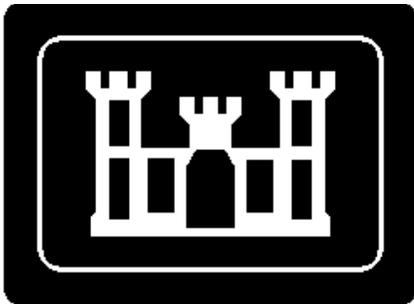


RCRA FACILITY INVESTIGATION REPORT

FOR

FH-052 (Wash Racks within Main Cantonment) FORT HOOD, TEXAS



PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS FORT WORTH DISTRICT

CONTRACT NO. DACA63-96-D-0021

January 2000

**RCRA Facility Investigation Report
For
Site FH-052 (Wash Racks within Main Cantonment)**

Draft Final

**Prepared for
U.S. Army Corps of Engineers
Fort Worth District
Fort Worth, Texas**

**Under Contract Number
DACA63-96-D-0021**

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ACRONYMS

AA	Atomic absorption
BEGM	Bureau of Economic Geology Management
BG	background
BGS	below ground surface
CQAR	Chemical Quality Assessment Report
DOT	Department of Transportation
DPW	Directorate of Public Works
FH	Fort Hood
ft	feet or foot
GC/MS	Gas Chromatography/Mass Spectrometry
ICP	Inductively Coupled Plasma
IDW	Investigation Derived Waste
LCS	Laboratory Control Samples
MSC	medium specific concentration
msl	mean sea level
MS/MSDs	Matrix Spike/Matrix Spike Duplicate
NPDES	National Pollution Discharge Elimination System
ppb	parts per billion
ppm	parts per million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RRS	Risk Reduction Standards
SAIC	Science Applications International Corporation
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TNRCC	Texas Natural Resource Conservation Commission
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit

EXECUTIVE SUMMARY

The Fort Hood military reservation is regulated under the Resource Conservation and Recovery Act (RCRA) as a hazardous waste management facility. The RCRA permit requires that Fort Hood perform a RCRA Facility Investigation (RFI) for solid waste management units (SWMUs) listed in the permit. This report is for the RFI at SWMU FH-052 that consists of motor pool wash racks and the associated drainage system. The motor pool wash racks are located along Tank Destroyer Boulevard in the main cantonment of Fort Hood and discharge to a storm water drainage system located south of Sandowski Road. Each of the wash racks is equipped with a mechanical baffled oil/water separator. The storm water drainage system immediately downstream of the wash racks consists of open, concrete-lined channels, pipe culverts, and other man-made, lined structures. The storm water drainage system downstream of the intersection of Casa Blanca Road and Sandowski Road is unlined.

The approach to the RFI included field sampling and laboratory analysis from sediments and surface water from the unlined drainage ditches downstream of the wash racks. The sampling and analysis program was conducted in accordance with the Final RFI Work Plan for Fort Hood Site FH-052 (USACE 1995) and the TNRCC approved Work Plan Modifications dated 21 April 1998. Twelve sediment and two surface water samples were collected from the unlined ditches which received discharge from the cleaning of military vehicles in the vehicle wash racks and storm water runoff.

A total of twelve sediment samples were collected from ten ditch locations and analyzed according to the Final RCRA Facility Investigation Work Plan for 35 SWMUs (USACE 1995) and modifications to the Work Plan. Ditch samples were collected from two locations during the first round collected in November 1996, five locations during the second sampling event in September 1997, and five locations during the third sampling event in March 1998 (original two locations plus three more locations between those of the first and second sampling event). The number and location of the samples were adequate to provide information regarding the presence/absence of contamination and the characterization of the lateral extent of potential contamination.

Initial investigation of FH-052 in November 1996 indicated arsenic was present in the drainage ditch samples at locations SW101 (21.1 J ppm) and SW102 (15.3 J ppm) above TNRCC RRS Number 1. Arsenic is an element that is ubiquitous in soils. There is no current known source for the potential arsenic contamination, which indicates that the initial arsenic concentrations detected at the two sample locations were a random occurrence rather than fixed in-place contamination.

Results of the initial round of sediment analysis indicated that only arsenic exceeded site background reference concentrations at locations SW101 (21.1 J ppm) and SW102 (15.3 J ppm) above TNRCC RRS Number 1. No VOCs or SVOCs were detected at concentrations greater than PQLs. The second sampling event included provisions to collect (1) background arsenic from outside the influence of the drainage ditch at FH-052, and (2) additional ditch sediment samples downstream of the original locations to determine the possible extent of lateral contamination. No arsenic was detected in the second sampling event at concentrations greater than either the original site-wide or new FH-052 specific arsenic 95% UTL background concentrations (TNRCC RRSs Number 1). To ensure that the potential arsenic contamination didn't exist between the first and second sampling event locations, additional samples for arsenic analysis would be taken at the original locations and three points between the first and second sampling event. This third sampling event was conducted in March of 1998. The arsenic results from original sample locations taken during the third sampling event at SW101 and SW102 were 2.7 and 3.6 J ppm, respectively, which are below the site-wide and the FH-052 specific TNRCC RRS Number 1 value. There is no known source for the arsenic at the site other than possible historical pesticide applications that incorporated arsenic in the formula. Arsenic is ubiquitous in soils which

has been a widely recognized problem by both the TNRCC and EPA (see memo in Appendix E). With all of the follow up investigations at FH-052, the detection of arsenic in the first sampling event was more likely a random occurrence rather than a true indication of in-place contamination at FH-052.

Barium was detected in surface water samples collected during the first sampling event at concentrations above the PQL but less than TNRCC RRSs Number 2 and the MCL of 2.0 ppm. Based on discussions with the TNRCC about initial FH-052 findings, no additional sampling for surface water was designated for the second and third sampling events. The surface water in the drainage ditch has intermittent flow and final disposition of the water is monitored by a National Pollution Discharge Elimination System (NPDES) permit.

Consequently, the analytical results indicate that the drainage ditch at FH-052 has not been contaminated by the nearby wash racks. Based on the results of this RFI investigation, the site should be considered closed under TNRCC RRSs Number 1 and no further action is recommended.

1.0 INTRODUCTION

Fort Hood is an active U.S. Army installation occupying 217,551 acres (339 square miles) in southern Coryell and Bell Counties in central Texas. It is situated 60 miles north of Austin, and about 50 miles south of Waco. The installation is located north of and adjacent to the city of Killeen, east of and adjacent to the city of Copperas Cove, and four miles south of the city of Gatesville. A vicinity map is shown in Figure 1.1.

Fort Hood began operations in 1942. Robert Gray Air Field, originally operated by the Air Force as Robert Gray Air Force Base, was established in 1947 (U. S. Army 1996a). Fort Hood's mission is training, testing, and deployment of military personnel and equipment. The post is commanded by the III Corps Commander. Currently, the post supports two full divisions (the 1st Cavalry and 4th Infantry Divisions). Forty-three thousand military personnel are stationed there; and an additional 30,000 family members, civilians, volunteers, and private-sector employees also live or work at Fort Hood (U.S. Army 1996b). Among the military assets of Fort Hood are approximately 2,500 tracked vehicles, over 11,000 wheeled vehicles, six fixed-wing aircraft, and 230 rotary-wing aircraft. The post has 67 active firing and demolition ranges.

The Fort Hood military reservation is regulated under the Resource Conservation and Recovery Act (RCRA) as a hazardous waste management facility. Fort Hood has a RCRA permit to operate three hazardous waste storage units. The RCRA permit requires that Fort Hood perform a RCRA Facility Investigation (RFI) for 40 solid waste management units (SWMUs) listed in the permit. These SWMUs are distributed across the military reservation, in the main cantonment, West Fort Hood, and North Fort Hood. They include former solid waste landfills and burial sites, former and inactive underground storage tank locations, active wash rack/sewer systems, effluent ponds, and a sanitary sewer network. An installation map is shown in Figure 1.2.

This report describes the collection and analysis of sediment and surface water data from SWMU FH-052, Wash Racks within the Main Cantonment Area. It is one of 35 SWMUs investigated during the RFI conducted November 1996, September 1997, and March 1998.

1.1 BACKGROUND

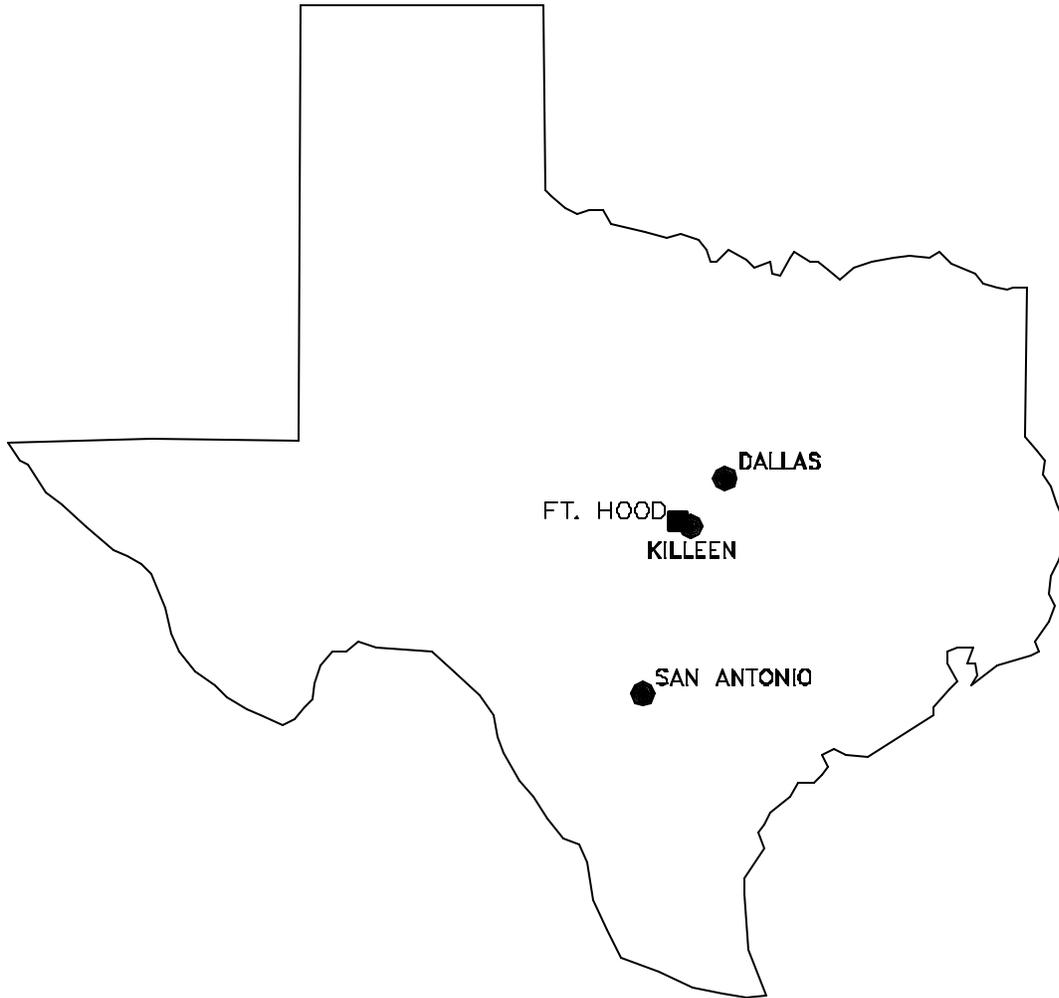
SWMU FH-052 consists of motor pool wash racks and the associated drainage system. The motor pool wash racks are located along Tank Destroyer Boulevard in the main cantonment of Fort Hood and discharge to a storm water drainage system located south of Sandowski Road. Each of the wash racks is equipped with a mechanical baffled oil/water separator. The storm water drainage system immediately downstream of the wash racks consists of open, concrete-lined channels, pipe culverts, and other man-made, lined structures. The storm water drainage system downstream of the intersection of Casa Blanca Road and Sandowski Road is unlined.

1.2 SCOPE AND OBJECTIVES

The objective of the RFI at FH-052 was to determine if there has been a release of contaminant(s) from the motor pool wash racks to the environment and, if identified, to characterize the potential source and extent of contamination. According to the RCRA Facility Investigation Work Plan for 35 Solid Waste Management Units (USACE, 1995), the overall goal of the RFI process is to obtain investigative data necessary to meet the following objectives:

- \$ assess the nature and extent of soil and groundwater contamination at each Fort Hood SWMU (FH-052),

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U.S. ARMY
FORT HOOD, TEXAS



RCRA FACILITY INVESTIGATION

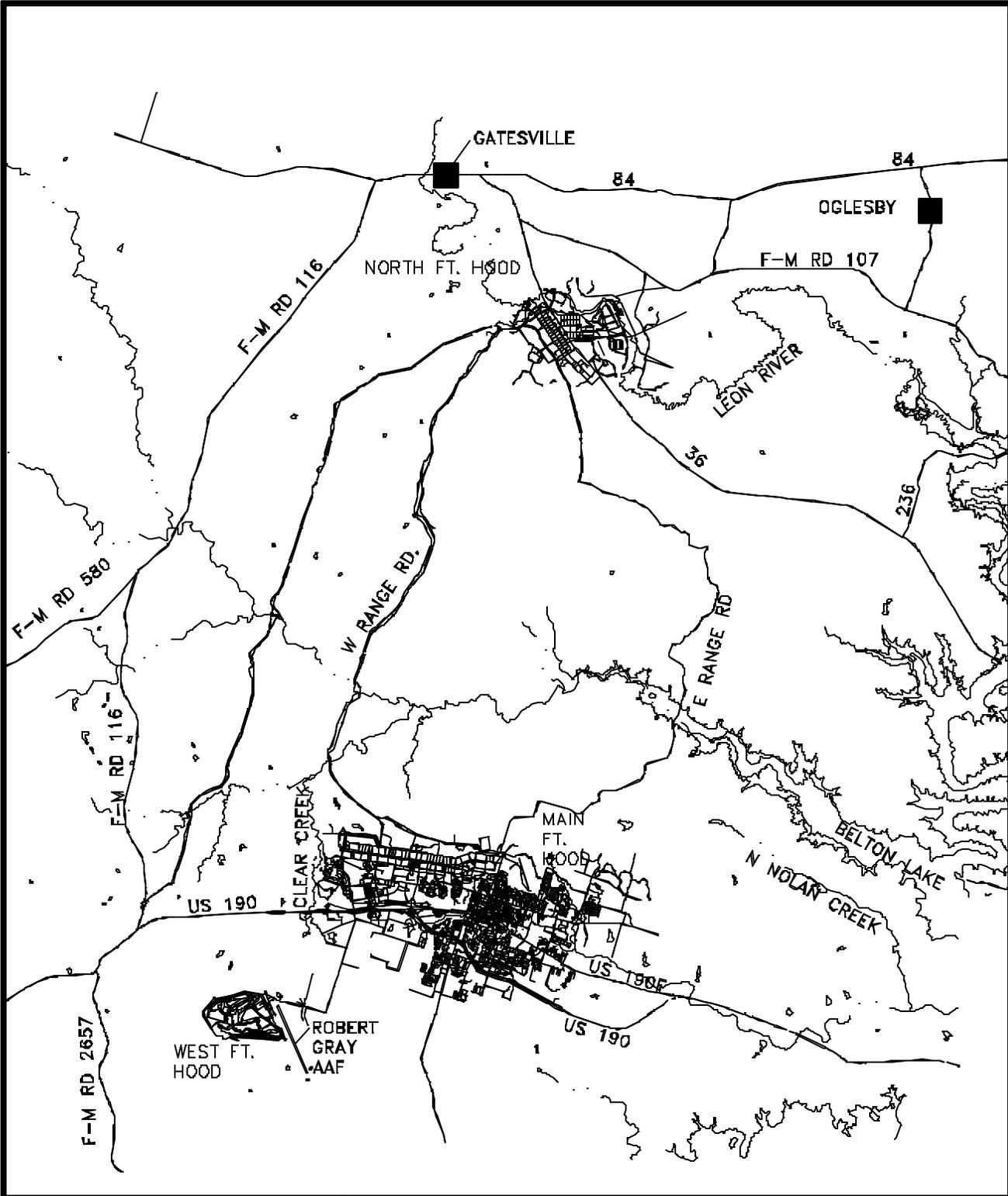
FORT HOOD
VICINITY MAP



Science Applications
International Corporation Columbus, Ohio

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LEGEND

-  MAJOR ROADS
-  RIVERS/STREAMS
-  WATER BODIES

U.S. ARMY
FORT HOOD, TEXAS

RCRA FACILITY INVESTIGATION

FT. HOOD INSTALLATION MAP



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- \$ assess the geology and hydrogeology at FH-052 and the relationship to the overall geology and hydrogeology of Fort Hood,
- \$ analyze risks to human health and the environment using the TNRCC Risk Reduction Rule Guidance and, if necessary, standardized risk assessment methodologies,
- \$ input into a corrective measures study (CMS), if necessary,
- \$ input into any necessary corrective measure engineering design, and
- \$ input into implementation of any selected corrective measures.

The specific objectives of the investigation at FH-052 are as follows:

- determine/confirm the presence or absence of contaminants in the surface water of the unlined storm water drainage system, and
- determine /confirm the presence or absence of contaminants in the sediments of the unlined storm water drainage system.

The approach to the RFI included field sampling and laboratory analysis of sediments and surface water from the unlined drainage ditches downstream of the wash racks. The sampling and analysis program was conducted in accordance with the Final RCRA Facility Investigation Work Plan for Fort Hood Site FH-052 (USACE 1995) along with the TNRCC approved Work Plan modifications dated 21 April 1998.

2.0 ENVIRONMENTAL SETTING

The material presented in this section describes the physical characteristics of FH-052 and its surroundings. The geology, physiography, and climate are presented using regional and site-specific data where available.

2.1 PHYSIOGRAPHIC SETTING

Fort Hood is located within the eastern edge of the Lampasas Cut Plains region of the North-Central Plains physiographic province. The topography of Fort Hood consists of small stream valleys separated by ridge-forming mesas. Relief is as great as 340 ft. The Black and Blackwell Mountains are prominent features north of the main cantonment, as are Seven Mile Mountain at West Fort Hood, and the Dalton Mountains southwest of North Fort Hood. A topographic map of the main cantonment of Fort Hood is provided in Figure 2.1.

Local relief on the main cantonment and at West Fort Hood is generally less than 100 ft, with flat to gently rolling topography. Elevations on the main cantonment range from 860 to 940 ft above mean sea level (msl). SWMU FH-052 elevation is approximately 880 ft above msl.

The rivers, streams, and creeks that constitute the main surface water pathways at Fort Hood are shown on Figure 1.2. The main cantonment lies along a watershed divide between Belton Lake and the Leon River, downstream from the lake. The western and north-central parts of the main cantonment are drained by Clear Creek, which discharges to House Creek. House Creek is a tributary to the eastward-flowing Cowhouse Creek, which discharges to Belton Lake, a man-made reservoir. South Nolan Creek and North Nolan Creek both originate on Fort Hood and flow eastward to the Leon River, below Belton Lake. Surface water drains from Lake A via a drainage ditch that drains to an unnamed tributary of Bull Run Creek which drains to Cowhouse Creek.

2.2 GEOLOGIC CONDITIONS

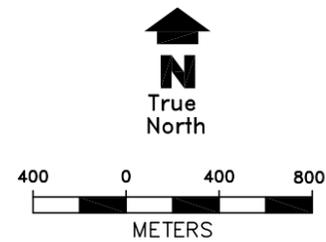
A summary of the geology of the Fort Hood area relevant to this RFI is adapted from the Final RCRA Facility Investigation Work Plan, 35 Solid Waste Management Units, Fort Hood, Texas (USACE 1995). Relevant information on the occurrences of soils and bedrock has been incorporated to further characterize the geology of FH-052 and its surroundings.

2.2.1 Bedrock

Lower Cretaceous marine sedimentary rocks make up the stratigraphy underlying Fort Hood. The Fredericksburg Group consists of several stratigraphic units. The Walnut Formation is the lowermost unit of the Fredericksburg Group and is the dominant stratigraphic unit in the main cantonment. It consists of shales with interbedded limestone, chalky nodular limestone, and shell aggregates. The fossiliferous Walnut Formation is exposed in many locations at Fort Hood. It varies in thickness from 100 to 150 ft (BEGM 1979). The Comanche Peak Formation and an undifferentiated unit overlie the Walnut Formation, but are present at the surface only north of the main cantonment in the Black and Blackwell Mountains, and on West Fort Hood on Seven Mile Mountain.

Bedrock dips gently to the southeast throughout the area. Inactive faults are present in the subsurface to the east of Fort Hood along the Balcones Fault Zone, which runs through Bell, McLennan, and Hill Counties.

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LEGEND

-  TOPOGRAPHIC CONTOUR (FT.)
-  DRAINAGE
-  SURFACE DRAINAGE FLOW
-  FH-052

U.S. ARMY
FORT HOOD, TEXAS



RCRA FACILITY INVESTIGATION
TOPOGRAPHY AND DRAINAGE
OF MAIN FT. HOOD



Science Applications
International Corporation Columbus, Ohio

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2.2.2 Unconsolidated Materials

Alluvial deposits of Quaternary age are present along stream valleys on the main cantonment, specifically along South Nolan Creek on the southern edge of the cantonment (USACE 1995). It is suspected that much alluvium and other natural surface deposits have been reworked throughout the active life of Fort Hood during construction projects.

2.3 CHARACTERIZATION OF SOILS

In many areas of the main cantonment, silty or sandy clay soils overlie bedrock. In upland areas, these soils contain abundant rock fragments. In general, these soils have low permeabilities (USDA 1985a,b). They range in thickness from 15 to 20 ft. Because soils have been extensively reworked for construction and landfilling in the SWMUs that were investigated, it is difficult to apply the USDA classification to the soils encountered on the main cantonment.

2.4 CHARACTERIZATION OF CLIMATE

The climate of the Fort Hood-Killeen area can be characterized as semi-arid continental. Winters (December-March) are mild, with the average daily maximum temperature in January (the coldest month) reaching 60° F. Below-freezing temperatures occur on an average of 23 days per year. The normal daily winter temperature range is 42 to 62° F. At times, strong northerly winds accompanied by sharp drops in temperature occur during the winter months. Summers (June-September) are hot and dry. The average daily maximum temperature in August, the hottest month, reaches 95.9° F. The normal daily temperature range for summer is 75 to 95° F. The average daily temperature in Killeen is 68.1° F.

Average annual rainfall in the Killeen area is 30.4 inches, and is most concentrated from September to May (U.S. Army 1996a). Snowfall is rare. The average annual humidity in the region is 55 percent. Severe weather in the form of heavy rain, hail storms, and ice storms is common in the winter months.

3.0 UNIT CHARACTERIZATION

Motor pool wash racks located along Tank Destroyer Boulevard discharge to a storm water drainage system located south of Sandowski Road. The storm water drainage ditches are concrete lined up to a point southeast of the intersection of Casa Blanca and Sandowski Roads. Beyond this point, the drainage ditches are unlined. The wash racks are located in motorpools and each wash rack is equipped with an oil/water separator. Storm water runoff and wash water effluent from the oil/water separators is discharged into the storm water drainage system. The wash water effluent is generated during the cleaning of military vehicles. Photographs of SWMU FH-052 were taken in September 1997 and are presented in Figure 3.1. No previous investigations have been performed at FH-052 and its wash rack/storm water drainage systems to characterize the sediments and surface water in the unlined drainage ditches.

Visual observations did not indicate the presence of any contamination. The surface water in the ditch at FH-052 was flowing during the three sampling events and had a depth of approximately 8 inches to 1 foot. The surface water appeared to be very clear, however, no turbidity measurements were collected. The sediment that was collected had textures that ranged from silty-clay to sand and gravel and the color ranged from pale yellow to olive brown. The sediment has characteristics typical of soils in the area.



Figure 3.1 Photographs of FH-052

4.0 CHARACTERIZATION OF UNIT CONTAMINATION

The RFI field program was designed to do the following at SWMU FH-052:

- \$ assess the nature and extent of soil and groundwater contamination at each Fort Hood SWMU,
- \$ assess the geology and hydrogeology at FH-052 and the relationship to the overall geology and hydrogeology of Fort Hood,
- \$ analyze risks to human health and the environment using the TNRCC Risk Reduction Rule Guidance and, if necessary, standardized risk assessment methodologies,
- \$ input into a corrective measures study (CMS), if necessary,
- \$ input into any necessary corrective measure engineering design, and
- \$ input into implementation of any selected corrective measures.

The specific objectives of the investigation at FH-052 are as follows:

- determine/confirm the presence or absence of contaminants in the surface water of the unlined storm water drainage system, and
- determine /confirm the presence or absence of contaminants in the sediments of the unlined storm water drainage system.

4.1 TECHNICAL APPROACH

Twelve sediment and two surface water samples were collected from the unlined ditches that received discharge from the motor pool wash racks and storm water runoff. Sampling at FH-052 was conducted in November 1996, September 1997, and March 1998. In November 1996 samples were collected for both surface water and sediment, and in September 1997 and March 1998 only sediments were collected in the unlined drainage ditches. Sample results from the November 1996 sampling effort identified arsenic as a potential contaminant of concern in sediment at FH-052. However, the sediment samples taken during the first sampling event were not sufficient to characterize the extent of contamination at the site. Therefore after a discussion with TNRCC and a modification to the Work Plan, five additional sediment samples were taken from the ditch in September 1997 and analyzed for arsenic only. No contamination was found in the September 1997 sediment samples, therefore in March 1998, sediment samples were collected from the two original locations and three locations between the original sample points and those sampled in September 1997.

Sediment samples collected in the drainage ditch have characteristics typical of the soils in the area, and have been compared to background screening criteria for soils.

4.2 UNIT INVESTIGATION ANALYTICAL RESULTS

A table containing all analytical results for sediments and surface water at FH-052, the respective analytical method, date collected, laboratory and data validation qualifiers, and detection limits are provided in their entirety in Appendix A. Additionally, the laboratory analytical report forms for each sample are included in Appendix A. Tables 4.1 and 4.2 summarize those constituents detected above practical quantitation limits (PQLs) for sediment and surface water, respectively. Constituents detected above PQLs were screened against background and risk-based screening criteria as described in Section 4.3 and Section 5.0. Figure 4.1 presents the sampling locations and summarizes those constituents detected above screening criteria described in Section 5 of this report.

Table 4.1 FH-052 Analytes Detected in Sediment Above Practical Quantitation Limits (PQLs)

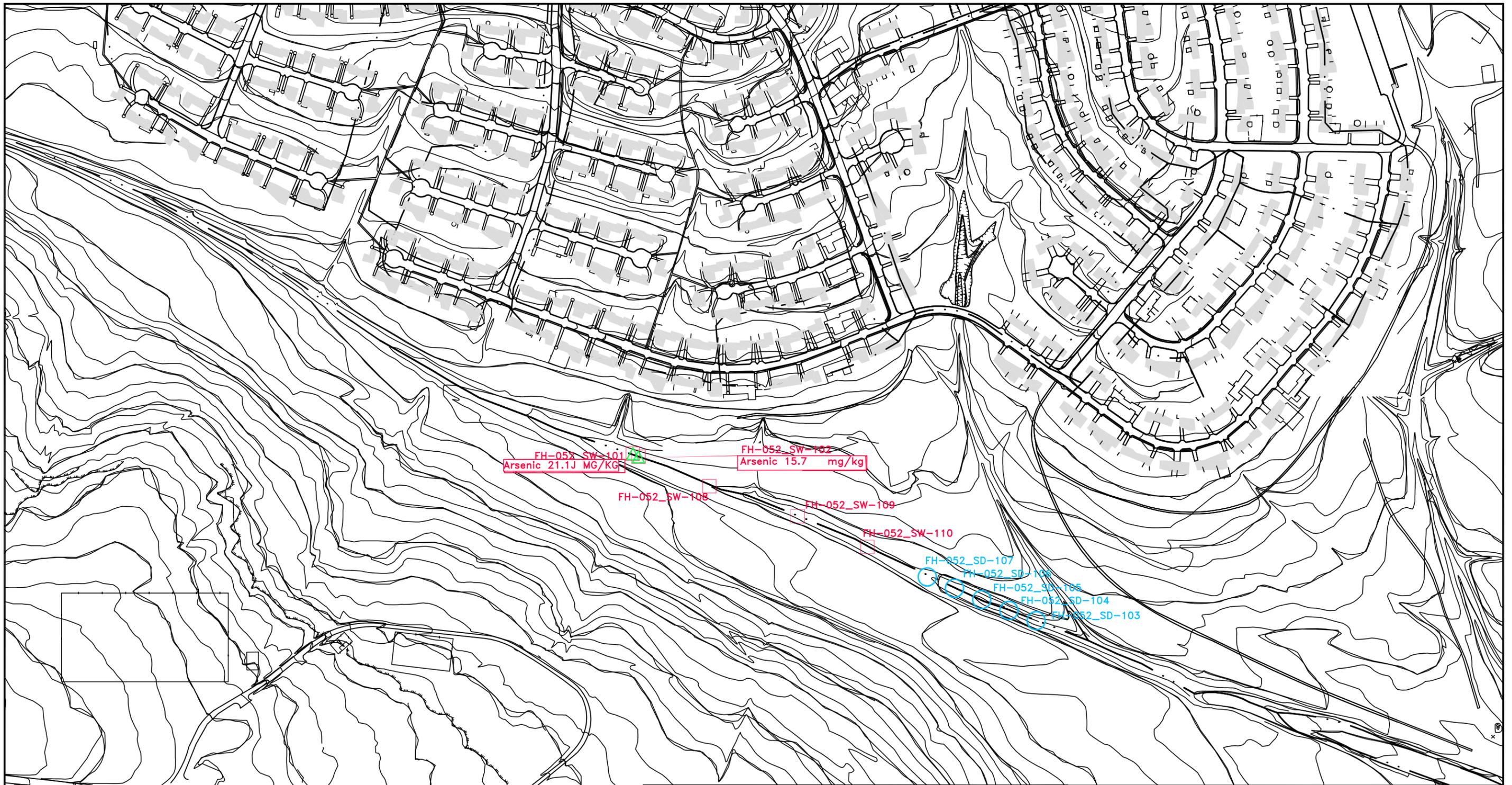
Location	Sample ID	Sample Event	Analysis Type	Parameter	Result	PQL	Units
SW101	52SD101	Nov 1996	Metals	Arsenic	21.1 J	0.54	mg/kg
SW101	52SD101	Nov 1996	Metals	Barium	108	0.13	mg/kg
SW101	52SD101	Nov 1996	Metals	Cadmium	0.3	0.07	mg/kg
SW101	52SD101	Nov 1996	Metals	Chromium	23.4 J	0.13	mg/kg
SW101	52SD101	Nov 1996	Metals	Lead	13	0.23	mg/kg
SW101	52SD101	Nov 1996	Metals	Selenium	0.96	0.49	mg/kg
SW101	52SD108	March 1998	Metals	Arsenic	2.7 J	0.45	mg/kg
SW102	52SD102	Nov 1996	Metals	Arsenic	15.3 J	0.5	mg/kg
SW102	52SD102	Nov 1996	Metals	Barium	71.1	0.12	mg/kg
SW102	52SD102	Nov 1996	Metals	Cadmium	0.26	0.06	mg/kg
SW102	52SD102	Nov 1996	Metals	Chromium	17.1 J	0.12	mg/kg
SW102	52SD102	Nov 1996	Metals	Lead	8.5	0.21	mg/kg
SW102	52SD109	March 1998	Metals	Arsenic	3.6 J	0.48	mg/kg
SW103	52SD103	Sept 1997	Metals	Arsenic	3.5	0.91	mg/kg
SW104	52SD104	Sept 1997	Metals	Arsenic	2	0.39	mg/kg
SW105	52SD105	Sept 1997	Metals	Arsenic	3.4	0.38	mg/kg
SW106	52SD106	Sept 1997	Metals	Arsenic	1.6	0.41	mg/kg
SW107	52SD107	Sept 1997	Metals	Arsenic	6.5	0.48	mg/kg
SW108	52SD110	March 1998	Metals	Arsenic	3.7 J	0.45	mg/kg
SW109	52SD111	March 1998	Metals	Arsenic	3 J	0.37	mg/kg
SW110	52SD112	March 1998	Metals	Arsenic	6.3 J	0.43	mg/kg

J - Indicates estimated value due to laboratory or data validation QA/QC criteria not being met

Table 4.2 FH-052 Analytes Detected in Surface Water Above Practical Quantitation Limits (PQLs)

Location	Sample ID	Sampling Event	Analysis Type	Parameter	Result	PQL	Units
SW101	52SW101	Nov 1996	Metals	Barium	73.7	0.3	ug/l
SW102	52SW102	Nov 1996	Metals	Barium	70.3	0.3	ug/l

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LEGEND	
	MARCH 1998 SEDIMENT SAMPLE LOCATION (D.O. 0008, MOD.1)
	NOVEMBER 1996 SEDIMENT AND SURFACE WATER LOCATION (D.O. 0001)
	SEPTEMBER 1997 SEDIMENT SAMPLE LOCATIONS (D.O. 0008)

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RCRA FACILITY INVESTIGATION			
SAMPLE LOCATIONS AND RESULTS ABOVE SCREENING CRITERIA AT FH-052			
		Science Applications International Corporation Columbus, Ohio	
SCALE 1"=100M	PROJECT NO.	FIGURE NO. 4.1	

4.2.1 Sediment Analytical Results

Inorganic constituents including arsenic, barium, cadmium, chromium, lead, and selenium were detected in sediments at concentrations greater than the PQLs during the November 1996 sampling event. Arsenic was the only constituent analyzed in the second and third sampling events and was found to be greater than the PQL in all samples. Table 4.1 presents all the analytes detected above PQLs for sediments. The range of concentrations for these analytes in FH-052 samples are; arsenic (1.6 ppm to 21.1 J ppm), barium (71.1 ppm to 108 ppm), cadmium (0.26 ppm to 0.3 ppm), chromium (17.1 J ppm to 23.4 J ppm), lead (8.5 ppm to 13 ppm), and selenium (0.96 ppm). No volatile or semivolatile compounds were detected at FH-052 in sediments at concentrations greater than PQLs.

4.2.2 Drainage Ditch Surface Water Results

Barium was the only constituent detected in the surface water samples at concentrations above PQLs (see Table 4.2). The concentration of barium in the surface water samples was 73.7 ppb at SW101 and 70.3 ppb at SW102. No volatile or semivolatile compounds were detected at FH-052 in surface water samples at concentrations greater than PQLs.

4.2.3 Disposition of Investigation Derived Waste

No solid or liquid investigation derived waste (IDW) was generated during sampling at FH-052. Any sediment that remained after the sample container was filled was placed back into the ditch.

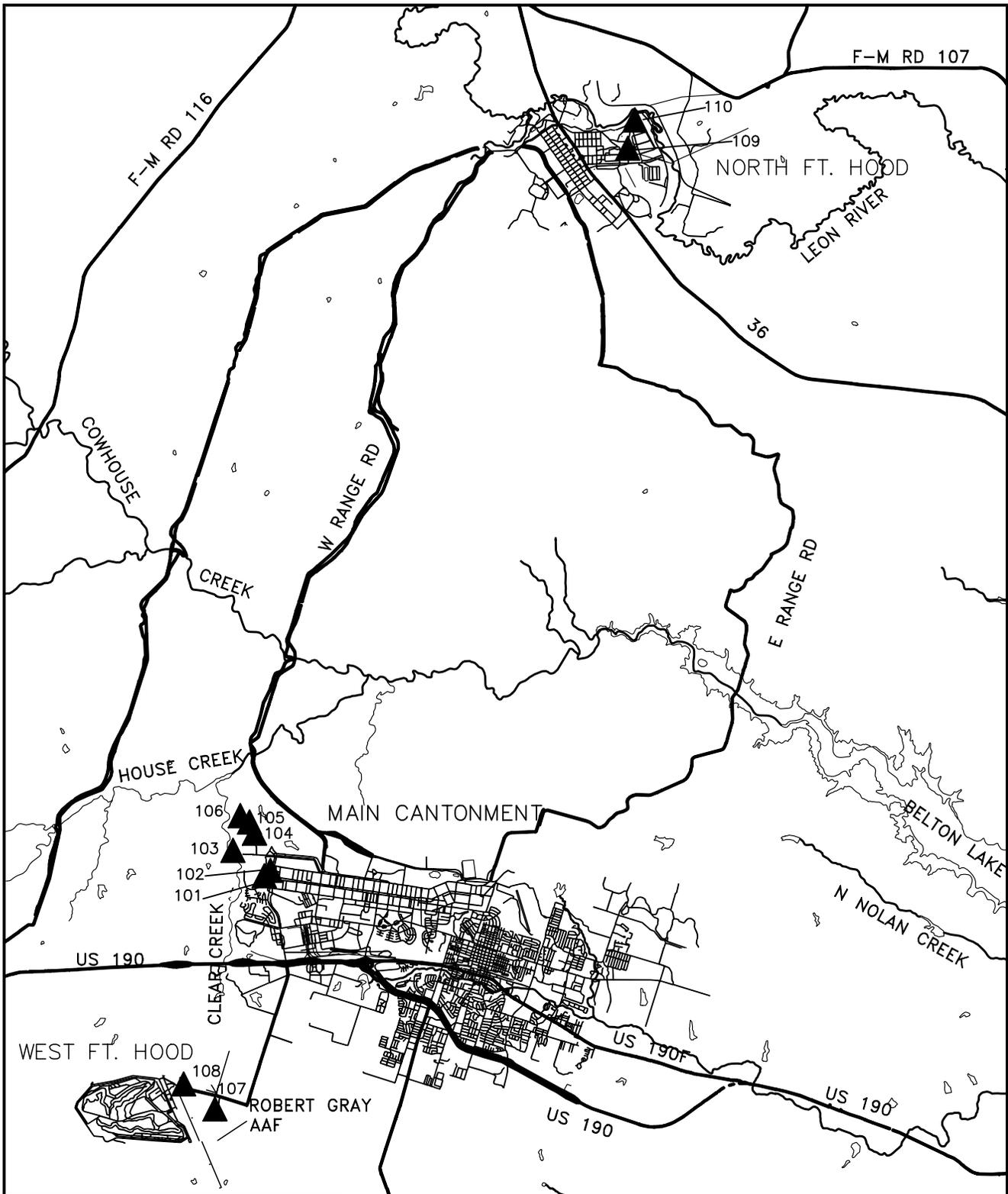
4.3 BACKGROUND CHARACTERIZATION AND COMPARISONS WITH WASTE UNIT SAMPLING RESULTS

In order to characterize naturally occurring constituents in soils and sediments at Fort Hood, samples were collected at 10 separate locations within the facility boundaries in the north, west, and main cantonments. Sampling locations are believed to be outside the influence of past or current industrial and/or waste activities at the facility. The general background sampling locations are presented in Figure 4.2. Background soils data and soil boring logs are presented in Appendices B and C, respectively.

Site-wide background samples were analyzed for the following metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. No quality assurance/quality control (QA/QC) problems were encountered with the background data set for arsenic, barium, cadmium, chromium, and lead. There were only 40 valid background sample results for selenium due to QA/QC problems with the selenium data. A discussion of the data QA/QC is presented in Section 6.1. Mercury was detected in only 1 of 43 subsurface soil samples and selenium in 2 of 40 background subsurface samples. Silver was not detected in any background soil samples. In addition to these site-wide background samples, ten additional soil background samples were taken during the September 1997 sampling event at locations parallel to and outside the influence of the drainage ditch to determine background arsenic concentrations specific to FH-052 (Figure 4.3). The site-wide background results were used for comparison and characterization purpose of the first sampling event. The second and third sampling event results were compared to the arsenic background values specific to FH-052.

Two statistical methods presented in Section 6 of the Final RCRA Facility Investigation Work Plan (USACE 1995) can be used to determine if there is a statistically significant difference between background soil

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LEGEND

-  MAJOR ROADS
-  RIVERS/STREAMS
-  WATER BODIES
-  BACKGROUND SOIL SAMPLE LOCATION

U.S. ARMY
FORT HOOD, TEXAS
RCRA FACILITY INVESTIGATION



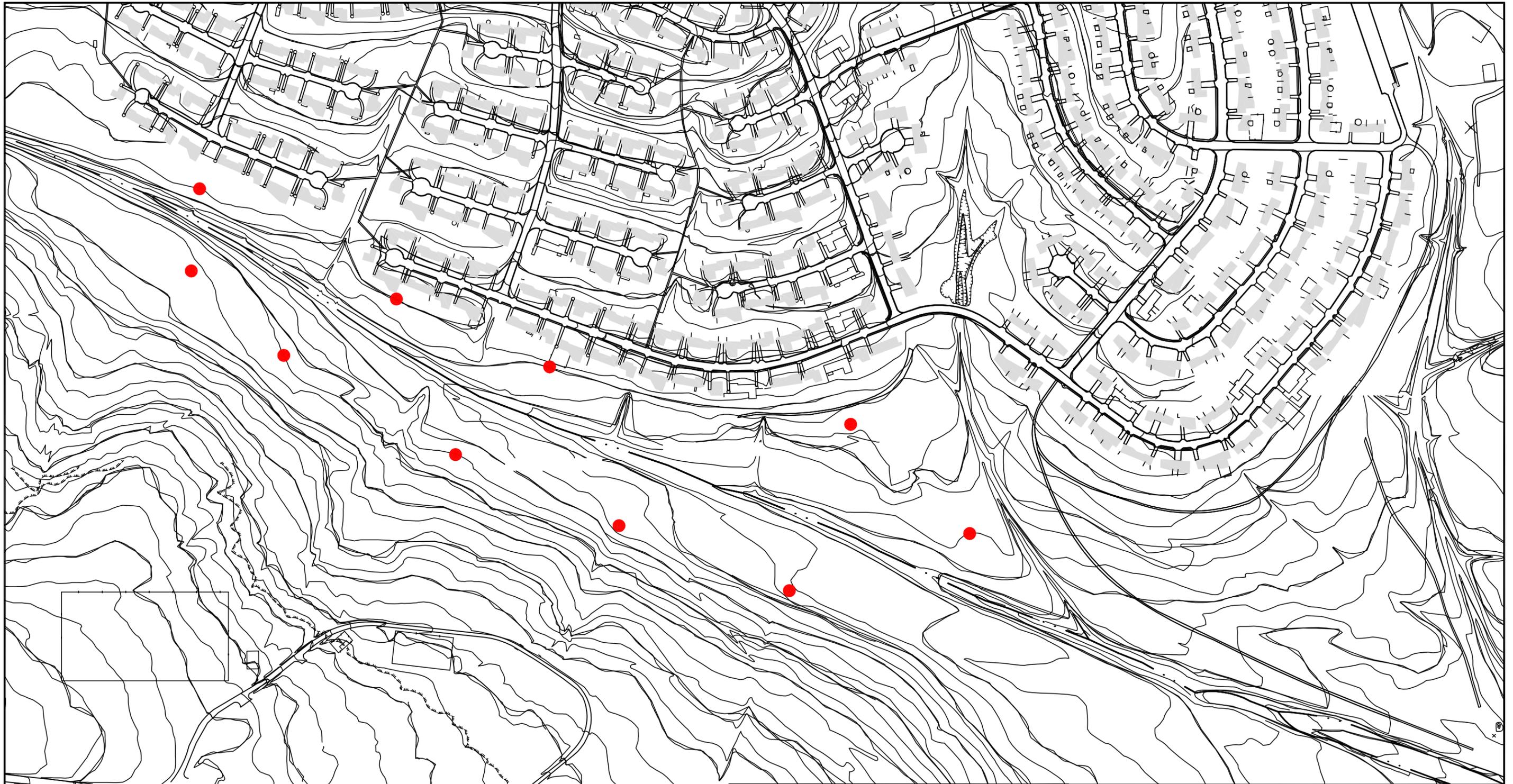
**LOCATIONS OF
BACKGROUND SOIL SAMPLES**



Science Applications International Corporation Columbus, Ohio

DRAWN SC	CHECKED	DATE	SCALE 1"=5000M	PROJECT NO.	FIGURE NO. 4.2
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LEGEND

● SAMPLING LOCATION

U.S. ARMY
FORT HOOD, TEXAS



RCRA FACILITY INVESTIGATION
BACKGROUND SAMPLING LOCATIONS FOR
FH-052



Science Applications
International Corporation Columbus, Ohio

SCALE
1"=100M

PROJECT NO.

FIGURE NO.
4.3

concentrations and the concentrations of metals detected in SWMU samples. The flow chart from the Final RCRA Facility Investigation Work Plan for 35 SWMUs (USAE 1995) used for the statistical evaluations is provided in Appendix D. Background statistical calculations were determined by combining metals results from surface soils (0-2 ft) and subsurface soils (>2 ft) into one background data set. The methods include: (1) a 95% upper tolerance limit (UTL) calculation, and (2) an overall data set mean background concentration.

The primary statistical method for screening data is to compare SWMU data to the respective background 95% UTL values. A site-wide 95% background UTL value was calculated for arsenic, barium, cadmium, chromium, and lead. The 95% UTL is an estimate of the 95th percentile of the population of background concentrations, such that, with a high degree of confidence, 95% of all background concentrations would be less than the UTL value. Results of the 95% UTL calculation are presented in Table 4.3. For inorganic parameters where there were fewer than 50% detects, and the distribution was neither normal nor lognormal, the maximum detected concentration was used in place of the 95% UTL. Concentrations of mercury and selenium in the background samples met these criteria and the maximum detected concentrations for mercury and selenium were used as the background screening criteria. For inorganic parameters where there were no detects, such as silver in this data set, the PQLs were used in place of the 95% UTLs as the background comparison value. Appendix D contains spreadsheets of the Shapiro Wilks test on the background data for distribution, and results of the 95% UTL calculations for the background data.

At FH-052 during the second sampling event in September 1997, background samples were collected for arsenic specific to this SWMU. A second 95% background UTL for arsenic was calculated specifically for FH-052. This value is presented in Table 4.3 and was used for screening the data from the second and third sampling events.

The second statistical method that could be used compares the mean concentration for each metal in background samples to the mean for each metal in the SWMU samples. The potential contaminant of concern after the first sampling event was arsenic. Since it is not statistically reliable to conduct calculations on two data points no comparison of the means was conducted for the first round of data. The arsenic results of the second and third sampling events were less than the 95% UTL developed specifically for arsenic at FH-052, therefore it was not necessary to conduct the second statistical methods calculations.

**Table 4.3 Statistical Analysis of 95% UTL Concentrations
Background Soils**

Analyte (units)	Mean	95% UTL	Maximum Detect	Results > PQL	Distribution
Arsenic (mg/kg)	4.3500	9.19	11.6	43/43	N
Arsenic (mg/kg) ¹	6.8300	8.42	7.8	10/10	N
Barium (mg/kg)	30.19	157.3	155.0	43/43	L
Cadmium (mg/kg)	0.15	0.67	0.79	36/44	L
Chromium (mg/kg)	7.32	24.88	23.6	44/44	L
Lead (mg/kg)	5.77	19.0	33.20	44/44	L
Mercury (mg/kg)	0.0400	0.04*	0.04	1/44	D
Selenium (mg/kg)	0.345	0.44*	0.44	2/40	D
Silver (mg/kg)	0.218	**	ND	0/44	D

Results less than the detection limit were set to 2 the reported detection limit.

L-distribution most similar to lognormal.

N-distribution most similar to normal.

D-distribution not determined because fewer than five detects or less than 50% detects.

¹- Arsenic results of a special FH-052 background sampling event to provide site specific arsenic information. This 95% UTL result is used for screening of the data from the second and third sampling events at FH-052.

*UTL -maximum detected

** The 95% UTL could not be calculated due to no detects in the background data set, therefore, the PQL is used as the background comparison value.

ND - Not Detected

5.0 SCREENING ANALYSIS RESULTS

The Texas Natural Resource Conservation Commission (TNRCC) has promulgated risk reduction standards (30 TAC 335, Subchapter S) for soils and groundwater for residential and industrial land uses. Risk reduction standards (RRSs) Number 1 are defined as 95% UTL background concentrations or analytical practical quantitation limit (PQL) values, whichever are greater. RRSs Number 2 are health-based standards and criteria that are deemed protective of human health or the environment. The TNRCC RRSs have been used to screen the data generated at FH-052 to determine whether or not constituents are present at the site at concentrations that warrant further investigation.

The TNRCC RRSs Number 1 were used to determine if there has been a release of hazardous constituents from the site. In order to determine whether there has been a release at FH-052, sediment sample results were compared to the 95% UTL background concentration levels. Initially, background soil levels were determined for 8 metals in November 1996 and the results are presented in Section 4.3. Since there is no current known source for arsenic at FH-052, it was determined that additional site specific arsenic background samples for FH-052 were needed and these were collected in September 1997. Metals detected above background levels are considered a potential release from the unit.

In order to determine whether or not the concentrations of arsenic detected at FH-052 warrant further action, sample results were screened against the TNRCC RRS Number 2 for arsenic. However, based on a letter from Dan Pearson of the TNRCC, the TNRCC RRS Number 2 cleanup standards for arsenic were below common background levels and a cleanup level of 20 ppm for arsenic in soils was recommended. A copy of this letter is provided in Appendix E. This numerical value is deemed protective of human health and is based on the residential soil exposure pathway only.

5.1 DITCH SEDIMENT SCREENING RESULTS

Inorganic constituents including arsenic, barium, cadmium, chromium, lead, and selenium were detected in sediments at concentrations greater than the PQLs during the November 1996 sampling event. The results from these sediment samples were compared to the 95% UTL background soil value and TNRCC RRS Number 2 (or MSCs). Ditch sediments were compared to background or risk-based soil criteria because the sediments have characteristics more consistent with soils. Table 5.1 lists those constituents detected in drainage ditch sediments above background 95% UTL and TNRCC RRS Number 2 criteria (arsenic 20 ppm). Appendix F contains all of the results above PQL and the respective screening criteria. The maximum concentration of arsenic detected in FH-052 sediments was 21.7 J ppm at location SW101. This sample was collected during the first sampling event. Subsequent sampling of the same location under similar conditions indicates that arsenic is not present in sediments above the 95% UTL. Based on these results, there is no risk to human health or the environment from the sediments at this unit.

5.2 SURFACE WATER SCREENING RESULTS

There are no background values for surface water at Fort Hood. Analytes detected above the PQL in surface water samples collected from the ditch were screened using TNRCC RRSs or MSCs for groundwater. These criteria are based on a residential drinking water intake scenario. Barium was detected at levels above the PQL but less than the TNRCC RRSs Number 2, 30 TAC 335 groundwater criteria, and the maximum contaminant level (MCL) in drinking water of 2.0 ppm. At concentrations less than the MCL barium poses no risk to human health or the environment.

Table 5.1 FH-052 Analytes Above Screening Criteria

Location	Sample ID	Parameter	Result	Units	Screening Information		
					Criterion	Concentration	Units
SW101 ^a	52SD101	Arsenic	21.1 J	mg/kg	TNRCC and EPA recommendation	20	mg/kg

J - Indicates estimated value due to laboratory or data validation of QA/QC parameters.

^a From the first sampling event

^b TNRCC and EPA recommended background arsenic criteria for soils using a residential exposure pathway (see memo in Appendix E)

6.0 INVESTIGATION ANALYSIS

6.1 DATA QUALITY ASSURANCE/QUALITY CONTROL

The Fort Hood RFI Work Plan, the contract laboratory's Quality Assurance Plan, and USEPA SW-846 or other approved procedures for analytical chemistry and physical testing methods were followed for field and laboratory quality assurance/quality control (QA/QC) of FH-052 samples. Field QC samples included trip blanks, rinsate blanks, field duplicates, and split samples. All QA and QC samples were collected as replicate samples of the same field sample. The QA and QC samples were collected at a frequency of 10 percent and analyzed along with the associated environmental samples. Laboratory QC procedures as prescribed by each analytical method were followed by the contract laboratory and included, where applicable, gas chromatography/mass spectrometry (GC/MS) tuning, initial and continuing calibrations, method/extraction blanks, laboratory control samples (LCS), surrogate spikes, internal and external standards, duplicates, matrix spikes/matrix spike duplicates (MS/MSDs), inductively coupled plasma (ICP) and atomic absorption (AA) related QC procedures/samples, and spiked sample clean-up results.

Quality control analyses were conducted by the contract laboratory as an internal control measure of the accuracy and precision of the data. Quality assurance sample analyses were performed by the Army Corps of Engineers-Southwest District Laboratory as an external control measure of the accuracy and precision of the contract laboratory's results and of sampling procedures. The QA/QC, and corresponding field sample results are reviewed by Army Corps of Engineers quality assurance personnel, who then issue a Chemical Quality Assurance Report (CQAR). According to the CQAR for FH-052 one soil sample was analyzed in triplicate and one in duplicate for arsenic with no potential weaknesses in the data.

Data QA/QC procedures also included an independent data validation of 10 percent of the results for compliance of analyses to data quality objectives. All results for FH-052 data that were reviewed as a function of the data validation task met project data quality objectives, and are usable data with the exception of the selenium results for 10 background soil samples. The selenium results were rejected due to unacceptable matrix spike recoveries and were therefore excluded from background calculations. The rejected background data had no impact on the FH-052 results. No other problems with the data were encountered. A copy of the laboratory results and the associated quality control samples are included in Appendix A.

6.2 INVESTIGATION RESULTS

The data set for FH-052 and the quality of the data are usable to meet the objectives of the RFI as described in Section 4.0 of this report. A total of twelve sediment samples were collected from ten ditch locations and analyzed according to the Final RCRA Facility Investigation Work Plan for 35 SWMUs (USACE 1995) and modifications to the Work Plan. Ditch samples were collected from two locations during the first round collected in November 1996, five locations during the second sampling event in September 1997, and five locations during the third sampling event in March 1998 (original two locations plus three more locations between those of the first and second sampling event). The number and location of the samples were adequate to provide information regarding the presence/absence of contamination and the characterization of the lateral extent of potential contamination.

Results of the initial round of sediment analysis indicated that only arsenic exceeded site background reference concentrations. No VOCs or SVOCs were detected at concentrations greater than PQLs. In order to determine the lateral extent of the potential arsenic contamination and to determine FH-052 specific background concentrations, further investigation was needed. The second sampling event included provisions to collect (1) background arsenic from outside the influence of the drainage ditch at FH-052, and (2) additional ditch sediment samples downstream of the original locations to determine the possible extent of lateral

contamination. No arsenic was detected in the second sampling event at concentrations greater than either the original site-wide or new FH-052 specific arsenic 95% UTL background concentrations (TNRCC RRSs Number 1). To ensure that the potential arsenic contamination didn't exist between the first and second sampling event locations, it was determined that additional samples for arsenic analysis would be taken at the original locations and three points between the first and second sampling events. This sampling was conducted in March of 1998 and the results indicated that arsenic was not present at FH-052 above the site-wide or FH-052 specific 95% UTL background concentrations.

The detection of arsenic in the first sampling event is not supported by the subsequent sampling events. The highest concentration of arsenic was an estimated value of 21.1 ppm which approximates the TNRCC and EPA recommended screening value of 20 ppm for arsenic. There is no known source for the arsenic contamination at the site other than possible historical pesticide applications that incorporated arsenic in the formula. Arsenic is ubiquitous in soils which has been a widely recognized problem by both the TNRCC and EPA (see memo in Appendix E). With all of the follow up investigations at FH-052, the detection of arsenic in the first sampling event was more likely a random occurrence rather than a true indication of in-place contamination at FH-052.

Barium was detected in the surface water above the PQL but less than TNRCC RRSs Number 2 and the MCL for barium of 2.0 ppm. Based on discussions with the TNRCC about initial FH-052 findings, no additional sampling for surface water was designated for the second and third sampling events. The surface water in the ditch has intermittent flow, and final disposition of the water is monitored at an outfall by a National Pollution Discharge Elimination System (NPDES) permit. The detected barium concentrations at FH-052 did not exceed permit limits.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Initial investigation of FH-052 in November 1996 indicated arsenic was present in the drainage ditch samples at locations SW101 (21.1 J ppm) and SW102 (15.3 J ppm) above TNRCC RRS Number 1. Subsequent sampling of the same locations indicate that arsenic concentrations were 2.7 J ppm and 3.6 J ppm, respectively, which are below the TNRCC RRS Number 1 value. Arsenic is an element that is ubiquitous in soils. There is no current known source for the potential arsenic contamination, which indicates that the initial arsenic concentrations detected at the two sample locations were a random occurrence rather than fixed in-place contamination. Barium was detected in surface water during the first sampling event at concentrations less than TNRCC RRS Number 2 (MCL for drinking water). The intermittent flow of surface water in the drainage ditches at FH-052 and the low barium concentrations indicate there is no risk to human health or the environment. Consequently, the analytical results for FH-052 sediment and surface water samples indicate the drainage ditches have not been contaminated by the nearby wash racks. Based on the results of this RFI investigation, FH-052 should be considered closed under TNRCC RRSs Number 1 and no further action is recommended.

8.0 REFERENCES

- ADSS. 1989. Acid Disposal Site Study, Training Area 65, December 26, 1989.
- BEGM 1979. Geologic Atlas of Texas, Waco Sheet (map). University of Texas at Austin/Bureau of Economic Geology.
- 30 TAC 335. Industrial Solid Waste and Municipal Hazardous Waste, Subchapter K. Hazardous Substance Facilities Assessment and Remediation.
- U.S. Army. 1996a. Fort Hood 1996 Public Affairs Document. 72p.
- U.S. Army. 1996b. Fort Hood Command Information Summary, 2nd Quarter 1996. Public Affairs Office, 21p. (leaflet).
- U.S. Army. 1992. History of Fort Hood: The First Fifty Years 1942-1992. III Mobile Army Corps, 7p. (leaflet).
- USACE. 1995. Final RCRA Facility Investigation Work Plan. 35 Solid Waste Management Units, Fort Hood, Texas. December 1995.
- USDA. 1985a. Soil Survey of Coryell County, Texas. Soil Conservation Service.
- USDA. 1985b. Soil Survey of Bell County, Texas. Soil Conservation Service.
- USEPA, SW-846. Test Methods for Evaluating Solid Waste. Physical/Chemical. Second Edition, Rev. 0, September, 1986, and Third Edition, Rev. 1, November 1990.
- USEPA, 1989. Guidance Document on the Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, EPA/530-SW-89-026.
- IIA. 1982. Installation Assessment of Fort Hood, Texas, Report Number DRXTH-ES-IA-81188. June, 1982.

Appendix A

Analytical Sample Results

Location: NA
 Sample ID: TB001 Depth: NA
 COE Sample ID: FH052-TB001/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
<u>VOLATILE ORGANICS</u>							
1,1,1,2-Tetrachloroethane	630-20-6	5	5	U		ug/l	SW846 8240
1,1,1-Trichloroethane	71-55-6	5	5	U		ug/l	SW846 8240
1,1,2,2-Tetrachloroethane	79-34-5	5	5	U		ug/l	SW846 8240
1,1,2-Trichloroethane	79-00-5	5	5	U		ug/l	SW846 8240
1,1-Dichloroethane	75-34-3	5	5	U		ug/l	SW846 8240
1,1-Dichloroethene	75-35-4	5	5	U		ug/l	SW846 8240
1,1-Dichloropropene	563-58-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichlorobenzene	87-61-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichloropropane	96-18-4	5	5	U		ug/l	SW846 8240
1,2,4-Trichlorobenzene	120-82-1	5	5	U		ug/l	SW846 8240
1,2,4-trimethylbenzene	95-63-6	5	5	U		ug/l	SW846 8240
1,2-cis-Dichloroethene	156-59-2	5	5	U		ug/l	SW846 8240
1,2-dibromo-3-chloropropane	96-12-8	5	5	U		ug/l	SW846 8240
1,2-Dibromoethane	106-93-4	5	5	U		ug/l	SW846 8240
1,2-Dichlorobenzene	95-50-1	5	5	U		ug/l	SW846 8240
1,2-Dichloroethane	107-06-2	5	5	U		ug/l	SW846 8240
1,2-Dichloropropane	78-87-5	5	5	U		ug/l	SW846 8240
1,2-trans-Dichloroethene	156-60-5	5	5	U		ug/l	SW846 8240
1,3,5-trimethylbenzene	108-67-8	5	5	U		ug/l	SW846 8240
1,3-Dichlorobenzene	541-73-1	5	5	U		ug/l	SW846 8240
1,3-Dichloropropane	142-28-9	5	5	U		ug/l	SW846 8240
1,4-Dichlorobenzene	106-46-7	5	5	U		ug/l	SW846 8240
2,2-Dichloropropane	594-20-7	5	5	U		ug/l	SW846 8240
2-Butanone	78-93-3	5	5	U		ug/l	SW846 8240
2-Chlorotoluene	95-49-8	5	5	U		ug/l	SW846 8240
2-Hexanone	591-78-6	5	5	U		ug/l	SW846 8240
4-Chlorotoluene	106-43-4	5	5	U		ug/l	SW846 8240
4-Methyl-2-pentanone	108-10-1	5	5	U		ug/l	SW846 8240
Acetone	67-64-1	5	5	U		ug/l	SW846 8240
Benzene	71-43-2	5	5	U		ug/l	SW846 8240
Bromobenzene	108-86-1	5	5	U		ug/l	SW846 8240
Bromochloromethane	74-97-5	5	5	U		ug/l	SW846 8240
Bromodichloromethane	75-27-4	5	5	U		ug/l	SW846 8240
Bromoform	75-25-2	5	5	U		ug/l	SW846 8240
Bromomethane	74-83-9	5	5	U		ug/l	SW846 8240
Carbon Tetrachloride	56-23-5	5	5	U		ug/l	SW846 8240
Chlorobenzene	108-90-7	5	5	U		ug/l	SW846 8240
Chloroethane	75-00-3	5	5	U		ug/l	SW846 8240
Chloroform	67-66-3	5	5	U		ug/l	SW846 8240
Chloromethane	74-87-3	5	5	U		ug/l	SW846 8240
Dibromochloromethane	124-48-1	5	5	U		ug/l	SW846 8240
Dibromomethane	74-95-3	5	5	U		ug/l	SW846 8240
Dichlorodifluoromethane	75-71-8	5	5	U		ug/l	SW846 8240
Ethylbenzene	100-41-4	5	5	U		ug/l	SW846 8240
Hexachlorobutadiene	87-68-3	5	5	U		ug/l	SW846 8240
Isopropyl Benzene	98-82-8	5	5	U		ug/l	SW846 8240
m,p-Xylene	13-302-07	5	5	U		ug/l	SW846 8240
Methylene Chloride	75-09-2	5	5	U		ug/l	SW846 8240
n-Butylbenzene	104-51-8	5	5	U		ug/l	SW846 8240
n-propylbenzene	103-65-1	5	5	U		ug/l	SW846 8240
Naphthalene	91-20-3	5	5	U		ug/l	SW846 8240
o-Xylene	95-47-6	5	5	U		ug/l	SW846 8240
p-Isopropyltoluene	99-87-6	5	5	U		ug/l	SW846 8240
sec-Butylbenzene	135-98-8	5	5	U		ug/l	SW846 8240
Styrene	100-42-5	5	5	U		ug/l	SW846 8240
tert-Butylbenzene	98-06-6	5	5	U		ug/l	SW846 8240
Tetrachloroethene	127-18-4	5	5	U		ug/l	SW846 8240
Toluene	108-88-3	5	5	U		ug/l	SW846 8240
Trichloroethene	79-01-6	5	5	U		ug/l	SW846 8240
Trichlorofluoromethane	75-69-4	5	5	U		ug/l	SW846 8240
Vinyl Chloride	75-01-4	5	5	U		ug/l	SW846 8240

Location: NA
 Sample ID: ER011 Depth: NA
 COE Sample ID: FH052-ER011/11-15-96
 Date Collected: 11/15/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
INORGANICS							
Arsenic	7440-38-2	2.5	2.5	U		ug/l	SW846 6010
Barium	7440-39-3	0.3	0.30	U		ug/l	SW846 6010
Cadmium	7440-43-9	0.5	0.50	U		ug/l	SW846 6010
Chromium	7440-47-3	0.8	0.80	U		ug/l	SW846 6010
Lead	7439-92-1	1.7	1.7	U		ug/l	SW846 6010
Mercury	7439-97-6	0.1	0.10	UN		ug/l	SW846 7470
Selenium	7782-49-2	2.8	2.8	U		ug/l	SW846 6010
Silver	7440-22-4	1.2	1.2	U		ug/l	SW846 6010
SEMI-VOLATILE ORGANICS							
1,2,4,5-Tetrachlorobenzene	95-94-3	10	10	U		ug/l	SW846 8270
1,2,4-Trichlorobenzene	120-82-1	10	10	U		ug/l	SW846 8270
1,2-Dichlorobenzene	95-50-1	10	10	U		ug/l	SW846 8270
1,3-Dichlorobenzene	541-73-1	10	10	U		ug/l	SW846 8270
1,4-Dichlorobenzene	106-46-7	10	10	U		ug/l	SW846 8270
2,2'-oxybis(1-chloropropane)	108-60-1	10	10	U		ug/l	SW846 8270
2,4,5-Trichlorophenol	95-95-4	50	50	U		ug/l	SW846 8270
2,4,6-Trichlorophenol	88-06-2	10	10	U		ug/l	SW846 8270
2,4-Dichlorophenol	120-83-2	10	10	U		ug/l	SW846 8270
2,4-Dimethylphenol	105-67-9	10	10	U		ug/l	SW846 8270
2,4-Dinitrophenol	51-28-5	50	50	U		ug/l	SW846 8270
2,4-Dinitrotoluene	121-14-2	10	10	U		ug/l	SW846 8270
2,6-Dinitrotoluene	606-20-2	10	10	U		ug/l	SW846 8270
2-Chloronaphthalene	91-58-7	10	10	U		ug/l	SW846 8270
2-Chlorophenol	95-57-8	10	10	U		ug/l	SW846 8270
2-Methylnaphthalene	91-57-6	10	10	U		ug/l	SW846 8270
2-Methylphenol	95-48-7	10	10	U		ug/l	SW846 8270
2-Nitroaniline	88-74-4	50	50	U		ug/l	SW846 8270
2-Nitrophenol	88-75-5	10	10	U		ug/l	SW846 8270
3,3'-Dichlorobenzidine	91-94-1	20	20	U		ug/l	SW846 8270
3-Nitroaniline	99-09-2	50	50	U		ug/l	SW846 8270
4,6-Dinitro-o-Cresol	534-52-1	50	50	U		ug/l	SW846 8270
4-Bromophenyl-phenyl Ether	101-55-3	10	10	U		ug/l	SW846 8270
4-chloro-3-methylphenol	59-50-7	10	10	U		ug/l	SW846 8270
4-Chloroaniline	106-47-8	10	10	U		ug/l	SW846 8270
4-Chlorophenyl-phenylether	7005-72-3	10	10	U		ug/l	SW846 8270
4-Methylphenol	106-44-5	10	10	U		ug/l	SW846 8270
4-Nitroaniline	100-01-6	50	50	U		ug/l	SW846 8270
4-Nitrophenol	100-02-7	50	50	U		ug/l	SW846 8270
Acenaphthene	83-32-9	10	10	U		ug/l	SW846 8270
Acenaphthylene	208-96-8	10	10	U		ug/l	SW846 8270
Anthracene	120-12-7	10	10	U		ug/l	SW846 8270
Benzo(a)anthracene	56-55-3	10	10	U		ug/l	SW846 8270
Benzo(a)pyrene	50-32-8	10	10	U		ug/l	SW846 8270
Benzo(b)fluoranthene	205-99-2	10	10	U		ug/l	SW846 8270
Benzo(g,h,i)perylene	191-24-2	10	10	U		ug/l	SW846 8270
Benzo(k)fluoranthene	207-08-9	10	10	U		ug/l	SW846 8270
Benzoic Acid	65-85-0	50	50	U		ug/l	SW846 8270
Benzyl Alcohol	100-51-6	10	10	U		ug/l	SW846 8270
Bis(2-chloroethoxy)methane	111-91-1	10	10	U		ug/l	SW846 8270
Bis(2-chloroethyl)ether	111-44-4	10	10	U		ug/l	SW846 8270
Bis(2-ethylhexyl)phthalate	117-81-7	10	10	U		ug/l	SW846 8270
Butyl Benzyl Phthalate	85-68-7	10	10	U		ug/l	SW846 8270
Chrysene	218-01-9	10	10	U		ug/l	SW846 8270
Di-n-butyl Phthalate	84-74-2	10	10	U		ug/l	SW846 8270
Di-n-octyl Phthalate	117-84-0	10	10	U		ug/l	SW846 8270
Dibenz(a,h)anthracene	53-70-3	10	10	U		ug/l	SW846 8270
Dibenzofuran	132-64-9	10	10	U		ug/l	SW846 8270
Diethyl Phthalate	84-66-2	10	10	U		ug/l	SW846 8270
Dimethyl Phthalate	131-11-3	10	10	U		ug/l	SW846 8270
Fluoranthene	206-44-0	10	10	U		ug/l	SW846 8270
Fluorene	86-73-7	10	10	U		ug/l	SW846 8270
Hexachlorobenzene	118-74-1	10	10	U		ug/l	SW846 8270

Location: NA
 Sample ID: ER011 Depth: NA
 COE Sample ID: FH052-ER011/11-15-96
 Date Collected: 11/15/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
Hexachlorobutadiene	87-68-3	10	10	U		ug/l	SW846 8270
Hexachlorocyclopentadiene	77-47-4	10	10	U		ug/l	SW846 8270
Hexachloroethane	67-72-1	10	10	U		ug/l	SW846 8270
Indeno(1,2,3-cd)pyrene	193-39-5	10	10	U		ug/l	SW846 8270
Isophorone	78-59-1	10	10	U		ug/l	SW846 8270
N-Nitroso-di-n-propylamine	621-64-7	10	10	U		ug/l	SW846 8270
N-Nitrosodiphenylamine	86-30-6	10	10	U		ug/l	SW846 8270
Naphthalene	91-20-3	10	10	U		ug/l	SW846 8270
Nitrobenzene	98-95-3	10	10	U		ug/l	SW846 8270
Pentachlorophenol	87-86-5	50	50	U		ug/l	SW846 8270
Phenanthrene	85-01-8	10	10	U		ug/l	SW846 8270
Phenol	108-95-2	10	10	U		ug/l	SW846 8270
Pyrene	129-00-0	10	10	U		ug/l	SW846 8270
Pyridine	110-86-1	50	50	U		ug/l	SW846 8270
<u>VOLATILE ORGANICS</u>							
1,1,1,2-Tetrachloroethane	630-20-6	5	5	U		ug/l	SW846 8240
1,1,1-Trichloroethane	71-55-6	5	5	U		ug/l	SW846 8240
1,1,2,2-Tetrachloroethane	79-34-5	5	5	U		ug/l	SW846 8240
1,1,2-Trichloroethane	79-00-5	5	5	U		ug/l	SW846 8240
1,1-Dichloroethane	75-34-3	5	5	U		ug/l	SW846 8240
1,1-Dichloroethene	75-35-4	5	5	U		ug/l	SW846 8240
1,1-Dichloropropene	563-58-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichlorobenzene	87-61-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichloropropane	96-18-4	5	5	U		ug/l	SW846 8240
1,2,4-Trichlorobenzene	120-82-1	5	5	U		ug/l	SW846 8240
1,2,4-trimethylbenzene	95-63-6	5	5	U		ug/l	SW846 8240
1,2-cis-Dichloroethene	156-59-2	5	5	U		ug/l	SW846 8240
1,2-dibromo-3-chloropropane	96-12-8	5	5	U		ug/l	SW846 8240
1,2-Dibromoethane	106-93-4	5	5	U		ug/l	SW846 8240
1,2-Dichlorobenzene	95-50-1	5	5	U		ug/l	SW846 8240
1,2-Dichloroethane	107-06-2	5	5	U		ug/l	SW846 8240
1,2-Dichloropropane	78-87-5	5	5	U		ug/l	SW846 8240
1,2-trans-Dichloroethene	156-60-5	5	5	U		ug/l	SW846 8240
1,3,5-trimethylbenzene	108-67-8	5	5	U		ug/l	SW846 8240
1,3-Dichlorobenzene	541-73-1	5	5	U		ug/l	SW846 8240
1,3-Dichloropropane	142-28-9	5	5	U		ug/l	SW846 8240
1,4-Dichlorobenzene	106-46-7	5	5	U		ug/l	SW846 8240
2,2-Dichloropropane	594-20-7	5	5	U		ug/l	SW846 8240
2-Butanone	78-93-3	5	5	U		ug/l	SW846 8240
2-Chlorotoluene	95-49-8	5	5	U		ug/l	SW846 8240
2-Hexanone	591-78-6	5	5	U		ug/l	SW846 8240
4-Chlorotoluene	106-43-4	5	5	U		ug/l	SW846 8240
4-Methyl-2-pentanone	108-10-1	5	5	U		ug/l	SW846 8240
Acetone	67-64-1	12	5			ug/l	SW846 8240
Benzene	71-43-2	5	5	U		ug/l	SW846 8240
Bromobenzene	108-86-1	5	5	U		ug/l	SW846 8240
Bromochloromethane	74-97-5	5	5	U		ug/l	SW846 8240
Bromodichloromethane	75-27-4	5	5	U		ug/l	SW846 8240
Bromoform	75-25-2	5	5	U		ug/l	SW846 8240
Bromomethane	74-83-9	5	5	U		ug/l	SW846 8240
Carbon Tetrachloride	56-23-5	5	5	U		ug/l	SW846 8240
Chlorobenzene	108-90-7	5	5	U		ug/l	SW846 8240
Chloroethane	75-00-3	5	5	U		ug/l	SW846 8240
Chloroform	67-66-3	5	5	U		ug/l	SW846 8240
Chloromethane	74-87-3	5	5	U		ug/l	SW846 8240
Dibromochloromethane	124-48-1	5	5	U		ug/l	SW846 8240
Dibromomethane	74-95-3	5	5	U		ug/l	SW846 8240
Dichlorodifluoromethane	75-71-8	5	5	U		ug/l	SW846 8240
Ethylbenzene	100-41-4	5	5	U		ug/l	SW846 8240
Hexachlorobutadiene	87-68-3	5	5	U		ug/l	SW846 8240
Isopropyl Benzene	98-82-8	5	5	U		ug/l	SW846 8240
m,p-Xylene	13-302-07	5	5	U		ug/l	SW846 8240
Methylene Chloride	75-09-2	6	5			ug/l	SW846 8240
n-Butylbenzene	104-51-8	5	5	U		ug/l	SW846 8240

Location: NA
Sample ID: ER011 **Depth:** NA
COE Sample ID: FH052-ER011/11-15-96
Date Collected: 11/15/96

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
n-propylbenzene	103-65-1	5	5	U		ug/l	SW846 8240
Naphthalene	91-20-3	5	5	U		ug/l	SW846 8240
o-Xylene	95-47-6	5	5	U		ug/l	SW846 8240
p-Isopropyltoluene	99-87-6	5	5	U		ug/l	SW846 8240
sec-Butylbenzene	135-98-8	5	5	U		ug/l	SW846 8240
Styrene	100-42-5	5	5	U		ug/l	SW846 8240
tert-Butylbenzene	98-06-6	5	5	U		ug/l	SW846 8240
Tetrachloroethene	127-18-4	5	5	U		ug/l	SW846 8240
Toluene	108-88-3	5	5	U		ug/l	SW846 8240
Trichloroethene	79-01-6	5	5	U		ug/l	SW846 8240
Trichlorofluoromethane	75-69-4	5	5	U		ug/l	SW846 8240
Vinyl Chloride	75-01-4	5	5	U		ug/l	SW846 8240

Location: NA
Sample ID: ER078 **Depth:** NA
COE Sample ID: FH052-ER078/09-09-97
Date Collected: 9/9/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	2.5	2.5	U		ug/l	SW846 6010

Location: NA
Sample ID: ER079 **Depth:** NA
COE Sample ID: FH052-ER079/09-09-97
Date Collected: 9/9/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	2.5	2.5	U		ug/l	SW846 6010

Location: NA
Sample ID: ER080 **Depth:** NA
COE Sample ID: FH052-ER080/09-09-97
Date Collected: 9/9/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	2.5	2.5	U		ug/l	SW846 6010

Location: SB101
Sample ID: BKSB145 Depth: 0.0-2.0
COE Sample ID: FH000-SB101/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	7.6	0.32			mg/kg	SW846 6010

Location: SB102
Sample ID: BKSB146 Depth: 0.0-2.0
COE Sample ID: FH000-SB102/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.4	0.32			mg/kg	SW846 6010

Location: SB103
Sample ID: BKSB147 Depth: 0.0-2.0
COE Sample ID: FH000-SB103/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	7	0.33			mg/kg	SW846 6010

Location: SB104
Sample ID: BKSB148 Depth: 0.0-2.0
COE Sample ID: FH000-SB148/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.6	0.32			mg/kg	SW846 6010

Location: SB105
Sample ID: BKSB149 Depth: 0.0-2.0
COE Sample ID: FH000-SB149/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.8	0.34			mg/kg	SW846 6010

Location: SB106
Sample ID: BKSB150 Depth: 0.0-2.0
COE Sample ID: FH000-SB150/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.7	0.32			mg/kg	SW846 6010

Location: SB107
Sample ID: BKSB151 Depth: 0.0-2.0
COE Sample ID: FH000-SB151/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	7.8	0.33			mg/kg	SW846 6010

Location: SB108
Sample ID: BKSB152 Depth: 0.0-2.0
COE Sample ID: FH000-SB152/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	5.9	0.31			mg/kg	SW846 6010

Location: SB109
Sample ID: BKSB153 Depth: 0.0-2.0
COE Sample ID: FH000-SB153/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.7	0.32			mg/kg	SW846 6010

Location: SB110
Sample ID: BKSB154 Depth: 0.0-2.0
COE Sample ID: FH000-SB154/09-10-97/0.0-2.0
Date Collected: 9/10/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.2	0.32			mg/kg	SW846 6010

Location: SW101
Sample ID: 52SD101 Depth: NA
COE Sample ID: FH052-SD101/11-14-96
Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
INORGANICS							
Arsenic	7440-38-2	21.1	0.54	N	J	mg/kg	SW846 6010
Barium	7440-39-3	108	0.13			mg/kg	SW846 6010
Cadmium	7440-43-9	0.3	0.07	B		mg/kg	SW846 6010
Chromium	7440-47-3	23.4	0.13	E	J	mg/kg	SW846 6010
Lead	7439-92-1	13	0.23			mg/kg	SW846 6010
Mercury	7439-97-6	0.05	0.05	U	U	mg/kg	SW846 7470
Selenium	7782-49-2	0.96	0.49			mg/kg	SW846 6010
Silver	7440-22-4	0.31	0.31	U	U	mg/kg	SW846 6010
SEMIVOLATILE ORGANICS							
1,2,4,5-Tetrachlorobenzene	95-94-3	540	540	U		ug/kg	SW846 8270
1,2,4-Trichlorobenzene	120-82-1	540	540	U		ug/kg	SW846 8270
1,2-Dichlorobenzene	95-50-1	540	540	U		ug/kg	SW846 8270
1,3-Dichlorobenzene	541-73-1	540	540	U		ug/kg	SW846 8270
1,4-Dichlorobenzene	106-46-7	540	540	U		ug/kg	SW846 8270
2,2'-oxybis(1-chloropropane)	108-60-1	540	540	U		ug/kg	SW846 8270
2,4,5-Trichlorophenol	95-95-4	2600	2600	U		ug/kg	SW846 8270
2,4,6-Trichlorophenol	88-06-2	540	540	U		ug/kg	SW846 8270
2,4-Dichlorophenol	120-83-2	540	540	U		ug/kg	SW846 8270
2,4-Dimethylphenol	105-67-9	540	540	U		ug/kg	SW846 8270
2,4-Dinitrophenol	51-28-5	2600	2600	U		ug/kg	SW846 8270
2,4-Dinitrotoluene	121-14-2	540	540	U		ug/kg	SW846 8270
2,6-Dinitrotoluene	606-20-2	540	540	U		ug/kg	SW846 8270
2-Chloronaphthalene	91-58-7	540	540	U		ug/kg	SW846 8270
2-Chlorophenol	95-57-8	540	540	U		ug/kg	SW846 8270
2-Methylnaphthalene	91-57-6	540	540	U		ug/kg	SW846 8270
2-Methylphenol	95-48-7	540	540	U		ug/kg	SW846 8270
2-Nitroaniline	88-74-4	2600	2600	U		ug/kg	SW846 8270
2-Nitrophenol	88-75-5	540	540	U		ug/kg	SW846 8270
3,3'-Dichlorobenzidine	91-94-1	1100	1100	U		ug/kg	SW846 8270
3-Nitroaniline	99-09-2	2600	2600	U		ug/kg	SW846 8270
4,6-Dinitro-o-Cresol	534-52-1	2600	2600	U		ug/kg	SW846 8270
4-Bromophenyl-phenyl Ether	101-55-3	540	540	U		ug/kg	SW846 8270
4-chloro-3-methylphenol	59-50-7	540	540	U		ug/kg	SW846 8270
4-Chloroaniline	106-47-8	540	540	U		ug/kg	SW846 8270
4-Chlorophenyl-phenylether	7005-72-3	540	540	U		ug/kg	SW846 8270
4-Methylphenol	106-44-5	540	540	U		ug/kg	SW846 8270
4-Nitroaniline	100-01-6	2600	2600	U		ug/kg	SW846 8270
4-Nitrophenol	100-02-7	2600	2600	U		ug/kg	SW846 8270
Acenaphthene	83-32-9	540	540	U		ug/kg	SW846 8270
Acenaphthylene	208-96-8	540	540	U		ug/kg	SW846 8270
Anthracene	120-12-7	540	540	U		ug/kg	SW846 8270
Benzo(a)anthracene	56-55-3	540	540	U		ug/kg	SW846 8270
Benzo(a)pyrene	50-32-8	540	540	U		ug/kg	SW846 8270
Benzo(b)fluoranthene	205-99-2	540	540	U		ug/kg	SW846 8270
Benzo(g,h,i)perylene	191-24-2	540	540	U		ug/kg	SW846 8270
Benzo(k)fluoranthene	207-08-9	540	540	U		ug/kg	SW846 8270
Benzoic Acid	65-85-0	2600	2600	U		ug/kg	SW846 8270
Benzyl Alcohol	100-51-6	540	540	U		ug/kg	SW846 8270
Bis(2-chloroethoxy)methane	111-91-1	540	540	U		ug/kg	SW846 8270
Bis(2-chloroethyl)ether	111-44-4	540	540	U		ug/kg	SW846 8270
Bis(2-ethylhexyl)phthalate	117-81-7	540	540	U		ug/kg	SW846 8270
Butyl Benzyl Phthalate	85-68-7	540	540	U		ug/kg	SW846 8270
Chrysene	218-01-9	540	540	U		ug/kg	SW846 8270
Di-n-butyl Phthalate	84-74-2	540	540	U		ug/kg	SW846 8270
Di-n-octyl Phthalate	117-84-0	540	540	U		ug/kg	SW846 8270
Dibenz(a,h)anthracene	53-70-3	540	540	U		ug/kg	SW846 8270
Dibenzofuran	132-64-9	540	540	U		ug/kg	SW846 8270
Diethyl Phthalate	84-66-2	540	540	U		ug/kg	SW846 8270
Dimethyl Phthalate	131-11-3	540	540	U		ug/kg	SW846 8270
Fluoranthene	206-44-0	540	540	U		ug/kg	SW846 8270
Fluorene	86-73-7	540	540	U		ug/kg	SW846 8270
Hexachlorobenzene	118-74-1	540	540	U		ug/kg	SW846 8270

Location: SW101
 Sample ID: 52SD101 Depth: NA
 COE Sample ID: FH052-SD101/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
Hexachlorobutadiene	87-68-3	540	540	U		ug/kg	SW846 8270
Hexachlorocyclopentadiene	77-47-4	540	540	U		ug/kg	SW846 8270
Hexachloroethane	67-72-1	540	540	U		ug/kg	SW846 8270
Indeno(1,2,3-cd)pyrene	193-39-5	540	540	U		ug/kg	SW846 8270
Isophorone	78-59-1	540	540	U		ug/kg	SW846 8270
N-Nitroso-di-n-propylamine	621-64-7	540	540	U		ug/kg	SW846 8270
N-Nitrosodiphenylamine	86-30-6	540	540	U		ug/kg	SW846 8270
Naphthalene	91-20-3	540	540	U		ug/kg	SW846 8270
Nitrobenzene	98-95-3	540	540	U		ug/kg	SW846 8270
Pentachlorophenol	87-86-5	2600	2600	U		ug/kg	SW846 8270
Phenanthrene	85-01-8	540	540	U		ug/kg	SW846 8270
Phenol	108-95-2	540	540	U		ug/kg	SW846 8270
Pyrene	129-00-0	540	540	U		ug/kg	SW846 8270
Pyridine	110-86-1	540	540	U		ug/kg	SW846 8270
VOLATILE ORGANICS							
1,1,1,2-Tetrachloroethane	630-20-6	8	8	U	U	ug/kg	SW846 8260
1,1,1-Trichloroethane	71-55-6	8	8	U	U	ug/kg	SW846 8260
1,1,2,2-Tetrachloroethane	79-34-5	8	8	U	U	ug/kg	SW846 8260
1,1,2-Trichloroethane	79-00-5	8	8	U	U	ug/kg	SW846 8260
1,1-Dichloroethane	75-34-3	8	8	U	U	ug/kg	SW846 8260
1,1-Dichloroethene	75-35-4	8	8	U	U	ug/kg	SW846 8260
1,1-Dichloropropene	563-58-6	8	8	U	U	ug/kg	SW846 8260
1,2,3-Trichlorobenzene	87-61-6	8	8	U	U	ug/kg	SW846 8260
1,2,3-Trichloropropane	96-18-4	8	8	U	U	ug/kg	SW846 8260
1,2,4-Trichlorobenzene	120-82-1	8	8	U	U	ug/kg	SW846 8260
1,2,4-trimethylbenzene	95-63-6	8	8	U	U	ug/kg	SW846 8260
1,2-cis-Dichloroethene	156-59-2	8	8	U	U	ug/kg	SW846 8260
1,2-dibromo-3-chloropropane	96-12-8	8	8	U	U	ug/kg	SW846 8260
1,2-Dibromoethane	106-93-4	8	8	U	U	ug/kg	SW846 8260
1,2-Dichlorobenzene	95-50-1	8	8	U	U	ug/kg	SW846 8260
1,2-Dichloroethane	107-06-2	8	8	U	U	ug/kg	SW846 8260
1,2-Dichloropropane	78-87-5	8	8	U	U	ug/kg	SW846 8260
1,2-trans-Dichloroethene	156-60-5	8	8	U	U	ug/kg	SW846 8260
1,3,5-trimethylbenzene	108-67-8	8	8	U	U	ug/kg	SW846 8260
1,3-Dichlorobenzene	541-73-1	8	8	U	U	ug/kg	SW846 8260
1,3-Dichloropropane	142-28-9	8	8	U	U	ug/kg	SW846 8260
1,4-Dichlorobenzene	106-46-7	8	8	U	U	ug/kg	SW846 8260
2,2-Dichloropropane	594-20-7	8	8	U	U	ug/kg	SW846 8260
2-Butanone	78-93-3	4	8	J	J	ug/kg	SW846 8260
2-Chlorotoluene	95-49-8	8	8	U	U	ug/kg	SW846 8260
2-Hexanone	591-78-6	8	8	U	U	ug/kg	SW846 8260
4-Chlorotoluene	106-43-4	8	8	U	U	ug/kg	SW846 8260
4-Methyl-2-pentanone	108-10-1	8	8	U	U	ug/kg	SW846 8260
Acetone	67-64-1	18	8	B	U	ug/kg	SW846 8260
Benzene	71-43-2	8	8	U	U	ug/kg	SW846 8260
Bromobenzene	108-86-1	8	8	U	U	ug/kg	SW846 8260
Bromochloromethane	74-97-5	8	8	U	U	ug/kg	SW846 8260
Bromodichloromethane	75-27-4	8	8	U	U	ug/kg	SW846 8260
Bromoform	75-25-2	8	8	U	U	ug/kg	SW846 8260
Bromomethane	74-83-9	8	8	U	U	ug/kg	SW846 8260
Carbon Tetrachloride	56-23-5	8	8	U	U	ug/kg	SW846 8260
Chlorobenzene	108-90-7	8	8	U	U	ug/kg	SW846 8260
Chloroethane	75-00-3	8	8	U	U	ug/kg	SW846 8260
Chloroform	67-66-3	8	8	U	U	ug/kg	SW846 8260
Chloromethane	74-87-3	8	8	U	U	ug/kg	SW846 8260
Dibromochloromethane	124-48-1	8	8	U	U	ug/kg	SW846 8260
Dibromomethane	74-95-3	8	8	U	U	ug/kg	SW846 8260
Dichlorodifluoromethane	75-71-8	8	8	U	U	ug/kg	SW846 8260
Ethylbenzene	100-41-4	8	8	U	U	ug/kg	SW846 8260
Hexachlorobutadiene	87-68-3	8	8	U	U	ug/kg	SW846 8260
Isopropyl Benzene	98-82-8	8	8	U	U	ug/kg	SW846 8260
m,p-Xylene	13-302-07	8	8	U	U	ug/kg	SW846 8260
Methylene Chloride	75-09-2	5	8	J	U	ug/kg	SW846 8260
n-Butylbenzene	104-51-8	8	8	U	U	ug/kg	SW846 8260

Location: SW101
 Sample ID: 52SD101 Depth: NA
 COE Sample ID: FH052-SD101/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
n-propylbenzene	103-65-1	8	8	U	U	ug/kg	SW846 8260
Naphthalene	91-20-3	8	8	U	U	ug/kg	SW846 8260
o-Xylene	95-47-6	8	8	U	U	ug/kg	SW846 8260
p-Isopropyltoluene	99-87-6	8	8	U	U	ug/kg	SW846 8260
sec-Butylbenzene	135-98-8	8	8	U	U	ug/kg	SW846 8260
Styrene	100-42-5	8	8	U	U	ug/kg	SW846 8260
tert-Butylbenzene	98-06-6	8	8	U	U	ug/kg	SW846 8260
Tetrachloroethene	127-18-4	8	8	U	U	ug/kg	SW846 8260
Toluene	108-88-3	8	8	U	U	ug/kg	SW846 8260
Trichloroethene	79-01-6	8	8	U	U	ug/kg	SW846 8260
Trichlorofluoromethane	75-69-4	8	8	U	U	ug/kg	SW846 8260
Vinyl Chloride	75-01-4	8	8	U	U	ug/kg	SW846 8260

Location: SW101
 Sample ID: 52SW101 Depth: NA
 COE Sample ID: FH052-SW101/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
<u>INORGANICS</u>							
Arsenic	7440-38-2	2.5	2.5	U	U	ug/l	SW846 6010
Barium	7440-39-3	73.7	0.30			ug/l	SW846 6010
Cadmium	7440-43-9	0.5	0.50	U	U	ug/l	SW846 6010
Chromium	7440-47-3	0.8	0.80	U	U	ug/l	SW846 6010
Lead	7439-92-1	1.7	1.7	U	U	ug/l	SW846 6010
Mercury	7439-97-6	0.1	0.10	U	U	ug/l	SW846 7470
Selenium	7782-49-2	2.8	2.8	U	U	ug/l	SW846 6010
Silver	7440-22-4	1.2	1.2	U	U	ug/l	SW846 6010

SEMIVOLATILE ORGANICS

1,2,4,5-Tetrachlorobenzene	95-94-3	10	10	U		ug/l	SW846 8270
1,2,4-Trichlorobenzene	120-82-1	10	10	U		ug/l	SW846 8270
1,2-Dichlorobenzene	95-50-1	10	10	U		ug/l	SW846 8270
1,3-Dichlorobenzene	541-73-1	10	10	U		ug/l	SW846 8270
1,4-Dichlorobenzene	106-46-7	10	10	U		ug/l	SW846 8270
2,2'-oxybis(1-chloropropane)	108-60-1	10	10	U		ug/l	SW846 8270
2,4,5-Trichlorophenol	95-95-4	50	50	U		ug/l	SW846 8270
2,4,6-Trichlorophenol	88-06-2	10	10	U		ug/l	SW846 8270
2,4-Dichlorophenol	120-83-2	10	10	U		ug/l	SW846 8270
2,4-Dimethylphenol	105-67-9	10	10	U		ug/l	SW846 8270
2,4-Dinitrophenol	51-28-5	50	50	U		ug/l	SW846 8270
2,4-Dinitrotoluene	121-14-2	10	10	U		ug/l	SW846 8270
2,6-Dinitrotoluene	606-20-2	10	10	U		ug/l	SW846 8270
2-Chloronaphthalene	91-58-7	10	10	U		ug/l	SW846 8270
2-Chlorophenol	95-57-8	10	10	U		ug/l	SW846 8270
2-Methylnaphthalene	91-57-6	10	10	U		ug/l	SW846 8270
2-Methylphenol	95-48-7	10	10	U		ug/l	SW846 8270
2-Nitroaniline	88-74-4	50	50	U		ug/l	SW846 8270
2-Nitrophenol	88-75-5	10	10	U		ug/l	SW846 8270
3,3'-Dichlorobenzidine	91-94-1	20	20	U		ug/l	SW846 8270
3-Nitroaniline	99-09-2	50	50	U		ug/l	SW846 8270
4,6-Dinitro-o-Cresol	534-52-1	50	50	U		ug/l	SW846 8270
4-Bromophenyl-phenyl Ether	101-55-3	10	10	U		ug/l	SW846 8270
4-chloro-3-methylphenol	59-50-7	10	10	U		ug/l	SW846 8270
4-Chloroaniline	106-47-8	10	10	U		ug/l	SW846 8270
4-Chlorophenyl-phenylether	7005-72-3	10	10	U		ug/l	SW846 8270
4-Methylphenol	106-44-5	10	10	U		ug/l	SW846 8270
4-Nitroaniline	100-01-6	50	50	U		ug/l	SW846 8270
4-Nitrophenol	100-02-7	50	50	U		ug/l	SW846 8270
Acenaphthene	83-32-9	10	10	U		ug/l	SW846 8270

Location: SW101
Sample ID: 52SW101 Depth: NA
COE Sample ID: FH052-SW101/11-14-96
Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
Acenaphthylene	208-96-8	10	10	U		ug/l	SW846 8270
Anthracene	120-12-7	10	10	U		ug/l	SW846 8270
Benzo(a)anthracene	56-55-3	10	10	U		ug/l	SW846 8270
Benzo(a)pyrene	50-32-8	10	10	U		ug/l	SW846 8270
Benzo(b)fluoranthene	205-99-2	10	10	U		ug/l	SW846 8270
Benzo(g,h,i)perylene	191-24-2	10	10	U		ug/l	SW846 8270
Benzo(k)fluoranthene	207-08-9	10	10	U		ug/l	SW846 8270
Benzoic Acid	65-85-0	50	50	U		ug/l	SW846 8270
Benzyl Alcohol	100-51-6	10	10	U		ug/l	SW846 8270
Bis(2-chloroethoxy)methane	111-91-1	10	10	U		ug/l	SW846 8270
Bis(2-chloroethyl)ether	111-44-4	10	10	U		ug/l	SW846 8270
Bis(2-ethylhexyl)phthalate	117-81-7	10	10	U		ug/l	SW846 8270
Butyl Benzyl Phthalate	85-68-7	10	10	U		ug/l	SW846 8270
Chrysene	218-01-9	10	10	U		ug/l	SW846 8270
Di-n-butyl Phthalate	84-74-2	10	10	U		ug/l	SW846 8270
Di-n-octyl Phthalate	117-84-0	10	10	U		ug/l	SW846 8270
Dibenz(a,h)anthracene	53-70-3	10	10	U		ug/l	SW846 8270
Dibenzofuran	132-64-9	10	10	U		ug/l	SW846 8270
Diethyl Phthalate	84-66-2	10	10	U		ug/l	SW846 8270
Dimethyl Phthalate	131-11-3	10	10	U		ug/l	SW846 8270
Fluoranthene	206-44-0	10	10	U		ug/l	SW846 8270
Fluorene	86-73-7	10	10	U		ug/l	SW846 8270
Hexachlorobenzene	118-74-1	10	10	U		ug/l	SW846 8270
Hexachlorobutadiene	87-68-3	10	10	U		ug/l	SW846 8270
Hexachlorocyclopentadiene	77-47-4	10	10	U		ug/l	SW846 8270
Hexachloroethane	67-72-1	10	10	U		ug/l	SW846 8270
Indeno(1,2,3-cd)pyrene	193-39-5	10	10	U		ug/l	SW846 8270
Isophorone	78-59-1	10	10	U		ug/l	SW846 8270
N-Nitroso-di-n-propylamine	621-64-7	10	10	U		ug/l	SW846 8270
N-Nitrosodiphenylamine	86-30-6	10	10	U		ug/l	SW846 8270
Naphthalene	91-20-3	10	10	U		ug/l	SW846 8270
Nitrobenzene	98-95-3	10	10	U		ug/l	SW846 8270
Pentachlorophenol	87-86-5	50	50	U		ug/l	SW846 8270
Phenanthrene	85-01-8	10	10	U		ug/l	SW846 8270
Phenol	108-95-2	10	10	U		ug/l	SW846 8270
Pyrene	129-00-0	10	10	U		ug/l	SW846 8270
Pyridine	110-86-1	50	50	U		ug/l	SW846 8270
VOLATILE ORGANICS							
1,1,1,2-Tetrachloroethane	630-20-6	5	5	U		ug/l	SW846 8240
1,1,1-Trichloroethane	71-55-6	5	5	U		ug/l	SW846 8240
1,1,2,2-Tetrachloroethane	79-34-5	5	5	U		ug/l	SW846 8240
1,1,2-Trichloroethane	79-00-5	5	5	U		ug/l	SW846 8240
1,1-Dichloroethane	75-34-3	5	5	U		ug/l	SW846 8240
1,1-Dichloroethene	75-35-4	5	5	U		ug/l	SW846 8240
1,1-Dichloropropene	563-58-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichlorobenzene	87-61-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichloropropane	96-18-4	5	5	U		ug/l	SW846 8240
1,2,4-Trichlorobenzene	120-82-1	5	5	U		ug/l	SW846 8240
1,2,4-trimethylbenzene	95-63-6	5	5	U		ug/l	SW846 8240
1,2-cis-Dichloroethene	156-59-2	5	5	U		ug/l	SW846 8240
1,2-dibromo-3-chloropropane	96-12-8	5	5	U		ug/l	SW846 8240
1,2-Dibromoethane	106-93-4	5	5	U		ug/l	SW846 8240
1,2-Dichlorobenzene	95-50-1	5	5	U		ug/l	SW846 8240
1,2-Dichloroethane	107-06-2	5	5	U		ug/l	SW846 8240
1,2-Dichloropropane	78-87-5	5	5	U		ug/l	SW846 8240
1,2-trans-Dichloroethene	156-60-5	5	5	U		ug/l	SW846 8240
1,3,5-trimethylbenzene	108-67-8	5	5	U		ug/l	SW846 8240
1,3-Dichlorobenzene	541-73-1	5	5	U		ug/l	SW846 8240
1,3-Dichloropropane	142-28-9	5	5	U		ug/l	SW846 8240
1,4-Dichlorobenzene	106-46-7	5	5	U		ug/l	SW846 8240
2,2-Dichloropropane	594-20-7	5	5	U		ug/l	SW846 8240
2-Butanone	78-93-3	5	5	U		ug/l	SW846 8240
2-Chlorotoluene	95-49-8	5	5	U		ug/l	SW846 8240
2-Hexanone	591-78-6	5	5	U		ug/l	SW846 8240

Location: SW101
 Sample ID: 52SW101 Depth: NA
 COE Sample ID: FH052-SW101/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
4-Chlorotoluene	106-43-4	5	5	U		ug/l	SW846 8240
4-Methyl-2-pentanone	108-10-1	5	5	U		ug/l	SW846 8240
Acetone	67-64-1	5	5	U		ug/l	SW846 8240
Benzene	71-43-2	5	5	U		ug/l	SW846 8240
Bromobenzene	108-86-1	5	5	U		ug/l	SW846 8240
Bromochloromethane	74-97-5	5	5	U		ug/l	SW846 8240
Bromodichloromethane	75-27-4	5	5	U		ug/l	SW846 8240
Bromoform	75-25-2	5	5	U		ug/l	SW846 8240
Bromomethane	74-83-9	5	5	U		ug/l	SW846 8240
Carbon Tetrachloride	56-23-5	5	5	U		ug/l	SW846 8240
Chlorobenzene	108-90-7	5	5	U		ug/l	SW846 8240
Chloroethane	75-00-3	5	5	U		ug/l	SW846 8240
Chloroform	67-66-3	5	5	U		ug/l	SW846 8240
Chloromethane	74-87-3	5	5	U		ug/l	SW846 8240
Dibromochloromethane	124-48-1	5	5	U		ug/l	SW846 8240
Dibromomethane	74-95-3	5	5	U		ug/l	SW846 8240
Dichlorodifluoromethane	75-71-8	5	5	U		ug/l	SW846 8240
Ethylbenzene	100-41-4	5	5	U		ug/l	SW846 8240
Hexachlorobutadiene	87-68-3	5	5	U		ug/l	SW846 8240
Isopropyl Benzene	98-82-8	5	5	U		ug/l	SW846 8240
m,p-Xylene	13-302-07	5	5	U		ug/l	SW846 8240
Methylene Chloride	75-09-2	5	5	U		ug/l	SW846 8240
n-Butylbenzene	104-51-8	5	5	U		ug/l	SW846 8240
n-propylbenzene	103-65-1	5	5	U		ug/l	SW846 8240
Naphthalene	91-20-3	5	5	U		ug/l	SW846 8240
o-Xylene	95-47-6	5	5	U		ug/l	SW846 8240
p-Isopropyltoluene	99-87-6	5	5	U		ug/l	SW846 8240
sec-Butylbenzene	135-98-8	5	5	U		ug/l	SW846 8240
Styrene	100-42-5	5	5	U		ug/l	SW846 8240
tert-Butylbenzene	98-06-6	5	5	U		ug/l	SW846 8240
Tetrachloroethene	127-18-4	5	5	U		ug/l	SW846 8240
Toluene	108-88-3	5	5	U		ug/l	SW846 8240
Trichloroethene	79-01-6	5	5	U		ug/l	SW846 8240
Trichlorofluoromethane	75-69-4	5	5	U		ug/l	SW846 8240
Vinyl Chloride	75-01-4	5	5	U		ug/l	SW846 8240

Location: SW101
 Sample ID: 52SD108 Depth: NA
 COE Sample ID: FH052-SD108/03-18-98
 Date Collected: 3/18/98

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
<u>INORGANICS</u>							
Arsenic	7440-38-2	2.7	0.45	SN	J	mg/kg	SW846 6010

Location: SW102
 Sample ID: 52SD102 Depth: NA
 COE Sample ID: FH052-SD102/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
<u>INORGANICS</u>							
Arsenic	7440-38-2	15.3	0.50	N	J	mg/kg	SW846 6010
Barium	7440-39-3	71.1	0.12			mg/kg	SW846 6010
Cadmium	7440-43-9	0.26	0.06	B		mg/kg	SW846 6010

Location: SW102
 Sample ID: 52SD102 Depth: NA
 COE Sample ID: FH052-SD102/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
Chromium	7440-47-3	17.1	0.12	E	J	mg/kg	SW846 6010
Lead	7439-92-1	8.5	0.21			mg/kg	SW846 6010
Mercury	7439-97-6	0.05	0.05	U	U	mg/kg	SW846 7470
Selenium	7782-49-2	0.46	0.46	U	U	mg/kg	SW846 6010
Silver	7440-22-4	0.29	0.29	U	U	mg/kg	SW846 6010
SEMIVOLATILE ORGANICS							
1,2,4,5-Tetrachlorobenzene	95-94-3	500	500	U		ug/kg	SW846 8270
1,2,4-Trichlorobenzene	120-82-1	500	500	U		ug/kg	SW846 8270
1,2-Dichlorobenzene	95-50-1	500	500	U		ug/kg	SW846 8270
1,3-Dichlorobenzene	541-73-1	500	500	U		ug/kg	SW846 8270
1,4-Dichlorobenzene	106-46-7	500	500	U		ug/kg	SW846 8270
2,2'-oxybis(1-chloropropane)	108-60-1	500	500	U		ug/kg	SW846 8270
2,4,5-Trichlorophenol	95-95-4	2400	2400	U		ug/kg	SW846 8270
2,4,6-Trichlorophenol	88-06-2	500	500	U		ug/kg	SW846 8270
2,4-Dichlorophenol	120-83-2	500	500	U		ug/kg	SW846 8270
2,4-Dimethylphenol	105-67-9	500	500	U		ug/kg	SW846 8270
2,4-Dinitrophenol	51-28-5	2400	2400	U		ug/kg	SW846 8270
2,4-Dinitrotoluene	121-14-2	500	500	U		ug/kg	SW846 8270
2,6-Dinitrotoluene	606-20-2	500	500	U		ug/kg	SW846 8270
2-Chloronaphthalene	91-58-7	500	500	U		ug/kg	SW846 8270
2-Chlorophenol	95-57-8	500	500	U		ug/kg	SW846 8270
2-Methylnaphthalene	91-57-6	500	500	U		ug/kg	SW846 8270
2-Methylphenol	95-48-7	500	500	U		ug/kg	SW846 8270
2-Nitroaniline	88-74-4	2400	2400	U		ug/kg	SW846 8270
2-Nitrophenol	88-75-5	500	500	U		ug/kg	SW846 8270
3,3'-Dichlorobenzidine	91-94-1	1000	1000	U		ug/kg	SW846 8270
3-Nitroaniline	99-09-2	2400	2400	U		ug/kg	SW846 8270
4,6-Dinitro-o-Cresol	534-52-1	2400	2400	U		ug/kg	SW846 8270
4-Bromophenyl-phenyl Ether	101-55-3	500	500	U		ug/kg	SW846 8270
4-chloro-3-methylphenol	59-50-7	500	500	U		ug/kg	SW846 8270
4-Chloroaniline	106-47-8	500	500	U		ug/kg	SW846 8270
4-Chlorophenyl-phenylether	7005-72-3	500	500	U		ug/kg	SW846 8270
4-Methylphenol	106-44-5	500	500	U		ug/kg	SW846 8270
4-Nitroaniline	100-01-6	2400	2400	U		ug/kg	SW846 8270
4-Nitrophenol	100-02-7	2400	2400	U		ug/kg	SW846 8270
Acenaphthene	83-32-9	500	500	U		ug/kg	SW846 8270
Acenaphthylene	208-96-8	500	500	U		ug/kg	SW846 8270
Anthracene	120-12-7	500	500	U		ug/kg	SW846 8270
Benzo(a)anthracene	56-55-3	500	500	U		ug/kg	SW846 8270
Benzo(a)pyrene	50-32-8	500	500	U		ug/kg	SW846 8270
Benzo(b)fluoranthene	205-99-2	500	500	U		ug/kg	SW846 8270
Benzo(g,h,i)perylene	191-24-2	500	500	U		ug/kg	SW846 8270
Benzo(k)fluoranthene	207-08-9	500	500	U		ug/kg	SW846 8270
Benzoic Acid	65-85-0	2400	2400	U		ug/kg	SW846 8270
Benzyl Alcohol	100-51-6	500	500	U		ug/kg	SW846 8270
Bis(2-chloroethoxy)methane	111-91-1	500	500	U		ug/kg	SW846 8270
Bis(2-chloroethyl)ether	111-44-4	500	500	U		ug/kg	SW846 8270
Bis(2-ethylhexyl)phthalate	117-81-7	500	500	U		ug/kg	SW846 8270
Butyl Benzyl Phthalate	85-68-7	500	500	U		ug/kg	SW846 8270
Chrysene	218-01-9	500	500	U		ug/kg	SW846 8270
Di-n-butyl Phthalate	84-74-2	500	500	U		ug/kg	SW846 8270
Di-n-octyl Phthalate	117-84-0	500	500	U		ug/kg	SW846 8270
Dibenz(a,h)anthracene	53-70-3	500	500	U		ug/kg	SW846 8270
Dibenzofuran	132-64-9	500	500	U		ug/kg	SW846 8270
Diethyl Phthalate	84-66-2	500	500	U		ug/kg	SW846 8270
Dimethyl Phthalate	131-11-3	500	500	U		ug/kg	SW846 8270
Fluoranthene	206-44-0	500	500	U		ug/kg	SW846 8270
Fluorene	86-73-7	500	500	U		ug/kg	SW846 8270
Hexachlorobenzene	118-74-1	500	500	U		ug/kg	SW846 8270
Hexachlorobutadiene	87-68-3	500	500	U		ug/kg	SW846 8270
Hexachlorocyclopentadiene	77-47-4	500	500	U		ug/kg	SW846 8270
Hexachloroethane	67-72-1	500	500	U		ug/kg	SW846 8270
Indeno(1,2,3-cd)pyrene	193-39-5	500	500	U		ug/kg	SW846 8270
Isophorone	78-59-1	500	500	U		ug/kg	SW846 8270

Location: SW102
Sample ID: 52SD102 Depth: NA
COE Sample ID: FH052-SD102/11-14-96
Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
N-Nitroso-di-n-propylamine	621-64-7	500	500	U		ug/kg	SW846 8270
N-Nitrosodiphenylamine	86-30-6	500	500	U		ug/kg	SW846 8270
Naphthalene	91-20-3	500	500	U		ug/kg	SW846 8270
Nitrobenzene	98-95-3	500	500	U		ug/kg	SW846 8270
Pentachlorophenol	87-86-5	2400	2400	U		ug/kg	SW846 8270
Phenanthrene	85-01-8	500	500	U		ug/kg	SW846 8270
Phenol	108-95-2	500	500	U		ug/kg	SW846 8270
Pyrene	129-00-0	500	500	U		ug/kg	SW846 8270
Pyridine	110-86-1	500	500	U		ug/kg	SW846 8270
<u>VOLATILE ORGANICS</u>							
1,1,1,2-Tetrachloroethane	630-20-6	8	8	U	U	ug/kg	SW846 8260
1,1,1-Trichloroethane	71-55-6	8	8	U	U	ug/kg	SW846 8260
1,1,2,2-Tetrachloroethane	79-34-5	8	8	U	U	ug/kg	SW846 8260
1,1,2-Trichloroethane	79-00-5	8	8	U	U	ug/kg	SW846 8260
1,1-Dichloroethane	75-34-3	8	8	U	U	ug/kg	SW846 8260
1,1-Dichloroethene	75-35-4	8	8	U	U	ug/kg	SW846 8260
1,1-Dichloropropene	563-58-6	8	8	U	U	ug/kg	SW846 8260
1,2,3-Trichlorobenzene	87-61-6	8	8	U	U	ug/kg	SW846 8260
1,2,3-Trichloropropane	96-18-4	8	8	U	U	ug/kg	SW846 8260
1,2,4-Trichlorobenzene	120-82-1	8	8	U	U	ug/kg	SW846 8260
1,2,4-trimethylbenzene	95-63-6	8	8	U	U	ug/kg	SW846 8260
1,2-cis-Dichloroethene	156-59-2	8	8	U	U	ug/kg	SW846 8260
1,2-dibromo-3-chloropropane	96-12-8	8	8	U	U	ug/kg	SW846 8260
1,2-Dibromoethane	106-93-4	8	8	U	U	ug/kg	SW846 8260
1,2-Dichlorobenzene	95-50-1	8	8	U	U	ug/kg	SW846 8260
1,2-Dichloroethane	107-06-2	8	8	U	U	ug/kg	SW846 8260
1,2-Dichloropropane	78-87-5	8	8	U	U	ug/kg	SW846 8260
1,2-trans-Dichloroethene	156-60-5	8	8	U	U	ug/kg	SW846 8260
1,3,5-trimethylbenzene	108-67-8	8	8	U	U	ug/kg	SW846 8260
1,3-Dichlorobenzene	541-73-1	8	8	U	U	ug/kg	SW846 8260
1,3-Dichloropropane	142-28-9	8	8	U	U	ug/kg	SW846 8260
1,4-Dichlorobenzene	106-46-7	8	8	U	U	ug/kg	SW846 8260
2,2-Dichloropropane	594-20-7	8	8	U	U	ug/kg	SW846 8260
2-Butanone	78-93-3	8	8	U	U	ug/kg	SW846 8260
2-Chlorotoluene	95-49-8	8	8	U	U	ug/kg	SW846 8260
2-Hexanone	591-78-6	8	8	U	U	ug/kg	SW846 8260
4-Chlorotoluene	106-43-4	8	8	U	U	ug/kg	SW846 8260
4-Methyl-2-pentanone	108-10-1	8	8	U	U	ug/kg	SW846 8260
Acetone	67-64-1	16	8	B	U	ug/kg	SW846 8260
Benzene	71-43-2	8	8	U	U	ug/kg	SW846 8260
Bromobenzene	108-86-1	8	8	U	U	ug/kg	SW846 8260
Bromochloromethane	74-97-5	8	8	U	U	ug/kg	SW846 8260
Bromodichloromethane	75-27-4	8	8	U	U	ug/kg	SW846 8260
Bromoform	75-25-2	8	8	U	U	ug/kg	SW846 8260
Bromomethane	74-83-9	8	8	U	U	ug/kg	SW846 8260
Carbon Tetrachloride	56-23-5	8	8	U	U	ug/kg	SW846 8260
Chlorobenzene	108-90-7	8	8	U	U	ug/kg	SW846 8260
Chloroethane	75-00-3	8	8	U	U	ug/kg	SW846 8260
Chloroform	67-66-3	8	8	U	U	ug/kg	SW846 8260
Chloromethane	74-87-3	8	8	U	U	ug/kg	SW846 8260
Dibromochloromethane	124-48-1	8	8	U	U	ug/kg	SW846 8260
Dibromomethane	74-95-3	8	8	U	U	ug/kg	SW846 8260
Dichlorodifluoromethane	75-71-8	8	8	U	U	ug/kg	SW846 8260
Ethylbenzene	100-41-4	8	8	U	U	ug/kg	SW846 8260
Hexachlorobutadiene	87-68-3	8	8	U	U	ug/kg	SW846 8260
Isopropyl Benzene	98-82-8	8	8	U	U	ug/kg	SW846 8260
m,p-Xylene	13-302-07	8	8	U	U	ug/kg	SW846 8260
Methylene Chloride	75-09-2	7	8	J	U	ug/kg	SW846 8260
n-Butylbenzene	104-51-8	8	8	U	U	ug/kg	SW846 8260
n-propylbenzene	103-65-1	8	8	U	U	ug/kg	SW846 8260
Naphthalene	91-20-3	8	8	U	U	ug/kg	SW846 8260
o-Xylene	95-47-6	8	8	U	U	ug/kg	SW846 8260
p-Isopropyltoluene	99-87-6	8	8	U	U	ug/kg	SW846 8260
sec-Butylbenzene	135-98-8	8	8	U	U	ug/kg	SW846 8260

Location: SW102
 Sample ID: 52SD102 Depth: NA
 COE Sample ID: FH052-SD102/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
Styrene	100-42-5	8	8	U	U	ug/kg	SW846 8260
tert-Butylbenzene	98-06-6	8	8	U	U	ug/kg	SW846 8260
Tetrachloroethene	127-18-4	8	8	U	U	ug/kg	SW846 8260
Toluene	108-88-3	8	8	U	U	ug/kg	SW846 8260
Trichloroethene	79-01-6	8	8	U	U	ug/kg	SW846 8260
Trichlorofluoromethane	75-69-4	8	8	U	U	ug/kg	SW846 8260
Vinyl Chloride	75-01-4	8	8	U	U	ug/kg	SW846 8260

Location: SW102
 Sample ID: 52SW102 Depth: NA
 COE Sample ID: FH052-SW102/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
INORGANICS							
Arsenic	7440-38-2	2.5	2.5	U	U	ug/l	SW846 6010
Barium	7440-39-3	70.3	0.30			ug/l	SW846 6010
Cadmium	7440-43-9	0.5	0.50	U	U	ug/l	SW846 6010
Chromium	7440-47-3	0.8	0.80	U	U	ug/l	SW846 6010
Lead	7439-92-1	1.7	1.7	U	U	ug/l	SW846 6010
Mercury	7439-97-6	0.1	0.10	U	UJ	ug/l	SW846 7470
Selenium	7782-49-2	2.8	2.8	U	U	ug/l	SW846 6010
Silver	7440-22-4	1.2	1.2	U	U	ug/l	SW846 6010
SEMIVOLATILE ORGANICS							
1,2,4,5-Tetrachlorobenzene	95-94-3	10	10	U		ug/l	SW846 8270
1,2,4-Trichlorobenzene	120-82-1	10	10	U		ug/l	SW846 8270
1,2-Dichlorobenzene	95-50-1	10	10	U		ug/l	SW846 8270
1,3-Dichlorobenzene	541-73-1	10	10	U		ug/l	SW846 8270
1,4-Dichlorobenzene	106-46-7	10	10	U		ug/l	SW846 8270
2,2'-oxybis(1-chloropropane)	108-60-1	10	10	U		ug/l	SW846 8270
2,4,5-Trichlorophenol	95-95-4	50	50	U		ug/l	SW846 8270
2,4,6-Trichlorophenol	88-06-2	10	10	U		ug/l	SW846 8270
2,4-Dichlorophenol	120-83-2	10	10	U		ug/l	SW846 8270
2,4-Dimethylphenol	105-67-9	10	10	U		ug/l	SW846 8270
2,4-Dinitrophenol	51-28-5	50	50	U		ug/l	SW846 8270
2,4-Dinitrotoluene	121-14-2	10	10	U		ug/l	SW846 8270
2,6-Dinitrotoluene	606-20-2	10	10	U		ug/l	SW846 8270
2-Chloronaphthalene	91-58-7	10	10	U		ug/l	SW846 8270
2-Chlorophenol	95-57-8	10	10	U		ug/l	SW846 8270
2-Methylnaphthalene	91-57-6	10	10	U		ug/l	SW846 8270
2-Methylphenol	95-48-7	10	10	U		ug/l	SW846 8270
2-Nitroaniline	88-74-4	50	50	U		ug/l	SW846 8270
2-Nitrophenol	88-75-5	10	10	U		ug/l	SW846 8270
3,3'-Dichlorobenzidine	91-94-1	20	20	U		ug/l	SW846 8270
3-Nitroaniline	99-09-2	50	50	U		ug/l	SW846 8270
4,6-Dinitro-o-Cresol	534-52-1	50	50	U		ug/l	SW846 8270
4-Bromophenyl-phenyl Ether	101-55-3	10	10	U		ug/l	SW846 8270
4-chloro-3-methylphenol	59-50-7	10	10	U		ug/l	SW846 8270
4-Chloroaniline	106-47-8	10	10	U		ug/l	SW846 8270
4-Chlorophenyl-phenylether	7005-72-3	10	10	U		ug/l	SW846 8270
4-Methylphenol	106-44-5	10	10	U		ug/l	SW846 8270
4-Nitroaniline	100-01-6	50	50	U		ug/l	SW846 8270
4-Nitrophenol	100-02-7	50	50	U		ug/l	SW846 8270
Acenaphthene	83-32-9	10	10	U		ug/l	SW846 8270
Acenaphthylene	208-96-8	10	10	U		ug/l	SW846 8270
Anthracene	120-12-7	10	10	U		ug/l	SW846 8270
Benzo(a)anthracene	56-55-3	10	10	U		ug/l	SW846 8270
Benzo(a)pyrene	50-32-8	10	10	U		ug/l	SW846 8270
Benzo(b)fluoranthene	205-99-2	10	10	U		ug/l	SW846 8270

Location: SW102
Sample ID: 52SW102 Depth: NA
COE Sample ID: FH052-SW102/11-14-96
Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
Benzo(g,h,i)perylene	191-24-2	10	10	U		ug/l	SW846 8270
Benzo(k)fluoranthene	207-08-9	10	10	U		ug/l	SW846 8270
Benzoic Acid	65-85-0	50	50	U		ug/l	SW846 8270
Benzyl Alcohol	100-51-6	10	10	U		ug/l	SW846 8270
Bis(2-chloroethoxy)methane	111-91-1	10	10	U		ug/l	SW846 8270
Bis(2-chloroethyl)ether	111-44-4	10	10	U		ug/l	SW846 8270
Bis(2-ethylhexyl)phthalate	117-81-7	10	10	U		ug/l	SW846 8270
Butyl Benzyl Phthalate	85-68-7	10	10	U		ug/l	SW846 8270
Chrysene	218-01-9	10	10	U		ug/l	SW846 8270
Di-n-butyl Phthalate	84-74-2	10	10	U		ug/l	SW846 8270
Di-n-octyl Phthalate	117-84-0	10	10	U		ug/l	SW846 8270
Dibenz(a,h)anthracene	53-70-3	10	10	U		ug/l	SW846 8270
Dibenzofuran	132-64-9	10	10	U		ug/l	SW846 8270
Diethyl Phthalate	84-66-2	10	10	U		ug/l	SW846 8270
Dimethyl Phthalate	131-11-3	10	10	U		ug/l	SW846 8270
Fluoranthene	206-44-0	10	10	U		ug/l	SW846 8270
Fluorene	86-73-7	10	10	U		ug/l	SW846 8270
Hexachlorobenzene	118-74-1	10	10	U		ug/l	SW846 8270
Hexachlorobutadiene	87-68-3	10	10	U		ug/l	SW846 8270
Hexachlorocyclopentadiene	77-47-4	10	10	U		ug/l	SW846 8270
Hexachloroethane	67-72-1	10	10	U		ug/l	SW846 8270
Indeno(1,2,3-cd)pyrene	193-39-5	10	10	U		ug/l	SW846 8270
Isophorone	78-59-1	10	10	U		ug/l	SW846 8270
N-Nitroso-di-n-propylamine	621-64-7	10	10	U		ug/l	SW846 8270
N-Nitrosodiphenylamine	86-30-6	10	10	U		ug/l	SW846 8270
Naphthalene	91-20-3	10	10	U		ug/l	SW846 8270
Nitrobenzene	98-95-3	10	10	U		ug/l	SW846 8270
Pentachlorophenol	87-86-5	50	50	U		ug/l	SW846 8270
Phenanthrene	85-01-8	10	10	U		ug/l	SW846 8270
Phenol	108-95-2	10	10	U		ug/l	SW846 8270
Pyrene	129-00-0	10	10	U		ug/l	SW846 8270
Pyridine	110-86-1	50	50	U		ug/l	SW846 8270
<u>VOLATILE ORGANICS</u>							
1,1,1,2-Tetrachloroethane	630-20-6	5	5	U		ug/l	SW846 8240
1,1,1-Trichloroethane	71-55-6	5	5	U		ug/l	SW846 8240
1,1,2,2-Tetrachloroethane	79-34-5	5	5	U		ug/l	SW846 8240
1,1,2-Trichloroethane	79-00-5	5	5	U		ug/l	SW846 8240
1,1-Dichloroethane	75-34-3	5	5	U		ug/l	SW846 8240
1,1-Dichloroethene	75-35-4	5	5	U		ug/l	SW846 8240
1,1-Dichloropropene	563-58-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichlorobenzene	87-61-6	5	5	U		ug/l	SW846 8240
1,2,3-Trichloropropane	96-18-4	5	5	U		ug/l	SW846 8240
1,2,4-Trichlorobenzene	120-82-1	5	5	U		ug/l	SW846 8240
1,2,4-trimethylbenzene	95-63-6	5	5	U		ug/l	SW846 8240
1,2-cis-Dichloroethene	156-59-2	5	5	U		ug/l	SW846 8240
1,2-dibromo-3-chloropropane	96-12-8	5	5	U		ug/l	SW846 8240
1,2-Dibromoethane	106-93-4	5	5	U		ug/l	SW846 8240
1,2-Dichlorobenzene	95-50-1	5	5	U		ug/l	SW846 8240
1,2-Dichloroethane	107-06-2	5	5	U		ug/l	SW846 8240
1,2-Dichloropropane	78-87-5	5	5	U		ug/l	SW846 8240
1,2-trans-Dichloroethene	156-60-5	5	5	U		ug/l	SW846 8240
1,3,5-trimethylbenzene	108-67-8	5	5	U		ug/l	SW846 8240
1,3-Dichlorobenzene	541-73-1	5	5	U		ug/l	SW846 8240
1,3-Dichloropropane	142-28-9	5	5	U		ug/l	SW846 8240
1,4-Dichlorobenzene	106-46-7	5	5	U		ug/l	SW846 8240
2,2-Dichloropropane	594-20-7	5	5	U		ug/l	SW846 8240
2-Butanone	78-93-3	5	5	U		ug/l	SW846 8240
2-Chlorotoluene	95-49-8	5	5	U		ug/l	SW846 8240
2-Hexanone	591-78-6	5	5	U		ug/l	SW846 8240
4-Chlorotoluene	106-43-4	5	5	U		ug/l	SW846 8240
4-Methyl-2-pentanone	108-10-1	5	5	U		ug/l	SW846 8240
Acetone	67-64-1	5	5	U		ug/l	SW846 8240
Benzene	71-43-2	5	5	U		ug/l	SW846 8240
Bromobenzene	108-86-1	5	5	U		ug/l	SW846 8240

Location: SW102
 Sample ID: 52SW102 Depth: NA
 COE Sample ID: FH052-SW102/11-14-96
 Date Collected: 11/14/96

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
Bromochloromethane	74-97-5	5	5	U		ug/l	SW846 8240
Bromodichloromethane	75-27-4	5	5	U		ug/l	SW846 8240
Bromoform	75-25-2	5	5	U		ug/l	SW846 8240
Bromomethane	74-83-9	5	5	U		ug/l	SW846 8240
Carbon Tetrachloride	56-23-5	5	5	U		ug/l	SW846 8240
Chlorobenzene	108-90-7	5	5	U		ug/l	SW846 8240
Chloroethane	75-00-3	5	5	U		ug/l	SW846 8240
Chloroform	67-66-3	5	5	U		ug/l	SW846 8240
Chloromethane	74-87-3	5	5	U		ug/l	SW846 8240
Dibromochloromethane	124-48-1	5	5	U		ug/l	SW846 8240
Dibromomethane	74-95-3	5	5	U		ug/l	SW846 8240
Dichlorodifluoromethane	75-71-8	5	5	U		ug/l	SW846 8240
Ethylbenzene	100-41-4	5	5	U		ug/l	SW846 8240
Hexachlorobutadiene	87-68-3	5	5	U		ug/l	SW846 8240
Isopropyl Benzene	98-82-8	5	5	U		ug/l	SW846 8240
m,p-Xylene	13-302-07	5	5	U		ug/l	SW846 8240
Methylene Chloride	75-09-2	5	5	U		ug/l	SW846 8240
n-Butylbenzene	104-51-8	5	5	U		ug/l	SW846 8240
n-propylbenzene	103-65-1	5	5	U		ug/l	SW846 8240
Naphthalene	91-20-3	5	5	U		ug/l	SW846 8240
o-Xylene	95-47-6	5	5	U		ug/l	SW846 8240
p-Isopropyltoluene	99-87-6	5	5	U		ug/l	SW846 8240
sec-Butylbenzene	135-98-8	5	5	U		ug/l	SW846 8240
Styrene	100-42-5	5	5	U		ug/l	SW846 8240
tert-Butylbenzene	98-06-6	5	5	U		ug/l	SW846 8240
Tetrachloroethene	127-18-4	5	5	U		ug/l	SW846 8240
Toluene	108-88-3	5	5	U		ug/l	SW846 8240
Trichloroethene	79-01-6	5	5	U		ug/l	SW846 8240
Trichlorofluoromethane	75-69-4	5	5	U		ug/l	SW846 8240
Vinyl Chloride	75-01-4	5	5	U		ug/l	SW846 8240

Location: SW102
 Sample ID: 52SD109 Depth: NA
 COE Sample ID: FH052-SD109/03-18-97
 Date Collected: 3/18/98

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
INORGANICS							
Arsenic	7440-38-2	3.6	0.48	SN	J	mg/kg	SW846 6010

Location: SW103
 Sample ID: 52SD103 Depth: NA
 COE Sample ID: FH052-SD103/09-11-97
 Date Collected: 9/11/97

Parameter	CAS Number	Result	Detection Limit	Lab Qual	Data Qual	Units	Method
INORGANICS							
Arsenic	7440-38-2	3.5	0.91			mg/kg	SW846 6010

Location: SW104
Sample ID: 52SD104 Depth: NA
COE Sample ID: FH052-SD104/09-11-97
Date Collected: 9/11/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	2	0.39			mg/kg	SW846 6010

Location: SW105
Sample ID: 52SD105 Depth: NA
COE Sample ID: FH052-SD105/09-11-97
Date Collected: 9/11/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	3.4	0.38			mg/kg	SW846 6010

Location: SW106
Sample ID: 52SD106 Depth: NA
COE Sample ID: FH052-SD106/09-11-97
Date Collected: 9/11/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	1.6	0.41			mg/kg	SW846 6010

Location: SW107
Sample ID: 52SD107 Depth: NA
COE Sample ID: FH052-SD107/09-11-97
Date Collected: 9/11/97

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.5	0.48			mg/kg	SW846 6010

Location: SW108
Sample ID: 52SD110 Depth: NA
COE Sample ID: FH052-SD110/03-18-98
Date Collected: 3/18/98

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	3.7	0.45	N	J	mg/kg	SW846 6010

Location: SW109
Sample ID: 52SD111 Depth: NA
COE Sample ID: FH052-SD111/03-18-98
Date Collected: 3/18/98

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	3	0.37	SN	J	mg/kg	SW846 6010

Location: SW110
Sample ID: 52SD112 Depth: NA
COE Sample ID: FH052-SD112/03-18-98
Date Collected: 3/18/98

<u>Parameter</u>	<u>CAS Number</u>	<u>Result</u>	<u>Detection Limit</u>	<u>Lab Qual</u>	<u>Data Qual</u>	<u>Units</u>	<u>Method</u>
<u>INORGANICS</u>							
Arsenic	7440-38-2	6.3	0.43	SN	J	mg/kg	SW846 6010

• Laboratory Qualifiers

INORGANIC LABORATORY QUALIFIER FLAGS	
U	The analyte was analyzed for but not detected.
B	The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
E	The reported value is estimated because of the presence of interference.
M	Duplicate injection precision not met.
N	Spike sample recovery not within control limits.
S	The reported value was determined by the Method of Standard Additions (MSA).
W	Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.
•	Duplicate analysis not within control limits.
-	Correlation coefficient for the MSA is less than 0.995.

ORGANIC LABORATORY QUALIFIER FLAGS	
U	<p>Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For example, 10 U for phenol in water if the sample final volume is the protocol-specified final volume. If a 1 to 10 dilution of extract is necessary, the reported limit is 100 U. For a soil sample, the value must be adjusted for percent moisture. For example, if the sample had 24% moisture and a 1 to 10 dilution factor the sample quantitation limit for phenol (330 U) would be corrected to:</p> $\frac{(330U)}{D} \times df \text{ where } D = \frac{100 - \% \text{moisture}}{100}$ <p>And df = dilution factor</p> <p>at 24% moisture $D = \frac{100-24}{100} = 0.76$</p> $\frac{(330U)}{.76} \times 10 = 4300$ <p>U rounded to the appropriate number of significant figures</p>
J	Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero. For example, if the sample quantitation limit is 10 ug/L but a concentration of 3 ug/L is calculated, report it as 3J. The sample quantitation limit must be adjusted for both dilution and percent moisture as discussed for the U flag, so that if a sample with 24% moisture and a 1 to 10 dilution factor has a calculated concentration of 300 ug/Kg and a sample quantitation limit of 430 ug/Kg, report the concentration as 300J.
N	Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
P	This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported and flagged with a "P".
C	This flag applies to pesticide results where the identification has been confirmed GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract shall be confirmed by GC/MS.
B	This flag is used when the analyte is found in the associated blank as well in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag must be used for a TIC as well as for a positively identified TCL compound.

ORGANIC LABORATORY QUALIFIER FLAGS	
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis. If one or more compounds have a response greater than full scale the sample or extract must be diluted and reanalyzed according to the specifications in Exhibit D. All such compounds with a response greater than full scale should have the concentration flagged with an "E" for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses shall be reported on separate Forms I.
D	This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is reanalyzed at a higher dilution factor, as in the "E" flag above all concentration values reported on that Form I are flagged with the "D" flag.
A	This flag indicates that a TIC is a suspected adol-condensation product
X	Over specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such descriptions attached to the Sample Data Summary Package and the Case Narrative. If more than one is required use "Y" and "Z", as needed. If more than five qualifiers are required for a sample result use the "X" flag to combine several flags, as needed. For instance the "X" flag might combine the "A", "B", and "D" flags for some sample.

** Data Qualifiers

DATA VALIDATION QUALIFIER FLAGS	
U	The analyte was analyzed for but not detected.
J	The reported value is estimated because of the presence of interference.
R	The reported value is rejected.

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

52SD101

Lab Name: SWL-TULSA Contract: SAIC
 Lab Code: SWOK Case No.: SAIC SAS No.: SDG No.: 27668
 Matrix: (soil/water) SOIL Lab Sample ID: 27668.13
 Sample wt/vol: 30.0 (g/mL) G Lab File ID: M3603.D
 Level: (low/med) LOW Date Received: 11/18/96
 % Moisture: not dec. 39 dec. Date Extracted: 11/19/96
 Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/96
 Concentrated Extract Volume: 1000(uL)
 GPC Cleanup: (Y/N) N pH: 8.9 Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2-----	3-Nitroaniline	2600	U
83-32-9-----	Acenaphthene	540	U
121-14-2-----	2,4-Dinitrotoluene	540	U
51-28-5-----	2,4-Dinitrophenol	2600	U
100-02-7-----	4-Nitrophenol	2600	U
132-64-9-----	Dibenzofuran	540	U
84-66-2-----	Diethylphthalate	540	U
7005-72-3-----	4-Chlorophenyl-phenylether	540	U
86-73-7-----	Fluorene	540	U
100-01-6-----	4-Nitroaniline	2600	U
534-52-1-----	4,6-Dinitro-2-methylphenol	2600	U
86-30-6-----	N-Nitrosodiphenylamine (1)	540	U
101-55-3-----	4-Bromophenylphenylether	540	U
118-74-1-----	Hexachlorobenzene	540	U
87-86-5-----	Pentachlorophenol	2600	U
85-01-8-----	Phenanthrene	540	U
120-12-7-----	Anthracene	540	U
84-74-2-----	Di-n-butylphthalate	540	U
206-44-0-----	Fluoranthene	540	U
129-00-0-----	Pyrene	540	U
85-68-7-----	Butylbenzylphthalate	540	U
91-94-1-----	3,3'-Dichlorobenzidine	1100	U
56-55-3-----	Benzo(a)anthracene	540	U
218-01-9-----	Chrysene	540	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	540	U
117-84-0-----	Di-n-octylphthalate	540	U
205-99-2-----	Benzo(b)fluoranthene	540	U
207-08-9-----	Benzo(k)fluoranthene	540	U
50-32-8-----	Benzo(a)pyrene	540	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	540	U
53-70-3-----	Dibenz(a,h)anthracene	540	U
191-24-2-----	Benzo(g,h,i)perylene	540	U
110-86-1-----	Pyridine	540	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

52SD101

b Name: SWL-TULSA

Contract: SAIC

Lab Code: SWOK

Case No.: SAIC

SAS No.:

SDG No.: 27668

Matrix: (soil/water) SOIL

Lab Sample ID: 27668.13

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: M3603.D

Level: (low/med) LOW

Date Received: 11/18/96

% Moisture: not dec. 39 dec.

Date Extracted: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 12/08/96

Concentrated Extract Volume: 1000(uL)

GPC Cleanup: (Y/N) N

pH: 8.9

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
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95-94-3-----	1,2,4,5-Tetrachlorobenzene	540	U
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

52SW101

Lab Name: SWL-TULSA

Contract: FT HOOD

Lab Code: SWOK

Case No.: SAIC

SAS No.:

SDG No.: 27668

Matrix: (soil/water) WATER

Lab Sample ID: 27668.02

Sample wt/vol: 5.0 (g/mL) ML

Lab File ID: UL358.D

Level: (low/med) LOW

Date Received: 11/18/96

% Moisture: not dec. _____

Date Analyzed: 11/20/96

Column: (pack/cap) CAP

Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	UG/L	Q
74-87-3	CHLOROMETHANE	5	U
74-83-9	BROMOMETHANE	5	U
75-01-4	VINYL CHLORIDE	5	U
75-00-3	CHLOROETHANE	5	U
75-09-2	METHYLENE CHLORIDE	5	U
67-64-1	ACETONE	5	U
75-35-4	1 1-DICHLOROETHENE	5	U
75-34-3	1 1-DICHLOROETHANE	5	U
67-66-3	CHLOROFORM	5	U
107-06-2	1 2-DICHLOROETHANE	5	U
78-93-3	2-BUTANONE	5	U
71-55-6	1 1 1-TRICHLOROETHANE	5	U
56-23-5	CARBON TETRACHLORIDE	5	U
75-27-4	BROMODICHLOROMETHANE	5	U
78-87-5	1 2-DICHLOROPROPANE	5	U
79-01-6	TRICHLOROETHENE	5	U
124-48-1	DIBROMOCHLOROMETHANE	5	U
79-00-5	1 1 2-TRICHLOROETHANE	5	U
71-43-2	BENZENE	5	U
75-25-2	BROMOFORM	5	U
108-10-1	4-METHYL-2-PENTANONE	5	U
591-78-6	2-HEXANONE	5	U
127-18-4	TETRACHLOROETHENE	5	U
108-88-3	TOLUENE	5	U
79-34-5	1 1 2 2-TETRACHLOROETHANE	5	U
108-90-7	CHLOROBENZENE	5	U
100-41-4	ETHYL BENZENE	5	U
100-42-5	STYRENE	5	U
156-59-2	cis-1 2-DICHLOROETHENE	5	U
156-60-5	trans-1 2-DICHLOROETHENE	5	U
13-302-07	m,p-XYLENES	5	U
95-47-6	o-XYLENE	5	U
106-93-4	1 2-DIBROMOETHANE	5	U
630-20-6	1 1 1 2-TETRACHLOROETHANE	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

52SW101

Lab Name: SWL-TULSA

Contract: FT HOOD

Lab Code: SWOK

Case No.: SAIC

SAS No.:

SDG No.: 27668

Matrix: (soil/water) WATER

Lab Sample ID: 27668.02

Sample wt/vol: 5.0 (g/mL) ML

Lab File ID: UL358.D

Level: (low/med) LOW

Date Received: 11/18/96

% Moisture: not dec. _____

Date Analyzed: 11/20/96

Column: (pack/cap) CAP

Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-18-4-----1 2 3-	TRICHLOROPROPANE	5	U
75-71-8-----	DICHLORODIFLUOROMETHANE	5	U
75-69-4-----	TRICHLOROFLUOROMETHANE	5	U
74-95-3-----	DIBROMOMETHANE	5	U
96-12-8-----1 2-	DIBROMO-3-CHLOROPROPANE	5	U
108-86-1-----	BROMOBENZENE	5	U
104-51-8-----n-	BUTYLBENZENE	5	U
98-06-6-----tert-	BUTYLBENZENE	5	U
135-98-8-----sec-	BUTYLBENZENE	5	U
95-49-8-----2-	CHLOROTOLUENE	5	U
106-43-4-----4-	CHLOROTOLUENE	5	U
95-50-1-----1 2-	DICHLOROBENZENE	5	U
541-73-1-----1 3-	DICHLOROBENZENE	5	U
106-46-7-----1 4-	DICHLOROBENZENE	5	U
142-28-9-----1 3-	DICHLOROPROPANE	5	U
594-20-7-----2 2-	DICHLOROPROPANE	5	U
563-58-6-----1 1-	DICHLOROPROPENE	5	U
87-68-3-----	HEXACHLOROBUTADIENE	5	U
98-82-8-----	ISOPROPYLBENZENE	5	U
99-87-6-----p-	ISOPROPYLTOLUENE	5	U
91-20-3-----	NAPHTHALENE	5	U
103-65-1-----n-	PROPYLBENZENE	5	U
87-61-6-----1 2 3-	TRICHLOROBENZENE	5	U
120-82-1-----1 2 4-	TRICHLOROBENZENE	5	U
95-63-6-----1 2 4-	TRIMETHYLBENZENE	5	U
108-67-8-----1 3 5-	TRIMETHYLBENZENE	5	U
74-97-5-----	BROMOCHLOROMETHANE	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

52SW102

Lab Name: SWL-TULSA

Contract: FT HCOO

Lab Code: SWOK

Case No.: SAIC

SAS No.:

SDG No.: 27668

Matrix: (soil/water) WATER

Lab Sample ID: 27668.03

Sample wt/vol: 5.0 (g/mL) ML

Lab File ID: UL359.D

Level: (low/med) LOW

Date Received: 11/18/96

% Moisture: not dec. _____

Date Analyzed: 11/20/96

Column: (pack/cap) CAP

Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
96-18-4	1 2 3-TRICHLOROPROPANE	5	U
75-71-8	DICHLORODIFLUOROMETHANE	5	U
75-69-4	TRICHLOROFLUOROMETHANE	5	U
74-95-3	DIBROMOMETHANE	5	U
96-12-8	1 2-DIBROMO-3-CHLOROPROPANE	5	U
108-86-1	BROMOBENZENE	5	U
104-51-8	n-BUTYLBENZENE	5	U
98-06-6	tert-BUTYLBENZENE	5	U
135-98-8	sec-BUTYLBENZENE	5	U
95-49-8	2-CHLOROTOLUENE	5	U
106-43-4	4-CHLOROTOLUENE	5	U
95-50-1	1 2-DICHLOROBENZENE	5	U
541-73-1	1 3-DICHLOROBENZENE	5	U
106-46-7	1 4-DICHLOROBENZENE	5	U
142-28-9	1 3-DICHLOROPROPANE	5	U
594-20-7	2 2-DICHLOROPROPANE	5	U
563-58-6	1 1-DICHLOROPROPENE	5	U
87-68-3	HEXACHLOROBUTADIENE	5	U
98-82-8	ISOPROPYLBENZENE	5	U
99-87-6	p-ISOPROPYLTOLUENE	5	U
91-20-3	NAPHTHALENE	5	U
103-65-1	n-PROPYLBENZENE	5	U
87-61-6	1 2 3-TRICHLOROBENZENE	5	U
120-82-1	1 2 4-TRICHLOROBENZENE	5	U
95-63-6	1 2 4-TRIMETHYLBENZENE	5	U
108-67-8	1 3 5-TRIMETHYLBENZENE	5	U
74-97-5	BROMOCHLOROMETHANE	5	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

52SW102

b Name: SWL-TULSA

Contract: SAIC

Lab Code: SWOK

Case No.: SAIC

SAS No.:

SDG No.: 27668

Matrix: (soil/water) WATER

Lab Sample ID: 27668.03

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: M3578.D

Level: (low/med) LOW

Date Received: 11/18/96

% Moisture: not dec. 0 dec.

Date Extracted: 11/19/96

Extraction: (SepF/Cont/Sonc) CONT

Date Analyzed: 12/08/96

Concentrated Extract Volume: 1000(uL)

GPC Cleanup: (Y/N) N

pH: 8.4

Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Q
108-95-2	Phenol	10
111-44-4	bis(2-Chloroethyl) ether	10
95-57-8	2-Chlorophenol	10
541-73-1	1,3-Dichlorobenzene	10
106-46-7	1,4-Dichlorobenzene	10
100-51-6	Benzyl alcohol	10
95-50-1	1,2-Dichlorobenzene	10
95-48-7	2-Methylphenol	10
108-60-1	bis(2-Chloroisopropyl) ether	10
106-44-5	4-Methylphenol	10
621-64-7	N-Nitroso-di-n-propylamine	10
67-72-1	Hexachloroethane	10
98-95-3	Nitrobenzene	10
78-59-1	Isophorone	10
88-75-5	2-Nitrophenol	10
105-67-9	2,4-Dimethylphenol	10
65-85-0	Benzoic Acid	50
111-91-1	bis(2-Chloroethoxy) methane	10
120-83-2	2,4-Dichlorophenol	10
120-82-1	1,2,4-Trichlorobenzene	10
91-20-3	Naphthalene	10
106-47-8	4-Chloroaniline	10
87-68-3	Hexachlorobutadiene	10
59-50-7	4-Chloro-3-methylphenol	10
91-57-6	2-Methylnaphthalene	10
77-47-4	Hexachlorocyclopentadiene	10
88-06-2	2,4,6-Trichlorophenol	10
95-95-4	2,4,5-Trichlorophenol	50
91-58-7	2-Chloronaphthalene	10
88-74-4	2-Nitroaniline	50
131-11-3	Dimethylphthalate	10
208-96-8	Acenaphthylene	10
606-20-2	2,6-Dinitrotoluene	10

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

52SW102

b Name: SWL-TULSA

Contract: SAIC

Lab Code: SWOK

Case No.: SAIC

SAS No.:

SDG No.: 27668

Matrix: (soil/water) WATER

Lab Sample ID: 27668.03

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: M3578.D

Level: (low/med) LOW

Date Received: 11/18/96

% Moisture: not dec. 0 dec.

Date Extracted: 11/19/96

Extraction: (SepF/Cont/Sonc) CONT

Date Analyzed: 12/08/96

Concentrated Extract Volume: 1000(uL)

GPC Cleanup: (Y/N) N

pH: 8.4

Dilution Factor: 1.0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
99-09-2-----	3-Nitroaniline	50	U
83-32-9-----	Acenaphthene	10	U
121-14-2-----	2,4-Dinitrotoluene	10	U
51-28-5-----	2,4-Dinitrophenol	50	U
100-02-7-----	4-Nitrophenol	50	U
132-64-9-----	Dibenzofuran	10	U
84-66-2-----	Diethylphthalate	10	U
7005-72-3-----	4-Chlorophenyl-phenylether	10	U
86-73-7-----	Fluorene	10	U
100-01-6-----	4-Nitroaniline	50	U
534-52-1-----	4,6-Dinitro-2-methylphenol	50	U
86-30-6-----	N-Nitrosodiphenylamine (1)	10	U
101-55-3-----	4-Bromophenylphenylether	10	U
118-74-1-----	Hexachlorobenzene	10	U
87-86-5-----	Pentachlorophenol	50	U
85-01-8-----	Phenanthrene	10	U
120-12-7-----	Anthracene	10	U
84-74-2-----	Di-n-butylphthalate	10	U
206-44-0-----	Fluoranthene	10	U
129-00-0-----	Pyrene	10	U
85-68-7-----	Butylbenzylphthalate	10	U
91-94-1-----	3,3'-Dichlorobenzidine	20	U
56-55-3-----	Benzo(a)anthracene	10	U
218-01-9-----	Chrysene	10	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	10	U
117-84-0-----	Di-n-octylphthalate	10	U
205-99-2-----	Benzo(b)fluoranthene	10	U
207-08-9-----	Benzo(k)fluoranthene	10	U
50-32-8-----	Benzo(a)pyrene	10	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	10	U
53-70-3-----	Dibenz(a,h)anthracene	10	U
191-24-2-----	Benzo(g,h,i)perylene	10	U
110-86-1-----	Pyridine	50	U

Appendix B

Background Sample Results

Ft. Hood RCRA Facility Investigation
FH-BKG Fort Hood Background
Analytical Results

Station: SB101 Background Soil Boring SB101

Sample ID: FH000-SB10112-10-96/2.0-2.5 (BKSB101)

Sample Depth: 2.0-2.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/10/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3	0.41	MG/KG		
Barium	21.3	0.10	MG/KG	*	J
Cadmium	0.12	0.05	MG/KG	B	
Chromium	5.1	0.10	MG/KG	E*	J
Lead	6	0.17	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.37	0.37	MG/KG	U	U
Silver	0.24	0.24	MG/KG	U	U

Sample ID: FH000-SB10212-10-96/4.0-4.7 (BKSB102)

Sample Depth: 4.0-4.7 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/10/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	2	0.39	MG/KG		
Barium	8	0.10	MG/KG	*	J
Cadmium	0.05	0.05	MG/KG	B	
Chromium	10.3	0.10	MG/KG	E*	J
Lead	5	0.17	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.36	0.36	MG/KG	U	U
Silver	0.23	0.23	MG/KG	U	U

Sample ID: FH000-SB10312-10-96/10.5-11.0 (BKSB103)

Sample Depth: 10.5-11.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/10/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	9.1	0.42	MG/KG		
Barium	14.7	0.10	MG/KG	*	J
Cadmium	0.05	0.05	MG/KG	U	U
Chromium	10.1	0.10	MG/KG	E*	J
Lead	9.5	0.18	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.38	0.38	MG/KG	U	U
Silver	0.24	0.24	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Station: SB102 Background Soil Boring SB102
 Sample ID: FH000-SB12112-12-96/0.0-1.5 (BKSB121) Sample Depth: 0.0-1.5 FT
 Matrix: Soil Field Sample Type: Grab Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.1	0.38	MG/KG		
Barium	24	0.09	MG/KG		
Cadmium	0.18	0.05	MG/KG	B	
Chromium	6.3	0.09	MG/KG		
Lead	10.2	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.22	0.22	MG/KG	U	U

Sample ID: FH000-SB12212-12-96/14.0-14.5 (BKSB122) Sample Depth: 14.0-14.5 FT
 Matrix: Soil Field Sample Type: Grab Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.2	0.36	MG/KG		
Barium	6.1	0.09	MG/KG		
Cadmium	0.06	0.04	MG/KG	B	
Chromium	4.9	0.09	MG/KG		
Lead	4.1	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB12312-12-96/19.0-19.5 (BKSB123) Sample Depth: 19.0-19.5 FT
 Matrix: Soil Field Sample Type: Grab Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.8	0.36	MG/KG		
Barium	5.5	0.09	MG/KG		
Cadmium	0.08	0.04	MG/KG	B	
Chromium	4.3	0.09	MG/KG		
Lead	3.8	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB20212-12-96/0.0-1.5 (BKSB202) Sample Depth: 0.0-1.5 FT
 Matrix: Soil Field Sample Type: Field Duplicate Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.2	0.37	MG/KG		
Barium	18.2	0.09	MG/KG		
Cadmium	0.12	0.04	MG/KG	B	
Chromium	5.9	0.09	MG/KG		
Lead	4.5	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Ft. Hood RCRA Facility Investigation
FH-BKG Fort Hood Background
Analytical Results

Station: SB103 Background Soil Boring SB103

Sample ID: FH000-SB10412-10-96/0.0-1.5 (BKSB104)

Sample Depth: 0.0-1.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/10/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	6.2	0.35	MG/KG		
Barium	28.2	0.08	MG/KG	*	J
Cadmium	0.15	0.04	MG/KG	B	
Chromium	3.1	0.08	MG/KG	E*	J
Lead	5.3	0.15	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.32	0.32	MG/KG	U	U
Silver	0.2	0.20	MG/KG	U	U

Sample ID: FH000-SB10512-10-96/4.0-6.0 (BKSB105)

Sample Depth: 4.0-6.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/10/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.3	0.36	MG/KG		
Barium	23.4	0.09	MG/KG	*	J
Cadmium	0.11	0.04	MG/KG	B	
Chromium	4	0.09	MG/KG	E*	J
Lead	3.9	0.15	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB10612-10-96/9.0-9.4 (BKSB106)

Sample Depth: 9.0-9.4 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/10/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.4	0.37	MG/KG		
Barium	43.7	0.09	MG/KG	*	J
Cadmium	0.16	0.04	MG/KG	B	
Chromium	7.6	0.09	MG/KG	E*	J
Lead	5	0.16	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB10712-10-96/14.0-15.0 (BKSB107)

Sample Depth: 14.0-15.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/10/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	53	0.39	MG/KG		
Barium	1350	0.09	MG/KG	*	J
Cadmium	0.35	0.05	MG/KG	B	
Chromium	5.1	0.09	MG/KG	E*	J
Lead	6.1	0.17	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.36	0.36	MG/KG	U	U
Silver	0.23	0.23	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Station: SB104 Background Soil Boring SB104

Sample ID: FH000-SB10812-11-96/0.0-1.0 (BKSB108)

Sample Depth: 0.0-1.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/11/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	6	0.40	MG/KG		
Barium	72.4	0.10	MG/KG	*	J
Cadmium	0.2	0.05	MG/KG	B	
Chromium	12.9	0.10	MG/KG	E*	J
Lead	9.8	0.17	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.37	0.37	MG/KG	U	U
Silver	0.23	0.23	MG/KG	U	U

Sample ID: FH000-SB10912-11-96/4.0-5.0 (BKSB109)

Sample Depth: 4.0-5.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/11/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.5	0.38	MG/KG		
Barium	155	0.09	MG/KG	*	J
Cadmium	0.07	0.05	MG/KG	B	
Chromium	6.5	0.09	MG/KG	E*	J
Lead	3.2	0.16	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.22	0.22	MG/KG	U	U

Sample ID: FH000-SB11012-11-96/11.0-11.5 (BKSB110)

Sample Depth: 11.0-11.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/11/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.8	0.40	MG/KG		
Barium	24.1	0.10	MG/KG	*	J
Cadmium	0.06	0.05	MG/KG	B	
Chromium	16.6	0.10	MG/KG	E*	J
Lead	7.8	0.17	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.36	0.36	MG/KG	U	U
Silver	0.23	0.23	MG/KG	U	U

Sample ID: FH000-SB11112-11-96/18.0-18.5 (BKSB111)

Sample Depth: 18.0-18.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/11/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	5.2	0.38	MG/KG		
Barium	7.2	0.09	MG/KG	*	J
Cadmium	0.05	0.05	MG/KG	B	
Chromium	6.2	0.09	MG/KG	E*	J
Lead	5.3	0.16	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.35	0.35	MG/KG	U	U
Silver	0.22	0.22	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Station:	SB105	Background Soil Boring SB105	Sample Depth:	1.0-1.5 FT	
	Sample ID: FH000-SB11212-11-96/1.0-1.5	(BKSB112)	Field Sample Type:	Grab	Collected: 12/11/96
	Matrix: Soil				
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	1.6	0.35	MG/KG		
Barium	6.6	0.09	MG/KG	•	J
Cadmium	0.04	0.04	MG/KG	U	U
Chromium	4	0.09	MG/KG	E*	J
Lead	1.5	0.15	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.32	0.32	MG/KG	U	U
Silver	0.2	0.20	MG/KG	U	U
Sample ID: FH000-SB11312-11-96/4.0-5.0 (BKSB113) Sample Depth: 4.0-5.0 FT					
Matrix: Soil Field Sample Type: Grab Collected: 12/11/96					
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	5.7	0.40	MG/KG		
Barium	20.5	0.10	MG/KG	•	J
Cadmium	0.07	0.05	MG/KG	B	
Chromium	8.9	0.10	MG/KG	E*	J
Lead	6	0.17	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.36	0.36	MG/KG	U	U
Silver	0.23	0.23	MG/KG	U	U
Sample ID: FH000-SB11412-11-96/11.0-12.0 (BKSB114) Sample Depth: 11.0-12.0 FT					
Matrix: Soil Field Sample Type: Grab Collected: 12/11/96					
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	5.2	0.42	MG/KG		
Barium	25.2	0.10	MG/KG	•	J
Cadmium	0.05	0.05	MG/KG	U	U
Chromium	20.3	0.10	MG/KG	E*	J
Lead	7.7	0.18	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.38	0.38	MG/KG	U	U
Silver	0.24	0.24	MG/KG	U	U
Sample ID: FH000-SB11512-11-96/15.0-15.5 (BKSB115) Sample Depth: 15.0-15.5 FT					
Matrix: Soil Field Sample Type: Grab Collected: 12/11/96					
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	5.3	0.36	MG/KG		
Barium	10.6	0.09	MG/KG	•	J
Cadmium	0.06	0.04	MG/KG	B	
Chromium	7.3	0.09	MG/KG	E*	J
Lead	5.1	0.15	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.32	0.32	MG/KG	U	U
Silver	0.2	0.20	MG/KG	U	U

Ft. Hood RCRA Facility Investigation
FH-BKG Fort Hood Background
Analytical Results

Sample ID: FH000-SB11612-11-96/22.0-22.5 (BKSB116)
 Matrix: Soil

Sample Depth: 22.0-22.5 FT
 Field Sample Type: Grab

Collected: 12/11/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	11.6	0.37	MG/KG		
Barium	4.9	0.09	MG/KG	*	J
Cadmium	0.2	0.04	MG/KG	B	
Chromium	2.7	0.09	MG/KG	E*	J
Lead	5.6	0.16	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Ft. Hood RCRA Facility Investigation
FH-BKG Fort Hood Background
Analytical Results

Station: SB106 Background Soil Boring SB106

Sample ID: FH000-SB11712-12-96/0.0-1.0 (BKSB117)

Sample Depth: 0.0-1.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.4	0.37	MG/KG		
Barium	27.9	0.09	MG/KG	*	J
Cadmium	0.18	0.04	MG/KG	B	
Chromium	5.7	0.09	MG/KG	E*	J
Lead	8.3	0.16	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB11812-12-96/9.0-9.5 (BKSB118)

Sample Depth: 9.0-9.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	2.6	0.37	MG/KG		
Barium	4.4	0.09	MG/KG	*	J
Cadmium	0.19	0.04	MG/KG	B	
Chromium	2.2	0.09	MG/KG	E*	J
Lead	3.7	0.16	MG/KG	EN*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB11912-12-96/14.0-14.5 (BKSB119)

Sample Depth: 14.0-14.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	0.66	0.37	MG/KG	B	
Barium	3	0.09	MG/KG		
Cadmium	0.06	0.04	MG/KG	B	
Chromium	2.1	0.09	MG/KG		
Lead	1.3	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB12012-12-96/19.0-20.0 (BKSB120)

Sample Depth: 19.0-20.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	0.44	0.35	MG/KG	B	
Barium	2	0.08	MG/KG		
Cadmium	0.04	0.04	MG/KG	U	U
Chromium	0.93	0.08	MG/KG	B	
Lead	0.72	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.32	0.32	MG/KG	U	U
Silver	0.2	0.20	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Sample ID: FH000-SB20112-12-96/0.0-1.0

(BKS201)

Sample Depth: 0.0-1.0 FT

Matrix: Soil

Field Sample Type: Field Duplicate

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.4	0.36	MG/KG		
Barium	17.9	0.09	MG/KG		
Cadmium	0.14	0.04	MG/KG	B	
Chromium	2.6	0.09	MG/KG		
Lead	5.9	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Ft. Hood RCRA Facility Investigation
FH-BKG Fort Hood Background
Analytical Results

Station: SB107 Background Soil Boring SB107

Sample ID: FH000-SB12412-12-96/0.0-1.0 (BKSB124)

Sample Depth: 0.0-1.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	6	0.37	MG/KG		
Barium	19.3	0.09	MG/KG		
Cadmium	0.11	0.04	MG/KG	B	
Chromium	7.2	0.09	MG/KG		
Lead	4.5	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB12512-12-96/4.0-4.5 (BKSB125)

Sample Depth: 4.0-4.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.2	0.35	MG/KG		
Barium	18.1	0.09	MG/KG		
Cadmium	0.11	0.04	MG/KG	B	
Chromium	5.1	0.09	MG/KG		
Lead	1.7	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.36	0.32	MG/KG	B	
Silver	0.2	0.20	MG/KG	U	U

Sample ID: FH000-SB12612-12-96/5.5-6.0 (BKSB126)

Sample Depth: 5.5-6.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	2.5	0.36	MG/KG		
Barium	5.4	0.09	MG/KG		
Cadmium	0.06	0.04	MG/KG	B	
Chromium	5.5	0.09	MG/KG		
Lead	1.5	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.44	0.33	MG/KG	B	
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB20312-12-96/0.0-1.0 (BKSB203)

Sample Depth: 0.0-1.0 FT

Matrix: Soil

Field Sample Type: Field Duplicate

Collected: 12/12/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	5.9	0.37	MG/KG		
Barium	39	0.09	MG/KG		
Cadmium	0.17	0.05	MG/KG	B	
Chromium	9.3	0.09	MG/KG		
Lead	6.6	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Station: SB108 Background Soil Boring SB108

Sample ID: FH000-SB135/01-14-97/0.0-1.0 (BKSB135)

Sample Depth: 0.0-1.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/14/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	2.7	0.36	MG/KG		
Barium	15.4	0.09	MG/KG	*	J
Cadmium	0.17	0.04	MG/KG	B*	J
Chromium	6.1	0.09	MG/KG		
Lead	2.5	0.15	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	1.5	1.5	MG/KG	UWN	R
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB136/01-14-97/5.0-5.5 (BKSB136)

Sample Depth: 5.0-5.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/14/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.3	0.38	MG/KG		
Barium	14.8	0.09	MG/KG	*	J
Cadmium	0.2	0.05	MG/KG	B*	J
Chromium	8.3	0.09	MG/KG		
Lead	3	0.16	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.32	0.32	MG/KG	UWN	R
Silver	0.22	0.22	MG/KG	U	U

Sample ID: FH000-SB137/01-14-97/9.0-9.5 (BKSB137)

Sample Depth: 9.0-9.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/14/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	8.2	0.36	MG/KG		
Barium	7.8	0.09	MG/KG	*	J
Cadmium	0.18	0.04	MG/KG	B*	J
Chromium	8.1	0.09	MG/KG		
Lead	2.3	0.15	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.31	0.31	MG/KG	UWN	R
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB138/01-14-97/14.0-14.5 (BKSB138)

Sample Depth: 14.0-14.5 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/14/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	9.2	0.38	MG/KG		
Barium	12.2	0.09	MG/KG	*	J
Cadmium	0.21	0.05	MG/KG	B*	J
Chromium	11.1	0.09	MG/KG		
Lead	4.1	0.16	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.32	0.32	MG/KG	UWN	R
Silver	0.22	0.22	MG/KG	U	U

Ft. Hood RCRA Facility Investigation
FH-BKG Fort Hood Background
Analytical Results

Sample ID: FH000-SB139/01-14-97/16.5-17.0 (BKSB139)
 Matrix: Soil

Sample Depth: 16.5-17.0 FT
 Field Sample Type: Grab

Collected: 01/14/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	7.6	0.37	MG/KG		
Barium	7.3	0.09	MG/KG	*	J
Cadmium	0.2	0.04	MG/KG	B*	J
Chromium	8.4	0.09	MG/KG		
Lead	3.6	0.16	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.31	0.31	MG/KG	UWN	R
Silver	0.21	0.21	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Station: SB109 Background Soil Boring SB109

Sample ID: FH000-SB140/01-15-97/0.0-1.0 (BKSB140)

Sample Depth: 0.0-1.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/15/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.8	0.41	MG/KG		
Barium	108	0.10	MG/KG	*	J
Cadmium	0.79	0.05	MG/KG	*	J
Chromium	16.1	0.10	MG/KG		
Lead	33.2	0.17	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.35	0.35	MG/KG	UWN	R
Silver	0.24	0.24	MG/KG	U	U

Sample ID: FH000-SB141/01-15-97/4.0-5.0 (BKSB141)

Sample Depth: 4.0-5.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/15/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	5.6	0.43	MG/KG		
Barium	127	0.10	MG/KG	*	J
Cadmium	0.45	0.05	MG/KG	B*	J
Chromium	23.6	0.10	MG/KG		
Lead	12.1	0.18	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	1.8	1.8	MG/KG	UN	R
Silver	0.25	0.25	MG/KG	U	U

Sample ID: FH000-SB142/01-15-97/9.0-10.0 (BKSB142)

Sample Depth: 9.0-10.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/15/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.8	0.44	MG/KG		
Barium	63	0.11	MG/KG	*	J
Cadmium	0.29	0.05	MG/KG	B*	J
Chromium	8.4	0.11	MG/KG		
Lead	5	0.19	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	1.9	1.9	MG/KG	UWN	R
Silver	0.25	0.25	MG/KG	U	U

Sample ID: FH000-SB143/01-15-97/14.5-15.0 (BKSB143)

Sample Depth: 14.5-15.0 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/15/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.8	0.41	MG/KG		
Barium	39.3	0.10	MG/KG	*	J
Cadmium	0.27	0.05	MG/KG	B*	J
Chromium	12.2	0.10	MG/KG		
Lead	6.6	0.17	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.35	0.35	MG/KG	UWN	R
Silver	0.24	0.24	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Sample ID: FH000-SB144/01-15-97/19.0-19.3 (BKS144)

Sample Depth: 19.0-19.3 FT

Matrix: Soil

Field Sample Type: Grab

Collected: 01/15/97

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.7	0.37	MG/KG		
Barium	36.1	0.09	MG/KG	*	J
Cadmium	0.2	0.04	MG/KG	B*	J
Chromium	6.5	0.09	MG/KG		
Lead	4	0.16	MG/KG	*	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.31	0.31	MG/KG	UWN	R
Silver	0.21	0.21	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Station:	SB110	Background Soil Boring SB110			
Sample ID:	FH000-SB12712-13-96/0.0-1.0	(BKSB127)	Sample Depth:	0.0-1.0 FT	
Matrix:	Soil		Field Sample Type:	Grab	
				Collected: 12/13/96	
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	1.9	0.36	MG/KG		
Barium	18.8	0.09	MG/KG		
Cadmium	0.04	0.04	MG/KG	U	U
Chromium	3.7	0.09	MG/KG		
Lead	3.8	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U
Sample ID:	FH000-SB12812-13-96/4.0-6.0	(BKSB128)	Sample Depth:	4.0-6.0 FT	
Matrix:	Soil		Field Sample Type:	Grab	
				Collected: 12/13/96	
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.6	0.38	MG/KG		
Barium	36.3	0.09	MG/KG		
Cadmium	0.05	0.05	MG/KG	U	U
Chromium	8.5	0.09	MG/KG		
Lead	7.5	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG		
Selenium	0.35	0.35	MG/KG	U	U
Silver	0.22	0.22	MG/KG	U	U
Sample ID:	FH000-SB12912-13-96/10.0-11.0	(BKSB129)	Sample Depth:	10.0-11.0 FT	
Matrix:	Soil		Field Sample Type:	Grab	
				Collected: 12/13/96	
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	2.6	0.36	MG/KG		
Barium	26.3	0.09	MG/KG		
Cadmium	0.04	0.04	MG/KG	U	U
Chromium	4.6	0.09	MG/KG		
Lead	4.1	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U
Sample ID:	FH000-SB13012-13-96/15.0-16.0	(BKSB130)	Sample Depth:	15.0-16.0 FT	
Matrix:	Soil		Field Sample Type:	Grab	
				Collected: 12/13/96	
Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	1	0.35	MG/KG	B	
Barium	8.1	0.08	MG/KG		
Cadmium	0.07	0.04	MG/KG	B	
Chromium	1.8	0.08	MG/KG		
Lead	3.1	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.32	0.32	MG/KG	U	U
Silver	0.2	0.20	MG/KG	U	U

Ft. Hood RCRA Facility Investigation

FH-BKG Fort Hood Background

Analytical Results

Sample ID: FH000-SB13112-13-96/20.0-21.0 (BKSB131) Sample Depth: 20.0-21.0 FT
 Matrix: Soil Field Sample Type: Grab Collected: 12/13/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	5.3	0.38	MG/KG		
Barium	65.9	0.09	MG/KG		
Cadmium	0.15	0.05	MG/KG	B	
Chromium	7.7	0.09	MG/KG		
Lead	10.1	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.22	0.22	MG/KG	U	U

Sample ID: FH000-SB13212-13-96/25.0-26.0 (BKSB132) Sample Depth: 25.0-26.0 FT
 Matrix: Soil Field Sample Type: Grab Collected: 12/13/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	4.2	0.37	MG/KG		
Barium	41.7	0.09	MG/KG		
Cadmium	0.04	0.04	MG/KG	U	U
Chromium	5.9	0.09	MG/KG		
Lead	7.8	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.34	0.34	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

Sample ID: FH000-SB13312-13-96/30.0-31.0 (BKSB133) Sample Depth: 30.0-31.0 FT
 Matrix: Soil Field Sample Type: Grab Collected: 12/13/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.2	0.39	MG/KG		
Barium	68.6	0.09	MG/KG		
Cadmium	0.11	0.05	MG/KG	B	
Chromium	4.9	0.09	MG/KG		
Lead	6.3	0.17	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.35	0.35	MG/KG	U	U
Silver	0.22	0.22	MG/KG	U	U

Sample ID: FH000-SB13412-13-96/34.0-34.5 (BKSB134) Sample Depth: 34.0-34.5 FT
 Matrix: Soil Field Sample Type: Grab Collected: 12/13/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	2.9	0.36	MG/KG		
Barium	20.1	0.09	MG/KG		
Cadmium	0.08	0.04	MG/KG	B	
Chromium	1.2	0.09	MG/KG		
Lead	2.3	0.15	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.33	0.33	MG/KG	U	U
Silver	0.21	0.21	MG/KG	U	U

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FH-BKG Fort Hood Background

Analytical Results

Sample ID: FH000-SB20412-13-96/4.0-6.0 (BKS204)

Sample Depth: 4.0-6.0 FT

Matrix: Soil

Field Sample Type: Field Duplicate

Collected: 12/13/96

Metals	Result	Detection Limit	Units	Qualifiers	
				Lab	Data
Arsenic	3.2	0.38	MG/KG		
Barium	31.9	0.09	MG/KG		
Cadmium	0.05	0.05	MG/KG	U	U
Chromium	6.5	0.09	MG/KG		
Lead	7.1	0.16	MG/KG	EN	J
Mercury	0.04	0.04	MG/KG	U	U
Selenium	0.35	0.35	MG/KG	U	U
Silver	0.22	0.22	MG/KG	U	U

Appendix C

Background Soil Boring Logs



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Boring FHBKG-SB101

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FHBKG : Background
Start Date : 12/10/96
End Date : 12/10/96
Northing Coord. : 3446458.08 m
Easting Coord. : 61375.50 m UTM 14 North
Total Depth of Boring : 18.5 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : 15.0 feet
Depth Drilled Into Rock: 3.5 feet
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. 887.80ft	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS		
0					Topsoil. 0.0-0.5' bgs.; weathered tan limestone.	No sample recovery.		
1	887	CL			CLAY; weathered limestone fragments; damp; soft; moderately plastic; 10YR5/4 yellowish brown.	Sample BKSB101 collected 2.0-2.5' bgs.		
2	886				Same as above; dry.			
3	885				Same as above; dry; more weathered limestone.	Description from soil cuttings.		
4	884							
5	883	CH			CLAY, fat; fewer fragments; damp; firm; highly plastic; mottled 10YR6/6 brownish yellow and 2.5Y7/1 light gray.	Sample BKSB102 collected 4.0-4.7' bgs.		
6	882				Same CLAY as above; more silty; interbedded with weathered limestone; dry.	Description from soil cuttings.		
7	881							
8	880							
9	879	CL						
10	878				Same as above; dry.			
11	877				Silty CLAY; dry; firm; non-plastic; 10YR6/6 brownish yellow.	Sample BKSB103 collected 10.5-11.0' bgs.		
12	876				Same as above; interbedded with tan weathered limestone; dry.			
13	875	LS						
14	874							
15	873				LIMESTONE, weathered; dry; blue-gray.	Description from soil cuttings.		
16	872							
17	871							
18	870					Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.		
19	869				Bottom of Boring @ 18.5' bgs.			
20	868							



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Boring FHBKG-SB102

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FHBKG : Background
Start Date : 12/12/96
End Date : 12/12/96
Northing Coord. : 3446503.40 m
Easting Coord. : 613980.64 m UTM 14 North
Total Depth of Boring : 19.5 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : 16.0 feet
Depth Drilled Into Rock: 3.5 feet
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. 912.28ft	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0	912				Topsoil. 0.0-0.4' bgs.	Sample BKSB121, duplicate BKSB202, and split sample BKSB302 collected 0.0-0.5' bgs. Description from soil cuttings.
1	911	CL			Silty CLAY; weathered limestone fragments; dry; firm; non-plastic; mottled 10YR5/3 brown and 10YR8/2 very pale brown.	
2	910	CL			Same as above; dry.	
3	909					
4	908	CL			LIMESTONE, weathered, tan; and Silty Clay interbeds; dry.	
5	907					
6	906				Zones of limestone and highly indurated silty clay (weathered limestone?); shell fragments; roots; dry; very hard; 2.5Y8/2 pale yellow.	
7	905					
8	904					
9	903				Same as above; dry.	
10	902					
11	901	CL			Same as above; dry.	
12	900					
13	899					Description from soil cuttings.
14	898					Sample BKSB122 collected 14.0-14.5' bgs.
15	897				Same as above; dry.	
16	896				LIMESTONE, weathered; dry; blue-gray.	
17	895	LS			Same as above; dry.	
18	894					
19	893				Same as above; dry.	
20					Bottom of Boring @ 19.5' bgs.	Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.



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Boring FHBKG-SB103

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FHBKG : Background
Start Date : 12/10/96
End Date : 12/10/96
Northing Coord. : 3447405.80 m
Easting Coord. : 606690.49 m UTM 14 North
Total Depth of Boring : 17.0 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : 15.0 feet
Depth Drilled Into Rock: 2.0 feet
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. 795.26ft	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0	795				Topsoil. 0.0-0.2' bgs.; weathered tan limestone.	Sample BKSB104 collected 0.0-0.5' bgs.
1	794	CL			Interbedded Silty and pebbly CLAY; 40% coarse sand to pebble sized angular to subrounded fragments; dry; moderately plastic; thin layers of 10YR8/4 very pale brown and 10YR3/2 very dark grayish brown.	Description from soil cuttings.
2	793				Same as above; no pebbles; dry.	
3	792					
4	791	CL			Same as above; weathered, tan limestone fragments; dry.	Sample BKSB105 collected 4.0-4.5' bgs.
5	790					
6	789	CL			Same as above; interbeds of limestone; dry.	Sample BKSB106 collected 9.0-9.5' bgs.
7	788				Same as above; dry.	
8	787					
9	786					
10	785	CL			Same as above; except more medium to coarse sand; dry; soft; non-plastic.	Sample BKSB107 collected 14.0-15.0' bgs.
11	784					
12	783					
13	782	CL			Same as above; dry.	Description from soil cuttings.
14	781					
15	780	LS			Silty CLAY; weathered limestone fragments; damp; firm; moderately plastic; mottled 10YR8/2 very pale brown and 10YR6/4 light yellowish brown.	Sample BKSB107 collected 14.0-15.0' bgs.
16	779				LIMESTONE, weathered; dry; blue-gray.	
17	778				Bottom of Boring @ 17.0' bgs.	
18	777					
19	776					
20						

Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.

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Boring FHBKG-SB104

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FHBKG : Background
Start Date : 12/11/96
End Date : 12/11/96
Northing Coord. : 3447780.16 m
Easting Coord. : 613523.75 m UTM 14 North
Total Depth of Boring : 24.0 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : 24.0 feet
Depth Drilled Into Rock: NA
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. 896.29	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0	896				Topsoil. 0.0-1.0' bgs.; weathered tan limestone.	Sample BKS108 collected 0.0-1.0' bgs.
1	895				Silty CLAY; trace organics; weathered limestone fragments; damp; soft; low plasticity; 2.5Y7/6 yellow.	
2	894				Same as above.	Description from soil cuttings.
3	893				Same as above; no organics; dry; 10YR7/8 yellow mottle.	Sample BKS109 collected 4.0-5.0' bgs.
4	892				Same as above; slightly more silty; dry; hard; brittle.	Description from soil cuttings.
5	891	CL				Description from soil cuttings. Hard drilling.
6	890					
7	889					
8	888					
9	887				LIMESTONE, weathered; tan.	
10	886	LS			weathered limestone as above.	
11	885				Silty CLAY as above; dry.	Sample BKS110 collected 11.0-11.5' bgs.
12	884	CL			Same as above; dry.	Geotechnical sample collected 12.0-13.0' bgs.
13	883				Silty CLAY and weathered LIMESTONE interbeds.	
14	882					Description from soil cuttings.
15	881	CL				
16	880					
17	879					
18	878	CL			Silty CLAY as above; dry.	Sample BKS111 collected 18.0-18.5' bgs.
19	877				Silty CLAY and weathered LIMESTONE interbeds.	
20	876					Description from soil cuttings.
21	875	CL				
22	874					
23	873				Same as above; dry. Blue-gray weathered limestone fragments; dry.	
24	872	LS			Bottom of Boring at 24.0' bgs.	Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.
25						



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Boring FHBKG-SB105

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FHBKG : Background
Start Date : 12/11/96
End Date : 12/11/96
Northing Coord. : Not
Easting Coord. : Surveyed
Total Depth of Boring : 24.0 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : 24.0 feet
Depth Drilled Into Rock: NA
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. NS	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0	0	GP			GRAVEL (graded area).	
1	-1	CL			Silty CLAY; weathered limestone fragments; dry; firm; non-plastic; 2.5Y6/4 light yellowish brown.	Sample BKSB112 collected 1.0-1.5' bgs.
2	-2				Same as above; dry.	Description from soil cuttings.
3	-3	CH			CLAY, fat; dry; firm; highly plastic; mottled 2.5Y6/4 light yellowish brown and 10YR6/6 brownish yellow.	Sample BKSB113 collected 4.0-5.0' bgs.
4	-4				Silty CLAY and LIMESTONE interbeds; dry; firm; 2.5Y6/4 light yellowish brown.	
5	-5	CL				Description from soil cuttings.
6	-6					
7	-7					
8	-8					
9	-9	CL			Same as above; dry.	
10	-10				Same as above; dry; moderately plastic.	Sample BKSB114 collected 11.0-12.0' bgs.
11	-11				Same as above; dry.	Description from soil cuttings.
12	-12	CL			Same as above; more silt; dry; hard; brittle; non-plastic.	Sample BKSB115 collected 15.0-15.5' bgs.
13	-13				Same as above with weathered limestone interbeds.	
14	-14	CL				Description from soil cuttings.
15	-15					
16	-16					
17	-17					
18	-18	CL			Same as above; dry.	Sample BKSB116 collected 22.0-22.5' bgs.
19	-19				Blue-gray weathered limestone; dry; hard drilling to 24.0'.	
20	-20	LS			Bottom of Boring at 24.0' bgs.	Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.
21	-21					
22	-22					
23	-23					
24	-24					
25	-25					



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Boring FHBKG-SB106

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FHBKG : Background
Start Date : 12/12/96
End Date : 12/12/96
Northing Coord. : Not
Easting Coord. : Surveyed
Total Depth of Boring : 25.5 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : 25.5 feet
Depth Drilled Into Rock: NA
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. NS	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0	0	CL			Silty CLAY; weathered limestone fragments; dry; firm; non-plastic; mottled 2.5Y7/6 yellow and 10YR6/6 brownish yellow.	Sample BKSB117 collected 0.0-1.0' bgs.
1	-1				Same as above; dry.	Geotechnical sample collected 3.0-4.0' bgs.
2	-2				Same as above with weathered limestone interbeds.	Description from soil cuttings.
3	-3				Same as above with trace sand; dry.	
4	-4	CL			Same as above with weathered limestone interbeds.	Description from soil cuttings.
5	-5				Same as above with trace sand; dry.	
6	-6				Same as above with weathered limestone interbeds.	
7	-7	SM			Silty SAND, fine; dry; non-plastic; carbonate (HCL fizz); 2.5Y8/4 pale yellow.	Sample BKSB118 collected 9.0-9.5' bgs.
8	-8				Same as above; dry.	
9	-9				Same as above except color change to 19YR8/2 very pale brown.	
10	-10	SP			Same as above SAND, fine; except no silt.	Sample BKSB119 collected 14.0-14.5' bgs.
11	-11				Same as above; dry.	Description from soil cuttings.
12	-12				Same as above; dry.	
13	-13	SW			SAND, fine; dry; soft; non-carbonate; 2.5Y8/4 pale yellow.	Sample BKSB120 collected 19.0-20.0' bgs.
14	-14				Same as above; dry.	Description from soil cuttings.
15	-15				Same as above; dry.	
16	-16	LS			LIMESTONE, weathered; dry; tan.	Description from soil cuttings.
17	-17				Blue-gray weathered limestone; dry.	
18	-18				Bottom of Boring at 25.5' bgs.	
19	-19					Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.
20	-20					
21	-21					
22	-22					
23	-23					
24	-24					
25	-25					
26	-26					
27	-27					
28	-28					
29	-29					
30	-30					



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Boring FHBKG-SB107

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FHBKG : Background
 Start Date : 12/12/96
 End Date : 12/12/96
 Northing Coord. : 3438421.71 m
 Easting Coord. : 612222.83 m UTM 14 North
 Total Depth of Boring : 6.0 feet

Drilling Company : Terra-Mar
 Driller : Bill Christopher
 Designation of Drill : Mobile Drill B-59
 Type of Drill Rig : Hollow Stem Auger
 Geologist : Jeff DeVaughn
 Depth to Bedrock : 1.7 feet
 Depth Drilled Into Rock: 4.3 feet
 Borehole Diameter : 8 inches
 Sampling Equipment : 4.25" Augers
 : CME Sampler 5' long

Depth in feet	Surf. Elev. NS	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0	0					
1	-1	CL			Silty CLAY; weathered limestone fragments; dry; hard; non-plastic; mottled 10YR6/8 brownish yellow and 10YR6/2 light brownish gray.	Sample BKSB124 collected 0.0-1.0' bgs.
2	-2				LIMESTONE, weathered, fossiliferous; Blue-Gray; 2.5Y6/1 gray.	
3	-3					Description from soil cuttings.
4	-4	LS			Same as above	Sample BKSB125 collected 4.0-4.5' bgs.
5	-5					Description from soil cuttings.
6	-6				Bottom of Boring at 6.0' bgs.	Sample BKSB126 collected 5.5-6.0' bgs.
7	-7					
8	-8					Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.
9	-9					
10						



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Boring FHBKG-SB108

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FHBKG : Background
Start Date : 01/14/97
End Date : 01/14/97
Northing Coord. : Not
Easting Coord. : Surveyed
Total Depth of Boring : 17.0 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : 15.0 feet
Depth Drilled Into Rock: 2.0 feet
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. NS	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0	0				Topsoil 0.0-0.4'	Sample BKSB135 collected 0.0-1.0' bgs.
1	-1				Silty CLAY; weathered limestone fragments; dry; firm; non-plastic; 10YR6/8 brownish yellow.	
2	-2					
3	-3				Same as above; dry.	Description from soil cuttings.
4	-4					
5	-5				Same as above; dry; mottled with 2.5Y7/3 pale yellow.	Sample BKSB136 collected 5.0-5.5' bgs.
6	-6					
7	-7				Same as above; dry.	Description from soil cuttings.
8	-8	CL				
9	-9				Same as above; dry.	Sample BKSB137 collected 9.0-9.5' bgs.
10	-10					
11	-11					
12	-12				Same as above; dry.	Description from soil cuttings.
13	-13					
14	-14				Same as above; less silty; dry. Same as above; dry.	Sample BKSB138 collected 14.0-14.5' bgs.
15	-15				LIMESTONE, weathered; blue-gray.	
16	-16	LS			Same as above; dry.	Sample BKSB139 collected 16.5-17.0' bgs.
17	-17				Bottom of Boring at 17.0' bgs.	
18	-18					Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.
19	-19					
20						



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FHBKG : Background
Start Date : 01/15/97
End Date : 01/15/97
Northing Coord. : 3471041.79 m
Easting Coord. : 626015.26 m UTM 14 North
Total Depth of Boring : 24.0 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : Not Encountered
Depth Drilled Into Rock: NA
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. 730.62ft	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS
0					Silty CLAY; trace roots; trace rock fragments <1cm, angular to subrounded; damp; highly plastic; 5YR2.5/1 black.	Sample BKSB140 collected 0.0-1.0' bgs.
1	730	CL			Same as above; damp.	Description from soil cuttings. Sample BKSB141 collected 4.0-5.0' bgs.
2	729				Same as above; damp.	
3	728				Same as above; damp.	
4	727				Same as above; damp.	
5	726				Same as above; damp.	
6	725				Same as above; damp.	
7	724	CL			Silty CLAY; trace weathered limestone fragments; dry; stiff; non-plastic; 7.5YR6/4 light brown.	Description from soil cuttings. Sample BKSB142 collected 9.0-10.0' bgs.
8	723				Some sand, fine, from 8-9' bgs.	
9	722				Same as above; dry.	
10	721				Same as above except rock fragments (mostly weathered limestone) up to 20% of total matrix.	
11	720				Same as above except rock fragments (mostly weathered limestone) up to 20% of total matrix.	
12	719				Same as above; dry.	
13	718				Same as above; dry.	
14	717				Same as above; dry.	
15	716				Same as above; with limestone fragments up to 40%; also 10% fine sand; dry.	
16	715				Same as above; dry.	
17	714				Same as above; dry.	
18	713				Same as above; dry.	
19	712	Same as above; dry.				
20	711	Same as above; dry.				
21	710	Same as above; dry.				
22	709	Same as above; dry.				
23	708	Same as above; dry.				
24	707	SM			Silty SAND, fine to medium; moist; soft; moderately plastic; 7.5Y6/8 reddish yellow and 7.5 YR7/1 light gray.	Water in hole, attempted sample, no recovery in gravel at 24'
25	706	GP			Bottom of boring at 24.0' bgs. GRAVEL,angular;saturated	Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.



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Boring FHBKG-SB110

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FHBKG : Background
Start Date : 12/13/96
End Date : 12/13/96
Northing Coord. : 3472081.13 m
Easting Coord. : 626432.83 m UTM 14 North
Total Depth of Boring : 34.5 feet

Drilling Company : Terra-Mar
Driller : Bill Christopher
Designation of Drill : Mobile Drill B-59
Type of Drill Rig : Hollow Stem Auger
Geologist : Jeff DeVaughn
Depth to Bedrock : Not Encountered
Depth Drilled Into Rock: NA
Borehole Diameter : 8 inches
Sampling Equipment : 4.25" Augers
: CME Sampler 5' long

Depth in feet	Surf. Elev. 729.66ft	USCS	GRAPHIC	Water Levels	DESCRIPTION	REMARKS					
0	729	SM			SAND, fine to medium; some silt; damp; soft; non-plastic; 7.5YR5/6 strong brown.	Sample BKSB127 collected 0.0-1.0' bgs.					
1	728				2	727	Same as above; damp to moist.				
3	726	SC			Clayey SAND; damp; firm; moderately plastic; 2.5YR4/6 red.	Sample BKSB128 collected 4.0-6.0' bgs.					
4	725				5	724	Same as above; damp.				
6	723				7	722	Same as above; damp.				
8	721				9	720	Same as above; damp.	Geotechnical sample collected 8.0-9.0' bgs.			
10	719				11	718	Same as above; slightly less clay; dry.	Sample BKSB129 collected 10.0-11.0' bgs.			
12	717				13	716	Same as above; dry.				
14	715				15	714	Same as above; less clay; dry; color change 5YR5/6 yellowish red.	Sample BKSB130 collected 15.0-16.0' bgs.			
16	713				17	712	Same as above; dry;				
18	711				19	710	Same as above; more clay; dry.				
20	709				CL			Silty CLAY; trace sand; trace tan weathered limestone fragments; dry; hard; 7.5YR6/6 reddish yellow.	Sample BKSB131 collected 20.0-21.0' bgs.		
21	708							22	707	Same as above; dry.	
23	706							24	705	Same as above; dry.	
25	704							26	703	Same as above; dry.	Sample BKSB132 collected 25.0-26.0' bgs.
27	702	28	701	Same as above; with more silt; moist; softer.							
29	700	30	699	Same as above; except very silty; damp; soft.				Sample BKSB133 collected 30.0-31.0' bgs.			
31	698	32	697								
33	696	SM									
34	695	GW									
35	694							Silty SAND, fine; trace gravel and coarse sand at bottom; saturated; non-plastic; 7.5Y6/6 reddish yellow.	Sample BKSB134 collected 34.0-34.5' bgs.		
36	694				SAND, coarse, and GRAVEL, poorly sorted, angular to round; saturated; 1.5 water in hole.						
37	693				Bottom of boring at 34.5' bgs.						
38	692										
39	691										
40	690					Soil colors from Munsell Soil Color Chart, 1992 Revised Edition.					

Appendix D

Statistical Analysis

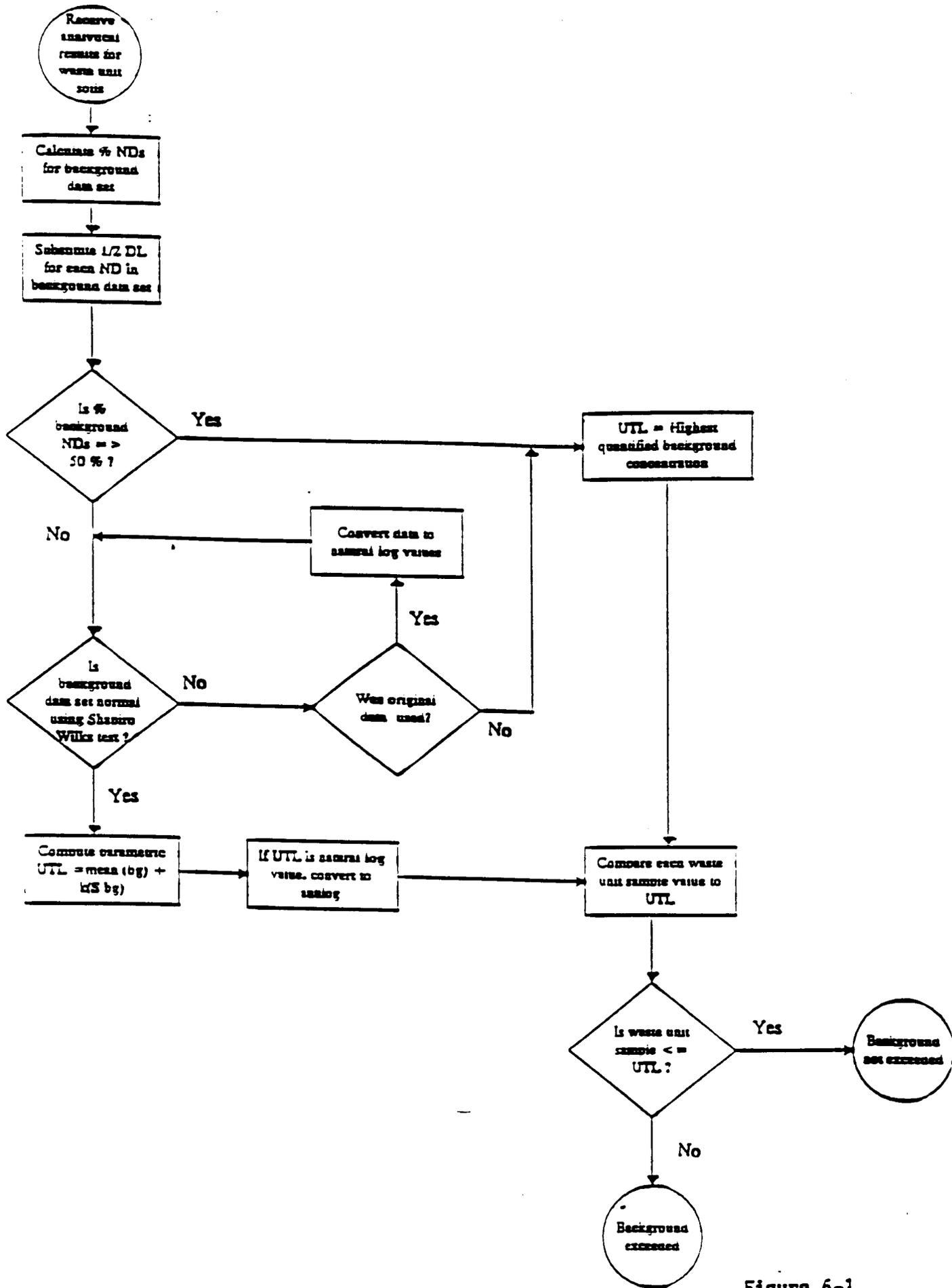


Figure 6-1
 95% Upper Tolerance Limit
 RFI Work Plan for 35 SW
 Fort Hood, Texas

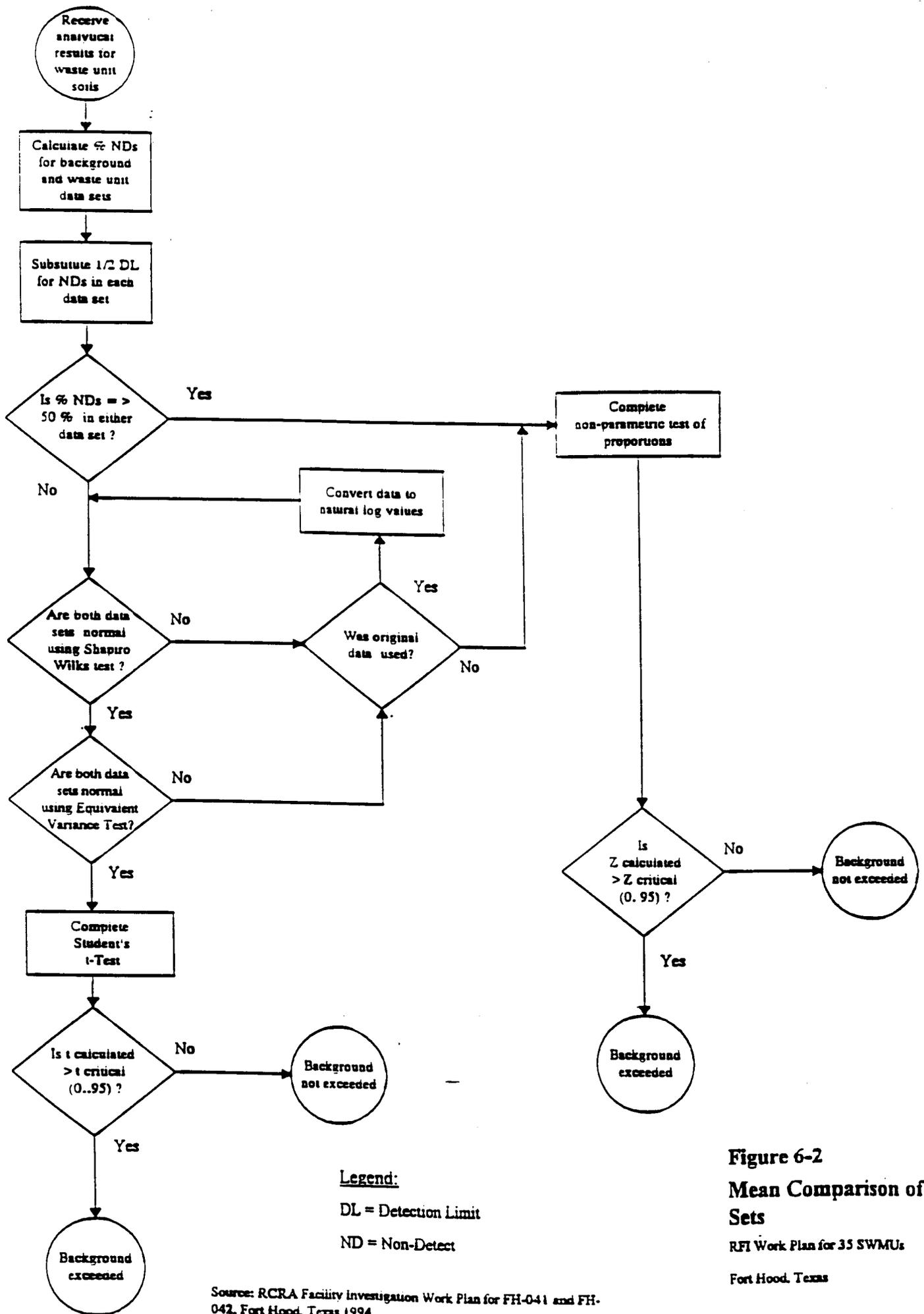


Figure 6-2
Mean Comparison of Sets
 RFI Work Plan for 35 SWMUs
 Fort Hood, Texas

Source: RCRA Facility Investigation Work Plan for FH-041 and FH-042, Fort Hood, Texas 1994.

95% UTLs

Soil Background 95% UTLs NO DUPLICATES						
smp_id	Mercury		Arsenic	Barium		
	Result (x)	Qual	Result (x)	Result	Qual	Ln(x)
BKSB101	0.04	U	3	21.3	J	3.05870707
BKSB102	0.04	U	2	8	J	2.07944154
BKSB103	0.04	U	9.1	14.7	J	2.68784749
BKSB105	0.04	U	4.3	23.4	J	3.15273602
BKSB106	0.04	U	4.4	43.7	J	3.7773481
BKSB107	0.04	U				
BKSB109	0.04	U	3.5	155	J	5.04342512
BKSB110	0.04	U	4.8	24.1	J	3.18221184
BKSB111	0.04	U	5.2	7.2	J	1.97408103
BKSB113	0.04	U	5.7	20.5	J	3.02042489
BKSB114	0.04	U	5.2	25.2	J	3.22684399
BKSB115	0.04	U	5.3	10.6	J	2.360854
BKSB116	0.04	U	11.6	4.9	J	1.58923521
BKSB118	0.04	U	2.6	4.4	J	1.48160454
BKSB119	0.04	U	0.66	3		1.09861229
BKSB120	0.04	U	0.44	2		0.69314718
BKSB122	0.04	U	3.2	6.1		1.80828877
BKSB123	0.04	U	3.8	5.5		1.70474809
BKSB125	0.04	U	3.2	18.1		2.89591194
BKSB126	0.04	U	2.5	5.4		1.68639895
BKSB128	0.04		3.6	36.3		3.59181774
BKSB129	0.04	U	2.6	26.3		3.26956894
BKSB130	0.04	U	1	8.1		2.09186406
BKSB131	0.04	U	5.3	65.9		4.18813844
BKSB132	0.04	U	4.2	41.7		3.73050113
BKSB133	0.04	U	3.2	68.6		4.22829253
BKSB134	0.04	U	2.9	20.1		3.00071982
BKSB136	0.04	U	4.3	14.8	J	2.69462718
BKSB137	0.04	U	8.2	7.8	J	2.05412373
BKSB138	0.04	U	9.2	12.2	J	2.50143595
BKSB139	0.04	U	7.6	7.3	J	1.98787435
BKSB141	0.04	U	5.6	127	J	4.84418709
BKSB142	0.04	U	3.8	63	J	4.14313473
BKSB143	0.04	U	3.8	39.3	J	3.67122452
BKSB144	0.04	U	3.7	36.1	J	3.58629287
BKSB104	0.04	U	6.2	28.2	J	3.33932198
BKSB108	0.04	U	6	72.4	J	4.2822063
BKSB112	0.04	U	1.6	6.6	J	1.88706965
BKSB117	0.04	U	4.4	27.9	J	3.32862669
BKSB121	0.04	U	4.1	24		3.17805383
BKSB124	0.04	U	6	19.3		2.9601051
BKSB127	0.04	U	1.9	18.8		2.93385687
BKSB135	0.04	U	2.7	15.4	J	2.73436751
BKSB140	0.04	U	4.8	108	J	4.68213123
%nondetects=	0.04	0.95744681			0	
Distribution	D		N			L
Mean	0.04		4.35348837	30.1906977		2.91700954
std dev	0		2.29920368	33.4734423		1.01859487
n	44		43	43		43
K	2.097		2.102	2.102		2.102
UTL	0.04		9.1864145	100.55187		5.058096
UTL(ln)=exp(mean + K(std d						157.29074

95% UTLs

Soil Background							
smp_id	Cadmium				Chromium		
	Result (x)	Qual	1/2 nondetects	Ln(x)	Result (x)	Qual	Ln(x)
BKSB101	0.12		0.12	-2.1202635	5.1	J	1.62924054
BKSB102	0.05		0.05	-2.9957323	10.3	J	2.3321439
BKSB103	0.05	U	0.025	-3.6888795	10.1	J	2.31253542
BKSB105	0.11		0.11	-2.2072749	4	J	1.38629436
BKSB106	0.16		0.16	-1.8325815	7.6	J	2.02814825
BKSB107	0.35		0.35	-1.0498221	5.1	J	1.62924054
BKSB109	0.07		0.07	-2.65926	6.5	J	1.87180218
BKSB110	0.06		0.06	-2.8134107	16.6	J	2.8094027
BKSB111	0.05		0.05	-2.9957323	6.2	J	1.82454929
BKSB113	0.07		0.07	-2.65926	8.9	J	2.18605128
BKSB114	0.05	U	0.025	-3.6888795	20.3	J	3.01062089
BKSB115	0.06		0.06	-2.8134107	7.3	J	1.98787435
BKSB116	0.2		0.2	-1.6094379	2.7	J	0.99325177
BKSB118	0.19		0.19	-1.6607312	2.2	J	0.78845736
BKSB119	0.06		0.06	-2.8134107	2.1		0.74193734
BKSB120	0.04	U	0.02	-3.912023	0.93		-0.0725707
BKSB122	0.06		0.06	-2.8134107	4.9		1.58923521
BKSB123	0.08		0.08	-2.5257286	4.3		1.45861502
BKSB125	0.11		0.11	-2.2072749	5.1		1.62924054
BKSB126	0.06		0.06	-2.8134107	5.5		1.70474809
BKSB128	0.05	U	0.025	-3.6888795	8.5		2.14006616
BKSB129	0.04	U	0.02	-3.912023	4.6		1.5260563
BKSB130	0.07		0.07	-2.65926	1.8		0.58778666
BKSB131	0.15		0.15	-1.89712	7.7		2.04122033
BKSB132	0.04	U	0.02	-3.912023	5.9		1.77495235
BKSB133	0.11		0.11	-2.2072749	4.9		1.58923521
BKSB134	0.08		0.08	-2.5257286	1.2		0.18232156
BKSB136	0.2	J	0.2	-1.6094379	8.3		2.11625551
BKSB137	0.18	J	0.18	-1.7147984	8.1		2.09186406
BKSB138	0.21	J	0.21	-1.5606477	11.1		2.40694511
BKSB139	0.2	J	0.2	-1.6094379	8.4		2.12823171
BKSB141	0.45	J	0.45	-0.7985077	23.6		3.16124671
BKSB142	0.29	J	0.29	-1.2378744	8.4		2.12823171
BKSB143	0.27	J	0.27	-1.3093333	12.2		2.50143595
BKSB144	0.2	J	0.2	-1.6094379	6.5		1.87180218
BKSB104	0.15		0.15	-1.89712	3.1	J	1.13140211
BKSB108	0.2		0.2	-1.6094379	12.9	J	2.55722731
BKSB112	0.04	U	0.02	-3.912023	4	J	1.38629436
BKSB117	0.18		0.18	-1.7147984	5.7	J	1.74046617
BKSB121	0.18		0.18	-1.7147984	6.3		1.84054963
BKSB124	0.11		0.11	-2.2072749	7.2		1.97408103
BKSB127	0.04	U	0.02	-3.912023	3.7		1.30833282
BKSB135	0.17	J	0.17	-1.7719568	6.1		1.80828877
BKSB140	0.79	J	0.79	-0.2357223	16.1		2.77881927
%nondetects=		0.19148936				0	
Distribution				L			L
Mean	0.14545455			-2.343338	7.31886364		1.78668026
std dev	0.13475999			0.92656476	4.7817999		0.68062712
n	44			44	44		44
K	2.097			2.097	2.097		2.097
UTL	0.4280462			-0.400332	17.346298		3.2139553
UTL(ln)=exp(me				0.6700977			24.87729

95% UTLs

Soil Background	Lead		Selenium		Silver		
smp_id	Result (x)	Qual	Ln(x)	Result (x)	Qual	Result (x)	Qual
BKSB101	6	J	1.79175947	0.37	U	0.24	U
BKSB102	5	J	1.60943791	0.36	U	0.23	U
BKSB103	9.5	J	2.2512918	0.38	U	0.24	U
BKSB105	3.9	J	1.36097655	0.33	U	0.21	U
BKSB106	5	J	1.60943791	0.33	U	0.21	U
BKSB107	6.1	J	1.80828877	0.36	U	0.23	U
BKSB109	3.2	J	1.16315081	0.34	U	0.22	U
BKSB110	7.8	J	2.05412373	0.36	U	0.23	U
BKSB111	5.3	J	1.66770682	0.35	U	0.22	U
BKSB113	6	J	1.79175947	0.36	U	0.23	U
BKSB114	7.7	J	2.04122033	0.38	U	0.24	U
BKSB115	5.1	J	1.62924054	0.32	U	0.2	U
BKSB116	5.6	J	1.7227666	0.33	U	0.21	U
BKSB118	3.7	J	1.30833282	0.34	U	0.21	U
BKSB119	1.3	J	0.26236426	0.33	U	0.21	U
BKSB120	0.72	J	-0.3285041	0.32	U	0.2	U
BKSB122	4.1	J	1.41098697	0.33	U	0.21	U
BKSB123	3.8	J	1.33500107	0.33	U	0.21	U
BKSB125	1.7	J	0.53062825	0.36		0.2	U
BKSB126	1.5	J	0.40546511	0.44		0.21	U
BKSB128	7.5	J	2.01490302	0.35	U	0.22	U
BKSB129	4.1	J	1.41098697	0.33	U	0.21	U
BKSB130	3.1	J	1.13140211	0.32	U	0.2	U
BKSB131	10.1	J	2.31253542	0.34	U	0.22	U
BKSB132	7.8	J	2.05412373	0.34	U	0.21	U
BKSB133	6.3	J	1.84054963	0.35	U	0.22	U
BKSB134	2.3	J	0.83290912	0.33	U	0.21	U
BKSB136	3	J	1.09861229	0.32	R	0.22	U
BKSB137	2.3	J	0.83290912	0.31	R	0.21	U
BKSB138	4.1	J	1.41098697	0.32	R	0.22	U
BKSB139	3.6	J	1.28093385	0.31	R	0.21	U
BKSB141	12.1	J	2.49320545	1.8	R	0.25	U
BKSB142	5	J	1.60943791	1.9	R	0.25	U
BKSB143	6.6	J	1.88706965	0.35	R	0.24	U
BKSB144	4	J	1.38629436	0.31	R	0.21	U
BKSB104	5.3	J	1.66770682	0.32	U	0.2	U
BKSB108	9.8	J	2.28238239	0.37	U	0.23	U
BKSB112	1.5	J	0.40546511	0.32	U	0.2	U
BKSB117	8.3	J	2.11625551	0.33	U	0.21	U
BKSB121	10.2	J	2.32238772	0.34	U	0.22	U
BKSB124	4.5	J	1.5040774	0.34	U	0.21	U
BKSB127	3.8	J	1.33500107	0.33	U	0.21	U
BKSB135	2.5	J	0.91629073	1.5	R	0.21	U
BKSB140	33.2	J	3.50254988	0.35	R	0.24	U
%nondetects=		0					
Distribution			L	D		D	
Mean	5.77318182		1.52441844	—	0.345	0.21795455	
std dev	4.99838289		0.67810106	0.02427744		0.01390659	
n	44		44				
K	2.097		2.097				
UTL	16.254791		2.9463964				
UTL(ln)=exp(me			19.037227				

Shapiro Wilk for Barium

	Bkgd Conc (\bar{x}_i) (mg/kg)	Ordered Conc. $x(i)$	Reverse Ordered $x(n-i+1)$	Difference $x(n-i+1)-x(i)$	$a(n-i+1)$	$b(i)$
BKSB101	21.3	2	155	153	0.3894	59.5782
BKSB102	8	3	127	124	0.2684	33.2816
BKSB103	14.7	4.4	108	103.6	0.2334	24.18024
BKSB105	23.4	4.9	72.4	67.5	0.2078	14.0265
BKSB106	43.7	5.4	68.6	63.2	0.1871	11.82472
BKSB107		5.5	65.9	60.4	0.1695	10.2378
BKSB109	155	6.1	63	56.9	0.1539	8.75691
BKSB110	24.1	6.6	43.7	37.1	0.1398	5.18658
BKSB111	7.2	7.2	41.7	34.5	0.1269	4.37805
BKSB113	20.5	7.3	39.3	32	0.1149	3.6768
BKSB114	25.2	7.8	36.3	28.5	0.1035	2.94975
BKSB115	10.6	8	36.1	28.1	0.0927	2.60487
BKSB116	4.9	8.1	28.2	20.1	0.0824	1.65624
BKSB118	4.4	10.6	27.9	17.3	0.0724	1.25252
BKSB119	3	12.2	26.3	14.1	0.0628	0.88548
BKSB120	2	14.7	25.2	10.5	0.0534	0.5607
BKSB122	6.1	14.8	24.1	9.3	0.0442	0.41106
BKSB123	5.5	15.4	24	8.6	0.0352	0.30272
BKSB125	18.1	18.1	23.4	5.3	0.0263	0.13939
BKSB126	5.4	18.8	21.3	2.5	0.0175	0.04375
BKSB128	36.3	19.3	20.5	1.2	0.0087	0.01044
BKSB129	26.3	20.1	20.1	0	0	0
BKSB130	8.1	20.5	19.3	-1.2		0
BKSB131	65.9	21.3	18.8	-2.5		0
BKSB132	41.7	23.4	18.1	-5.3		
BKSB133	68.6	24	15.4	-8.6	sum Bi=	185.94432
BKSB134	20.1	24.1	14.8	-9.3		
BKSB136	14.8	25.2	14.7	-10.5	W(0.05,43)	0.943
BKSB137	7.8	26.3	12.2	-14.1	W=	0.73470973
BKSB138	12.2	27.9	10.6	-17.3		
BKSB139	7.3	28.2	8.1	-20.1		
BKSB141	127	36.1	8	-28.1		
BKSB142	63	36.3	7.8	-28.5		
BKSB143	39.3	39.3	7.3	-32		
BKSB144	36.1	41.7	7.2	-34.5		
BKSB104	28.2	43.7	6.6	-37.1		
BKSB108	72.4	63	6.1	-56.9		
BKSB112	6.6	65.9	5.5	-60.4		
BKSB117	27.9	68.6	5.4	-63.2		
BKSB121	24	72.4	4.9	-67.5		
BKSB124	19.3	108	4.4	-103.6		
BKSB127	18.8	127	3	-124		
BKSB135	15.4	155	2	-153		
BKSB140	108			0		
Sum of xi	1298.2					
Mean	30.19069767					
n=	43					
sum of xi ²	86253.36					
1/n=	0.023255814					
xi=(sum xi) ²	1685323.24					
d=	47059.79628					
W=	0.734709728					
W(0.05,43)=	0.943					
W<W(0.5,43), distribution is not Normal						

Shapiro Wilk for Barium

	ln of ordered Conc. x(i)		ln of Reverse Order x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)
	0.693147181	0.48045301	5.043425117	4.35027794	0.3894	1.693998228
	1.098612289	1.20694896	4.844187086	3.7455748	0.2684	1.005312276
	1.481604541	2.19515202	4.682131227	3.20052669	0.2334	0.747002929
	1.589235205	2.52566854	4.282206299	2.69297109	0.2078	0.559599393
	1.686398954	2.84394143	4.228292535	2.54189358	0.1871	0.475588289
	1.704748092	2.90616606	4.188138442	2.48339035	0.1695	0.420934664
	1.808288771	3.26990828	4.143134726	2.33484596	0.1539	0.359332793
	1.887069649	3.56103186	3.777348102	1.89027845	0.1398	0.264260928
	1.974081026	3.8969959	3.730501129	1.7564201	0.1269	0.222889711
	1.987874348	3.95164442	3.671224519	1.68335017	0.1149	0.193416935
	2.054123734	4.21942431	3.591817741	1.53769401	0.1035	0.15915133
	2.079441542	4.32407713	3.586292865	1.50685132	0.0927	0.139685118
	2.091864062	4.37589525	3.339321978	1.24745792	0.0824	0.102790532
	2.360854001	5.57363161	3.328626689	0.96777269	0.0724	0.070066743
	2.501435952	6.25718182	3.269568939	0.76813299	0.0628	0.048238752
	2.687847494	7.22452415	3.226843995	0.5389965	0.0534	0.028782413
	2.694627181	7.26101564	3.18221184	0.48758466	0.0442	0.021551242
	2.734367509	7.47676568	3.17805383	0.44368632	0.0352	0.015617758
	2.895911938	8.38630595	3.152736022	0.25682408	0.0263	0.006754473
	2.93385687	8.60751613	3.058707073	0.1248502	0.0175	0.002184879
	2.960105096	8.76222218	3.020424886	0.06031979	0.0087	0.000524782
	3.000719815	9.00431941	3.000719815	0		0
	3.020424886	9.12296649	2.960105096	-0.0603198		0
	3.058707073	9.35568896	2.93385687	-0.1248502		0
	3.152736022	9.93974443	2.895911938	-0.2568241		
	3.17805383	10.1000261	2.734367509	-0.4436863		6.537684167
	3.18221184	10.1264722	2.694627181	-0.4875847		
	3.226843995	10.4125222	2.687847494	-0.5389965	W(0.05,43)	0.943
	3.269568939	10.690081	2.501435952	-0.768133	W(ln)=	0.98083423
	3.328626689	11.0797556	2.360854001	-0.9677727		
	3.339321978	11.1510713	2.091864062	-1.2474579		
	3.586292865	12.8614965	2.079441542	-1.5068513		
	3.591817741	12.9011547	2.054123734	-1.537694		
	3.671224519	13.4778895	1.987874348	-1.6833502		
	3.730501129	13.9166387	1.974081026	-1.7564201		
	3.777348102	14.2683587	1.887069649	-1.8902785		
	4.143134726	17.1655654	1.808288771	-2.334846		
	4.188138442	17.5405036	1.704748092	-2.4833903		
	4.228292535	17.8784578	1.686398954	-2.5418936		
	4.282206299	18.3372908	1.589235205	-2.6929711		
	4.682131227	21.9223528	1.481604541	-3.2005267		
	4.844187086	23.4661485	1.098612289	-3.7455748		
	5.043425117	25.4361369	0.693147181	-4.3502779		
Sum of xi	125.4314103		125.4314103			
Mean	2.917009542					
n=	43					
sum of xi^2	409.4611119					
1/n=	0.023255814					
xi=(sum xi)^	15733.03869					
d=	43.57649126					
W(ln)=	0.98083423					
W(0.05,43)	0.943					
W>W(0.5,43), distribution is lognormal						

Shapiro Wilk for Cadmium

smp_id	Cadmium	(xi) ²	Ordered Conc. x(i)	Reverse Ordered x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)	smp_id
BKSB101	0.12	0.0144	0.02	0.79	0.77	0.3872	0.298144	BKSB101
BKSB102	0.05	0.0025	0.02	0.45	0.43	0.2667	0.114681	BKSB102
BKSB103	0.025	0.00063	0.02	0.35	0.33	0.2323	0.076659	BKSB103
BKSB104	0.15	0.0225	0.02	0.29	0.27	0.2072	0.055944	BKSB104
BKSB105	0.11	0.0121	0.02	0.27	0.25	0.1868	0.0467	BKSB105
BKSB106	0.16	0.0256	0.025	0.21	0.185	0.1695	0.031358	BKSB106
BKSB107	0.35	0.1225	0.025	0.2	0.175	0.1542	0.026985	BKSB107
BKSB108	0.2	0.04	0.025	0.2	0.175	0.1405	0.024588	BKSB108
BKSB109	0.07	0.0049	0.05	0.2	0.15	0.1278	0.01917	BKSB109
BKSB110	0.06	0.0036	0.05	0.2	0.15	0.116	0.0174	BKSB110
BKSB111	0.05	0.0025	0.06	0.2	0.14	0.1049	0.014686	BKSB111
BKSB112	0.02	0.0004	0.06	0.19	0.13	0.0943	0.012259	BKSB112
BKSB113	0.07	0.0049	0.06	0.18	0.12	0.0842	0.010104	BKSB113
BKSB114	0.025	0.00063	0.06	0.18	0.12	0.0745	0.00894	BKSB114
BKSB115	0.06	0.0036	0.06	0.18	0.12	0.0651	0.007812	BKSB115
BKSB116	0.2	0.04	0.07	0.17	0.1	0.056	0.0056	BKSB116
BKSB117	0.18	0.0324	0.07	0.16	0.09	0.0471	0.004239	BKSB117
BKSB118	0.19	0.0361	0.07	0.15	0.08	0.0383	0.003064	BKSB118
BKSB119	0.06	0.0036	0.08	0.15	0.07	0.0296	0.002072	BKSB119
BKSB120	0.02	0.0004	0.08	0.12	0.04	0.0211	0.000844	BKSB120
BKSB121	0.18	0.0324	0.11	0.11	0	0.0126	0	BKSB121
BKSB122	0.06	0.0036	0.11	0.11	0	0.0042	0	BKSB122
BKSB123	0.08	0.0064	0.11	0.11	0	0	0	BKSB123
BKSB124	0.11	0.0121	0.11	0.11	0	0	0	BKSB124
BKSB125	0.11	0.0121	0.12	0.08	-0.04			BKSB125
BKSB126	0.06	0.0036	0.15	0.08	-0.07	Sum of b=	0.781248	BKSB126
BKSB127	0.02	0.0004	0.15	0.07	-0.08			BKSB127
BKSB128	0.025	0.00063	0.16	0.07	-0.09	W=	0.744801	BKSB128
BKSB129	0.02	0.0004	0.17	0.07	-0.1	W(0.05,44)	0.944	BKSB129
BKSB130	0.07	0.0049	0.18	0.06	-0.12			BKSB130
BKSB131	0.15	0.0225	0.18	0.06	-0.12			BKSB131
BKSB132	0.02	0.0004	0.18	0.06	-0.12			BKSB132
BKSB133	0.11	0.0121	0.19	0.06	-0.13			BKSB133
BKSB134	0.08	0.0064	0.2	0.06	-0.14			BKSB134
BKSB135	0.17	0.0289	0.2	0.05	-0.15			BKSB135
BKSB136	0.2	0.04	0.2	0.05	-0.15			BKSB136
BKSB137	0.18	0.00063	0.2	0.025	-0.175			BKSB137
BKSB138	0.21	0.0225	0.2	0.025	-0.175			BKSB138
BKSB139	0.2	0.0121	0.21	0.025	-0.185			BKSB139
BKSB140	0.79	0.0256	0.27	0.02	-0.25			BKSB140
BKSB141	0.45	0.1225	0.29	0.02	-0.27			BKSB141
BKSB142	0.29	0.04	0.35	0.02	-0.33			BKSB142
BKSB143	0.27	0.0049	0.45	0.02	-0.43			BKSB143
BKSB144	0.2	0.0036	0.79	0.02	-0.77			BKSB144
Sum of xi	6.225							Sum of xi
Mean	0.14147727							Mean
n=	44							n=
sum of xi ²	1.700175							sum of xi ²
1/n=	0.02272727							1/n=
xi=(sum xi) ²	38.750625							xi=(sum xi) ²
d=	0.81947898							d=
W=	0.7448006							W=
W(0.05,44)=	0.944							W(0.05,44)=
W<W(0.5,44), the distribution is not normal								W<W(0.5,44),

Shapiro Wilk for Cadmium

ln of ordered Conc. x(i)	ln(xi)^2	ln of Reverse Order x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)
-3.912023005	15.303924	-0.2357223	3.67630067	0.3872	1.42346362
-3.912023005	15.303924	-0.7985077	3.11351531	0.2667	0.83037453
-3.912023005	15.303924	-1.0498221	2.86220088	0.2323	0.66488926
-3.912023005	15.303924	-1.2378744	2.67414865	0.2072	0.5540836
-3.912023005	15.303924	-1.3093333	2.60268969	0.1868	0.48618243
-3.688879454	13.607832	-1.5606477	2.12823171	0.1695	0.36073527
-3.688879454	13.607832	-1.6094379	2.07944154	0.1542	0.32064989
-3.688879454	13.607832	-1.6094379	2.07944154	0.1405	0.29216154
-2.995732274	8.9744119	-1.6094379	1.38629436	0.1278	0.17716842
-2.995732274	8.9744119	-1.6094379	1.38629436	0.116	0.16081015
-2.813410717	7.9152799	-1.6094379	1.2039728	0.1049	0.12629675
-2.813410717	7.9152799	-1.6607312	1.15267951	0.0943	0.10869768
-2.813410717	7.9152799	-1.7147984	1.09861229	0.0842	0.09250315
-2.813410717	7.9152799	-1.7147984	1.09861229	0.0745	0.08184662
-2.813410717	7.9152799	-1.7147984	1.09861229	0.0651	0.07151966
-2.659260037	7.0716639	-1.7719568	0.8873032	0.056	0.04968898
-2.659260037	7.0716639	-1.8325815	0.82667857	0.0471	0.03893656
-2.659260037	7.0716639	-1.89712	0.76214005	0.0383	0.02918996
-2.525728644	6.3793052	-1.89712	0.62860866	0.0296	0.01860682
-2.525728644	6.3793052	-2.1202635	0.40546511	0.0211	0.00855531
-2.207274913	4.8720625	-2.2072749	0	0.0126	0
-2.207274913	4.8720625	-2.2072749	0	0.0042	0
-2.207274913	4.8720625	-2.2072749	0	0	0
-2.207274913	4.8720625	-2.2072749	0	0	0
-2.120263536	4.4955175	-2.5257286	-0.40546511		
-1.897119985	3.5990642	-2.5257286	-0.62860866	Sum of b=	5.8963602
-1.897119985	3.5990642	-2.65926	-0.76214005		
-1.832581464	3.3583548	-2.65926	-0.82667857	W=	0.94177684
-1.771956842	3.139831	-2.65926	-0.8873032	W(0.05,44)	0.944
-1.714798428	2.9405336	-2.8134107	-1.09861229		
-1.714798428	2.9405336	-2.8134107	-1.09861229		
-1.660731207	2.7580281	-2.8134107	-1.15267951		
-1.609437912	2.5902904	-2.8134107	-1.2039728		
-1.609437912	2.5902904	-2.9957323	-1.38629436		
-1.609437912	2.5902904	-2.9957323	-1.38629436		
-1.609437912	2.5902904	-3.6888795	-2.07944154		
-1.609437912	2.5902904	-3.6888795	-2.07944154		
-1.560647748	2.4356214	-3.6888795	-2.12823171		
-1.30933332	1.7143537	-3.912023	-2.60268969		
-1.237874356	1.5323329	-3.912023	-2.67414865		
-1.049822124	1.1021265	-3.912023	-2.86220088		
-0.798507696	0.6376145	-3.912023	-3.11351531		
-0.235722334	0.055565	-3.912023	-3.67630067		
-103.106874					
-2.343338046					
44					
278.5307172					
0.022727273					
10631.02747					
36.91645655					
0.941776836					
0.944					
The distribution is approximately lognormal					

Shapiro Wilk Chromium

smp_id	Chromium	Ordered Conc. x(i)	Reverse Ordered x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)
BKSB101	5.1	0.93	23.6	22.67	0.3872	8.777824
BKSB102	10.3	1.2	20.3	19.1	0.2667	5.09397
BKSB103	10.1	1.8	16.6	14.8	0.2323	3.43804
BKSB104	3.1	2.1	16.1	14	0.2072	2.9008
BKSB105	4	2.2	12.9	10.7	0.1868	1.99876
BKSB106	7.6	2.7	12.2	9.5	0.1695	1.61025
BKSB107	5.1	3.1	11.1	8	0.1542	1.2336
BKSB108	12.9	3.7	10.3	6.6	0.1405	0.9273
BKSB109	6.5	4	10.1	6.1	0.1278	0.77958
BKSB110	16.6	4	8.9	4.9	0.116	0.5684
BKSB111	6.2	4.3	8.5	4.2	0.1049	0.44058
BKSB112	4	4.6	8.4	3.8	0.0943	0.35834
BKSB113	8.9	4.9	8.4	3.5	0.0842	0.2947
BKSB114	20.3	4.9	8.30	3.4	0.0745	0.2533
BKSB115	7.3	5.1	8.1	3	0.0651	0.1953
BKSB116	2.7	5.1	7.7	2.6	0.056	0.1456
BKSB117	5.7	5.1	7.6	2.5	0.0471	0.11775
BKSB118	2.2	5.5	7.3	1.8	0.0383	0.06894
BKSB119	2.1	5.7	7.2	1.5	0.0296	0.0444
BKSB120	0.93	5.9	6.5	0.6	0.0211	0.01266
BKSB121	6.3	6.1	6.5	0.4	0.0126	0.00504
BKSB122	4.9	6.2	6.3	0.1	0.0042	0.00042
BKSB123	4.3	6.3	6.2	-0.1	0	0
BKSB124	7.2	6.5	6.1	-0.4	0.0037	-0.00148
BKSB125	5.1	6.5	5.9	-0.6	Sum of b=	29.264074
BKSB126	5.5	7.2	5.7	-1.5		
BKSB127	3.7	7.3	5.5	-1.8	W=	0.87100033
BKSB128	8.5	7.6	5.1	-2.5	W(0.05,45)	0.945
BKSB129	4.6	7.7	5.1	-2.6		
BKSB130	1.8	8.1	5.1	-3		
BKSB131	7.7	8.30	4.9	-3.4		
BKSB132	5.9	8.4	4.9	-3.5		
BKSB133	4.9	8.4	4.6	-3.8		
BKSB134	1.2	8.5	4.3	-4.2		
BKSB135	6.1	8.9	4	-4.9		
BKSB136	8.30	10.1	4	-6.1		
BKSB137	8.1	10.3	3.7	-6.6		
BKSB138	11.1	11.1	3.1	-8		
BKSB139	8.4	12.2	2.7	-9.5		
BKSB140	16.1	12.9	2.2	-10.7		
BKSB141	23.6	16.1	2.1	-14		
BKSB142	8.4	16.6	1.8	-14.8		
BKSB143	12.2	20.3	1.2	-19.1		
BKSB144	6.5	23.6	0.93	-22.67		
Sum of x _i	322.03					
Mean	7.31886364					
n=	44					
sum of x _i ²	3340.1149					
1/n=	0.02272727					
x _i -(sum x _i) ²	103703.321					
d=	983.221243					
W=	0.87100033					
W(0.05,44)=	0.944					
W<W(0.5,45), the distribution is not normal						

Shapiro Wilk Chromium

smpl_id	ln of ordered Conc. x(i)	ln(xi)^2	ln of Reverse Order x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)
BKSB101	-0.07257069	0.00526651	3.161246712	3.2338174	0.3872	1.2521341
BKSB102	0.182321557	0.03324115	3.010620886	2.82829933	0.2667	0.75430743
BKSB103	0.587786665	0.34549316	2.809402695	2.22161603	0.2323	0.5160814
BKSB104	0.741937345	0.55047102	2.778819272	2.03688193	0.2072	0.42204194
BKSB105	0.78845736	0.62166501	2.557227311	1.76876995	0.1868	0.33040623
BKSB106	0.993251773	0.98654908	2.501435952	1.50818418	0.1695	0.25563722
BKSB107	1.131402111	1.28007074	2.406945108	1.275543	0.1542	0.19668873
BKSB108	1.30833282	1.71173477	2.332143895	1.02381108	0.1405	0.14384546
BKSB109	1.386294361	1.92181206	2.312535424	0.92624106	0.1278	0.11837361
BKSB110	1.386294361	1.92181206	2.186051277	0.79975692	0.116	0.0927718
BKSB111	1.458615023	2.12755778	2.140066163	0.68145114	0.1049	0.07148422
BKSB112	1.526056303	2.32884784	2.128231706	0.6021754	0.0943	0.05678514
BKSB113	1.589235205	2.52566854	2.128231706	0.5389965	0.0842	0.04538351
BKSB114	1.589235205	2.52566854	2.116255515	0.52702031	0.0745	0.03926301
BKSB115	1.62924054	2.65442474	2.091864062	0.46262352	0.0651	0.03011679
BKSB116	1.62924054	2.65442474	2.041220329	0.41197979	0.056	0.02307087
BKSB117	1.62924054	2.65442474	2.028148247	0.39890771	0.0471	0.01878855
BKSB118	1.704748092	2.90616606	1.987874348	0.28312626	0.0383	0.01084374
BKSB119	1.740466175	3.02922251	1.974081026	0.23361485	0.0296	0.006915
BKSB120	1.774952351	3.15045585	1.871802177	0.09684983	0.0211	0.00204353
BKSB121	1.808288771	3.26990828	1.871802177	0.06351341	0.0126	0.00080027
BKSB122	1.824549292	3.32898012	1.840549633	0.01600034	0.0042	6.7201E-05
BKSB123	1.840549633	3.38762295	1.824549292	-0.0160003	0	0
BKSB124	1.871802177	3.50364339	1.808288771	-0.0635134		0
BKSB125	1.871802177	3.50364339	1.774952351	-0.0968498	Sum of b=	4.38784974
BKSB126	1.974081026	3.8969959	1.740466175	-0.2336149		
BKSB127	1.987874348	3.95164442	1.704748092	-0.2831263	W=	0.96653268
BKSB128	2.028148247	4.11338531	1.62924054	-0.3989077	W(0.05,45)	0.945
BKSB129	2.041220329	4.16658043	1.62924054	-0.4119798		
BKSB130	2.091864062	4.37589525	1.62924054	-0.4626235		
BKSB131	2.116255515	4.4785374	1.589235205	-0.5270203		
BKSB132	2.128231706	4.52937019	1.589235205	-0.5389965		
BKSB133	2.128231706	4.52937019	1.526056303	-0.6021754		
BKSB134	2.140066163	4.57988318	1.458615023	-0.6814511		
BKSB135	2.186051277	4.77882018	1.386294361	-0.7997569		
BKSB136	2.312535424	5.34782009	1.386294361	-0.9262411		
BKSB137	2.332143895	5.79338475	1.30833282	-1.0238111		
BKSB138	2.406945108	6.25718182	1.131402111	-1.275543		
BKSB139	2.501435952	6.53941152	0.993251773	-1.5081842		
BKSB140	2.557227311	7.72183655	0.78845736	-1.76877		
BKSB141	2.778819272	7.8927435	0.741937345	-2.0368819		
BKSB142	2.809402695	9.06383812	0.587786665	-2.221616		
BKSB143	3.010620886	9.99348077	0.182321557	-2.8282993		
BKSB144	3.161246712	#REF!	-0.072570693	-3.2338174		
Sum of x _i	78.61393132					
Mean	1.786680257					
n=	44					
sum of x _i ²	160.3778498					
1/n=	0.022727273					
x _i =(sum xi) [^]	6180.150197					
d=	19.91989073					
W=	0.96653268					
W(0.05,44)	0.944					
W>W(0.5,44), the distribution is lognormal						

Shapiro Wilk for Lead

smpl_id	Lead	Ordered Conc. x(i)	Reverse Ordered x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)
BKSB101	6	0.72	33.2	32.48	0.3872	12.57626
BKSB102	5	1.3	12.1	10.8	0.2667	2.88036
BKSB103	9.5	1.5	10.2	8.7	0.2323	2.02101
BKSB104	5.3	1.5	10.1	8.6	0.2072	1.78192
BKSB105	3.9	1.7	9.8	8.1	0.1868	1.51308
BKSB106	5	2.3	9.5	7.2	0.1695	1.2204
BKSB107	6.1	2.3	8.3	6	0.1542	0.9252
BKSB108	9.8	2.5	7.8	5.3	0.1405	0.74465
BKSB109	3.2	3.00	7.8	4.8	0.1278	0.61344
BKSB110	7.8	3.1	7.7	4.6	0.116	0.5336
BKSB111	5.3	3.2	7.5	4.3	0.1049	0.45107
BKSB112	1.5	3.6	6.6	3	0.0943	0.2829
BKSB113	6	3.7	6.3	2.6	0.0842	0.21892
BKSB114	7.7	3.8	6.1	2.3	0.0745	0.17135
BKSB115	5.1	3.8	6	2.2	0.0651	0.14322
BKSB116	5.6	3.9	6	2.1	0.056	0.1176
BKSB117	8.3	4	5.6	1.6	0.0471	0.07536
BKSB118	3.7	4.1	5.3	1.2	0.0383	0.04596
BKSB119	1.3	4.1	5.3	1.2	0.0296	0.03552
BKSB120	0.72	4.1	5.1	1	0.0211	0.0211
BKSB121	10.2	4.5	5	0.5	0.0126	0.0063
BKSB122	4.1	5	5	0	0.0042	0
BKSB123	3.8	5	5	0	0	0
BKSB124	4.5	5	4.5	-0.5		0
BKSB125	1.7	5.1	4.1	-1		
BKSB126	1.5	5.3	4.1	-1.2	Sum of b=	26.37922
BKSB127	3.8	5.3	4.1	-1.2		
BKSB128	7.5	5.6	4	-1.6	W=	0.647733
BKSB129	4.1	6	3.9	-2.1	W(0.05,45)	0.945
BKSB130	3.1	6	3.8	-2.2		
BKSB131	10.1	6.1	3.8	-2.3		
BKSB132	7.8	6.3	3.7	-2.6		
BKSB133	6.3	6.6	3.6	-3		
BKSB134	2.3	7.5	3.2	-4.3		
BKSB135	2.5	7.7	3.1	-4.6		
BKSB136	3.00	7.8	3.00	-4.8		
BKSB137	2.3	7.8	2.5	-5.3		
BKSB138	4.1	8.3	2.3	-6		
BKSB139	3.6	9.5	2.3	-7.2		
BKSB140	33.2	9.8	1.7	-8.1		
BKSB141	12.1	10.1	1.5	-8.6		
BKSB142	5	10.2	1.5	-8.7		
BKSB143	6.6	12.1	1.3	-10.8		
BKSB144	4	33.2	0.72	-32.48		
Sum of xi	254.02					
Mean	5.773182					
n=	44					
sum of xi^2	2540.808					
1/n=	0.022727					
xi=(sum xi)^2	64526.16					
d=	1074.305					
W=	0.647733					
W(0.05,44)=	0.944					
W<W(0.5,44), the distribution is not normal						

Shapiro Wilk for Lead

smpl_id	ln of ordered Conc. x(i)	ln(xi)^2	ln of Reverse Order x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)
BKSB101	-0.328504067	0.107914922	3.502549876	3.83105394	0.3872	1.48338409
BKSB102	0.262364264	0.068835007	2.493205453	2.23084119	0.2667	0.59496534
BKSB103	0.405465108	0.164401954	2.32238772	1.91692261	0.2323	0.44530112
BKSB104	0.405465108	0.164401954	2.312535424	1.90707032	0.2072	0.39514497
BKSB105	0.530628251	0.281566341	2.282382386	1.75175413	0.1868	0.32722767
BKSB106	0.832909123	0.693737607	2.251291799	1.41838268	0.1695	0.24041586
BKSB107	0.832909123	0.693737607	2.116255515	1.28334639	0.1542	0.19789201
BKSB108	0.916290732	0.839588705	2.054123734	1.137833	0.1405	0.15986554
BKSB109	1.098612289	1.206948961	2.054123734	0.95551145	0.1278	0.12211436
BKSB110	1.131402111	1.280070738	2.041220329	0.90981822	0.116	0.10553891
BKSB111	1.16315081	1.352919806	2.014903021	0.85175221	0.1049	0.08934881
BKSB112	1.280933845	1.640791516	1.887069649	0.6061358	0.0943	0.05715861
BKSB113	1.30833282	1.711734767	1.840549633	0.53221681	0.0842	0.04481266
BKSB114	1.335001067	1.782227848	1.808288771	0.4732877	0.0745	0.03525993
BKSB115	1.335001067	1.782227848	1.791759469	0.4567584	0.0651	0.02973497
BKSB116	1.360976553	1.852257178	1.791759469	0.43078292	0.056	0.02412384
BKSB117	1.386294361	1.921812056	1.722766598	0.33647224	0.0471	0.01584784
BKSB118	1.410986974	1.99088424	1.667706821	0.25671985	0.0383	0.00983237
BKSB119	1.410986974	1.99088424	1.667706821	0.25671985	0.0296	0.00759891
BKSB120	1.410986974	1.99088424	1.62924054	0.21825357	0.0211	0.00460515
BKSB121	1.504077397	2.262248815	1.609437912	0.10536052	0.0126	0.00132754
BKSB122	1.609437912	2.590290394	1.609437912	0	0.0042	0
BKSB123	1.609437912	2.590290394	1.609437912	0		0
BKSB124	1.609437912	2.590290394	1.504077397	-0.10536052		0
BKSB125	1.62924054	2.654424736	1.410986974	-0.21825357		
BKSB126	1.667706821	2.781246039	1.410986974	-0.25671985	Sum of b=	4.39150052
BKSB127	1.667706821	2.781246039	1.410986974	-0.25671985		
BKSB128	1.722766598	2.96792475	1.386294361	-0.33647224	W(ln)=	0.97536815
BKSB129	1.791759469	3.210401996	1.360976553	-0.43078292		
BKSB130	1.791759469	3.210401996	1.335001067	-0.4567584	W(0.05,44)	0.944
BKSB131	1.808288771	3.26990828	1.335001067	-0.4732877		
BKSB132	1.840549633	3.387622953	1.30833282	-0.53221681		
BKSB133	1.887069649	3.56103186	1.280933845	-0.6061358		
BKSB134	2.014903021	4.059834182	1.16315081	-0.85175221		
BKSB135	2.041220329	4.166580431	1.131402111	-0.90981822		
BKSB136	2.054123734	4.219424313	1.098612289	-0.95551145		
BKSB137	2.054123734	4.219424313	0.916290732	-1.137833		
BKSB138	2.116255515	4.478537404	0.832909123	-1.28334639		
BKSB139	2.251291799	5.068314762	0.832909123	-1.41838268		
BKSB140	2.282382386	5.209269354	0.530628251	-1.75175413		
BKSB141	2.312535424	5.347820087	0.405465108	-1.90707032		
BKSB142	2.32238772	5.393484723	0.405465108	-1.91692261		
BKSB143	2.493205453	6.216073429	0.262364264	-2.23084119		
BKSB144	3.502549876	12.26785563	-0.328504067	-3.83105394		
Sum of xi	67.07441138					
Mean	1.52441844					
n=	44					
sum of xi^2	122.0217748					
1/n=	0.022727273					
xi=(sum xi)^2	4498.976662					
d=	19.77230523					
W(ln)=	0.975368151					
W(0.05,44)=	0.944					
W>W(0.5,44), the distribution is lognormal						

Shapiro Wilk for Arsenic

smp_id	Arsenic				a(n-i+1)	b(i)
BKSB101	3	0.44	11.6	11.16	0.3894	4.345704
BKSB102	2	0.66	9.2	8.54	0.2684	2.292136
BKSB103	9.1	1	9.1	8.1	0.2334	1.89054
BKSB104	6.2	1.6	8.2	6.6	0.2078	1.37148
BKSB105	4.3	1.9	7.6	5.7	0.1871	1.06647
BKSB106	4.4	2	6.2	4.2	0.1695	0.7119
BKSB108	6	2.5	6	3.5	0.1539	0.53865
BKSB109	3.5	2.6	6	3.4	0.1398	0.47532
BKSB110	4.8	2.6	5.7	3.1	0.1269	0.39339
BKSB111	5.2	2.7	5.6	2.9	0.1149	0.33321
BKSB112	1.6	2.9	5.3	2.4	0.1035	0.2484
BKSB113	5.7	3	5.3	2.3	0.0927	0.21321
BKSB114	5.2	3.2	5.2	2	0.0824	0.1648
BKSB115	5.3	3.2	5.2	2	0.0724	0.1448
BKSB116	11.6	3.2	4.8	1.6	0.0628	0.10048
BKSB117	4.4	3.5	4.8	1.3	0.0534	0.06942
BKSB118	2.6	3.6	4.4	0.8	0.0442	0.03536
BKSB119	0.66	3.7	4.4	0.7	0.0352	0.02464
BKSB120	0.44	3.8	4.3	0.5	0.0263	0.01315
BKSB121	4.1	3.8	4.30	0.5	0.0175	0.00875
BKSB122	3.2	3.8	4.2	0.4	0.0087	0.00348
BKSB123	3.8	4.1	4.1	0	0	0
BKSB124	6	4.2	3.8	-0.4		
BKSB125	3.2	4.3	3.8	-0.5		
BKSB126	2.5	4.30	3.8	-0.5	sum Bi=	14.44529
BKSB127	1.9	4.4	3.7	-0.7		
BKSB128	3.6	4.4	3.6	-0.8	W(0.05,43)	0.943
BKSB129	2.6	4.8	3.5	-1.3	W=	0.939827935
BKSB130	1	4.8	3.2	-1.6		
BKSB131	5.3	5.2	3.2	-2		
BKSB132	4.2	5.2	3.2	-2		
BKSB133	3.2	5.3	3	-2.3		
BKSB134	2.9	5.3	2.9	-2.4		
BKSB135	2.7	5.6	2.7	-2.9		
BKSB136	4.30	5.7	2.6	-3.1		
BKSB137	8.2	6	2.6	-3.4		
BKSB138	9.2	6	2.5	-3.5		
BKSB139	7.6	6.2	2	-4.2		
BKSB140	4.8	7.6	1.9	-5.7		
BKSB141	5.6	8.2	1.6	-6.6		
BKSB142	3.8	9.1	1	-8.1		
BKSB143	3.8	9.2	0.66	-8.54		
BKSB144	3.7	11.6	0.44	-11.16		
Sum of xi	187.2					
Mean	4.3534884					
n=	43					
sum of xi^2	1036.9992					
1/n=	0.0232558					
xi=(sum xi)^2	35043.84					
d=	222.02618					
W=	0.9398279					
W(0.05,43)=	0.943					
W<W(0.5,43), the distribution is approximately normal						

Shapiro Wilk for Arsenic

	ln of ordered Conc. x(i)		ln of Reverse Order x(n-i+1)	Difference x(n-i+1)-x(i)	a(n-i+1)	b(i)
	-0.820980552	0.674009067	2.451005098	3.27198565	0.3894	1.27411121
	-0.415515444	0.172653084	2.219203484	2.63471893	0.2684	0.70715856
	0	0	2.208274414	2.20827441	0.2334	0.51541125
	0.470003629	0.220903412	2.104134154	1.63413053	0.2078	0.33957232
	0.641853886	0.411976411	2.028148247	1.38629436	0.1871	0.25937567
	0.693147181	0.480453014	1.824549292	1.13140211	0.1695	0.19177266
	0.916290732	0.839588705	1.791759469	0.87546874	0.1539	0.13473464
	0.955511445	0.913002122	1.791759469	0.83624802	0.1398	0.11690747
	0.955511445	0.913002122	1.740466175	0.78495473	0.1269	0.09961076
	0.993251773	0.986549085	1.722766598	0.72951482	0.1149	0.08382125
	1.064710737	1.133608953	1.667706821	0.60299608	0.1035	0.06241009
	1.098612289	1.206948961	1.667706821	0.56909453	0.0927	0.05275506
	1.16315081	1.352919806	1.648658626	0.48550782	0.0824	0.04000584
	1.16315081	2.781246039	1.648658626	0.48550782	0.0724	0.03515077
	1.16315081	6.007425991	1.568615918	0.40546511	0.0628	0.02546321
	1.252762968	2.195152016	1.568615918	0.31585295	0.0534	0.01686655
	1.280933845	0.913002122	1.481604541	0.2006707	0.0442	0.00886964
	1.30833282	0.172653084	1.481604541	0.17327172	0.0352	0.00609916
	1.335001067	0.674009067	1.458615023	0.12361396	0.0263	0.00325105
	1.335001067	1.99088424	1.458615023	0.12361396	0.0175	0.00216324
	1.335001067	1.352919806	1.435084525	0.10008346	0.0087	0.00087073
	1.410986974	1.782227848	1.410986974	0		0
	1.435084525	3.210401996	1.335001067	-0.1000835		0
	1.458615023	1.352919806	1.335001067	-0.123614		0
	1.458615023	0.839588705	1.335001067	-0.123614		
	1.481604541	0.411976411	1.30833282	-0.1732717		3.97638115
	1.481604541	1.640791516	1.280933845	-0.2006707		
	1.568615918	0.913002122	1.252762968	-0.3158529	W(0.05,43)	0.943
	1.568615918	0	1.16315081	-0.4054651	W(ln)=	0.91061638
	1.648658626	2.781246039	1.16315081	-0.4855078		
	1.648658626	2.059467595	1.16315081	-0.4855078		
	1.667706821	1.352919806	1.098612289	-0.5690945		
	1.667706821	1.133608953	1.064710737	-0.6029961		
	1.722766598	0.986549085	0.993251773	-0.7295148		
	1.740466175	2.127557784	0.955511445	-0.7849547		
	1.791759469	4.427380539	0.955511445	-0.836248		
	1.791759469	4.924864104	0.916290732	-0.8754687		
	1.824549292	4.113385313	0.693147181	-1.1314021		
	2.028148247	2.460555898	0.641853886	-1.3862944		
	2.104134154	2.96792475	0.470003629	-1.6341305		
	2.208274414	1.782227848	0	-2.2082744		
	2.219203484	1.782227848	-0.415515444	-2.6347189		
	2.451005098	1.711734767	-0.820980552	-3.2719857		
Sum of xi	56.26742214		56.26742214			
Mean	1.308544701					
n=	43					
sum of xi^2	90.99206827					
1/n=	0.023255814					
xi=(sum xi)^2	3166.022794					
d=	17.3636312					
W=	0.910616383					
W(0.05,43)=	0.943					
W<W(0.5,43), the distribution is not lognormal						

Appendix E

TNRCC Background Criteria Memo

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: Program Areas which Utilize the Risk Reduction Rules and Site Specific Risk Analysis

Date: May 19, 1995

From: Dan Pearson
Executive Director

Subject: Arsenic Soil Cleanup Standards

As a result of the TNRCC's experience at the Hi-Yield Superfund Site, it has become apparent there is considerable controversy regarding cleanup standards for arsenic. The TNRCC has Risk Reduction Rules which set a goal for risk due to residual contamination after cleanup (1×10^{-6}). When this goal is translated into a cleanup level for arsenic in soil, the result is .3 to .4 parts per million (ppm). This level of arsenic is below common background levels of arsenic in soil.

In such cases, the Risk Reduction Rules allow an alternate cleanup level of the background concentration. These background levels can be quite low (- 2.6 ppm) when compared to cleanup levels utilized by other agencies such as EPA and other state environmental agencies.

I have asked the Risk Reduction Implementation Committee to examine this issue and report back to me with a recommendation for an appropriate cleanup level for arsenic after careful examination of the relevant science and literature. I expect that this will take some time.

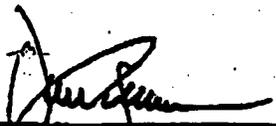
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MAY 23 1995

In the meanwhile, the TNRCC must move forward and address sites contaminated with arsenic.

INDUSTRIAL & HAZARDOUS WASTE

Therefore, in the interim, I am directing the various program areas that must make decisions in regard to arsenic contamination, to utilize a remediation cleanup level of 20 ppm for arsenic in soils in residential areas, based on soil exposure only. If other considerations, such as potential groundwater contamination, indicate that a lower level may be appropriate, those analyses should be followed rather than this directive. The EPA has used 20 ppm as a removal action level.

Until the Risk Reduction Implementation Committee presents its recommendations this value will serve as an adequately protective concentration in the meantime.



Dan Pearson

Appendix F

Screening Results

Summary of Detected Analytical Results, Detection Limits, and Screening Criteria for FH-052 Samples

Location	Sample ID	Depth	Parameter	Result	PQL	Units	Screening Criteria	Screening Value	Units
SW101	52SD101	--	Arsenic	21.1 J	0.54	mg/kg	Surface Soil Background	9.2	mg/kg
SW101	52SD101	--	Barium	108	0.13	mg/kg	Surface Soil Background	157.3	mg/kg
SW101	52SD101	--	Cadmium	0.3	0.07	mg/kg	Surface Soil Background	0.67	mg/kg
SW101	52SD101	--	Chromium	23.4 J	0.13	mg/kg	Surface Soil Background	24.88	mg/kg
SW101	52SD101	--	Lead	13	0.23	mg/kg	Surface Soil Background	19	mg/kg
SW101	52SD101	--	Selenium	0.96	0.49	mg/kg	30 TAC 335 Industrial Soil GWP	5	mg/kg
SW101	52SD108	--	Arsenic	2.7 J	0.45	mg/kg	Surface Soil Background	9.2	mg/kg
SW102	52SD102	--	Arsenic	15.3 J	0.5	mg/kg	Surface Soil Background	9.2	mg/kg
SW102	52SD102	--	Barium	71.1	0.12	mg/kg	Surface Soil Background	157.3	mg/kg
SW102	52SD102	--	Cadmium	0.26	0.06	mg/kg	Surface Soil Background	0.67	mg/kg
SW102	52SD102	--	Chromium	17.1 J	0.12	mg/kg	Surface Soil Background	24.88	mg/kg
SW102	52SD102	--	Lead	8.5	0.21	mg/kg	Surface Soil Background	19	mg/kg
SW102	52SD109	--	Arsenic	3.6 J	0.48	mg/kg	Surface Soil Background	7.32	mg/kg
SW103	52SD103	--	Arsenic	3.5	0.91	mg/kg	Surface Soil Background	9.2	mg/kg
SW104	52SD104	--	Arsenic	2	0.39	mg/kg	Surface Soil Background	9.2	mg/kg
SW105	52SD105	--	Arsenic	3.4	0.38	mg/kg	Surface Soil Background	9.2	mg/kg
SW106	52SD106	--	Arsenic	1.6	0.41	mg/kg	Surface Soil Background	9.2	mg/kg
SW107	52SD107	--	Arsenic	6.5	0.48	mg/kg	Surface Soil Background	9.2	mg/kg
SW108	52SD110	--	Arsenic	3.7 J	0.45	mg/kg	Surface Soil Background	9.2	mg/kg
SW109	52SD111	--	Arsenic	3 J	0.37	mg/kg	Surface Soil Background	9.2	mg/kg
SW110	52SD112	--	Arsenic	6.3 J	0.43	mg/kg	Surface Soil Background	9.2	mg/kg
SW101	52SW101	--	Barium	0.0737	0.003	mg/L	30 TAC 335 Groundwater	2	mg/L

Summary of Detected Analytical Results, Detection Limits, and Screening Criteria for FH-052 Samples

Location	Sample ID	Depth	Parameter	Result	PQL	Units	Screening Criteria	Screening Value	Units
SW102	52SW102	--	Barium	0.0703	0.003	mg/L	30 TAC 335 Groundwater	2	mg/L

J - Indicates estimated value due to laboratory or data validation QA/QC criteria not being met

