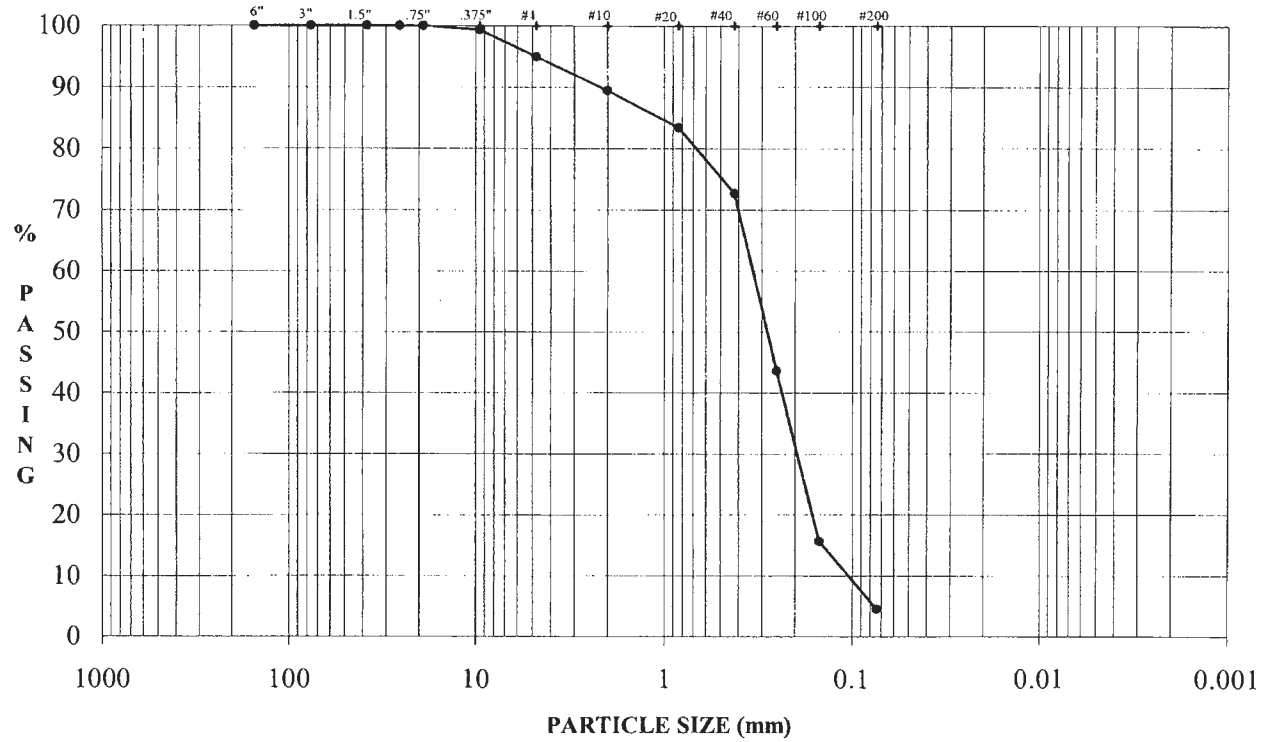
Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY
J11972

GOLDER ASSOCIATES INC.
CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	Silt or Clay
COBBLE	GRAVEL		SAND			FINES

Sample Data	
% Gravel	5.1
% Sand	90.4
% Fines	4.5
C_C	1.1
C_U	3.4
LL	-
PL	-
PI	-
USCS	SP
w (%)	15.4

Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	99.3%
#4	94.9%
#10	89.4%
#20	83.4%
#40	72.6%
#60	43.6%
#100	15.6%
#200	4.5%

COMMENTS:

DESCRIPTION

Sample: J11972-12

Depth: -

Wet Color: Olive

Description: Poorly graded sand

Date: 10/24/05

Technician: RDD

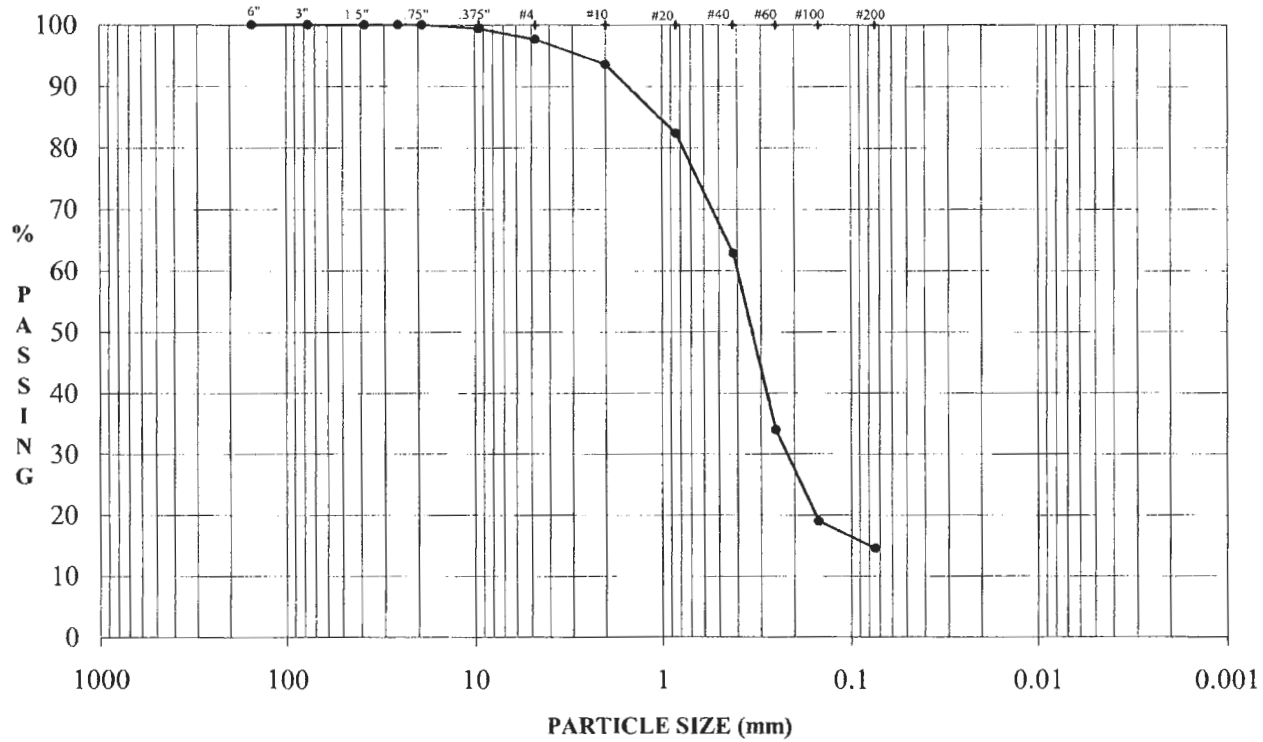
Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY
J11972

GOLDER ASSOCIATES INC.
CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	Silt or Clay
COBBLE	GRAVEL		SAND			FINES

Sample Data	
% Gravel	2.4
% Sand	83.2
% Fines	14.5
C_C	N/A
C_U	N/A
LL	-
PL	-
PI	-
USCS	-
w (%)	17.1
Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	99.4%
#4	97.6%
#10	93.6%
#20	82.4%
#40	62.8%
#60	33.9%
#100	19.0%
#200	14.5%

COMMENTS:

DESCRIPTION

Sample: J11972-13

Depth: -

Wet Color: Dark brown

Description: m-f Sand, some fines, trace gravel

Date: 10/24/05

Technician: RDD

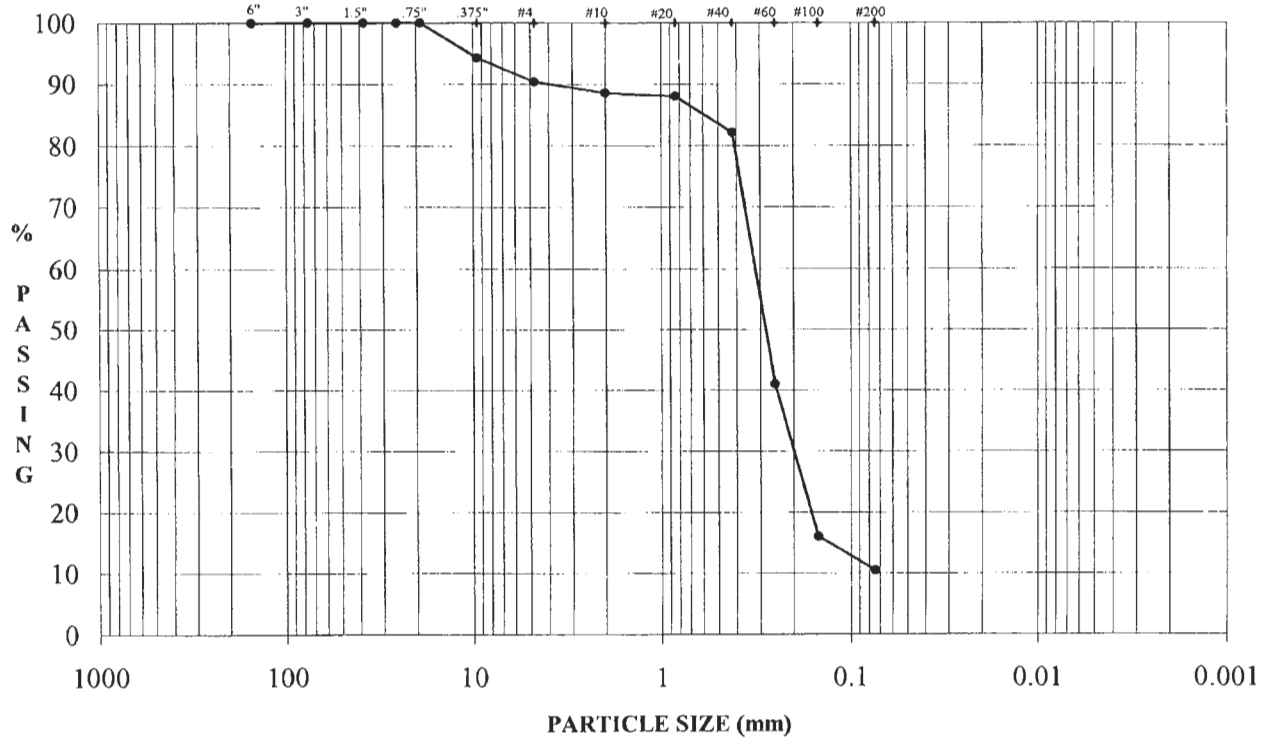
Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY
J11972

GOLDER ASSOCIATES INC.
CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	Silt or Clay
COBBLE	GRAVEL		SAND			FINES

Sample Data	
% Gravel	9.6
% Sand	79.9
% Fines	10.5
C_C	1.8
C_U	4.7
LL	-
PL	-
PI	-
USCS	SP-SM
w (%)	17.0

Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	94.3%
#4	90.4%
#10	88.6%
#20	88.0%
#40	82.1%
#60	41.0%
#100	16.0%
#200	10.5%

COMMENTS:

DESCRIPTION

Sample: J11972-31

Depth: -

Wet Color: Dark olive

Description: Poorly graded sand with silt

Date: 10/24/05

Technician: RDD

Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY

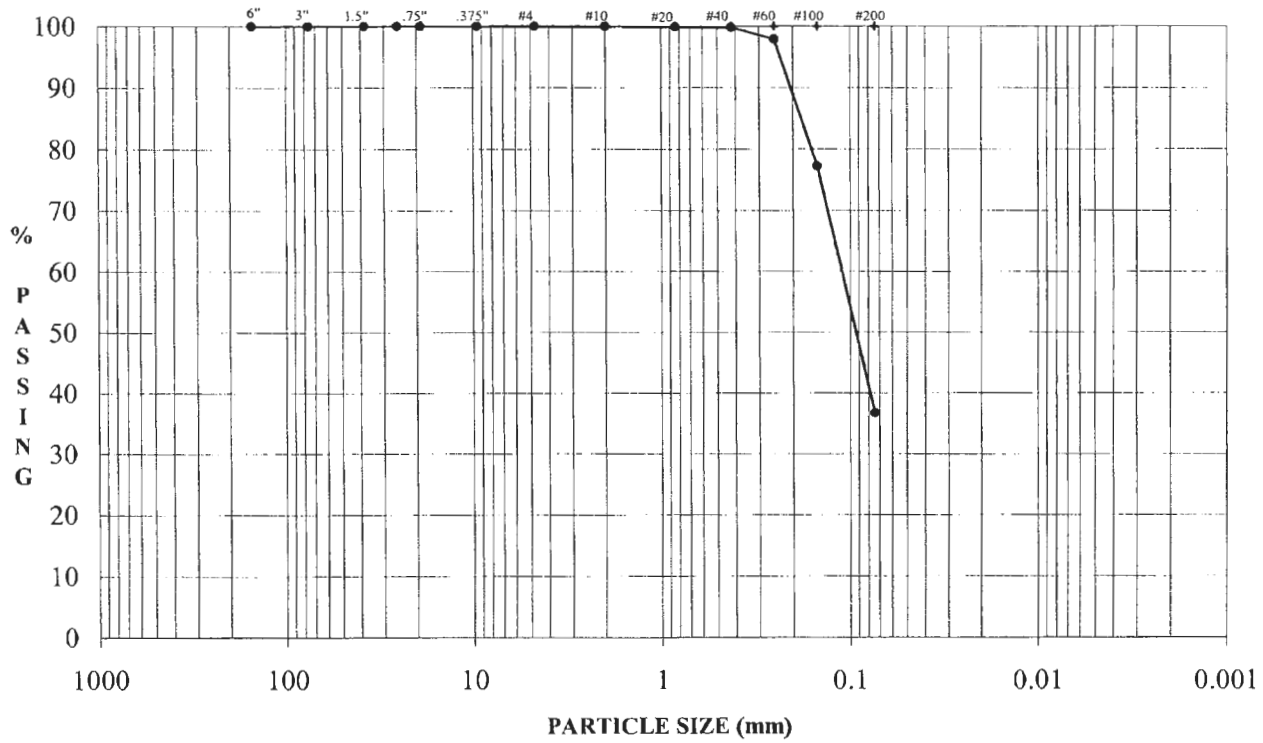
J11972

GOLDER ASSOCIATES INC.

CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



COBBLE	Coarse	Fine	Cor	Med	Fine	Silt or Clay
	GRAVEL		SAND			FINES

Sample Data	
% Gravel	0.0
% Sand	63.3
% Fines	36.7
C_C	N/A
C_U	N/A
LL	-
PL	-
PI	-
USCS	-
w (%)	31.9
Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	100.0%
#20	99.9%
#40	99.8%
#60	97.9%
#100	77.2%
#200	36.7%

COMMENTS:

DESCRIPTION

Sample: J11972-20

Depth: -

Wet Color: Olive

Description: f Sand and Fines, trace gravel

Date: 10/24/05

Technician: RDD

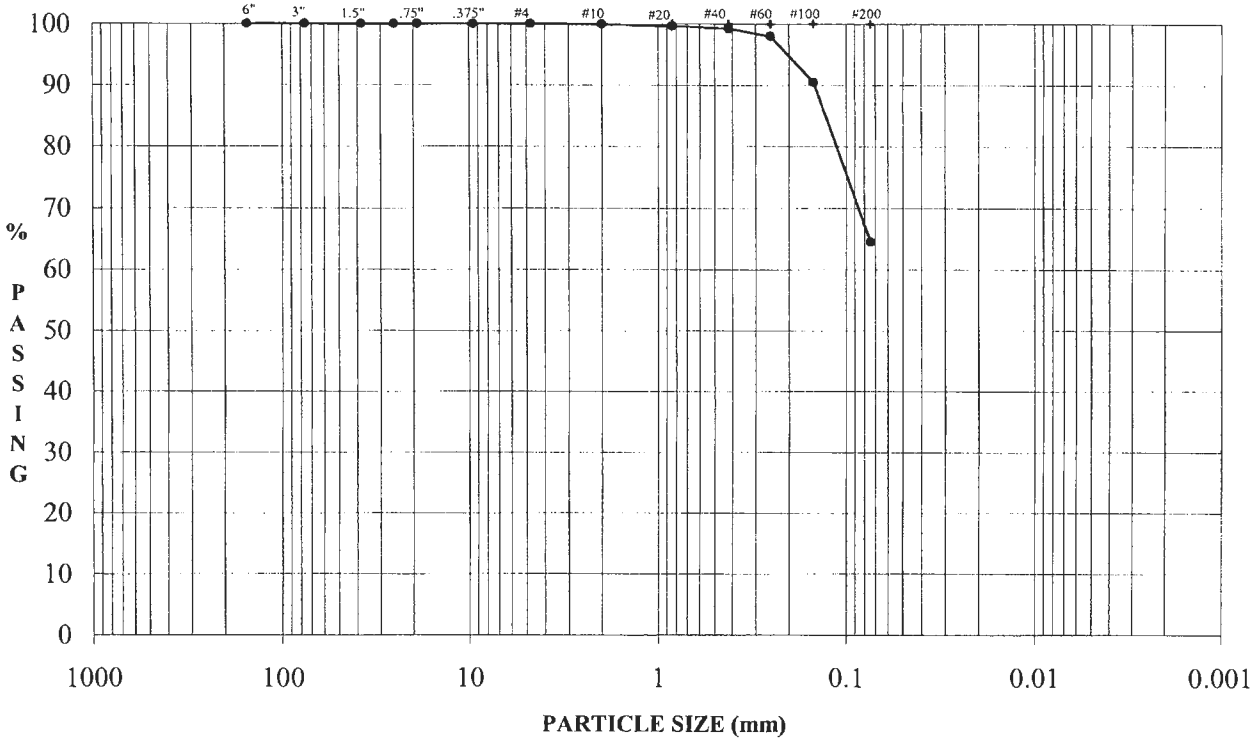
Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY
J11972

GOLDER ASSOCIATES INC.
CHERRY HILL, NEW JERSEY

PARTICLE-SIZE DISTRIBUTION ASTM D 422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	Silt or Clay
COBBLE	GRAVEL		SAND			FINES

Sample Data	
% Gravel	0.0
% Sand	35.5
% Fines	64.5
C_C	N/A
C_U	N/A
LL	-
PL	-
PI	-
USCS	-
w (%)	75.4

Percent Finer	
3"	100.0%
1 1/2"	100.0%
1"	100.0%
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#20	99.6%
#40	99.3%
#60	98.0%
#100	90.4%
#200	64.5%

COMMENTS:

DESCRIPTION

Sample: J11972-33

Depth: -

Wet Color: Olive brown

Description: Fines and f Sand

Date: 10/24/05

Technician: RDD

Reviewer: RMW

ACCUTEST/SDA TRINITY RIVER STUDY
J11972

GOLDER ASSOCIATES INC.
CHERRY HILL, NEW JERSEY

APPENDIX E
LABORATORY CHEMICAL ANALYTICAL DATA SHEETS

Information in this section is to be provided by the University of North Texas.

APPENDIX F
HABITAT ASSESSMENT FIELD FORMS

Information in this section is to be provided by the University of North Texas.