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HYDRO GeoLogic INC.

FINAL
RCRA FACILITY INVESTIGATION
SOLID WASTE MANAGEMENT UNITS
22, 23, 24, AND 25
NAS FORT WORTH JRB, TEXAS

Volume I of III

Prepared for

U.S. Air Force Center for Environmental Excellence
Brooks AFB, Texas
Contract Number F41624-95-D-8005

May 2001

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13 ABSTRACT (Maximum 200 words)

This document presents the environmental data collected in support of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) performed at Solid Waste Management Units (SWMU) 22, 23, 24, and 25, located at NAS Fort Worth JRB, Texas The SWMU designations were assigned by the Texas Natural Resource Conservation Commission (TNRCC) as part of the RCRA Permit (HW-50289) assigned to the base in February 1991. The U.S Air Force assigned site designations to the subject SWMUs under the Air Force Installation Restoration Program (IRP), which include Landfill 4 (SWMU 22), Landfill 5 (SWMU 23), Waste Burial Area 7 (SWMU 24), and Landfill 8 (SWMU 25)

The primary objective of the subject RFI was to determine the appropriate closure standard for soil media at SWMU 22, 23, 24, and 25, under the TNRCC Risk Reduction Rules, Chapter 335 - Industrial Solid Waste and Municipal Waste, Subchapter S - Risk Reduction Standards, (§335 551 - 335 569) Environmental data collected as part of this RFI indicates that closure under Risk Reduction Standard 2 is appropriate for soil media at the four subject SWMUs. Groundwater contamination in the region of the four SWMUs is currently being addressed under a separate Air Force program.

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PREFACE

This document contains the Final Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report for solid waste management units (SWMU) 22, 23, 24, and 25 at the former Carswell AFB, Fort Worth, Texas.

HydroGeoLogic, Inc. (HydroGeoLogic) prepared this report under contract to the U.S. Air Force Center for Environmental Excellence (AFCEE), Contract No. F41624-95-D-8005, Delivery Order No. 0002, in support of the Air Force Installation Restoration Program (IRP). The objective of the U.S. Air Force IRP is to assess past hazardous waste disposal and spill sites at U.S. Air Force installations and to develop remedial actions consistent with the National Contingency Plan for sites that pose a threat to human health and welfare or the environment.

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LIST OF ACRONYMS AND ABBREVIATIONS

1,2-DCA	1,2-dichloroethane
ACC	Air Combat Command
AFB	Air Force Base
AFBCA	Air Force Base Conversion Agency
AFCEE	U.S. Air Force Center for Environmental Excellence
AFP 4	Air Force Plant 4
AOCs	areas of concern
B2EHP	bis(2-ethylhexyl)phthalate
BBS	Basewide Background Study
bgs	below ground surface
BLRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
DNAPL	dense non-aqueous phase liquid
DPT	direct push technology
DQE	Data Quality Evaluation
DQOs	Data Quality Objectives
DRMO	Defense Reutilization and Marketing Office
E&E	Ecology and Environment
EDD	electronic data deliverable
EM	electromagnetic
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FS	feasibility study
FSP	Field Sampling Plan
GC/MS	gas chromatography/mass spectroscopy
GFAA	Graphite Furnace Atomic Absorption
gpd/ft^2	gallons per day per square foot
GWP-Ind	Groundwater Protection-Industrial
HSA	hollow stem auger
HydroGeoLogic	HydroGeoLogic, Inc.
ICP	Inductively Coupled Plasma
IRA	Interim Remedial Action
IRP	Installation Restoration Program
MDL	method detection limit
MEK	methyl ethyl ketone

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

mg/kg	milligram per kilogram
MQL	method quantitation limit
MS	matrix spike
MSC	medium-specific concentration
MSD	matrix spike duplicate
msl	mean sea level
nT	nanoteslas
NAS Fort Worth JRB	Naval Air Station Fort Worth Joint Reserve Base
NCDC	National Climatic Data Center
NGVD	National Geodetic Vertical Datum
NPL	National Priority List
OC	organochlorine
OWS	oil/water separator
O,O,O-TEPA	O,O,O-Triethyl phosphorothioate
P1	Paluxy 1
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
PQL	Practical Quantitation Limit
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RI	remedial investigation
RRS	Risk Reduction Standards
SAC	Strategic Air Command
SAI-Ind	Soil Air Interface-Industrial
SDG	sample delivery group
SIM	selective ion monitoring
SPLP	synthetic precipitation leaching procedure
SQL	sample quantitation limit
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TCA	trichloroethane
TCE	trichloroethene
TCLP	toxicity characterization leaching procedure
TNRCC	Texas Natural Resource Conservation Commission
TPH	total petroleum hydrocarbons

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
UST	underground storage tank
VOC	volatile organic compound

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TAB

SECTION L.0

FINAL
RCRA FACILITY INVESTIGATION
SOLID WASTE MANAGEMENT UNITS
22, 23, 24, AND 25
NAS FORT WORTH JRB, TEXAS

1.0 INTRODUCTION

The Texas Natural Resource Conservation Commission (TNRCC) issued a Resource Conservation and Recovery Act (RCRA) hazardous waste permit (HW-50289) to the former Carswell Air Force Base (AFB), Fort Worth, Texas, in February 1991. The former Carswell AFB is currently known as Naval Air Station Fort Worth JRB (NAS Fort Worth JRB). Requirements of the permit state that a RCRA Facility Investigation (RFI) must be conducted at all solid waste management units (SWMUs) and Areas of Concern (AOCs) listed or subsequently added to the HW-50289 permit. SWMU 22 (Landfill 4), SWMU 23 (Landfill 5), SWMU 24 (Waste Burial Area 7), and SWMU 25 (Landfill 8), are regulated by this permit and are the subject of this RFI report.

This report summarizes relevant historical site investigation data and current site investigation data, including soil and groundwater sampling results, as well as interim actions performed in support of the RFI at SWMUs 22, 23, 24, and 25. The primary objective of the RFI was to determine the appropriate closure standard for soil media at each of the four SMWUs under the TNRCC Risk Reduction Rules, Chapter 335 - Industrial Solid Waste and Municipal Solid Waste, Subchapter S - Risk Reduction Standards (RRS), Sections 335.551-335.569. Environmental data collected as part of this RFI and presented in this report indicate that closure under RRS 2 is appropriate for soil media at the four subject SWMUs. Under RRS 2 closure, soil media remains in place and does not pose a significant risk to human health or the environment. Groundwater contamination in the region of the four SWMUs is currently being addressed under a separate Air Force program and is not the subject of this RFI.

1.1 INSTALLATION DESCRIPTION

NAS Fort Worth JRB is located on 2,555 acres of land in Tarrant County, Texas, 8 miles west of downtown Fort Worth (Figure 1.1). The base comprises 2,264 acres and is bordered by Lake Worth to the north, the West Fork Trinity River, River Oaks, and the town of Westworth Village to the east, other urban areas of Fort Worth to the northeast and southeast, the city of White Settlement to the west and southwest, and Air Force Plant 4 (AFP 4) to the west. The area surrounding NAS Fort Worth JRB is mostly suburban. Land use in the immediate vicinity of the base is industrial, commercial, residential, and recreational (A.T. Kearney, 1989).

1.1.1 Installation History and Present Mission

Prior to initial base construction in 1941, the area that is now occupied by NAS Fort Worth JRB consisted of woods and pasture in an area called White Settlement. NAS Fort Worth JRB started as a modest dirt runway built to service the aircraft manufacturing plant located where AFP 4 is now. AFP 4 is a 760-acre site located on the western boundary of NAS Fort Worth JRB. Figure 1.2 depicts the base boundaries of NAS Fort Worth JRB and AFP 4, and the locations of SWMUs and AOCs at NAS Fort Worth JRB.

In August 1942, the base was opened as Tarrant Field Airdrome and used to train pilots to fly the B-24 under the jurisdiction of the Gulf Coast Army Air Field Training Command. In May 1943, the field was re-designated as Fort Worth Army Air Field with continued use as a training facility for pilots. The Strategic Air Command (SAC) assumed control of the installation in 1946 and the base served as the headquarters for the 8th Air Force.

It was renamed Carswell AFB in 1948, and the 7th Bomber Wing became the base host unit. The Headquarters 19th Air Division was located at Carswell AFB in 1951 where it remained until September 1988 (A.T. Kearney, 1989). The SAC mission remained at Carswell AFB until 1992 when the Air Combat Command (ACC) assumed control of the base upon disestablishment of SAC. In October 1994, the U.S. Navy assumed responsibility for much of the facility, and its name was changed from Carswell AFB to NAS Fort Worth JRB. The NAS Dallas and elements of Glenview and Memphis NASs were combined into the NAS Fort Worth JRB to streamline naval operations into one central area. The principal activities on the base have been maintaining and servicing bombers, fuel tankers, and fighter jet aircraft (A.T. Kearney, 1989).

1.1.2 Site Operational History

A summary of past and current industrial activities and waste disposal operations conducted at NAS Fort Worth JRB is presented in the following sections.

1.1.2.1 Industrial Activities

Major industrial operations at NAS Fort Worth JRB include maintenance of jet engines, aerospace ground equipment, fuel systems, weapons system, and pneudraulic systems; and maintenance of general and special purpose vehicles, aircraft corrosion control, and non-destructive inspection activities. Most of the liquid wastes that have been generated by industrial operations can be characterized as waste oils, recoverable fuels, spent solvents, and spent cleaners (CH2M HILL, 1996a).

Waste oils generally refer to lubricating fluids/oils and to a lesser extent, hydraulic fluids. Recoverable fuels refer to fuels drained from aircraft tanks and other base vehicles, such as Jet Propulsion grade 4 (JP-4) and leaded and unleaded gasoline. Spent solvents and cleaners refer to stripping liquids used for degreasing and cleaning of aircraft, aircraft systems and parts, electronic components, and vehicles. Included in this category are PD-680 (petroleum naphtha) and various chlorinated organic compounds. Specific types of degreasing solvents used by the U.S. Air Force have changed over the years. In the 1950s, carbon tetrachloride was commonly used until it was

replaced by trichloroethene (TCE) in about 1960. Since then, TCE and 1,1,1-trichloroethane (1,1,1-TCA) have been used although TCE usage has decreased in favor of 1,1,1-TCE. Today, PD-680 Type II, 1,1,1-TCA, and to a limited extent, TCE are used. Waste paint solvents and strippers are also generated on-site from corrosion control activities. Typical paint solvents include compounds like isobutyl acetate, toluene, methyl ethyl ketone (MEK), isopropanol, naphtha, and xylene. Paint strippers generally contain such compounds as methylene chloride, toluene, ammonium hydroxide, and phenolics. Servicing and maintenance of the engines and equipment of the B-52 and KC-135 aircraft generated the majority of waste liquids at NAS Fort Worth JRB (CH2M HILL, 1996a).

1.1.2.2 Waste Disposal Operations

Wastes have been generated and disposed of at NAS Fort Worth JRB since the beginning of industrial operations in 1942. Historical waste management practices at NAS Fort Worth JRB were presented in the Phase I Initial Assessment Report (CH2M HILL, 1984), the Phase I Remedial Investigation (RI) Report (Radian, 1989), and the Site Characterization Summary Informal Technical Information Report (CH2M HILL, 1996a), and are summarized in the following paragraphs:

1942-1970: The majority of waste oils, recovered fuels, spent solvents, and cleaners were burned at the fire department training areas during practice exercises. Some waste oils and spent solvents were disposed of through contractor removal, while some waste paints (contaminated with thinners and solvents), waste oils, and PD-680 are suspected of having been disposed of in the base landfills. Some waste oils, recovered fuels, spent solvents, and cleaners were also discharged to sanitary and storm sewers. These discharges occurred primarily at the washracks. In 1955, an oil/water separator (OWS) (Facility 1190) was installed to recover waste materials discharged from the washracks. Non-aqueous materials from OWSs were pumped out and disposed of through contractor removal. Aqueous discharge from OWSs was, and still is, pumped into the sanitary sewers.

1971-1975: During this period, most waste oils, spent solvents, and cleaners were disposed of by contractor removal. A private contractor would pump the materials from OWSs, 55-gallon drums, and bowsers. Recovered JP-4 was still stored at the fire training area and burned in practice exercises. Recovered JP-4 was also reused in aerospace ground equipment operations. Some waste paints (contaminated with thinners and solvents), waste oils, and PD-680 are suspected of having been disposed of in the base landfills. In addition, some waste oils, solvents, and cleaners were discharged into sanitary sewer drains, primarily at the washracks that discharge to the Facility 1190 OWS. This OWS was routinely pumped out by a private contractor, and the recovered materials were removed from the base by the contractor.

1976-1982: The majority of waste oils, spent solvents, and cleaners were disposed of by service contract either directly or through the Defense Reutilization and

Marketing Office (DRMO). Recovered JP-4 was stored at fire department training areas and burned during practice exercises. Recovered JP-4 was also used in aerospace ground equipment operations. PD-680 used at the washracks was discharged to the Facility 1190 OWS, which discharged to the sanitary sewers.

1983-Present: Waste oils, solvents, and cleaners are collected in 55-gallon drums and temporarily (less than 90 days) stored at 12 hazardous waste accumulation points located throughout the flightline area of the base. They are subsequently disposed of by contractor removal through DRMO. Recovered JP-4 and other fuels (Mogas - unleaded gasoline) are stored at the fire department training area for subsequent burning in practice exercises or reuse in aerospace ground equipment operations. Waste paint solvents or thinners and strippers such as toluene, isobutyl acetate, MEK, isopropanol, naphtha, and xylene are also temporarily stored prior to removal. Removal of waste oils and PD-680 (Type II) from OWSs is also handled by off-base contractor through DRMO.

1.2 REGULATORY ENVIRONMENT

On February 7, 1991 the former Carswell AFB was issued a RCRA hazardous waste permit (HW-50289) by the TNRCC. This permit requires a RFI of all SWMUs and AOCs listed in Permit Provision VIII (as well as those SWMUs subsequently added to the list) to determine whether hazardous constituents listed in Title 40, Code of Federal Regulations (40 CFR) Part 264, Appendix IX, have been released into the environment. SWMUs 22, 23, and 24 were designated in the original 1991 SWMU list. SWMU 25 was added to the HW-50289 permit by the TNRCC in a letter dated April 22, 1994 to the Air Force Base Conversion Agency (AFBCA). The primary regulatory programs that govern the investigation and potential closure of NAS Fort Worth JRB sites are RCRA and the TNRCC RRS Program. The TNRCC is the lead regulatory agency for activities to be conducted at the subject sites. Specifically, the TNRCC Corrective Action Section, Remediation Division, is responsible for overseeing the RFI at SWMUs 22, 23, 24, and 25. The U.S. Environmental Protection Agency (EPA), Region VI, provides secondary oversight of the RFI at SWMUs 22, 23, 24, and 25.

In Subchapter S of the Risk Reduction Rules, the TNRCC has developed a series of three standards by which closure of RCRA sites may be obtained. General procedures for determining these standards have been based on scientific principals so that specific numeric cleanup levels can be generated. The cleanup levels are specified for different types of contaminated media such as air, surface water, groundwater, and soil, and for cross-media contamination pathways such as soil to groundwater and soil to air. Compliance with the three RRSs are designed to assure adequate protection of human health and the environment from potential exposure to contaminants associated with releases from SWMUs and other AOCs.

A general overview of closure requirements under each of the three standards is provided below.

Standard 1: Closure/Remediation to Background - A Standard 1 closure may be requested when it is established that the subject site is unaffected by past or present waste disposal practices. Attainment of a Standard 1 closure is demonstrated by sufficient sample collection and analysis to indicate that media contaminant concentrations are below background for inorganic compounds or the Method Quantification Limit (MQL) for organic compounds.

Standard 2: Closure/Remediation to Health-Based Standards and Criteria - A Standard 2 closure may be requested when it is established that the subject site does not contain contaminant concentrations greater than Standard 2 screening values in any contaminated media of concern. In addition, contamination must be delineated to Standard 1. Attainment of a Standard 2 closure is demonstrated by sufficient sample collection and analysis from the contaminated media of concern using the procedures outlined in Subchapter S of the TNRCC Risk Reduction Rules and the TNRCC Consistency Memorandum. A document stating the responsible persons intention to fulfill deed certification requirements outlined in subsection 335.560 of the Risk Reduction Rules, Subchapter S must also be prepared and approved.

Standard 3: Closure/Remediation with Controls - A Standard 3 closure may be granted when the responsible party recommends a remedy to control contaminated media of concern which best achieves the requirements outlined in Subchapter S of the Risk Reduction Rules and the TNRCC Consistency Memorandum. This remedy must be approved by the TNRCC executive director, and following approval the responsible party must subsequently complete the remedy, submit the final report, initiate post closure care, and complete the deed recordation requirements outlined in subchapter S of the Risk Reduction Rules.

The primary emphasis of the subject investigation is to meet the requirements of Permit Provision VIII of the NAS Fort Worth HW-50289 permit. The NAS Fort Worth JRB is not a listed National Priority List (NPL) site. However, as the Installation Restoration Program (IRP), TNRCC RRS, and RCRA rely heavily on guidance documents prepared under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), this RFI has been performed and the report prepared using guidance documents from all four programs.

1.3 REPORT ORGANIZATION

The remainder of the report is organized as follows:

Section 2.0 provides a description of the environmental setting at the base and in the region of SWMUs 22, 23, 24, and 25.

Section 3.0 provides site descriptions and an overview of previous environmental investigations at SWMUs 22, 23, 24, and 25.

Section 4.0 includes a discussion of sampling strategies, Data Quality Objectives (DQOs), field activities, field Quality Assurance/Quality Control (QA/QC), laboratory analysis, data evaluation, and a site conceptual model.

Section 5.0 presents the analytical results and results of other field activities identified in Section 4.0.

Section 6.0 presents conclusions and recommendations for each site based on the findings presented in Section 5.0.

Section 7.0 presents the references used in the preparation of this RFI Report.

Appendix A contains soil boring logs recorded from soil borings, test pits, and monitoring wells advanced/installed by HydroGeoLogic under this investigation.

Appendix B contains Field Sampling Report Forms generated for each sample collected under this investigation.

Appendix C contains details of monitoring well construction for monitoring wells installed by HydroGeoLogic for this investigation.

Appendix D contains Monitoring Well Development Forms which present details about well development.

Appendix E contains the chain-of-custody forms for samples collected under this investigation.

Appendix F contains a chronology of laboratory analyses.

Appendix G presents exceptions to the Quality Assurance Project Plan (QAPP).

Appendix H contains data validation reports and data completeness calculation results.

Appendix I contains the report prepared on the laboratory audit performed by HydroGeoLogic personnel.

Appendix J contains all analytical data generated under this investigation.

Appendix K presents the geophysical investigation results confirming removal of buried metallic objects at SWMU 24 by IT Corporation.

Appendix L contains correspondence between AFCEE and TNRCC regarding dismissal of O,O,O-triethyl phosphorothioate (O,O,O-TEPA).

Appendix M contains analytical results for confirmation samples from the Interim Remedial Actions (IRAs) from IT Corporation and the analytical results for confirmation samples from the drum removal activities at SWMU 24 performed by IT Corporation.

Appendix N presents the Metes and Bounds surveys for SWMUs 22, 23, 24, and 25.

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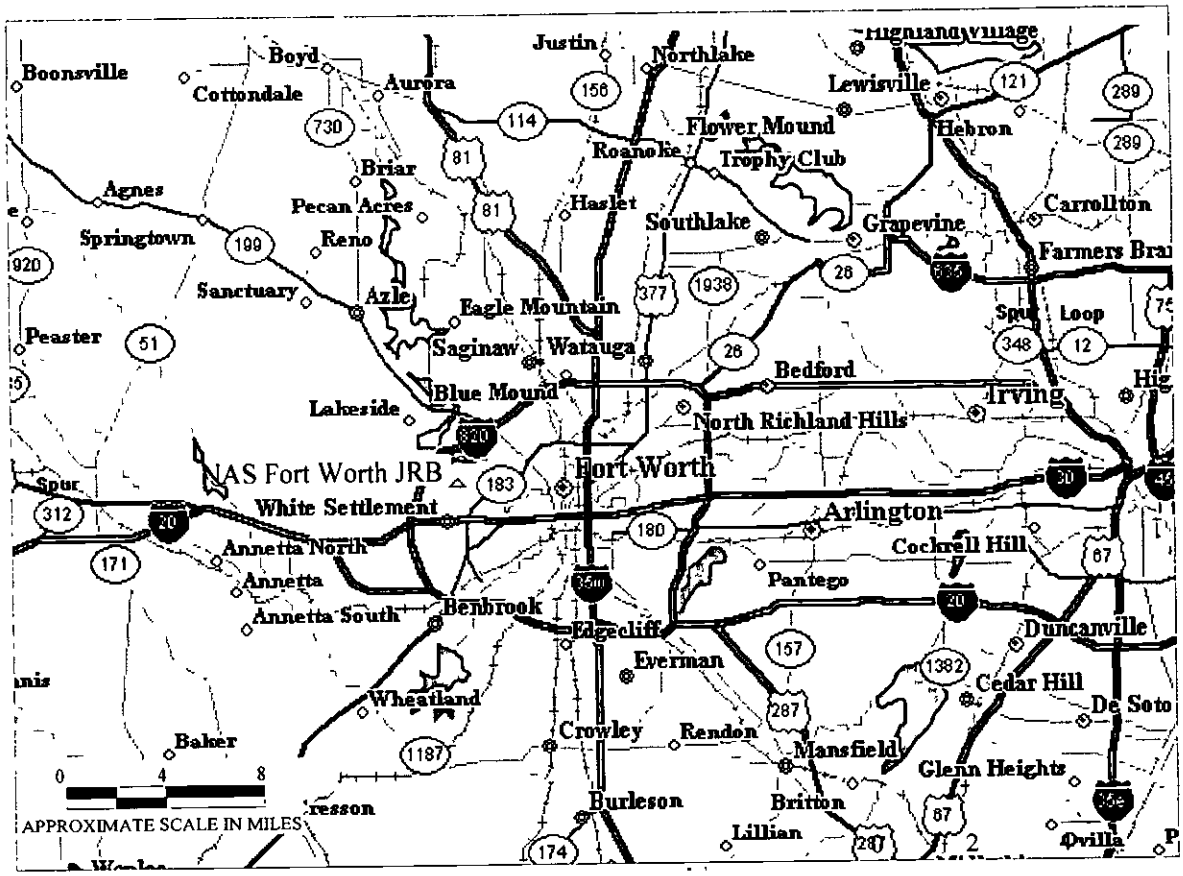
FIGURES



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final rfi swmus 22,23,24, and 25 Site_Loc apr
Project AFC001-024c
Created 08/12 98 cfarmer
Revised 05/30 01 asp
Map Source ProCD

HYDRO GeoLogic

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Figure 1.1

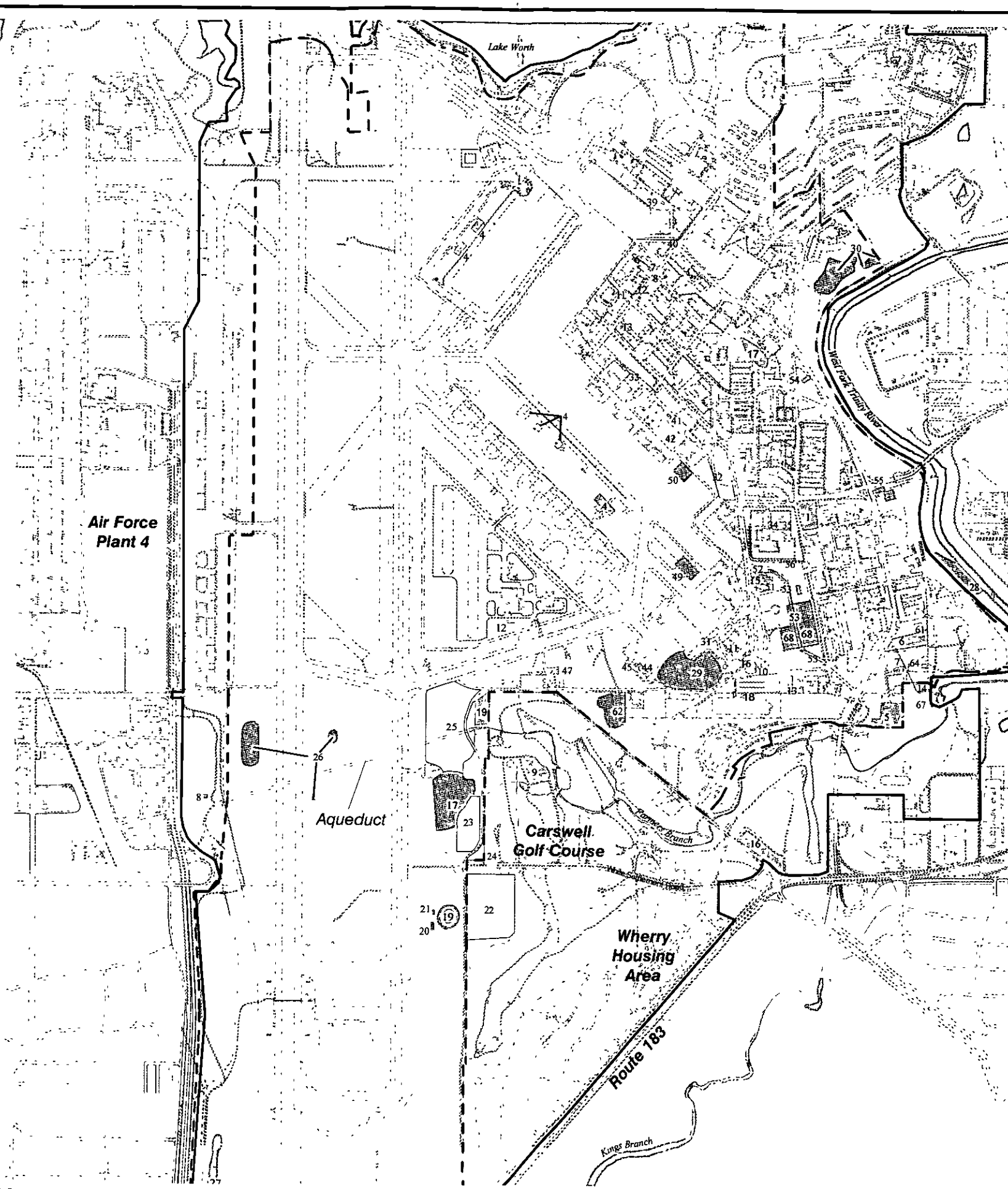
Site Location Map
NAS Fort Worth JRB, Texas

Areas of Concern (AOC)

1 Former Base Service Station/ Former Base Gas Station
2 Airfield Groundwater (Basewide Coverage)
4 Fuel Hydrant System
5 Grounds Maintenance Yard
6 RV Storage Area
7 Former Base Refueling Area
8 Aerospace Museum
9 Golf Course Maintenance Yard
10 O/W Separator
11 O/W Separator
12 O/W Separator
13 O/W Separator
14 Unnamed Stream
15 Storage Shed
16 Family Camp
17 Suspected Former Landfill
18 Suspected Former Fire Training Area A
19 Suspected Former Fire Training Area B

Solid Waste Management Units (SWMU)

5 Building 1626 Waste Accumulation Area
6 Building 1628 Wash Rack and Drain
7 Building 1628 Oil/Water Separator
8 Building 1628 Sludge Collection Tank
11 Building 1617 Waste Accumulation Area
12 Building 1619 Waste Accumulation Area
13 Building 1710 Visual Information Center Work Station Waste Accumulation Areas
16 Building 1060 Waste Accumulation Area
17 Landfill No 7
19 Fire Training Area No 2
20 Waste Fuel Storage Tank
21 Waste Oil Tank
22 Landfill No 4
23 Landfill No 5
24 Waste Burial Area
25 Landfill No 8
26 Landfill No 3
27 Landfill No 10
28 Landfill No 1
29 Landfill No 2
30 Landfill No 9
31 Building 1050 Waste Accumulation Area
32 Building 1410 Waste Accumulation Area
33 Building 1420 Waste Accumulation Area
34 Building 1194 Waste Accumulation Area
35 Vehicle Refueling Shop (Building 1194) Oil/Water Separation System
36 Building 1191 Waste Accumulation Area
37 Vehicle Maintenance Shop (Building 1191) Oil/Water Separation System
39 Building 1643 Waste Accumulation Area
40 Building 1643 Oil/Water Separation System
41 Building 1414 Oil/Water Separation System, Field Maintenance Squadron Aerospace Ground Equipment
42 Building 1414 Waste Accumulation Area
44 Building 1027 Oil/Water Separation System at the Aircraft Washing Hangar
45 Building 1027 Waste Oil Tank Vault at the Aircraft Washing Hangar
47 Building 1015 Jet Engine Test Cell Oil/Water Separator
49 Aircraft Washing Area No 1
50 Aircraft Washing Area No 2
51 Building 1190 Central Waste Holding Area
52 Building 1190 Oil/Water Separation System
53 Storm Water Drainage System
54 Storm Water Interceptors
55 East Gate Oil/Water Separator
61 Building 1320 Power Production Maintenance Facility Waste Accumulation Area
62 Landfill No 6
64 French Underdrain System
66 Sanitary Sewer System (Basewide Coverage)
67 Building 1340 Oil/Water Separator
68 POL Tank Farm



HydroGeoLogic, Inc —RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 1.2

SWMU and AOC Location Map
NAS Fort Worth JRB

U.S. Air Force Center for Environmental Excellence

Legend

- - - - NAS Fort Worth JRB (Carswell Field)
——— Former Carswell Air Force Base
68 Solid Waste Management Unit (SWMU)
24 SWMUs Discussed in this Report
1 Area of Concern (AOC)

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Map Source Jacobs, 1996

HYDRO GeoLogic INC.

TAB

SECTION 2.0

2.0 INSTALLATION ENVIRONMENTAL SETTING

The climate, physiography, geology, hydrology, biology, and demographics of the NAS Fort Worth JRB area are described in the following sections. This information has been primarily derived from the *Summary of Remediation Projects at AFP 4 and Carswell AFB* (ESE, 1994); the *IRP Remedial Investigation/Feasibility Study (RI/FS), Stage 2 Draft Final Technical Report, Carswell AFB* (Radian, 1989); and the *IRP RI, Stage 2 Final Report, Carswell AFB* (Radian, 1991).

2.1 PHYSIOGRAPHIC PROVINCE

The NAS Fort Worth JRB area is located along the border zone between two physiographic provinces. The southeastern part of the base is situated within the Grand Prairie section of the Central Lowlands Physiographic Province. Most of NAS Fort Worth JRB is located within this province. This region is characterized by broad, eastward-sloping terrace surfaces that are interrupted by westward-facing escarpments. The land surface is typically grass covered and treeless except for isolated stands of upland timber. The northwestern part of the NAS Fort Worth JRB area is situated within the Western Cross Timbers Physiographic Province. This area is characterized by rolling topography and a heavy growth of post and blackjack oaks (Radian, 1989). Surface elevations for this region range from about 850 feet above National Geodetic Vertical Datum (NGVD) west of the base to approximately 550 feet above NGVD along the eastern side of the base. Figure 2.1 is a section of the Lake Worth, Texas, U.S. Geological Survey topographic map showing the relief of the NAS Fort Worth JRB area.

2.2 REGIONAL GEOLOGY

The geologic units of interest for the region, from youngest to oldest, are as follows: (1) the Quaternary Alluvium (including fill material and terrace deposits), (2) the Cretaceous Goodland Limestone, (3) the Cretaceous Walnut Formation, (4) the Cretaceous Paluxy Formation, (5) the Cretaceous Glen Rose Formation, and (6) the Cretaceous Twin Mountains Formation. The areal limits of surface exposure of these geologic units at NAS Fort Worth JRB are shown in Figure 2.2. A generalized cross section of the geology beneath NAS Fort Worth JRB is presented in Figures 2.3 and 2.4 (adapted from Radian, 1989). Cross section locations and individual cross sections at NAS Fort Worth JRB are presented in Figures 2.5 through 2.8 (CH2M HILL, 1996a). The regional dip of the stratigraphic units beneath NAS Fort Worth JRB is between 35 and 40 feet per mile in an easterly to southeasterly direction. NAS Fort Worth JRB is located on the relatively stable Texas Craton, west of the faults that lie along the Ouachita Structural Belt. No major faults or fracture zones have been mapped near the base.

2.3 GROUNDWATER

The water-bearing geologic formations located in the NAS Fort Worth JRB area may be divided into the following five Hydrogeologic units, listed from the shallowest to the deepest: (1) an upper perched-water zone occurring in the alluvial terrace deposits associated with the Trinity River, (2) an aquitard of predominantly dry limestone of the Goodland and Walnut Formations, (3) an aquifer in the Paluxy Formation, (4) an aquitard of relatively impermeable limestone in the Glen

Rose Formation, and (5) a major aquifer in the sandstone of the Twin Mountains Formation. Table 2.1 presents additional information on the stratigraphic units found beneath NAS Fort Worth JRB. Each of these units is examined more explicitly in the following paragraphs. The relationship between these hydrogeologic units and geologic units is illustrated in Figure 2.9 (Radian, 1989).

2.3.1 Alluvial Terrace Deposits

The uppermost groundwater in the area occurs within the pore space of the grains of coarse sand and gravels deposited by the Trinity River. In some parts of Tarrant County, primarily in those areas adjacent to the Trinity River, groundwater from the terrace deposits is used for irrigation and residential use. However, groundwater from the terrace deposits is not often used as a source of potable water due to its limited distribution, poor yield, and susceptibility to surface/storm-water pollution (USGS, 1996). No potable water supply wells are completed in the terrace alluvium within 0.5 miles of NAS Fort Worth JRB.

Recharge to the water-bearing deposits occurs through infiltration from precipitation and from surface water bodies. Extensive on-site pavement and construction restricts this recharge Additional recharge, however, comes from leakage in water supply lines, sewer systems, storm drains, and cooling water systems. This leakage was calculated to be in excess of approximately 115.5 million gallons in 1991 for NAS Fort Worth JRB and AFP 4 (General Dynamics, 1992). This inflow of water to the shallow water-bearing unit effects local groundwater flow patterns and contamination transport, along with increasing the hydraulic head, which acts as the force to potentially drive water into lower aquifer systems. The estimated hydraulic conductivity of the alluvial aquifer is 4.57 gallons per day per square foot (gpd/ft^2) (Radian, 1989).

Flow between aquifers is impeded by the Goodland/Walnut Formations; accordingly, groundwater in the alluvial terrace is not in direct hydraulic communication with the underlying aquifers at NAS Fort Worth JRB. The exception to this rule is the "window area" found near AFP 4. To date, no evidence of contamination of the Paluxy aquifer has been found beneath NAS Fort Worth JRB and no other "window areas" have been discovered.

The primary water flow in the terrace deposits is generally eastward toward the West Fork Trinity River, although localized variations exist across the entire site. An NAS Fort Worth JRB potentiometric surface map of alluvial terrace groundwater in July 1998 (during the Appendix IX RFI sampling phase) is presented in Figure 2.10 (HydroGeoLogic, 1998a). Groundwater elevation data show a general easterly trend in groundwater flow beneath the NAS Fort Worth JRB area toward the West Fork Trinity River. The hydraulic gradient across the base is variable, reflecting variations in the flow direction and localized recharge. Groundwater discharge from the aquifer occurs into surface water on-site, specifically Farmers Branch Creek.

2.3.2 Goodland/Walnut Aquitard

The groundwater within the terrace deposits is isolated from groundwater within the lower aquifers by the low permeability of the Goodland Limestone and Walnut Formations. The primary inhibitors to vertical groundwater movement within these units are the fine-grained clay and shale

layers that are interbedded with layers of limestone. Some groundwater movement does occur between the individual bedding planes of both of these units, but the vertical hydraulic conductivity has been calculated to range between 7.3E-11 centimeters per second (cm/sec) to 1.2E-09 cm/sec for the NAS Fort Worth JRB and AFP 4 area. This corresponds to a vertical flow rate that ranges between 1.16E-03 feet per day (ft/d) to 5.22E-03 ft/d (ESE, 1994).

At the AFP 4 "window area," the Goodland/Walnut aquitard is breached, and the alluvial terrace groundwater is in direct contact with the groundwater in the Paluxy aquifer. Over 120 borings and monitoring wells have been advanced at NAS Fort Worth JRB to the Goodland/Walnut aquitard. With the exception of areas located within the incised river valley of the West Fork Trinity River, there is no evidence to date that a similar window exists on the base property. All five monitoring wells that fully penetrate the Paluxy aquifer on NAS Fort Worth JRB property are represented in cross sections (Figures 2.5 through 2.8). These wells are USGS01P, USGS05P, USGS06P, USGS07P, and Paluxy 1 (P1).

2.3.3 Paluxy Aquifer

The Paluxy aquifer is an important source of potable groundwater for the Fort Worth area. Many of the surrounding communities, particularly White Settlement, obtain their municipal water supplies from the Paluxy aquifer. Groundwater from the Paluxy is also used in some of the surrounding farms and ranches for agricultural purposes. Due to the extensive use of the Paluxy aquifer, water levels have declined significantly over the years. Water levels in the NAS Fort Worth JRB vicinity have not decreased as much as in the Fort Worth area due to its proximity to the Lake Worth recharge area and the fact that the base does not obtain water from the Paluxy aquifer. Drinking water at the base is supplied by the city of Fort Worth, which uses Lake Worth as its water source. The groundwater of the Paluxy aquifer is contained within the openings created by gaps between bedding planes, cracks, and fissures in the sandstones of the Paluxy Formation. Just as the Paluxy Formation is divided into upper and lower sand members, the aquifer is likewise divided into upper and lower aquifers. The upper sand is finer grained and contains a higher percentage of shale than the lower sand. In 1989, Radian estimated the hydraulic conductivity and transmissivity to be 130 to 140 gpd/ft^2 and 1,263 to 13,808 gpd/ft^2, respectively.

2.3.4 Glen Rose Aquitard

Below the Paluxy aquifer are the fine-grained limestone, shale, marl, and sandstone beds of the Glen Rose Formation. The thickness of the formation ranges from 250 to 450 feet. Although the sands in the Glen Rose Formation yield small quantities of groundwater in the area, the relatively impermeable limestone acts as an aquitard, restricting water movement between the Paluxy aquifer above and the Twin Mountains aquifer below.

2.3.5 Twin Mountains Aquifer

The Twin Mountains Formation is the oldest and deepest water supply source used in the NAS Fort Worth JRB area. The Twin Mountains Formation occurs approximately 600 feet below NAS Fort Worth JRB, with a thickness of between 250 to 430 feet. Recharge to the Twin Mountains aquifer occurs west of NAS Fort Worth JRB, where the formation out crops. Groundwater

movement is eastward in the downdip direction. The Twin Mountains groundwater occurs under unconfined conditions in the recharge area and becomes confined as it moves downdip. Transmissivities in the Twin Mountains aquifer range from 1,950 to 29,700 gpd/ft^2 and average 8,450 gpd/ft^2 in Tarrant County. Permeabilities range from 8 to 165 gpd/ft^2 and average 68 gpd/ft^2 in Tarrant County (CH2M HILL, 1984).

2.3.6 Water Well Survey Results

An inventory of water supply wells within a one-half-mile radius of the NAS Fort Worth JRB boundary was conducted by HydroGeoLogic in 1997. Figure 2.11 illustrates the locations of 39 wells that were identified from Texas Water Commission records. All of these wells were installed and completed in the Paluxy aquifer or the Twin Mountains aquifer. No active water wells are located on NAS Fort Worth JRB property. Water is supplied to the base by the city of Fort Worth, which obtains water from Lake Worth.

2.4 SURFACE WATER

Topographically, NAS Fort Worth JRB is fairly flat except for the lower lying areas along the tributaries of the Trinity River. The land surface slopes gently northeastward toward Lake Worth and eastward toward the West Fork Trinity River. Surface elevations range from about 690 feet above NGVD at the southwest corner of the base to approximately 550 feet above NGVD, along the eastern side of the base. Figure 2.1 is a section of the Lake Worth, Texas, U.S. Geological Survey topographic map showing the relief of the NAS Fort Worth JRB area.

NAS Fort Worth JRB is located within the Trinity River Basin, adjacent to Lake Worth. The lake is a man-made reservoir created by damming the Trinity River at a point just northeast of the base. The surface area of the lake is approximately 2,500 acres. Lake Worth receives a limited amount of stormwater runoff from NAS Fort Worth JRB during and immediately after rainfall events. Elevation of the water surface is fairly consistent at approximately 594 feet above NGVD, the fixed elevation of the dam spillway. Part of the eastern boundary of NAS Fort Worth JRB is defined by the West Fork Trinity River. River flow is towards the southeast into the Gulf of Mexico. Because the Trinity River has been dammed, the 100- and 500-year flood plains do not extend more than 400 feet from the center of the river or any of its tributaries.

Surface drainage on the base is mainly east towards the West Fork Trinity River. The base is partly drained by Farmers Branch Creek, a tributary of the West Fork Trinity River. Farmers Branch Creek begins within the community of White Settlement and flows eastward. Just south of AFP 4, Farmers Branch flows under the runway within two large culverts identified as an aqueduct. Most of the base drainage is intercepted by a series of storm drains and culverts, directed to OWSs, and discharged to the West Fork Trinity River downstream of Lake Worth. A small portion of the north end of the base drains directly into Lake Worth.

NAS Fort Worth JRB currently has three stormwater discharge points that are subject to National Pollution Discharge Elimination System requirements. Each discharge point is monitored weekly for chemical oxygen demand, oil and grease, and pH. The permit has been violated on numerous occasions. In 1979, these violations prompted the EPA to formally demand a corrective action

(CH2M HILL, 1984). Several additional sampling points were established to determine the flow of pollutants onto and off of the base. Samples were collected for a variety of parameters (spills, fish kills, odors, and oil sheen) as circumstances dictated (Radian, 1989).

2.5 CLIMATE

The climate in the Fort Worth area is classified as humid subtropical with hot summers and dry winters. Tropical maritime air masses control the weather during much of the year, but the passage of polar cold fronts and continental air masses can create large variations in winter temperatures (TNRCC, 1996b). In the Dallas - Fort Worth area, daily mean temperatures range from 43.4 degrees Fahrenheit (°F) in January to 85.3°F in July. The highest recorded temperature is 113°F, and the lowest temperature is 2°F. Freezing temperatures occur on average of 25 days in the year (National Climatic Data Center (NCDC), 2000).

Average relative humidity (after noon) ranges from 51 percent (September and October) to 62 percent (January) (NCDC, 2000). Mean annual precipitation recorded at the base is approximately 32 inches. The wettest months are April and May, with a secondary maximum in September. The period from November to March is generally dry, with a secondary minimum in August. Snowfall accounts for a small percentage of the total precipitation between November and March. Thunderstorm activity occurs at the base an average of 45 days per year, with the majority of the activity between April and June. Hail may fall 2 to 3 days per year. The maximum precipitation ever recorded in a 24-hour period is 5.9 inches. On the average, measurable snowfall occurs 2 days per year (TNRCC, 1996b).

Lake evaporation near NAS Fort Worth JRB is estimated to be approximately 57 inches per year. Evapotranspiration over land areas may be greater or less than lake evaporation depending on vegetative cover type and moisture availability. Average net precipitation is expected to be equal to the difference between average total precipitation and average lake evaporation, or approximately minus 25 inches per year. Mean cloud cover averages 50 percent at NAS Fort Worth JRB, with clear weather occurring frequently during the year. Some fog is present an average of 83 days per year. Wind speed averages 7 knots; however, a maximum of 80 knots has been recorded. Predominant wind direction is from the south-southwest throughout the year (TNRCC, 1996b).

2.6 BIOLOGY

Approximately 374 acres, or 14 percent, of NAS Fort Worth JRB is considered unimproved, indicating the presence of semi-natural to natural biological/ecological conditions. The base lies in the Cross Timbers and Prairies Regions of Texas, where native vegetation is characterized by alternating bands of prairies and woodlands. The higher elevations on the base are covered by native and cultivated grasses such as little bluestem, Indian grass, big bluestem, side oats, grama, and buffalo grass. Forested areas occur primarily on the lower land and along the banks of streams. Common wood species include oak, elm, pecan, hackberry, and sumac. Several non-native species such as catalpa and chinaberry are common (Radian, 1989).

Typical wildlife on the base includes black-tailed jackrabbits in grassy areas along the runway. In addition, cotton-tail rabbits, gray squirrels, and opossums exist in the wooded areas. Common birds include morning doves, meadowlarks, grackles, and starlings. Hunting and trapping are not allowed on the base, but in the nearby rural areas they are a popular form of recreation (Radian, 1989).

Reported game fish include black bass, sunfish, and catfish, all of which can be found in Lake Worth, Farmers Branch Creek, and one small pond located on base near the golf course equipment shed. According to the Texas Department of Parks and Wildlife and the U.S. Fish and Wildlife Service, there are no threatened or endangered species known to occur on NAS Fort Worth JRB. None of the federally listed endangered plant species for Texas are known to occur within 100 miles of Tarrant County. Of the federally listed endangered animals species, only the peregrine falcon and the whooping crane are known to occasionally inhabit the area; however, none of these is suspected to reside in the vicinity of NAS Fort Worth JRB (Radian, 1989).

2.7 DEMOGRAPHICS

The following sections describe the regional and site-specific demographics as they relate to the Fort Worth, Texas area and the NAS Fort Worth JRB.

2.7.1 Regional Demographics

Approximately 1,509,934 people reside within Tarrant County, Texas. Of this population, 431,845 reside within the city limits of Fort Worth (U.S. Department of Commerce, 1996). Several smaller cities and villages make up the remainder of the population. The communities of White Settlement, Lake Worth, Westworth Village, River Oaks, and Sansom Park lie within a 3-mile radius of the NAS Fort Worth JRB. The following populations that reside in the cities and villages are based on 1994 census data: White Settlement (city) 16,502; Lake Worth (city) 4,694; Westworth Village (town) 2,502; River Oaks (city) 6,747; and Sansom Park (city) 4,136 (U.S. Department of Commerce, 1994). Six schools are within a 2-mile radius of NAS Fort Worth JRB; the closest is 0.5 miles south (RUST, 1995).

The area surrounding NAS Fort Worth JRB is highly urbanized due to its proximity to the city of Fort Worth. The area is composed of a combination of residential, commercial, and light industrial properties that employ the majority of local residents (RUST, 1995).

2.7.2 Site-Specific Demographics

The current full-time population at NAS Fort Worth JRB is approximately 3,600 people, comprising 400 officers, 1,400 civilians, and 1,800 active reservists. Part-time military reservists will increase this population to over 6,000 military personnel (CH2M HILL, 1997).

Approximately 86 percent of NAS Fort Worth JRB has been developed by way of buildings, roads, parking lots, runways, and housing and recreational areas. On-site activities include various maintenance, inspection, and support activities for fuel systems, weapons, jet engines, AGE, and specialized ground equipment (HydroGeoLogic, 1997a).

2.8 SITE-SPECIFIC ENVIRONMENTAL SETTING

The following sections describe the site-specific environmental setting of NAS Fort Worth JRB.

2.8.1 Site-Specific Soils

The U.S. Soil Conservation Service has identified four major soil associations in the area of NAS Fort Worth JRB. The first association is the surficial soils of the nearly level to gently sloping clayey soils of the Sanger-Purves-Slidell Association. Second is the Aledo-Bolar-Sanger Association, which is located within the southwestern portion of the Sanger-Purves-Slidell Association and is characterized as an increasingly loamy clayey soil of gentle to moderate slope The third association, the Bastsil-Silawa Association separates the Sanger-Purves-Slidell Association from the Frio-Trinity Association. The Bastsil-Silawa Association is characterized as a sandy clay loam of nearly level slope (ESE, 1994). The clayey soils of the Frio-Trinity Association make up the fourth soil association and are located along the flood plain of the West Fork Trinity River. Each of these soil associations is summarized in Table 2.2. The areal limits of each of these soil associations and their occurrence on-site are shown in Figure 2.12.

2.8.2 Site-Specific Geology

The majority of NAS Fort Worth JRB is covered by alluvium deposited by the Trinity River during flood stages. The Quaternary Period alluvium (Holocene Epoch) occurs downstream from the Lake Worth Dam in the current flood plain of the West Fork Trinity River, on the east side of the base. Older alluvial deposits and terrace deposits (Pleistocene Epoch) also occur on-site. The alluvium is composed of gravel, sand, silt, and clay of varying thicknesses and lateral extent. The thickness of these materials ranges from 0 to 60 feet. Fill material is also included within these deposits where landfills, waste pits, excavation sites, and other construction activities have altered the original land surface. This fill material is made up of clay, silt, sand, and gravel mixtures, but may also contain debris and other waste (Radian, 1989).

Below the alluvial terrace deposits are the Cretaceous-age Goodland and Walnut Formations, which form the bedrock surface beneath NAS Fort Worth JRB. Both formations consist of interbedded, fossiliferous, hard limestone and calcareous shale. The upper formation, the Goodland Limestone, is exposed on the southern portion of the base, south of White Settlement Road. The Goodland is a chalky-white, fossiliferous limestone and marl. The thickness of the Goodland Limestone ranges from 20 to 25 feet. Below the Goodland Formation is the Walnut Formation (or Walnut Clay). The Walnut Formation is exposed in a small area along the shores of Lake Worth and Meandering Road Creek. This formation is a shell agglomerate limestone with varying amounts of clay and shale. It ranges in thickness from 25 to 35 feet throughout the site except where erosion has produced a few thinner areas. Subsurface investigations have located troughs and paleochannels that are eroded into the top of the bedrock at NAS Fort Worth JRB. These paleochannels are typical of an erosional surface modified by fluvial processes and are filled with sand and gravel deposits ranging in thickness from 15 to 35 feet (CH2M HILL, 1996a).

Below the Walnut Formation is the Paluxy Formation (or Paluxy Sand). The Paluxy Formation underlies all of NAS Fort Worth JRB. The formation consists of several thick sandstone layers

that are separated by thin, discontinuous shale and claystone layers. Sandstones in the formation are primarily a fine-to coarse-grained sand with minor amounts of clay, sandy clay, pyrite, lignite, and shale. The lower section of the Paluxy is generally coarser-grained than the upper section (CH2M HILL, 1996a). Total formation thickness ranges from 130 to 175 feet, with variable thickness and occurrence of individual layers across the site. Only one unit in this formation, a shale/silty shale, can be extensively mapped across the base.

The older Glen Rose and Twin Mountains Formations are not exposed at NAS Fort Worth JRB. The Glen Rose Formation consists primarily of calcareous sedimentary rock and some sands, clays, and anhydrite. The Glen Rose caps the Twin Mountain Formation, which is the oldest Cretaceous Formation in the NAS Fort Worth JRB area. The Twin Mountain Formation consists of a basal conglomerate of chert and quartz, grading upward into coarse- to fine-grained sand interspersed with varicolored shale.

TABLES

Table 2.1
Stratigraphic Units at NAS Fort Worth JRB, Texas[1]

Era	System	Series/Group	Stratigraphic Unit	Thickness (feet)[2]	Lithologic Characteristics[3]	Water-Yielding Characteristics
Cenozoic	Quaternary (1 8 mya to present)	Holocene	Fill material	0	Construction debris	Permeability varies, gravels and sands permeable
			Recent alluvial deposits	0-50	Gravel, sand, silt, clay	Permeability varies; gravels and sands permeable
		Pleistocene	Terrace alluvial deposits	0-60	Gravel, sand, silt, clay	Permeability varies; gravels and sands permeable
Mesozoic	Cretaceous (65 to 140 mya)	Comanchean/ Fredericksburg	Goodland Limestone	0-40	White fossiliferous limestone, coarsely nodular, resistant, and dense, contains some marl	Impermeable where not weathered; considered confining unit
			Walnut Formation	0.5-30	Medium to dark grey clay and limestone with shell conglomerates, fossiliferous, Gryphaea beds	Very low permeability; considered confining unit
		Comanchean/ Trinity	Paluxy Formation	130-175	Light grey to greenish-grey sandstone and mudstone; fine-grained to coarse-grained sandstone	Considered an aquifer, yields small to moderate quantities of water
			Glen Rose Formation	150, range unknown at AFP 4	Brownish-yellow and gray alternating limestone, marl, shale, and sand	Low permeability; considered confining unit in area of AFP 4
			Twin Mountains Formation[4]	200, range unknown at AFP 4	Fine- to coarse-grained sandstone shale and claystone, basal gravel conglomerate	Coarse sandstones and parts of formation considered aquifer; yields moderate to large quantities of water

Notes
[1] Table adapted from USGS, 1996
[2] Thickness determined from site logs, except for Glen Rose Limestone and Twin Mountains Formation (Baker et al , 1990, Figure 4, as cited in USGS 1996)
[3] Lithologic characteristics determined from field observations and from Winton and Adkins, 1919, University of Texas, Bureau of Economic Geology, 1972, U S Army Corps of Engineers, 1986, Baker et al , 1990, Environmental Science and Engineering, Inc , 1994, all as cited in USGS 1996
[4] This stratigraphic name does not conform to the usage of the USGS

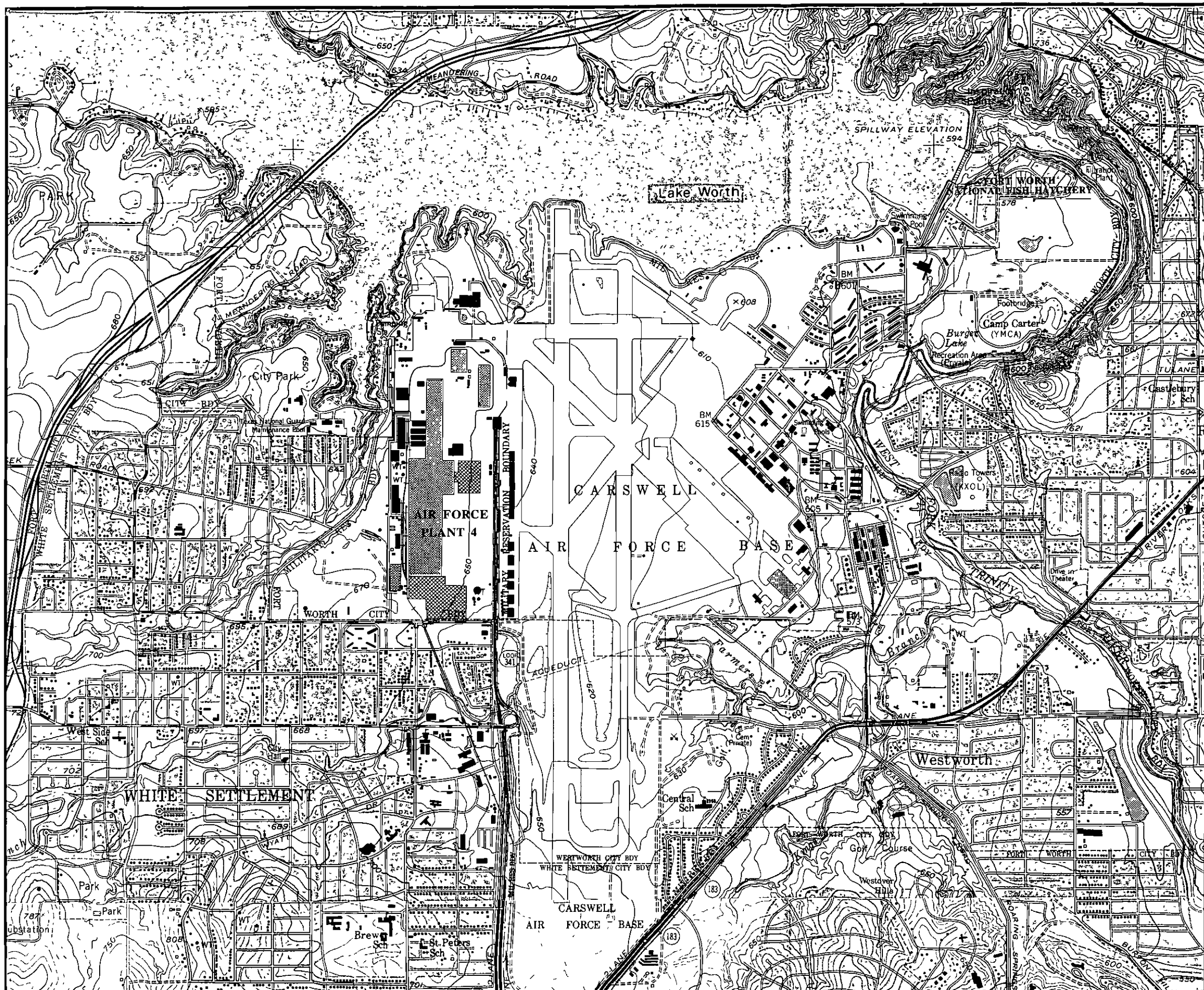
mya = million years ago

Table 2.2
Soil Associations at NAS Fort Worth JRB, Texas

Association	Description	Thickness (inches)	Percent Clay <2mm (percent)	pH	Permeability (cm/sec)	Available Water Capacity (in water/in soil)
Sanger-Purves-Slidell: Clayey soils of nearly level to gently sloping uplands.	Clay loam Clay over bedrock Silty clay	8 - 80	35 - 60	7.4-8 4	$<4.2\times10^{-5}$ to 3×10^{-4}	0.12 - 0.20
Aledo-Bolar-Sanger: Loamy and clayey soils of gently sloping to moderately steep uplands.	Clay loam over bedrock Clay loam	8 - 70	20 - 60	7.9-8.4	$<4.2\times10^{-5}$ to 9×10^{-4}	0.05 -0.18
Frio-Trinity: Clayey soil on nearly level flood plains.	Silty clay or loam Clay	25 - 75	35 - 80	7.4-8.4	$<4.2\times10^{-5}$ to 3×10^{-4}	0.11 - 0.20
Bastsil-Silawa: Loamy soils on nearly level to sloping stream terraces.	Sandy clay loam	40 - 80	7 - 35	4.5-7.8	9×10^{-4} to 3×10^{-3}	0.08 - 0.17

Sources: Summary of Hydrologic and Chemical Characterization Studies (ESE, July 1994).
Soil Survey of Tarrant County, Texas, pp. 202-203 (USDA, 1981)

FIGURES



HydroGeoLogic, Inc.—RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

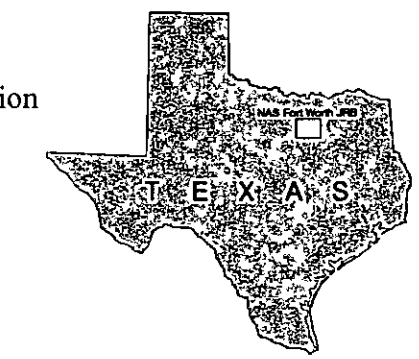
Figure 2.1

NAS Fort Worth JRB Regional Topographic Map

U.S. Air Force Center for Environmental Excellence

Legend

Site Location



N

0 5 1

SCALE IN MILES

Scale 1 24,000

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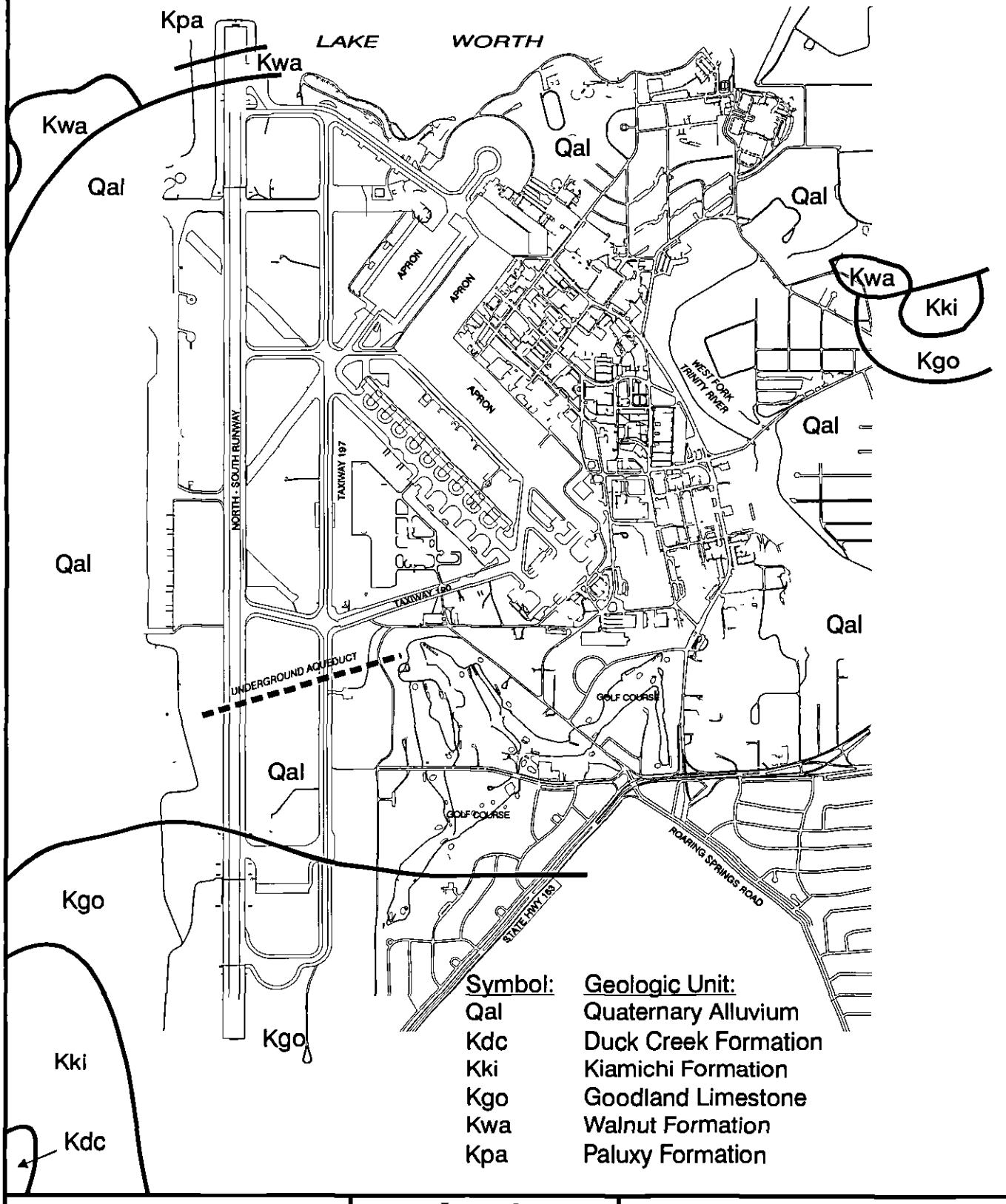
Project AFC001-19CD
Created by cfarmer 05/27/99
Revised 08/31/00 cf
Map Source USGS
Maps Lake Worth and Benbrook, TX
Dates Photorevised 1981, 1982

HYDRO GeoLogic INC



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Created by mlawlor 06/12/97
Revised 04/13/00 cf
Source Radian, 1989

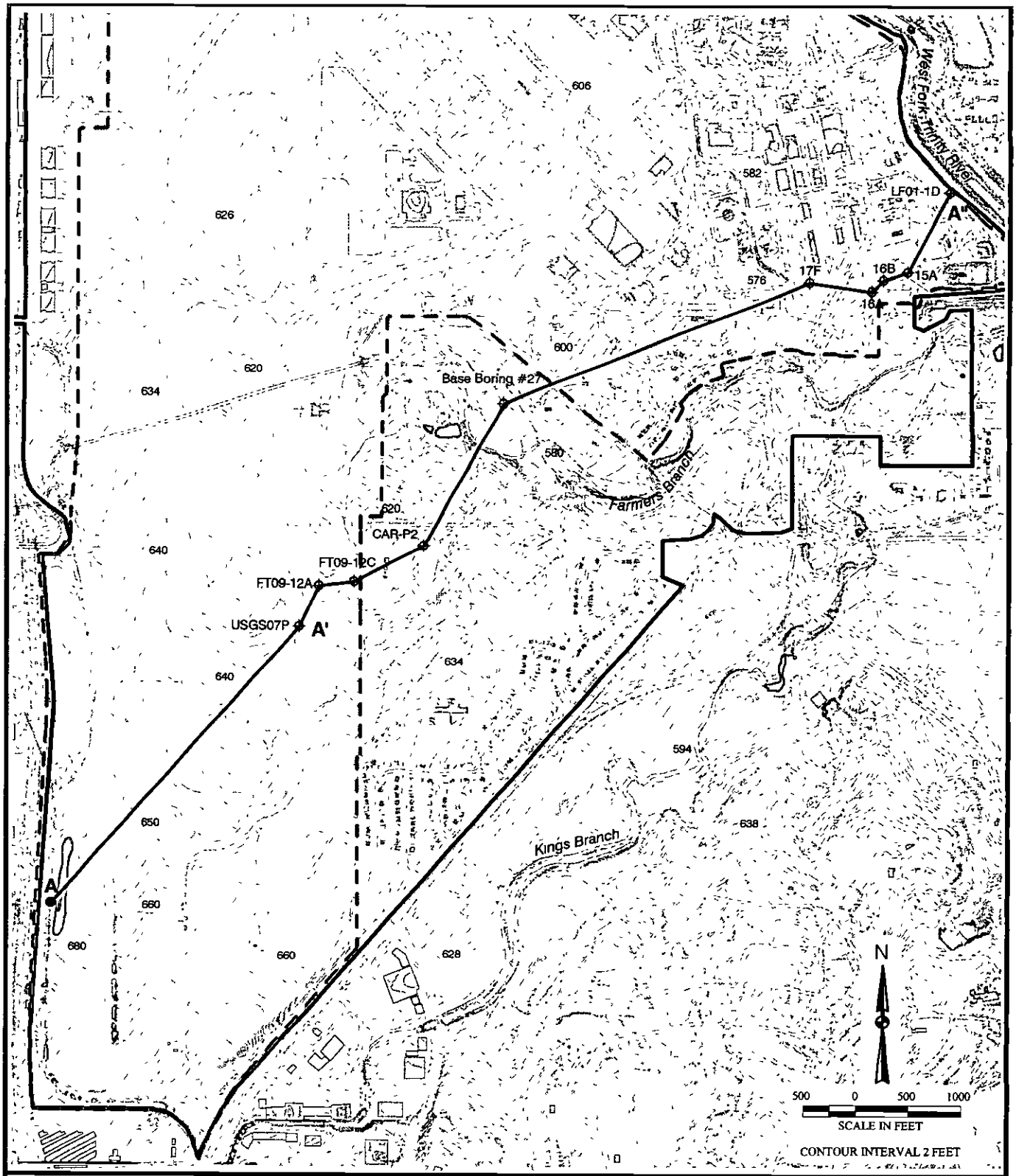
HYDRO GeoLogic Inc.

Legend

0 1000 2000
Scale in feet

N

Figure 2.2
Aerial Distribution of Geologic Units



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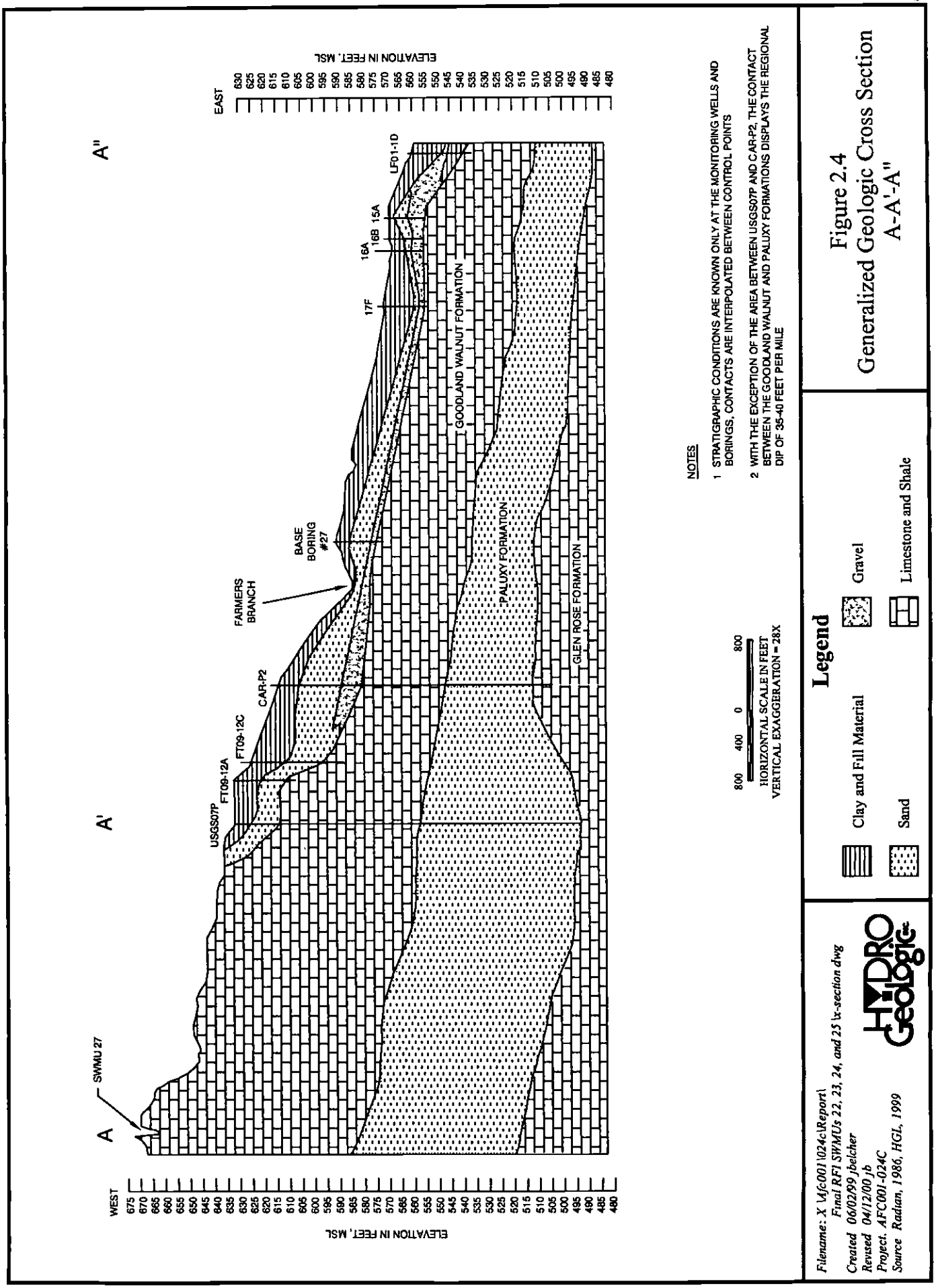
Project AFC001- 024C
Created 03/11/99 jbelcher
Revised 04/12/00 jb
Source HydroGeoLogic, Inc—GIS Database

HYDRO GeoLogic

Legend

- NAS Fort Worth JRB Boundary
- Former Carswell AFB Boundary
- SWMU 27 Location
- 660 Topographic Contour

Figure 2.3
Generalized Cross Section Location
A-A'-A"


A
A'
A"
SWMU 27
WEST
EAST
ELEVATION IN FEET, MSL
USGS07P
FT09-12A
FT09-12C
CAR-P2
FARMERS BRANCH
BASE BORING #27
17F
16A
16B
15A
LF01-1D
GOODLAND WALNUT FORMATION
PALUXY FORMATION
GLEN ROSE FORMATION
NOTES
1 STRATIGRAPHIC CONDITIONS ARE KNOWN ONLY AT THE MONITORING WELLS AND BORINGS, CONTACTS ARE INTERPOLATED BETWEEN CONTROL POINTS
2 WITH THE EXCEPTION OF THE AREA BETWEEN USGS07P AND CAR-P2, THE CONTACT BETWEEN THE GOODLAND WALNUT AND PALUXY FORMATIONS DISPLAYS THE REGIONAL DIP OF 35-40 FEET PER MILE
800 400 0 800
HORIZONTAL SCALE IN FEET
VERTICAL EXAGGERATION = 28X
Legend
Clay and Fill Material
Gravel
Sand
Limestone and Shale
Figure 2.4
Generalized Geologic Cross Section
A-A'-A"
Filename: X:\Afc001\024c\Report\
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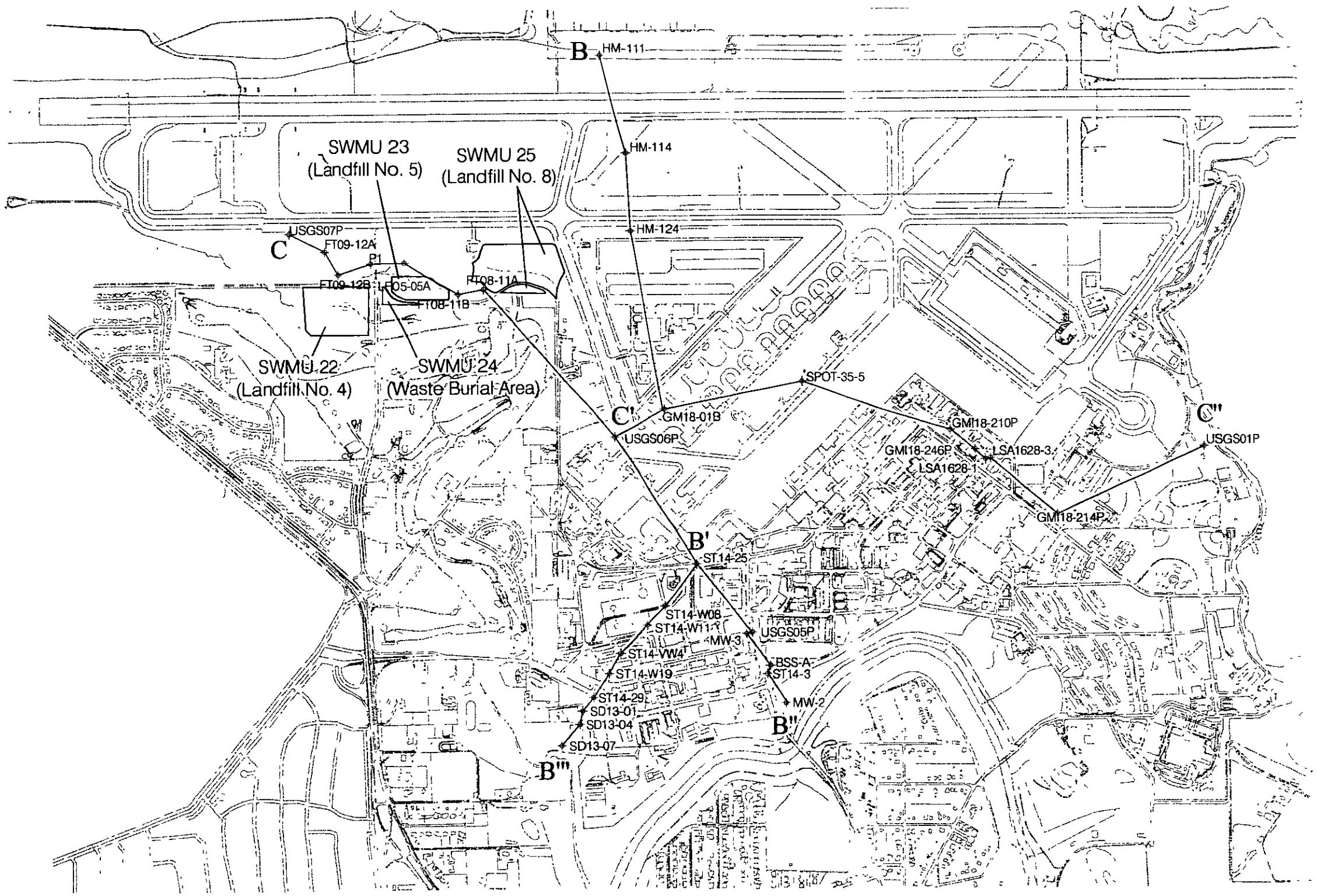
Created 06/02/99 jbelcher
Revised 04/12/00 jb
Project. AFC001-024C
Source Radian, 1986, HGL, 1999
HYDRO GeoLogic



HydroGeoLogic, Inc —RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 2.5

Cross Section Location Map

U.S. Air Force Center for Environmental Excellence

Legend

USGS01P — Boring Location

B ——— B' — Cross Section Line

Solid Waste Management Unit (SWMU)

N

0 500 1000 2000

SCALE IN FEET

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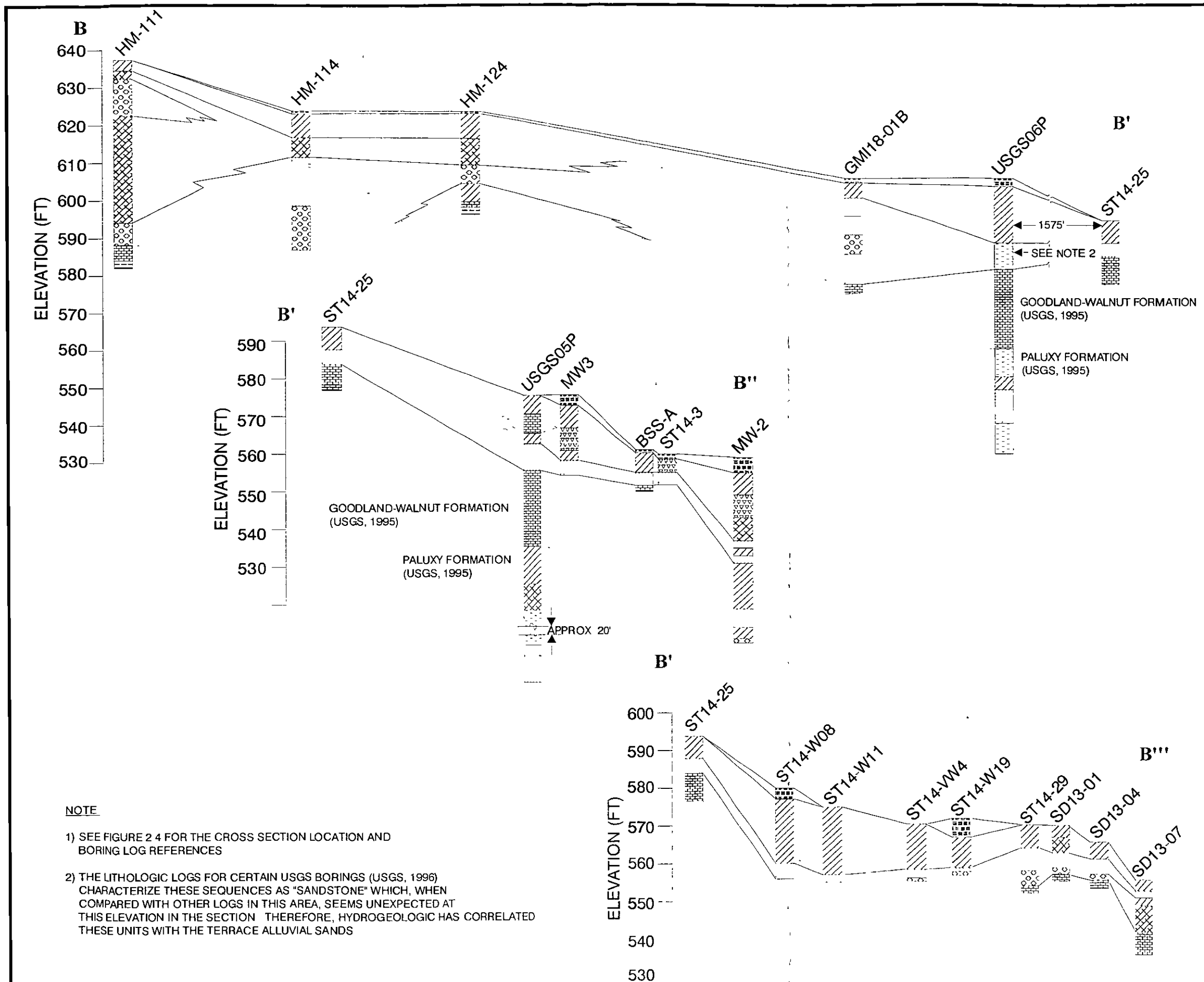
Project AFC001-024C
Created 06/12/97 M Lawlor
Revised 08/28/00 ap
Source Jacobs, 1996

HYDRO GeoLogic INC

Figure 2.6

Cross Sections B-B', B'-B'', and B'-B'''



NOTE

1) SEE FIGURE 2 4 FOR THE CROSS SECTION LOCATION AND BORING LOG REFERENCES

2) THE LITHOLOGIC LOGS FOR CERTAIN USGS BORINGS (USGS, 1996) CHARACTERIZE THESE SEQUENCES AS "SANDSTONE" WHICH, WHEN COMPARED WITH OTHER LOGS IN THIS AREA, SEEMS UNEXPECTED AT THIS ELEVATION IN THE SECTION THEREFORE, HYDROGEOLOGIC HAS CORRELATED THESE UNITS WITH THE TERRACE ALLUVIAL SANDS

U.S. Air Force Center for Environmental Excellence

Legend

- Stratigraphic Contact
- Inferred Stratigraphic Contact
- Fine- to Coarse-Grained Sand, Clayey Sand, Silty Sand, Gravelly Sand
- Clay, Silty Clay, Sandy Clay
- Silt, Clayey Silt, Sandy Silt
- Gravelly Clay or Clay w/Limestone
- Fill, Soil, Gravel, Rock
- Coarse Gravel, Silty Gravel, Sandy Gravel
- Limestone
- Claystone/Mudstone/Shale
- Sandstone

0 600 1200
HORIZONTAL SCALE IN FEET

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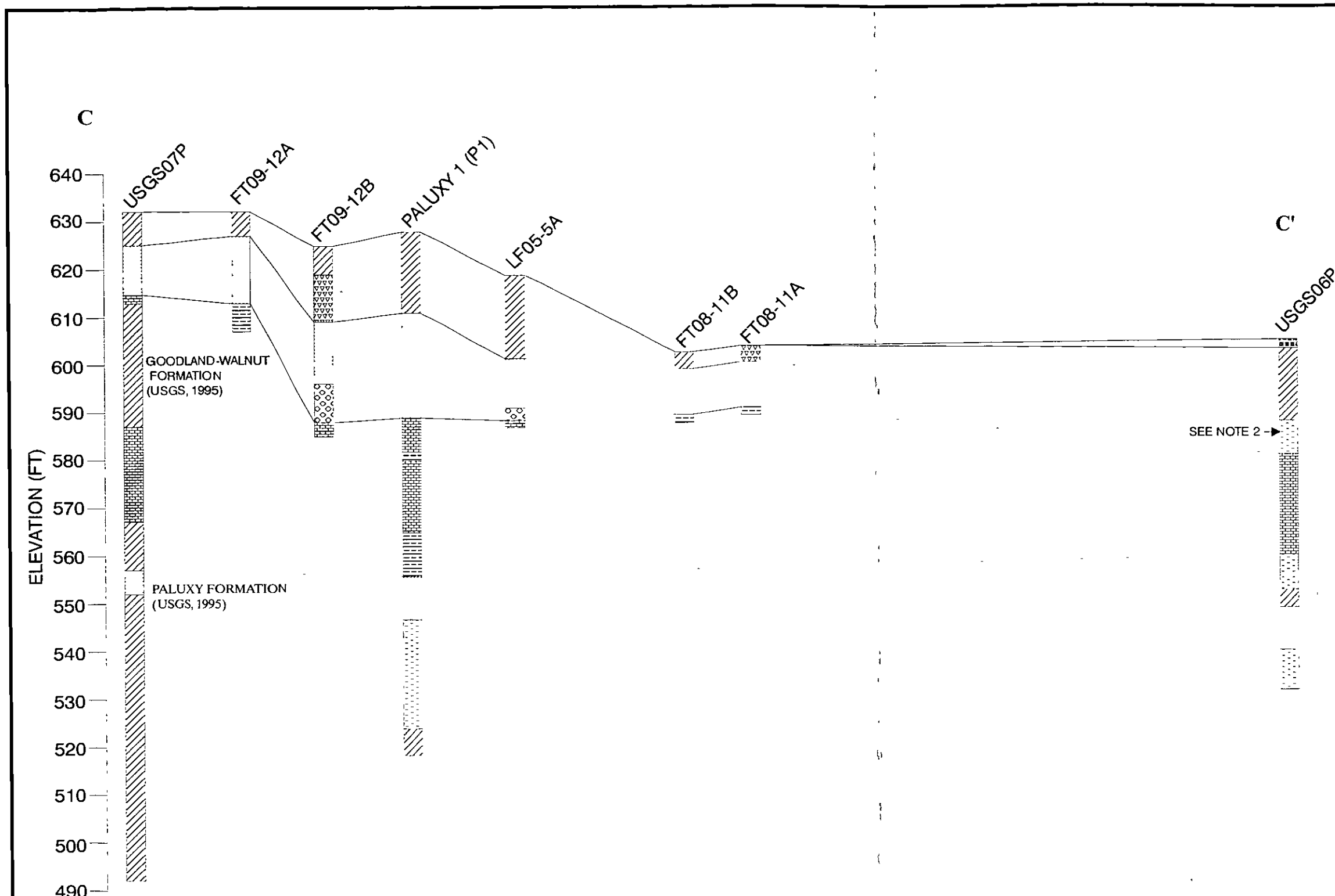
Project AFC001-024C
Created mlawlor 06/12/97
Revised 08/28/00 ap
Source CH2M HILL, 1996 b

HYDRO GeoLogic INC



NOTE

1) SEE FIGURE 2 4 FOR THE CROSS SECTION LOCATION AND BORING LOG REFERENCES

2) THE LITHOLOGIC LOGS FOR CERTAIN USGS BORINGS (USGS, 1996) CHARACTERIZE THESE SEQUENCES AS "SANDSTONE" WHICH, WHEN COMPARED WITH OTHER LOGS IN THIS AREA, SEEMS UNEXPECTED AT THIS ELEVATION IN THE SECTION THEREFORE, HYDROGEOLOGIC HAS CORRELATED THESE UNITS WITH THE TERRACE ALLUVIAL SANDS

HydroGeoLogic, Inc —RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 2.7

Cross Section C-C'

U.S. Air Force Center for Environmental Excellence

Legend

- Stratigraphic Contact
- Inferred Stratigraphic Contact
- Fine- to Coarse-Grained Sand, Clayey Sand, Silty Sand, Gravelly Sand
- Clay, Silty Clay, Sandy Clay
- Silt, Clayey Silt, Sandy Silt
- Gravelly Clay or Clay w/Limestone
- Fill, Soil, Gravel, Rock
- Coarse Gravel, Silty Gravel, Sandy Gravel
- Limestone
- Claystone/Mudstone/Shale
- Sandstone

0 600 1200
HORIZONTAL SCALE IN FEET

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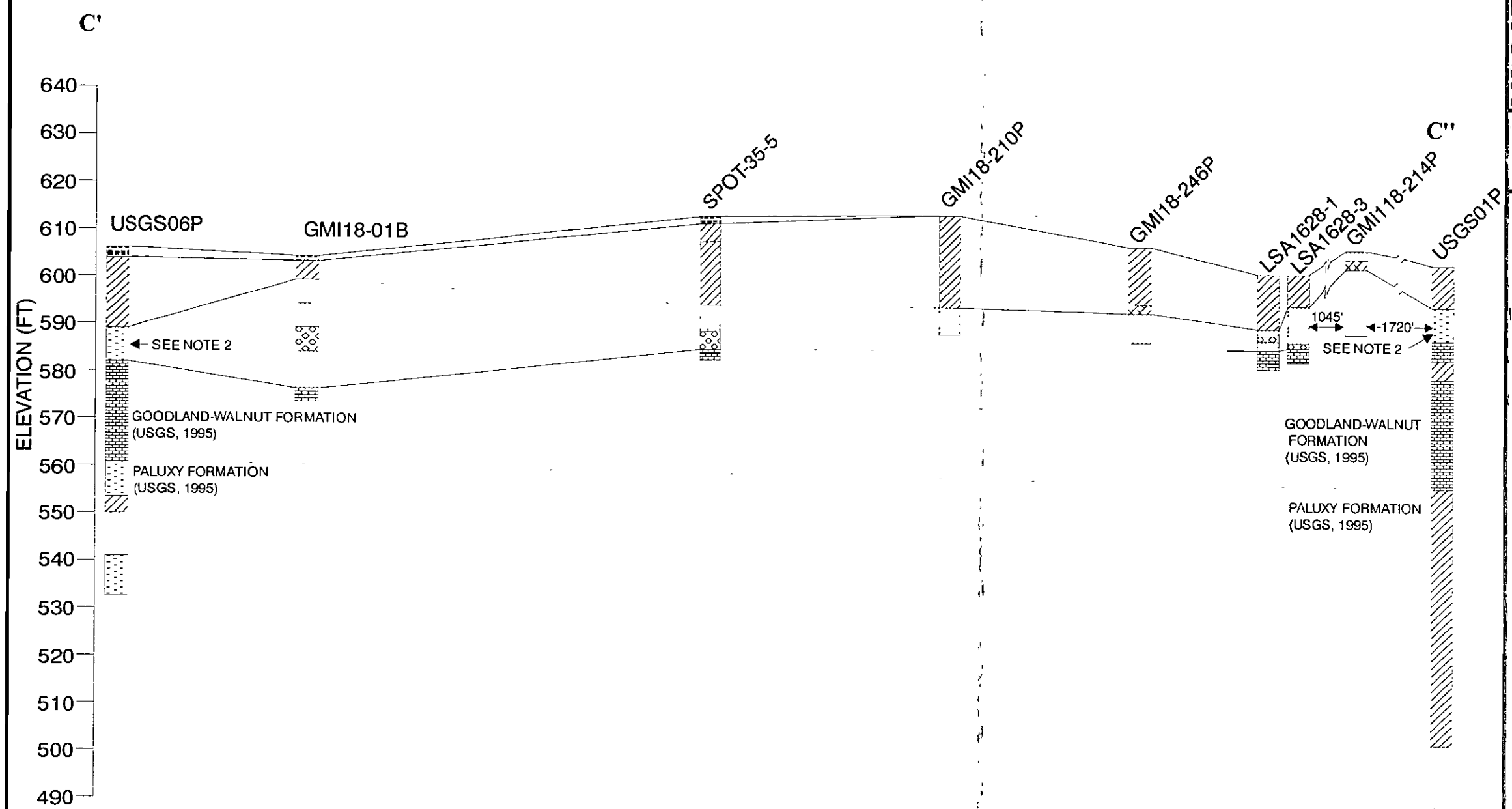
Project AFC001-05CEA
Created mlawlor 06/12/97
Revised 08/28/00 ap
Source CH2M HILL, 1996 b

HYDRO GeoLogic

Figure 2.8

Cross Section C'-C''

U.S. Air Force Center for Environmental Excellence



NOTE

1) SEE FIGURE 2 4 FOR THE CROSS SECTION LOCATION AND BORING LOG REFERENCES

2) THE LITHOLOGIC LOGS FOR CERTAIN USGS BORINGS (USGS, 1996) CHARACTERIZE THESE SEQUENCES AS "SANDSTONE" WHICH, WHEN COMPARED WITH OTHER LOGS IN THIS AREA, SEEMS UNEXPECTED AT THIS ELEVATION IN THE SECTION THEREFORE, HYDROGEOLOGIC HAS CORRELATED THESE UNITS WITH THE TERRACE ALLUVIAL SANDS

Legend

- Stratigraphic Contact
- Inferred Stratigraphic Contact
- Fine- to Coarse-Grained Sand, Clayey Sand, Silty Sand, Gravelly Sand
- Clay, Silty Clay, Sandy Clay
- Silt, Clayey Silt, Sandy Silt
- Gravelly Clay or Clay w/Limestone
- Fill, Soil, Gravel, Rock
- Coarse Gravel, Silty Gravel, Sandy Gravel
- Limestone
- Claystone/Mudstone/Shale
- Sandstone

0 600 1200
HORIZONTAL SCALE IN FEET

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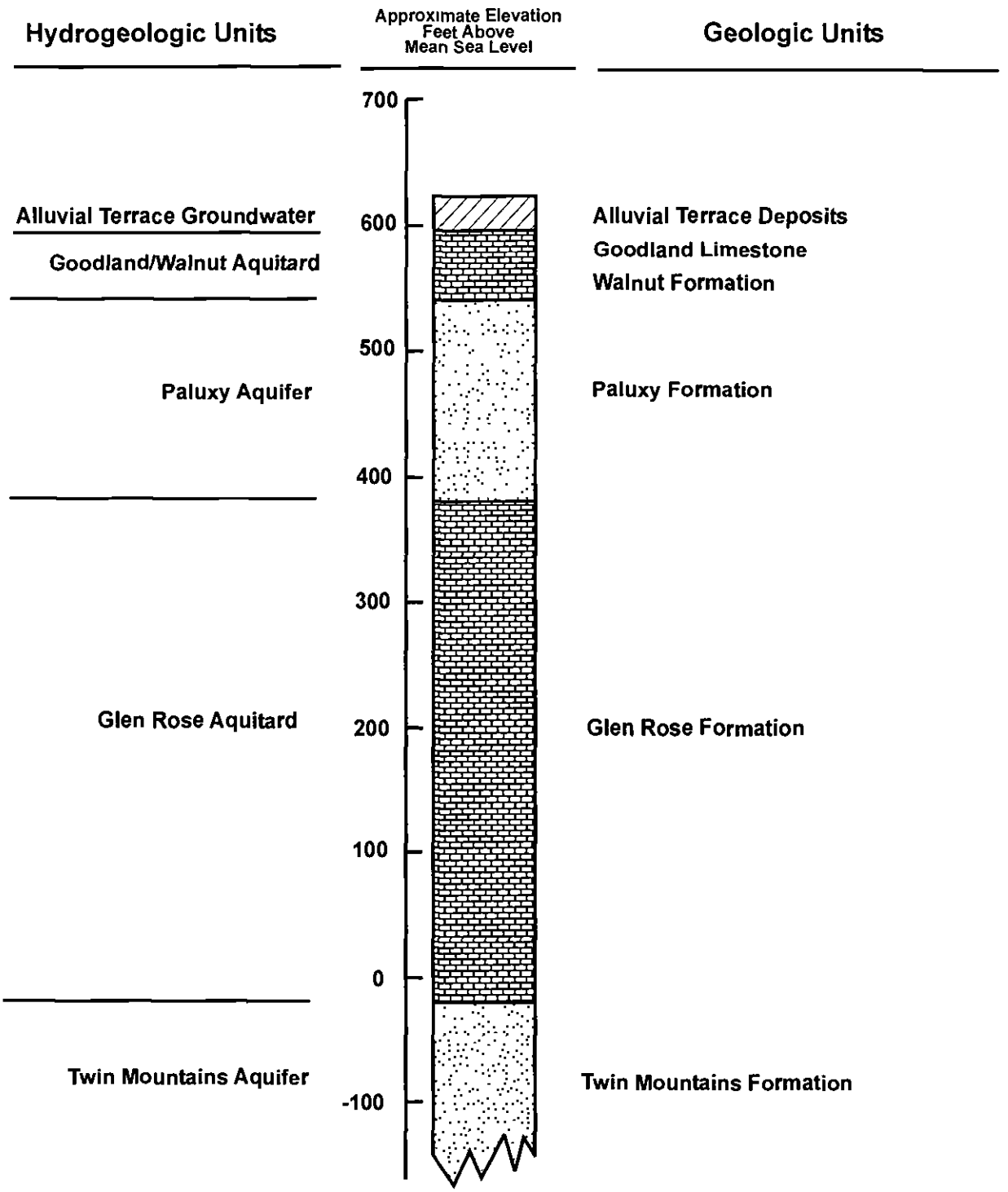
HYDRO GeoLogic INC



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Created mlawlor 06 12 97
Revised 04 25 00 cf
Source Radian, 1989

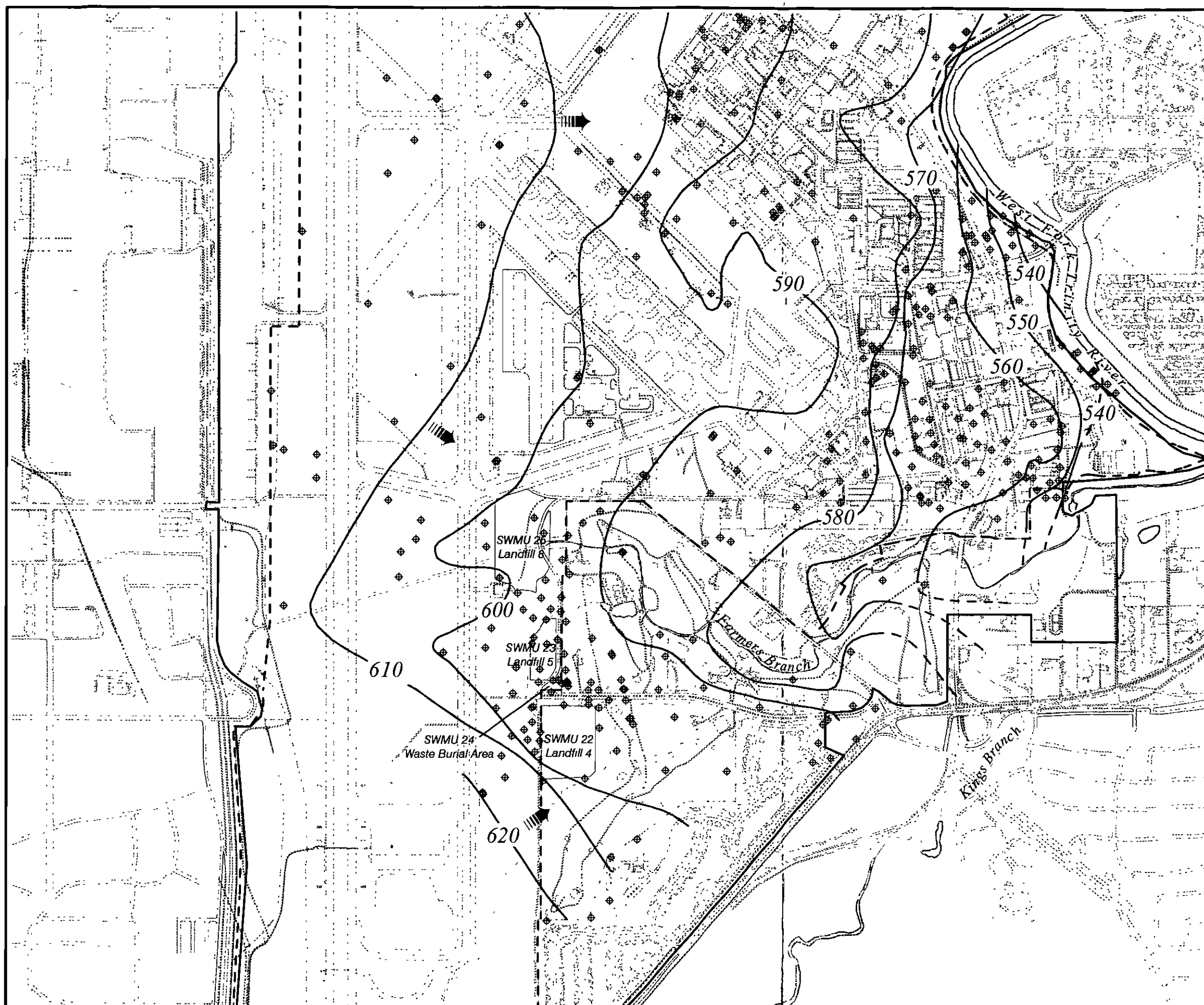
HYDRO GeoLogic

Legend

- Alluvium
- Limestone
- Sandstone

Figure 2.9

Stratigraphic Column Correlating Hydrogeologic Units and Geologic Units



HydroGeoLogic, Inc —RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 2.10
Groundwater Flow July 1998
and Locations of
SWMUs 22, 23, 24, and 25

U.S. Air Force Center for Environmental Excellence

Legend

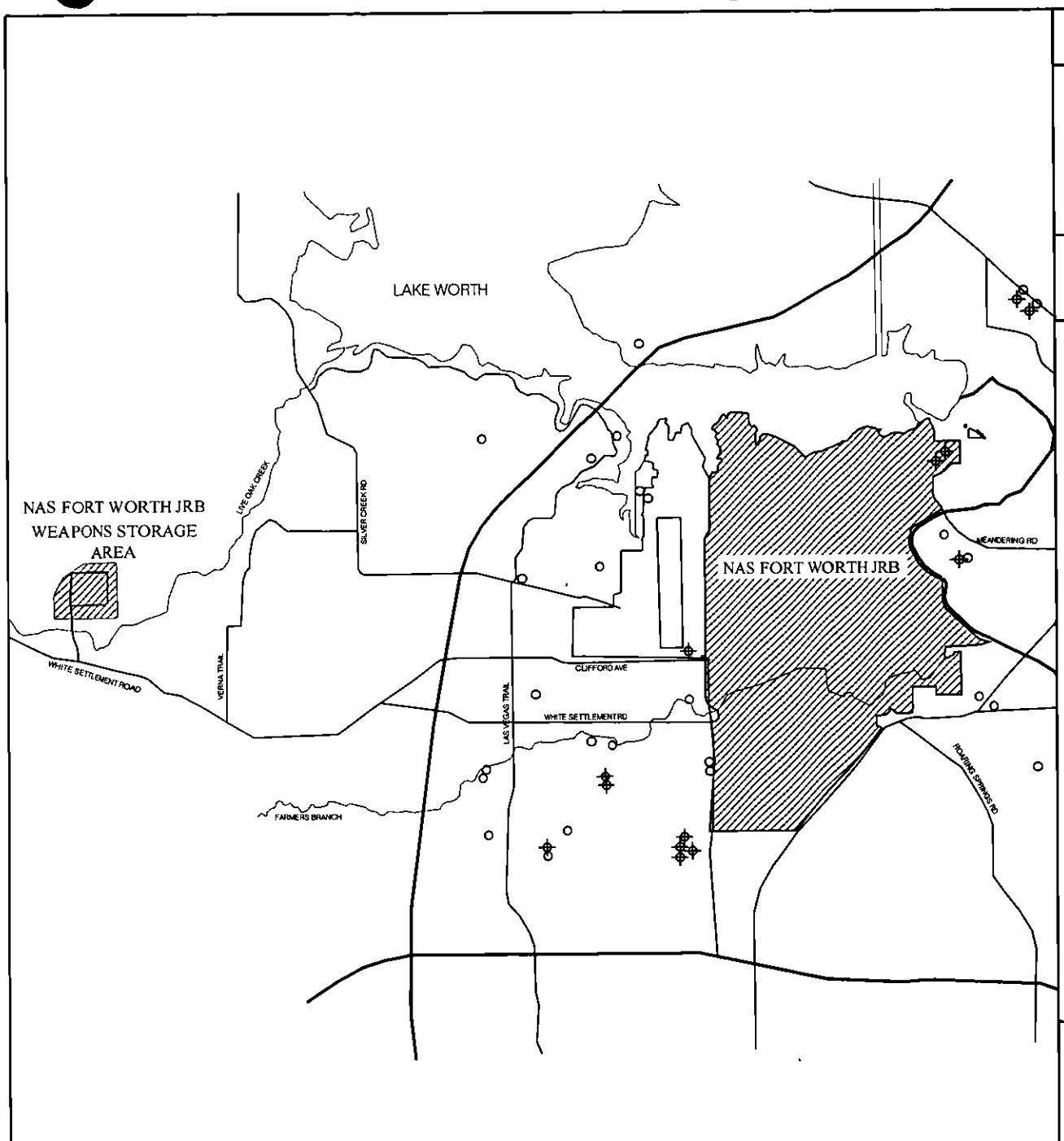
- NAS Fort Worth JRB (Carswell Field)
- Former Carswell Air Force Base
- Existing Monitoring Wells
- Solid Waste Management Unit (SWMU)
- Generalized Groundwater Flow
- –600– Groundwater Elevation Contour (Feet Above Mean Sea Level)

N

500 0 500 1000 1500
SCALE IN FEET

Filename X \Afc001\024c\Report\SWMUs 22, 23, 24, and 25
swmu_gwflow apr
Project AFC001-024C
Created 04/27/00 jbelcher
Revised
Source HydroGeoLogic, Inc—GIS Database

HYDRO GeoLogic INC



HydroGeoLogic, Inc.—RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 2.11

Location of Water Wells Within the Vicinity of NAS Fort Worth JRB

U.S. Air Force Center For Environmental Excellence

Legend

- Former Property Boundary of Carswell AFB
- Property Boundary of AF Plant 4
- Water Wells Currently in Use
- Water Wells Plugged, Abandoned, or Not Used

N

5000 2500 0 5000

SCALE IN FEET

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Project AFC001-024C
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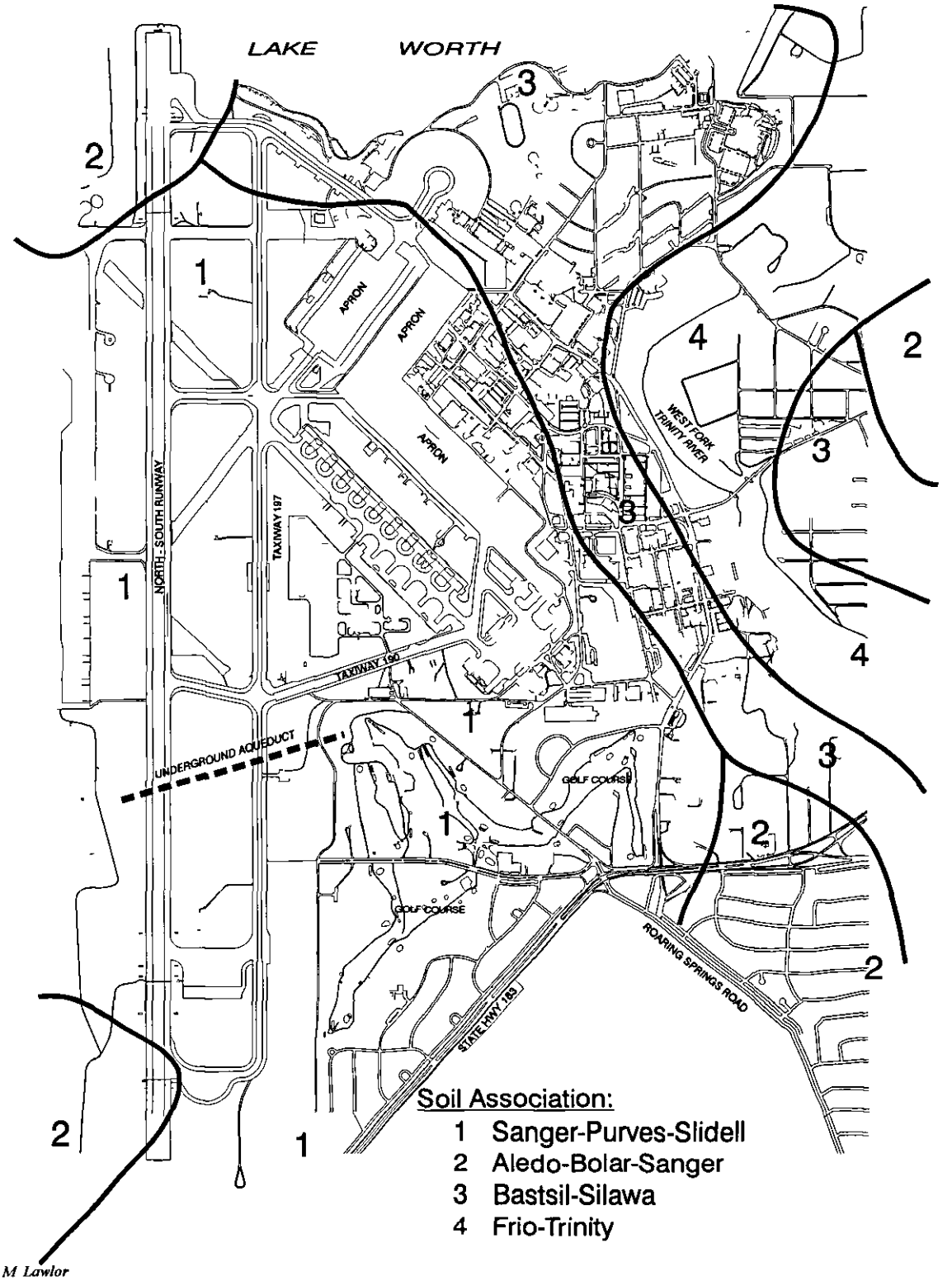
Revised 08/28/00 ap
Source Radian 1989

HYDRO GeoLogic

675 54

675 55



6/12/97 M Lawlor

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Created 6/12/97 mlawlor
Revised 04/25/00 cf
Source Radian, 1989

HYDRO GeoLogic

Legend

0 1000 2000
SCALE IN FEET

N

Figure 2.12
Soil Association Map

TAB

SECTION 3.0

3.0 SITE DESCRIPTIONS AND PAST INVESTIGATIONS

The Air Force IRP sites investigated as part of this RFI include four former landfills identified as SWMU 22 (Landfill 4 or LF-04), SWMU 23 (Landfill 5 or LF-05), SWMU 24 (Waste Burial Area 7 or WP-07), and SWMU 25 (Landfill 8 or LF-08). The location of these SWMUs in relation to the base is presented on Figure 1.2. Terrace alluvial aquifer groundwater flow in the region of these SWMUs is presented in Figure 2.10.

SWMU 22 is approximately 9 acres in size. It is located east of Taxiway 197 and south of White Settlement Road. SWMU 22 was operated as landfill during much of the history of Carswell AFB. The period of official operation of this SWMU was from 1956 to 1975 (A.T. Kearney, 1989). Base refuse was reportedly burned and buried at this unit during its operational period. SWMU 22 reportedly received solid domestic waste, partially filled paint cans, cadmium batteries, drums of waste paints, thinners, oils, PD-680, and medical waste as well as construction debris in the form of concrete, asphalt, wood, trees, and potentially small amounts of undocumented hazardous materials. After the period of official operation, the site was converted into a radar facility comprising three buildings and an underground storage tank (UST) for storage of diesel fuel. At the time the RFI was conducted, only one abandoned building existed at the site. The other two buildings were removed between 1992 and 1996. The UST was removed under the direction of Jacobs Engineering Group in 1996. Analytical results and documentation of the UST removal are presented in pages 6-18 through 6-24 of the Final Removal/Upgrade of USTs Technical Report, Volume I (Jacobs, 1997a). The remaining building was demolished in June 2000 in association with Interim Remedial Actions (IRAs) performed at the site.

SWMU 23 is approximately 3.1 acres in size and is located 250 feet north of the northwest corner of SWMU 22 adjacent to the western border of the base perimeter road. An intermittent un-named tributary of Farmers Branch Creek serves as the western and northern border of SWMU 23. This area served as an active base landfill from 1962 through 1975. Historic aerial photographs indicate that a clay berm was constructed adjacent to the un-named tributary during its period of operation. The area behind the berm was then filled to its existing level. The unit reportedly received all types of waste from the flightline area. Wastes managed at SWMU 23 were similar to the wastes managed at SWMU 22 (A.T. Kearney, 1989).

SWMU 24 is a 0.64 acre triangular strip of land located between SWMUs 22 and 23, adjacent to the base perimeter road and security fencing. SWMU 24 served as an active landfill during the 1960's. The unit received drums of cleaning solvents, tetraethyl leaded sludge, small quantities of undetermined waste, and may have received live ordinance (A.T. Kearney, 1989).

SWMU 25 is a 10 acre parcel of land located east of Taxiway 197, south of Taxiway Charlie, north of SWMU 17, and west of the base security fence. The unit overlies the underground aqueduct for Farmers Branch Creek. SWMU 25 was used as a fill area during the 1960s. It reportedly received asphalt, concrete rubble, construction debris, metal, trees, and wood. No hazardous materials were reportedly buried at this site; however, some of the fill materials listed above may contain hazardous constituents. (A.T. Kearney, 1989)

3.1 INVESTIGATION HISTORY

The "Flightline Area" has been the subject of several past investigations and reports. In past reports, the "Flightline Area" was defined as the area containing Landfills 3, 4, 5, 7, 8, Waste Burial Area 7, and Fire Department Training Areas 1 and 2. The investigation and characterization of a basewide TCE plume, emanating from AFP 4, was a primary focus of past flightline investigations conducted between 1984 and 1993. The current investigation is only concerned with the Landfill 4 (SWMU 22), Landfill 5 (SWMU 23), and Waste Burial Area 7 (SWMU 24) portions of past flightline investigations.

Intrusive sampling performed specifically to characterize contaminants of potential concern at SWMUs 22, 23, 24, and 25 was initiated in August 1997 based on the Draft Final RFI workplan (HydroGeologic, 1997a). The following historical investigations have been conducted in the vicinity of SWMUs 22, 23, 24, and 25 prior to RFI Activities.

- Site Investigation (Phase II, Stage I), February/March 1985 (Radian, 1986).
- Phase I RI/FS (Phase II, Stage II), February and April 1988 (Radian, 1989).
- IRP, Stage 2 Site Characterization Report, Flightline Area (Radian, 1990).
- IRP, Stage 2, Final Report, RI Report, Flightline Area (Radian, 1991).
- Phase I and II Report, Field Sampling, Analysis, and Testing, Carswell AFB, Landfills 4 and 5 (IT Corporation, 1993).
- Phase III Report, Field Sampling, Analysis, and Testing, Carswell AFB, Landfills 4 and 5 (IT Corporation, 1994).
- AFP 4, IRP, Basewide Groundwater Monitoring Quarterly Letter, NAS Fort Worth JRB, (Jacobs, 1995).
- IRP, Basewide Quarterly Groundwater Monitoring, First Semi-Annual Report, NAS Fort Worth JRB, (Law Environmental, 1996a).
- IRP, Basewide Quarterly Groundwater Monitoring, Second Semi-Annual Report, NAS Fort Worth JRB, (Law Environmental, 1996b).
- Draft RFI of SWMUs 22, 23, 24, and 25 Carswell AFB, Texas, (HydroGeoLogic, Inc, 1997b).

3.1.1 SWMU 22 and SWMU 23 Investigations

Previous investigations of SWMUs 22 and 23 were conducted and reports prepared grouping all of the SWMU sites within the Flightline Area together, and therefore, do not adequately characterize conditions specific to SWMUs 22 and 23. Investigations were based on information

obtained from record searches, personnel interviews, geophysical surveys, and sampling (including soil, groundwater, and surface water). Site-specific geology data was gathered during borehole drilling, sampling, lithologic logging, and geophysical surveys. Additional investigations, including groundwater sampling and geophysical surveys, were conducted to fill data gaps identified from initial investigation activities. The results of these investigations as well as additional investigations conducted by HydroGeoLogic are presented in Section 5.0.

3.1.2 SWMU 24 Investigations

A RFI and IRA were initiated at SWMU 24 when a contractor encountered a partially filled 55-gallon drum of TCE while installing an underground utility. This discovery prompted the U.S. Army Corps of Engineers (USACE) to contract Ecology and Environment (E&E) to perform a geophysical survey at SWMU 24 in February of 1991. Results from this survey revealed nine distinct geophysical anomalies, indicating buried metal objects beneath the ground surface (Figure 3.1, anomalies A through J).

Excavation activities at these anomalies were initiated by the USACE in October 1991. Area J was added to excavation activities based on field observations. A total of thirty four 55-gallon drums and ten 5-gallon buckets were excavated. These drums and buckets contained a total of 131 gallons of TCE and 169 gallons of TCE- contaminated liquid. Contaminated soils and liquids were properly disposed at offsite facilities (USACE, 1992). Results from the USACE excavation activities are presented in Table 3.1. The volume of contaminated soil removed from the excavations and the depth of the excavations were not presented in the report.

It should be noted that groundwater monitoring conducted by Radian Corporation between 1985 and 1989 indicates that TCE concentrations at the monitoring wells located upgradient of SWMU 24 are slightly higher than TCE concentrations at any of the monitoring wells located adjacent to and downgradient of SWMU 24.

3.1.3 SWMU 25 Investigations

No previous investigations have been performed specifically for SWMU 25, however several wells have been installed up-, down-, and cross-gradient of SWMU 25 as part of nearby investigations. Two monitoring wells, LF05-02 and HM-122, were installed upgradient of SWMU 25. Monitoring wells located downgradient of SWMU 25 include FT08-11A (located south of the aqueduct) and a nest of monitoring wells in the USGS phytoremediation area (located north of Farmers Branch Creek).

TCE concentrations at the monitoring wells located upgradient of SWMU 25 are consistently higher than TCE concentrations at any of the monitoring wells located downgradient of the SWMU.

3.2 REMEDIAL ACTIONS

No past remedial actions have been conducted at SWMUs 22, 23, or 25. However, as noted above in Section 3.1.2, the USACE excavated drums containing TCE as well as TCE-

contaminated soils from SWMU 24 in 1991. In addition, a groundwater pump and treat system was installed adjacent to and south of SWMU 24 in 1993. A series of 12 recovery wells were installed and connected to the pump and treat system in 1993 and 1994 (IT, 1993 and 1994). This pump and treat system was installed to provide hydraulic control and to remediate contaminated groundwater associated with the basewide TCE plume. Soil removal actions were performed in 2000 as part of this RFI. The details regarding these actions are discussed in Section 5.0.

TABLES

Table 3.1
Summary of Drum Removal Activities
SWMU 24 USACE - 1991

Geophysical Anomaly	Recovered 55-Gallon Drums	Recovered 5-Gallon Buckets	Gallons of Product Recovered	Soil Stockpile TCE Conc. (mg/Kg)	Soil Stockpile TCE Conc. (mg/Kg)	Soil Stockpile TPH Conc. (mg/Kg)	Disposition of Excavated Soil
A	3	0	0	NT	NT	NT	Removed
B	3	10	11	0.153	0.0099	ND	Removed
C	1	0	25	0.0177	0.013	87	Backfilled
D	0	0	0	NT	NT	NT	Backfilled
E	9	0	20	< MCL	< MCL	< MCL	Backfilled
F	12	0	25	0.0359	< MCL	110	Backfilled
G	5	0	50	< MCL	< MCL	< MCL	Backfilled
H	1	0	0	0.134	1.47	90	Removed
I	0	0	0	NT	NT	NT	Backfilled
J	0	0	0	1.35	0.245	65	Removed
Total	**34**	**10**	**131**	-	-	-	-

Note A total of 300 gallons of contaminated liquid was recovered and properly disposed
NT - Not Tested
ND - Not detected above practical quantification limit
MCL - Maximum Contaminant Level
TCE - trichloroethene
TPH - Total petroleum hydrocarbon

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FIGURES

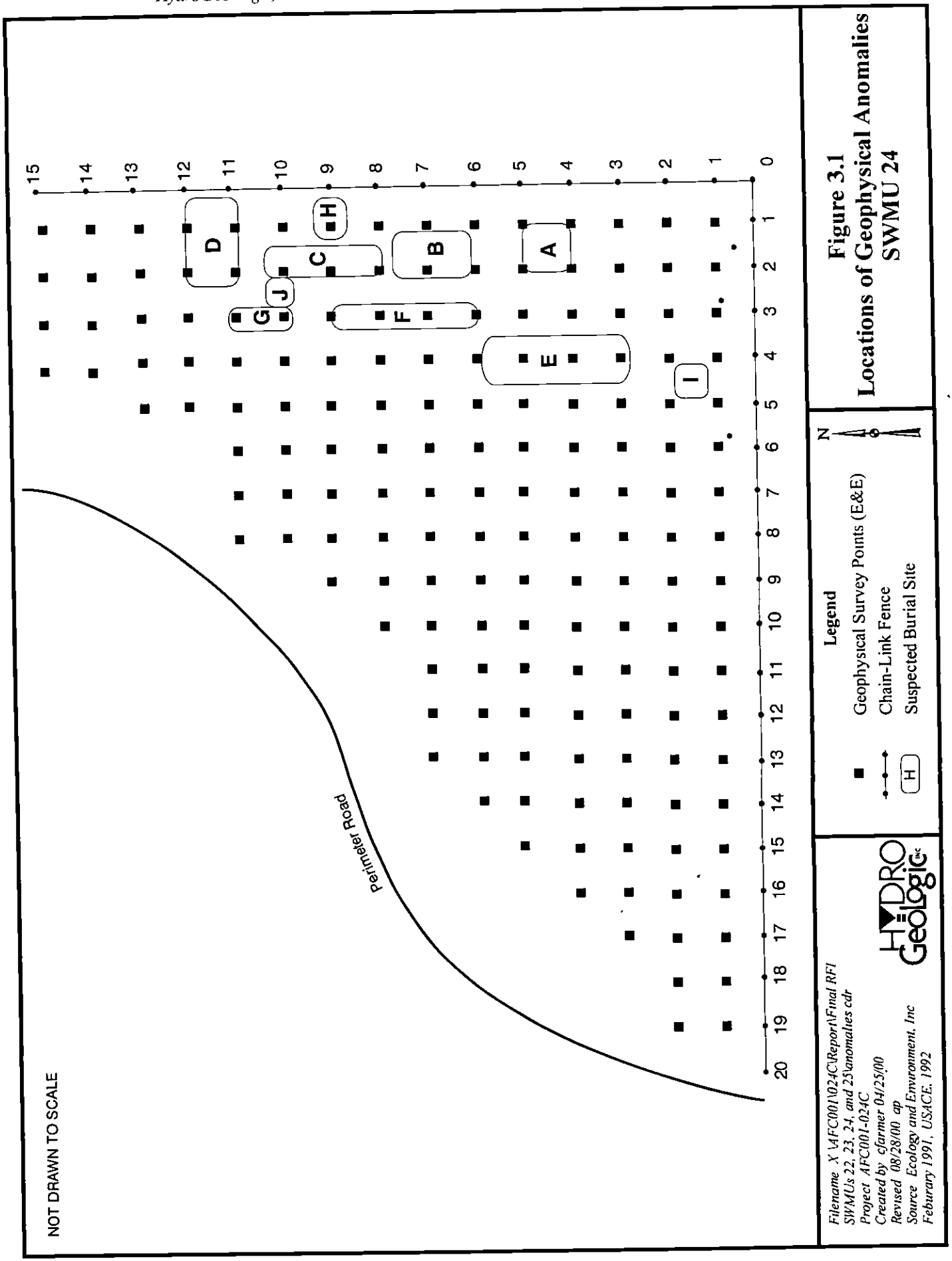

Figure 3.1
Locations of Geophysical Anomalies
SWMU 24

TAB

SECTION 4.0

4.0 SUMMARY OF PROJECT OBJECTIVES, ACTIVITIES, AND METHODOLOGY

4.1 PROJECT OBJECTIVES

This RFI was performed for the purpose of determining the nature and extent of soil contamination at each of the subject SWMUs in accordance with the requirements outlined in the TNRCC RRS Program. Specifically, the RFI was conducted to characterize the nature of the landfills, define landfill boundaries, and to determine if a release to the environment of the constituents listed in Title 40, 40 CFR Part 264 Appendix IX occurred at one or more of the four landfills.

Field activities performed to characterize landfill soils included: (1) geophysical surveys to assess the nature and limits of the landfills; (2) test pits to examine and confirm the nature of wastes buried at the landfills; (3) continuous core direct push technology (DPT) soil borings used to further investigate the nature of landfill debris, determine the lithology of native soils, and to support soil sample collection for laboratory analyses; and (4) the installation of monitoring wells using hollow stem auger (HSA) drilling to support groundwater sample collection for laboratory analyses.

4.2 INVESTIGATION STRATEGY

Prior to initiating any intrusive activities, both magnetometric and electromagnetic (EM) geophysical methods were used to determine the areal extent of SWMU 25, identify possible sources of contamination, and to locate buried metallic waste and landfill waste limits for intrusive investigation. As noted in Section 3.0, geophysical studies had been previously performed at SWMUs 22, 23, and 24. Based on a review of the geophysical data for each SWMU, test pits and soil borings were installed to achieve the following objectives:

- **Characterize the nature and extent of buried waste at each landfill.** Test pits were excavated in areas where the strongest geophysical anomalies were encountered to survey the nature and frequency of occurrence of waste types present at each landfill. Test pits were excavated to depths where native soils were encountered to help determine the vertical extent of landfill waste. Continuous DPT soil cores were collected from the ground surface to the top of the water table to assist in determining the vertical and areal extent of landfill waste, as well as providing lithology and depth to groundwater information.

- **Define the nature of potential chemical contamination at each landfill using broad screening methods.** DPT soil borings were placed near geophysical anomalies within each landfill and advanced to the top of the water table. At each DPT location, soil samples were collected every 5 feet from the surface to the top of the water table and shipped to a fixed-based laboratory for analysis of the full suite of Appendix IX compounds. At sampling intervals where only waste materials were recovered, samples were not collected for chemical analysis. At test pit locations, soil samples were collected at the ground surface and the bottom of the test pit for analysis of metals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs).

- **Determine whether potential chemical release(s) from each landfill have impacted groundwater.** HSA drilling was used to complete borings and install monitoring wells. All HSA borings were completed outside the landfill boundaries where data gaps existed from previously installed monitoring wells. Upgradient monitoring wells were used to define the nature of groundwater entering landfills, and downgradient wells were used to define the nature of groundwater exiting landfill areas. Each of the HSA borings installed during this RFI were drilled to bedrock. Monitoring wells were then installed and screened from just above the water table to bedrock. Although the HW50289 permit requires well screens spanning the uppermost 20 feet of uppermost aquifer, EPA Region VI has previously expressed concerns about the interval being too large. Since bedrock was generally less than 30 feet below ground surface (bgs), and the saturated thickness of the alluvial terrace groundwater was generally less than 12 feet, the majority of these wells were screened from bedrock to approximately 3 feet above the water table.

- **Delineate the extent of potential soil contamination at each landfill.** DPT borings were used to collect soil samples at specific intervals to delineate previously identified compounds to background/RRS-1 levels. Analysis of these soil samples was performed using the most definitive analytical methods available for the target compounds.

- **Utilize the Synthetic Precipitation Leaching Procedure (SPLP) to obtain a Site Specific medium-specific concentration (MSC).** SPLP was utilized when the concentration of landfill soil contaminants in DPT borings was detected at Standard 3 concentrations. DPT soil borings were positioned directly adjacent to previous borings or test pits where compounds had been detected at Standard 3 concentrations to collect samples at targeted intervals. Definitive analytical methods were selected to compare with original soil concentration totals. If soil analyte concentrations were above RRS-2 groundwater protection standards for industrial soil, the SPLP method was performed, the liquid extract analyzed, and the result compared to the TNRCC RRS-2 groundwater standard.

- **Determine if free-phase DNAPL was present in bedrock depressions beneath SWMUs 23 and 24.** DPT borings were used to determine the lowest elevation of bedrock under SWMU 24. Monitoring wells were then installed within each SWMU at identified bedrock depressions. These monitoring wells were drilled 0.5 feet into the bedrock and sampled for visual identification of DNAPL, as well as VOC analysis. This screening activity was performed to confirm that buried drums known to have contained chlorinated solvents, and now removed from SWMU 24, had not resulted in the deposition of DNAPL beneath SWMUs 23 or 24.

4.3 PROJECT ACTIVITIES

The RFI Work Plan, prepared by HydroGeoLogic in January 1997, was approved in August 1997 and field activities immediately commenced. Initial field activities at SWMUs 22, 23, 24, and 25 were conducted between August 1997 and September 1997. These activities included soil sampling from 28 test pits and 7 soil borings; surface water and sediment sampling; geophysical surveys of SWMU 25 and the northwestern portion of Carswell Golf Course; and the installation of 3 monitoring wells. It should be noted that surface water and sediment sampling results will

be evaluated and presented separately from this report as part of a baseline human and ecological risk assessment of sediments, surface water, and groundwater at NAS Fort Worth JRB in association with an ongoing focused feasibility study (FS) of the basewide TCE plume. Test pits and the initial soil borings were used to collect 35 surface and 28 subsurface soil samples at 35 locations. Groundwater samples were collected at 7 monitoring well locations. Both soil and groundwater samples were analyzed for metals (RCRA list), mercury; VOCs - AFCEE QAPP list; and SW8270B for SVOCs - AFCEE QAPP list. A Draft RFI Report summarizing the analytical results of field activities was prepared and submitted in December 1997 (HydroGeoLogic, 1997b). After review by the TNRCC, it was determined that additional delineation and characterization sampling was necessary using the Appendix IX analyte suite.

A technical memorandum summarizing proposed additional sampling was submitted to the United States Air Force (USAF) in March 1997. This technical memorandum was approved in April 1998 and field activities commenced in May 1998. Field activities conducted in 1998 included the installation of 25 continuous core DPT soil borings and the sampling of 2 monitoring wells. Soil borings were used to collect 24 surface and 77 subsurface soil samples at 25 locations. Groundwater samples were collected at the 2 monitoring well locations. Both soil and groundwater samples were analyzed for the broad spectrum suite of Appendix IX compounds and cis-1,2-dichloroethene.

In 1999, 25 soil borings and surface sample locations were completed at SWMUs 22, 23, 24, and 25. These borings were used for several purposes: (1) to define lithologically the areal extent of SWMU 25; (2) to assess potential contaminant impacts in the western portion of SWMU 25 with analysis of soil samples for Appendix IX analytes; (3) to delineate Standard 2 and 3 detections at each SWMU; (4) to confirm previous Standard 3 results at each SWMU; and (5) to perform SPLP analysis on confirmed Standard 3 detections at each SWMU. A total of 15 surface and 29 subsurface soil samples were collected. Delineation samples were targeted for specific analytes using the most definitive EPA analytical methods available. Two monitoring wells were also installed downgradient of SWMU 25. One round of groundwater sampling was performed at monitoring wells located directly downgradient of each SWMU. A total of five monitoring wells were sampled in 1999. Groundwater at each monitoring well was analyzed for Appendix IX total metals by SW6010B/SW7470A; Appendix IX VOCs by SW8260B; and Appendix IX SVOCs by SW8270C. Both of the SWMU 25 monitoring wells were analyzed for the above set of analytical suites only; however, additional Appendix IX analytical methods for groundwater analysis were selected for the other three SWMUs based on the unique contaminants of potential concern (COPCs) that were detected in the soil of each SWMU. For example, groundwater from the monitoring well located downgradient of SWMU 22 was also analyzed for organochlorine (OC) pesticides/polychlorinated biphenyls (PCBs) by SW8080A, and groundwater from the monitoring wells located downgradient of SWMUs 23 and 24 was also analyzed for organophosphorus pesticides by SW8141.

In January 2000, 11 soil boring and surface sample locations were completed at SWMUs 22 and 23. These borings were used to delineate Standard 2 and 3 detections at each SWMU, verify previous Standard 3 results, and to perform SPLP analysis on confirmed Standard 3 detections. A total of 8 surface and 12 subsurface soil samples were collected. In addition, 16 monitoring wells were sampled to confirm and delineate O,O,O-TEPA detected in a monitoring well located

downgradient of SWMU 23. Additionally, monitoring wells located directly downgradient of each SWMU were sampled for specific compounds detected and confirmed in soil at each SWMU. Groundwater samples from each of these was analyzed for Appendix IX total metals by SW6010A/SW7470A; Appendix IX VOCs by SW8260B; and Appendix IX SVOCs by SW8270C. At SWMU 22, additional analysis was performed for Appendix IX pesticides by SW8080A; at SWMUs 23, the additional analysis performed was Appendix IX organophosphorus pesticides by SW8141.

In March 2000, an additional 31 soil boring and surface samples locations were completed at SWMUs 22, 23, 24, and 25. The purpose of these boring was to further delineate Standard 2 and 3 detections at each SWMU, verify previous Standard 3 results, and to perform SPLP on confirmed Standard 3 detections at each SWMU. A total of 14 surface and 17 subsurface soil samples were collected. Again, delineation samples were targeted for specific analytes using the most definitive EPA analytical methods available. In addition, groundwater samples were collected from 19 monitoring wells to confirm previous results, and to further delineate detections of O,O,O-TEPA. Sample analysis was targeted for O,O,O-TEPA using SW8141 with confirmation analysis performed using the GC/MS method SW8270 in the Single Ion Mode (SIM).

In April 2000, IT Corporation performed geophysical surveys at SWMU 24 to verify that all drums (potentially containing chlorinated solvents) had been removed by the USACE during remedial actions conducted in 1991. In addition, IT Corporation installed 16 DPT soil borings and 4 monitoring wells at SWMUs 23 and 24 to determine the depth to bedrock and if any DNAPL was present on the bedrock surface. At SWMU 23, two soil borings were used to collect subsurface soil samples for VOC analysis, and two monitoring wells were installed 0.5 feet into the bedrock surface adjacent to the each DPT boring. Soil samples from DPT borings were collected in 5-foot intervals from 5 feet bgs to the top of the water table. At SWMU 24, 14 DPT soil borings were used to characterize the topography of the bedrock surface. Soil samples were collected only in the capillary fringe at each DPT location for screening level analysis of VOCs. Two monitoring wells were then installed 0.5 feet into the bedrock surface at locations determined to be the lowest points of the bedrock surface within the landfill. All four monitoring wells (two at SWMU 23 and two at SWMU 24) were used to screen for DNAPL on the bedrock surface below each SWMU. The two wells installed within SWMU 23 were removed after one round of groundwater sampling.

In June 2000, an additional 25 soil boring and surface sample locations were completed at SWMUs 22, 23, 24, and 25. These borings were used to further delineate Standard 2 and 3 detections at each SWMU, to verify previous Standard 3 results, and to perform SPLP on confirmed Standard 3 detections at each SWMU. A total of 17 surface and 29 subsurface soil samples were collected. Again, delineation samples were targeted for specific analytes using the most definitive EPA analytical methods available.

In July and August 2000, IT Corporation conducted IRAs at each SWMU to remove identified Standard 3 contaminated soil. For the purpose of removing soils with Standard 3 detections one excavation was completed at SWMU 22; two excavations were completed at SWMU 23; four excavations were completed at SWMU 24; and five excavations were completed at SWMU 25. Sidewall and floor samples were collected at each excavation to confirm that all Standard 3

contaminated soil had been removed. These analyses were targeted for the specific Standard 3 contaminants driving the need for each excavation. Validated confirmation results from these excavations are presented in Appendix M. Additionally, six excavations were completed at SWMU 24 for the purpose of investigating and removing metallic objects (including buried drums) identified during the May 2000 geophysical survey. In excavations where drums were encountered at SWMU 24, a broad screening analysis was used for confirmation sampling to determine the nature of contaminants contained within the drums, and to ensure these contaminant were sufficiently removed from the excavations. Validated confirmation results from the drum removal excavations are also presented in Appendix M. Detailed descriptions of IT's excavation can be found in the February 2001 Final Completion Report, Remedial Actions at Landfills LF-04, LF-05, LF-08, and Waste Burial Area WP-07 (IT Corporation, 2001).

The RFI sampling effort presented in this document was performed in accordance with the project Work Plan (HydroGeoLogic, 1997a). Data presented in this RFI Report includes a summary of all intrusive activities and analytical results generated during the soil and groundwater sampling programs.

4.4 FIELD SAMPLING METHODOLOGY

The field tasks described in the following sections were conducted to achieve the project objectives. As previously noted, each of the SWMUs received various types and amounts of construction debris throughout their respective periods of operation. Although suspected, documentation confirming unauthorized dumping of hazardous wastes and hazardous constituents has not been obtained. The field tasks described in the following sections were chosen by evaluating the type and purpose of data required to characterize each SWMU. Geophysical surveys, installation of DPT soil borings, test pit installation, and installation of monitoring wells served as a cost-effective means for gathering samples for visual observation, field screening, and laboratory analyses.

The following sections describe the methods employed for geophysical surveys, soil sampling, installation of DPT soil borings and monitoring wells, and groundwater sampling.

4.4.1 Geophysics

Two geophysical surveys were conducted at SWMU 25 by HydroGeoLogic; an EM survey and a magnetic survey were performed. The EM survey was used to identify and map areas with apparent conductivity contrasts. The magnetic survey was used to locate buried ferrous objects such as tanks, pipelines, and metallic debris. The purpose of the geophysical surveys was to determine the lateral extent of the landfill and to provide information for the selection of optimal intrusive sampling locations.

A systematic grid was established at the SWMU using a tape measure for distance and a transit for trueness. Survey lines were spaced every 20 feet and stations along the lines were marked at spacings of 50 feet.

The EM survey was conducted using a Geonics EM31 with a DL720 digital data recorder. The apparent conductivity of the ground is linearly related to the quadrature component and is measured in millisiemens per meter. The in phase component, measured in parts per thousand, is sensitive to large metallic objects. The EM survey procedure consisted of carrying the instrument along the survey lines. The quadrature and in phase readings were digitally recorded every 5 feet except where prevented by surface obstructions.

The magnetic survey was performed with a Gem Systems GSM-19 magnetometer/gradiometer, which is capable of measuring the total magnetic field intensity and the vertical magnetic gradient. The vertical magnetic gradient measures the difference in the total field intensity of the earth's magnetic field between two sensors positioned at different fixed heights above the ground. The total magnetic field intensity, measured in nanoteslas (nT), and the vertical magnetic field gradient, measured in nT per meter, were digitally recorded approximately every 5 feet along survey lines except where prevented by surface obstructions. A GSM-19 magnetic base station was also established at SWMU 25 to correct for diurnal variations in the Earth's magnetic field.

The geophysical data was downloaded and evaluated in the field for data quality and to make preliminary interpretations. Corrections for diurnal variations in the Earth's magnetic field were applied to the magnetic data before evaluation. The EM and magnetic results were placed on a grid and contoured with Surfer© for Windows and displayed as contour maps and 3-dimensional mesh diagrams. Figures presenting the results of these geophysical surveys are presented in Section 5.0.

Geophysical surveys at SWMUs 22 and 23 were performed by Radian Corporation in 1985. Results of these surveys, which utilized a combination of EM, earth resistivity vertical electrical soundings, and magnetometer techniques, are detailed in the IRP Phase II, Stage I, Volume I - Final Report (Radian, 1986). Figures from the Radian Final Report depicting the EM data at each SWMU are presented in Section 5.0 of this RFI report.

Geophysical surveys at SWMU 24 were performed by E&E in 1991. Results of this survey, which utilized a combination of ground penetrating radar and EM, are detailed in a report entitled *RFI/Remediation Plan, Removal of Buried Drums and UST, SWMU 24, Waste Burial Area* (USACE, 1991). The USACE excavation locations are presented in Figure 3.1. Confirmatory geophysical surveys were also performed at SWMU 24 by IT Corporation in 2000. Results of this survey, utilizing a combination of magnetic, time domain EM induction and frequency domain EM techniques, are detailed in the *Draft Surface Geophysical Survey Report, Waste Pile No. 7 Site* (IT Corporation, 2000). This report is presented as Appendix K.

4.4.2 Soil Sampling

Surface soil samples were collected adjacent to test pits and DPT borings using a stainless steel trowel and bowl. Subsurface test pit samples were collected from the bucket of the backhoe used to excavate the pit. Subsurface Appendix IX characterization soil samples were collected at 5-foot intervals until the water table or bedrock was encountered using a DPT sampling rig to minimize investigative derived waste.

In 1998, a vibra-core DPT system was used to advance dual cased sampling barrels into the subsurface. This triple cased sampling system consisted of a 3-foot long by 2.75-inch outer diameter drive casing, a 2-inch inner diameter core barrel, and six, 6-inch inner stainless steel sample sleeves that were simultaneously pushed, driven, or vibrated into the ground. After being advanced 3 feet, the inner barrel was retrieved, while the drive casing was left in place to prevent the borehole from collapsing. This drive casing ensured that subsequent soil samples were collected from the targeted interval and eliminated slough from higher up in the borehole.

In 1999 and 2000, a Strataprobe™ DPT system was used to advance dual cased sampling barrels into the subsurface. This double cased sampling system consisted of a 2-foot long by 2-inch outer diameter split spoon soil piston sampler and four, 6-inch inner stainless steel sample sleeves that were simultaneously pushed and driven into the ground. The piston prevents the sampler from filling as it is advanced to depth. After being advanced 2 feet, the inner drive string is retrieved to the surface.

Continuous soil samples were collected in stainless steel liners inside the sample barrel. The 1998 DPT subsurface sampling intervals were centered on 5 foot intervals in the following manner: 3.5 to 6.5 feet; 8.5 to 11.5 feet; 13.5 to 16.5 feet; and 18.5 to 21.5 feet. The 1999-2000 DPT subsurface sampling intervals were centered on 5-foot intervals in the following manner: 4 to 6 feet; 9 to 11 feet; 14 to 16 feet; and 19 to 21feet. A stainless steel sleeve with 100 percent recovery was selected for VOC analysis from each sampling interval. This sleeve was then immediately sealed with a Teflon™-lined plastic cap to avoid loss of volatiles. Soil samples collected for other analyses were containerized in glass jars with Teflon™-lined caps. All samples were immediately preserved in a cooler and shipped to the laboratory for analysis. Cuttings from all soil borings were containerized in Department of Transportation approved 55-gallon drums and labeled. Each boring was backfilled with a slurry grout mixture in accordance with the RFI Work Plan (HydroGeoLogic, 1997a).

Soil samples collected from test pits and borings in 1997 were analyzed for metals by SW6010-standard, VOCs by SW8260, and SVOCs by SW8270 (Table 4.1). In 1998, characterization soil samples were analyzed for the full suite of Appendix IX compounds (Table 4.2). Soil samples collected during delineation phases in 1999 and 2000 used definitive analyses for selected analytes. Specific samples for each of these rounds are detailed in the following tables: October 1999 (Table 4.3); January 2000 (Table 4.4); March 2000 (Table 4.5); and June 2000 (Table 4.6). Soil boring and test pit logs are presented in Appendix A. Soil Field Sampling Report Forms are presented in Appendix B.

Some of the boring identification numbers at SWMU 24 were changed in the ERPIMS database to avoid the use of the same borehole names across multiple sites. The previous boring names have been left the same in the text, figures, and tables to minimize confusion between the draft and final version of the RFI. Table 4.7 will serve as a reference guide between the ERPIMS database and the former boring identification numbers.

4.4.3 Monitoring Well Construction

Three monitoring wells were installed downgradient of SWMU 25 (WHGLTA801, WHGLTA803, and WHGLTA002) and one well (WHGLTA003) was installed downgradient of SWMUs 22, 23,

and 24. These wells were installed to provide adequate downgradient coverage and to fill in groundwater data gaps. A total of five monitoring wells were also installed within SWMUs 23, 24, and 25: WITCTA59 and WITCA60, (SWMU 23), WITCA57 and WITCTA58, (SWMU 24), and WHGLTA004 (SWMU 25). All of the WITCTA monitoring wells were drilled 0.5 to 1-foot into the bedrock to identify bedrock lithology and insure that well screens were positioned to sample potential DNAPL. Each of the WITCTA monitoring wells were gauged for DNAPL and sampled for VOCs. Monitoring wells WITCTA 59 and WITCTA60 were abandoned prior to the installation of the municipal landfill cover, after it was determined that no free-phase DNAPLs were present in these wells. Although no evidence of free-phase DNAPL was found in WITCTA57 and WITCTA58, these monitoring well were left in place for potential use in future groundwater monitoring. Monitoring well WHGLTA004 was initially installed as an upgradient monitoring well for SWMU 25; however, it was subsequently determined that the western boundary of SWMU 25 extended approximately 250 feet west of the well. Monitoring well completion details are presented in Table 4.8.

All monitoring wells were screened from the bedrock surface to above the water table, because the saturated intervals were less than 20 feet. The monitoring wells were constructed using flush-threaded 2-inch diameter Schedule 40 PVC casing and screen. The bottom of the screen was capped using a flush threaded PVC cap. All casing was new and unused. The filter pack consisted of silica sand and extended from the bottom of the hole to at least 2 feet above the top of the well screen. The bentonite seal consisted of at least 2 feet of bentonite between the filter pack and the casing grout. The bentonite was hydrated before placement, and only 100 percent sodium bentonite was used. The casing grout extended from the top of the bentonite seal to ground surface.

For flush-mounted completions, the casing was cut about 3 inches below the land surface and fitted with a water-tight casing cap to prevent surface water from entering the well. A freely draining valve box with a locking cover was also placed over the casing. When an above-ground surface completion was used, the well casing was extended 2 or 3 feet above land surface. A casing cap was provided for each well, and the extended casing was shielded with a steel sleeve that was placed over the casing and cap, and seated in a 3-foot by 3-foot by 4-inch concrete surface pad. It should be noted that IT Corporation installed four above-ground surface completion monitoring wells. A Monitoring Well Construction Form was completed for each well. The monitoring well construction details are presented in Appendix C.

4.4.4 Monitoring Well Development

Monitoring wells were developed following procedures outlined in HydroGeoLogic's 1997 RFI Field Sampling Plan (FSP) (HydroGeoLogic, 1997a). These procedures included: (1) development of installed monitoring wells no sooner than 24 hours after installation to allow for grout curing; (2) the removal of all drilling fluids used during well construction; (3) the use of pumps to develop wells; (4) development until stabilization criteria had been reached; and the turbidity of the well is less than 10 nephelometric turbidity units (NTU) remaining within a 5 NTU range for at least 30 minutes; (5) documentation of discharge water color and volume; (6) removal of all potential sediment in the bottom of the well; (7) no detergents, soaps, acids, bleaches, or other additives used to develop the well remain; and (8) all equipment be decontaminated prior

to initiating development activities. Data collected during monitoring well development was documented on well development forms. These forms are presented in Appendix D.

4.4.5 Groundwater Sampling

Groundwater purging and sampling was performed in accordance with protocols established in HydroGeoLogic's 1997 FSP. These protocols closely follow the recommendations outlined in EPA research paper entitled Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (April 1996). Sampling data and purging parameters for each well and each sampling event were recorded on Field Sampling Report Forms. Completed groundwater Field Sampling Report Forms can be found in Appendix B, and a summary of the groundwater sampling can be found in Table 4.9.

4.4.6 Surface Water and Sediment Sampling

In September 1997, a total of 11 surface water and sediment samples were collected as part of the initial investigation. The locations and procedures for surface water and sediment sampling followed those outlined in HydroGeoLogic's FSP (HydroGeoLogic, 1997a). An additional sediment sample was collected from a location where surface water was not present at the time of sampling, as the location was within an intermittent stream (sample EUHGLTA013). These samples were analyzed for metals and mercury, VOCs, and SVOCs as summarized in Table 4.10. As previously mentioned, these media are being addressed separately from this report as part of a baseline human and ecological risk assessment in association with an ongoing focused FS of the basewide TCE plume.

4.4.7 Site Surveying

All locations of field activities were surveyed by a state of Texas certified land surveyor. The surveys were third order (Urquhart, 1962), and an XY-coordinate system was used to identify locations. The X-coordinate was the east-west axis; the Y-coordinate was the north-south axis. The reference location was the origin. All surveyed locations were reported using the State Plane Coordinate System. Table 4.11 presents the X and Y coordinates in state plane coordinate values, the ground elevation, and the measuring point elevation if the location is a groundwater monitoring well. The elevations of all newly installed wells were surveyed at the water level measuring point (notch or colored mark) on the riser pipe. The elevation of the ground surface at each water level measuring point was also included in the survey.

The XY-coordinates for each sample location was determined to within 0.1 feet and referenced to the State Plane Coordinate System. Vertical control was to the NGVD and was within 0.01 feet for all sampling locations.

4.4.8 Record Keeping

Records of field and laboratory activities were documented on standard forms (Section 8.0 of the FSP). Project data such as geophysical surveys, groundwater level measurements, boring logs, survey data, well construction forms, chain-of-custody forms, and equipment calibration logs were reviewed for accuracy and completeness. These documents were reviewed by the Project Manager

daily during field sampling events and retained in the project files. The chain-of-custody forms can be found in Appendix E.

4.4.9 Chronology of Field Work

The chronology of project tasks and dates are presented Table 4.12.

4.5 FIELD QUALITY ASSURANCE/QUALITY CONTROL

The project QAPP and FSP require that field QC samples be collected in order to assess the impact of site conditions, sample collection activities, and site matrix on the analytical results. The field QC samples known collectively as field blanks are used to assess if sampling activities introduce contamination into environmental samples. Other field QC samples are used to assess the impact of site matrix and sample collection on analytical accuracy and precision.

Field blanks include:

- Ambient blanks. These blanks are collected for VOCs, only when there is a potential ambient contamination source (e.g., active runways, engine test cells, gasoline motors in operation) that could introduce contamination into the samples during sample collection. Ambient blanks are prepared on site, at the time of collection of the associated samples, downwind of the potential contamination source, using ASTM Type II reagent grade water. Ambient blanks are used to assess whether VOC contamination that is not representative of site conditions is being introduced into environmental samples due to ambient conditions.

- Equipment blanks. These blanks are collected daily and are analyzed for all analytes that are being analyzed in the associated field samples. Equipment blanks are collected by pouring or pumping ASTM Type II reagent grade water over or through sampling equipment immediately following decontamination. Equipment blanks are used to assess whether site decontamination procedures adequately prevent cross-contamination between samples.

- Trip blanks. Trip blanks consist of VOC sample vials filled in the laboratory with ASTM Type II reagent grade water, transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are prepared only when VOC samples are collected and are analyzed only for VOC analytes. Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage process.

Other field QC samples collected during RFI activities include:

- Field duplicate samples. A field duplicate sample is a second sample collected at the same location as the original sample (the 'parent' sample). Duplicate samples are collected simultaneously, or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. Field duplicate

sample results are used to assess precision of the sample collection process. One duplicate sample was collected for every ten groundwater and soil samples collected. The sample containers were assigned an identification number in the field so that they could not be identified (blind duplicate) as duplicate samples by laboratory personnel performing the analysis. Specific locations were designated for collection of field duplicate samples prior to the beginning of sample collection.

- Matrix spike (MS)/matrix spike duplicate (MSD) samples. An MS/MSD sample pair consists of duplicate aliquots of an environmental sample spiked with known concentrations of all analytes being analyzed for in the sample. MS/MSD samples are used to assess any potential bias introduced by the sample matrix on analytical accuracy or precision. One MS/MSD pair was collected for every 20 groundwater and soil samples collected. Specific locations were designated for collection of MS/MSD pairs prior to the beginning of sample collection.

4.6 LABORATORY ANALYSIS

Samples collected in 1997 as part of this RFI were analyzed for the following standard list of compounds:

- SW6010A-standard - Metals (RCRA List)
- SW7470A/SW7471A - Mercury
- SW8260A - Volatile Organics
- SW8270B - Semivolatile Organics

Samples collected in 1998 as part of this RFI were analyzed for the full suite of 40 CFR Appendix IX constituents. In accordance with the AFCEE Basewide QAPP (HydroGeoLogic, 1998b), the following EPA Methods were used to cover the full Appendix IX list:

- SW8260A - Volatile Organics
- SW8270B - Semivolatile Organics
- SW8080A - Organochlorine Pesticides and PCBs
- SW8140 - Organophosphorus Pesticides
- SW8151 - Chlorinated Herbicides
- SW8290 - Dioxins and Furans
- SW9010A/SW9012 - Cyanide
- SW9030 - Sulfide
- SW6010A-standard - Trace Elements (Metals)
- SW7470A/7471A - Mercury

The following EPA Methods were used during the delineation phase of sampling:

- SW8260B - Volatile Organics
- SW8270C - Semivolatile Organics
- SW6010B-trace - Trace Elements (Metals)
- SW7000-series - Trace Elements (Metals)
- SW7470A/SW7471A - Mercury

- SW8080A - Organochlorine Pesticides and PCBs
- SW8310 - Polynuclear Aromatic Hydrocarbons (PAHs)
- SW8141/SW8270 SIM - O,O,O-TEPA

4.6.1 Analytical Program

The data generated by this project were of sufficient quality and quantity to meet the overall project objective, which is closure of SWMUs 22, 23, 24, and 25 under the TNRCC RRSs. See subsection 4.6.3 for a detailed discussion of data quality and completeness.

Data from the following categories were required for this study:

- Site Characterization - Data were used to evaluate physical and chemical properties of buried waste, soil, groundwater, and surface water. The data were also used to characterize the nature and extent of any contaminants detected.

- Health and Safety - Data were used to establish the level of protection needed for the work party and other site related personnel. These data were gathered by the use of organic vapor analyzers and Dräger tubes during intrusive activities.

- A combination of screening level data and definitive level data was used during this RFI. Health and safety data were collected as screening data. All soil and water samples were analyzed following EPA Level III SW846 protocols. The definitions of screening data and definitive data, as established by the EPA (EPA, 1993), are described below:

- Screening Data with Definitive Confirmation - Screening data are generated by rapid, less precise methods of analysis with less rigorous sample preparation. Sample preparation steps may be restricted to simple procedures such as dilution with a solvent, instead of elaborate extraction/digestion and cleanup. Screening data provides analyte identification and quantification. Although the quantification may be determined using analytical methods with QA/QC procedures and criteria associated with definitive data, screening data without associated confirmation data are not considered to be data of known quality.

- Definitive Data - Definitive data are generated using rigorous analytical methods, such as approved EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. These methods produce tangible raw data (e.g., chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the QA/QC requirements are satisfied. For the data to be definitive, either analytical or total measurement error must be determined.

The data generated by the laboratory analysis of samples were sufficiently sensitive to allow comparison of the results to the TNRCC RRSs. The 2000 Basewide QAPP (HydroGeoLogic, 2000) describes each method that was performed as part of the investigation and outlines the QA measures the contract laboratory must follow. The methods of analysis selected for samples collected from NAS Fort Worth JRB produced screening as well as definitive data.

4.6.2 Chronology of Laboratory Analyses

A chronology of the analyses performed by the laboratory is presented in Appendix F. This chronology shows each project sample, collection date, and date of each reported analytical run for each method.

4.6.3 Quality Assurance/Quality Control Program

The current primary project QA/QC document is the 2000 Basewide QAPP (HydroGeoLogic, 2000). This document is based on versions 1.1, 2.0, and 3.0 of AFCEE's Model QAPP, with some base-specific modifications. The original project QAPP was produced by CH2M HILL (CH2M HILL, 1996b). This QAPP, incorporated by reference in HydroGeoLogic's RFI/CMS QAPP (HydroGeoLogic, 1997a), was the principal data QC for all data produced before March 1998. All analytical data associated with field activities conducted from March 1998 through March 2000 were produced under the QC requirements of the HydroGeoLogic Basewide QAPP (HydroGeoLogic, 1998b). This QAPP was superceded by the 2000 Basewide QAPP (HydroGeoLogic, 2000) in March, 2000. The requirements of the Basewide QAPPs are supplemented by each project laboratory's Quality Assurance Plan. Together, these two documents detail the requirements which must be followed in order to generate data of the level of quality required to support the project decision-making process. Among the requirements contained in these documents is the requirement for review of the data at several levels at the laboratory. Each benchtop chemist is responsible for a 100 percent review of all data generated, as is each laboratory section manager (or designee). Subsequent to analyst review, 10 percent of data are reviewed by the laboratory QA department prior to assembly of each data report. Each final data report is reviewed by the laboratory project manager prior to release from the laboratory. Laboratory-specific exceptions to the QAPP are presented in Appendix G.

4.6.3.1 QA/QC Program Performance

Evaluation of the QC and analytical data provided by the laboratory showed that there was general compliance with the QA/QC program. There were cases where individual analytes or QC elements did not meet program criteria. If these QC failures were serious enough, the laboratory performed re-analysis after attempting corrective action. Where re-analysis was not performed or corrective action was not successful, the data were qualified in accordance with the method-specific requirements of Section 7.0 and the general requirements of Section 8.0 of the Basewide QAPP (HydroGeoLogic, 1998b).

The QC events that commonly caused re-analysis for organic methods to be necessary were surrogates not meeting percent recovery criteria, internal standards not meeting peak area criteria, and analyte detections above the calibrated range of the instrument. Metals analyses by Graphite Furnace Atomic Absorption (GFAA) were often re-analyzed due to poor recovery test performance.

A total of 6,048 data points were generated by the analyses of project groundwater samples. Of these, 87 were rejected due to failure to achieve QA/QC program requirements. Total project groundwater data completeness is calculated to be 98.6 percent, which meets the project groundwater data completeness goal of 95 percent. A total of 43,080 data points were generated

by the analyses of project soil samples. Of these, 1,662 were rejected due to failure to achieve QA/QC program requirements. Total project soil data completeness is calculated to be 96.1 percent, which meets the project soil data completeness goal of 90 percent. A total of 221 data points were generated by the analyses of project soil samples prepared by SPLP. Of these, none were rejected due to failure to achieve QA/QC program requirements. Total project SPLP soil data completeness is 100 percent.

Completeness was also calculated on the basis of each analyte and matrix combination. The results of these calculations are presented in Appendix H.

4.6.3.2 QA Activities

The Quanterra Laboratory in Tampa, Florida and Denver, Colorado was used for analysis of samples collected in 1997. No audits were performed on this laboratory.

On March 25-26, 1998, the HydroGeoLogic project chemist, assisted by a Law Engineering project chemist, performed a QA audit of the facilities and practices of the Recra laboratory (currently Severn Trent Laboratories) in University Park, Illinois. The auditors reviewed the laboratory's Quality Assurance Plan, evaluated the laboratory's recent state certification performance evaluation sample results, reviewed the laboratory's standard operating procedures, and conducted an on-site inspection of the laboratory's facility. The laboratory was found to have sufficient expertise, resources, and procedures to generate definitive and legally defensible data. The laboratory QA audit report is provided as Appendix I.

4.6.4 Data Evaluation

This section describes the analytical methods and QC program utilized for the RFI of SWMUs 22, 23, 24, and 25 at NAS Fort Worth JRB. The analytical methods used for the analysis of the field samples are described in the 2000 Basewide QAPP (HydroGeoLogic, 2000).

The objective of the Data Quality Evaluation (DQE) is to provide a professional review of the analytical data packages submitted by the laboratory. The DQE consists of laboratory QC data and field QC data review, to indicate which data are usable, usable with qualification, or unusable. The analytical procedures used to generate field sample data are evaluated in accordance with the general and method specific QC criteria listed in Sections 5.0, 6.0, 7.0, and 8.0 of the 2000 Basewide QAPP (HydroGeoLogic, 2000).

The following items of laboratory QC data are reviewed:

- Sample integrity
- Sample completeness
- Preparation and analysis holding times
- Laboratory preparation and analysis methods
- Method accuracy and precision (e.g., MS/MSDs, dilution tests)
- Laboratory performance criteria (e.g., blanks, LCS recoveries, surrogates, internal standards)
- Instrument initial calibration and continuing calibration checks

Field QC performance is evaluated through evaluating field duplicates, field blanks, field documentation, and shipping criteria.

4.6.5 Methodology for Data Quality Assessment

The analytical results for samples collected in 1997 were validated by IT Corporation. The analytical results for samples collected in 1998 were validated by Law Engineering. The analytical results for samples collected in 1999 were validated by HydroGeoLogic. The analytical results for samples collected in 2000 were validated by IT Corporation and HydroGeoLogic. The data were evaluated in accordance with the procedures and acceptance criteria contained in the Basewide QAPP that was current at the time of data generation. All results from all analytical methods (with the exception of sulfide results) were evaluated with respect to the requirements of definitive data at the equivalent of an EPA level III review. The data review identified those data which were unusable due to serious QC deficiencies, as well as other data which were affected by QC problems but not of sufficient severity to warrant rejection. Rejected data were qualified 'R', while qualifiers of lesser severity were applied to usable data where necessary. These qualifiers are defined in subsection 4.6.7. The validation reports for each sample delivery group (SDG) are presented in Appendix H.

Subsequent to the data validation process, the required data validation qualifiers were entered into the project database. The accuracy of the validation and data entry process was checked at all stages. The 'as received' accuracy of each electronic data deliverable (EDD) for each data package was verified by comparing the contents of each EDD to the hardcopy of that data package (or SDG) at a 10 percent rate. The accuracy of the validation qualifiers was also checked on the final database output at a rate of 10 percent.

4.6.6 Selection of Analytical Methods

Analytical methods selected for the characterization phase of this investigation were based on their ability to screen the entire Appendix IX analyte list of compounds. Analytical methods capable of detecting a broad range of compounds while achieving the lowest Method Quantitation Limits (MQLs) and Method Detection Limits (MDLs) were selected for Appendix IX screening.

MDLs for these methods either met or exceeded background concentrations for the majority of constituents analyzed. There were some chemicals, however, for which the MQLs were above background levels for inorganics or the MCL for organics. Examples of these chemicals include antimony, arsenic, cadmium, chromium, lead, selenium, silver, thallium, vanadium, benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, bis(2ethylhexly)phthalate, chrysene, dieldrin, and indeno[1,2,3-*c,d*]pyrene.

Chemicals detected during characterization soil sampling with MQLs above TNRCC RRS-2 MSCs were analyzed during delineation soil sampling using more sensitive analytical methods. EPA SW-846 Methods capable of achieving MDLs/MQLs that met or were lower than a contaminant's MSC, or background concentration, were used for delineation. This tiered approach eliminated the need to perform 12 separate analytical methods for metals and 2 separate analytical methods for SVOCs during the initial screening, while minimizing the chance of encountering false negatives.

4.6.7 Definition of Data Qualifiers

Data from this investigation were analyzed according to procedures outlined in the September, 1998 TNRCC Interoffice Memorandum (TNRCC, 1998a). Analytical results were validated and assigned appropriate qualifiers as outlined below:

- "F" Qualifier - Detection between a compound's Sample Quantitation Limit (SQL) and Practical Quantitation Limit (PQL). Indicates that the compound is present, but the concentration is estimated.
- "J" Qualifier - Estimated detection. The contaminant was positively identified and the associated value is an estimated concentration.
- "S" Qualifier - Analytical result obtained using a screening method. May be used in conjunction with any other qualifier on this list.
- "U" Qualifier - The contaminant was analyzed for, but was not detected above the SQL. The associated value is the compound PQL. The U qualifier is also used to qualify detections where contamination was present in associated QA/QC samples.
- "UJ" Qualifier - The contaminant was analyzed for, but was not detected. The associated PQL value is an estimate and may be inaccurate or imprecise.
- "R" Qualifier - Results deemed unusable or rejected. The contaminant may or may not be present.
- No Qualifier - The analyte was detected at the reported concentration.

For validation, the hierarchy of qualifiers is: "R" > "UJ" > "U" > "F" > "J" > "no qualifier".

4.6.8 Data Screening Criteria

Tables presented in Section 5.0 of this document were generated by screening the analytical database (approximately 47,600 'valid' records of field samples) for all analyte detections over MQLs for organics and base background values for inorganics. The following information was also used to screen data presented in these tables:

- Final Jacobs Basewide Background Study (BBS) (Jacobs, 1998) - used for inorganic background values
- MQL - the method quantitation limit for an undiluted sample (i.e., the lowest non-zero standard in the laboratory's calibration curve). The MQL is analogous to the minimum

PQL (i.e., PQL not adjusted for sample-specific conditions such as subsample size or percent moisture)

- TNRCC Risk Reduction Standard 2 (RRS-2)
  - Groundwater Protection-Industrial (GWP-Ind)
  - Soil Air Interface-Industrial (SAI-Ind)
  - Groundwater (GW)

Soil analytical results were screened and tables generated using the following criteria: The analytical database was first screened for compounds detected above their MDL. Each concentration value was placed in the results column. The RRS-1 columns were generated using the highest value from either the BBS or the MQL. The RRS-2 columns were generated using the BBS for inorganics, the RRS-2 GWP-Ind values, the RRS-2 SAI-Ind values, and the MQL in this manner:

For inorganics - The default RRS-2 value is the MSC value as described in the TNRCC RRS Interoffice Memorandum (TNRCC, 1998a); however, if the BBS result was greater than or equal to the MSC value, then the BBS value was selected in accordance with subsection VI.3 of the RRS Memorandum.

For organics - The default value is the lowest of the RRS-2 GWP-Ind or the RRS-2 SAI-Ind. However, if the MQL value was greater than the RRS-2 value, then the MQL value was selected.

Tables generated for groundwater analytical results were screened in a similar manner as those for soil, with the exception that RRS-2 GW-Ind values were used in place of the RRS-2 GWP-Ind / RRS-2 SAI-Ind values.

The data presented on the figures in Section 5.0 includes inorganic chemicals detected above their BBS background concentration and organic chemicals detected above their MQL. The MQL was selected for presentation purposes because it is the lowest point at which an analytical instrument can accurately quantify a compound. As noted above, the MQL is analogous to RRS-2 and the RRS-1 (for organics, BBS for inorganics) when the most definitive analytical method is employed and the MQL is greater than the RRS-2. Inorganics are presented above their MDL because many of the background concentrations for metals are lower than their MQLs.

Most of the metals that were detected during the characterization soil investigations in 1997 and 1998 were detected between their MDL and SQL. These estimated (F-qualified) concentrations are occasionally above the background values generated in the Final BBS (Jacobs, 1998). The relative amount of F-qualified data decreased in the 1999 and 2000 delineation, confirmation, and SPLP sampling phase since samples were analyzed using the most sensitive analytical methods available.

In the discussions of analytical data presented in presented Section 5.0, references are made to the terms RRS-1, RRS-2, Standard 1, Standard 2, and Standard 3. It should be noted that RRS-1 and RRS-2 refer to the concentration points at which the contaminant concentration transitions from Standard 1 to Standard 2 or from Standard 2 to Standard 3, respectively. Any concentration

greater than RRS-1 is Standard 2; any concentration greater than RRS-2 is Standard 3. The exact relationship of these terms is displayed below:

Standard 1 ≤ RRS-1 < Standard 2 ≤ RRS-2 < Standard 3

4.6.9 Appendix IX Broad Spectrum Analytical Methods

All of the inorganic analytes in soil detected during the initial soil investigation (except mercury and cyanide) were analyzed using EPA Method SW6010A by Inductively Coupled Plasma Atomic Emission Spectroscopy, using non-trace instrumentation (ICP-standard). In the Final BBS (Jacobs, 1998), inorganic elements were analyzed using a combination of SW6010A (ICP-standard), SW6010A (ICP-trace), and GFAA methods. Table 4.13 displays the MQLs and MDLs for the various inorganic analyses from the Final Basewide QAPP used for the initial soil investigation activities (HydroGeoLogic, 1998b) and the Final BBS (Jacobs, 1998).

In Table 4.12, if elements analyzed by SW6010A regular-ICP have MQLs greater than the background values for surface and subsurface soil, the MQL is highlighted in gray. Most of these elements have an MDL at or near the background values. The only exceptions are antimony and selenium, both of which have MDLs slightly above background.

4.6.10 Delineation by Definitive Analytical Methods

In general, delineation phase sampling locations were selected where detected concentrations were greater than twice the RRS-1 over the RRS-1 values. Soil samples collected from these locations were analyzed using methods capable of achieving the lowest MQLs and MDLs. Specifically, the delineation/confirmation/SPLP phase analytical methods included: VOCs by SW8260B, SVOCs by SW8270C, Metals by SW6010B (ICP-trace), Metals by the SW7000 GFAA series, Mercury by SW7470A, Pesticides and PCBs by SW8080A, and PAHs by SW8310.

4.6.11 Use of Synthetic Precipitation Leaching Procedure

The SPLP extraction is used where the leaching potential due to normal rainfall is to be determined. Analytical results from SPLP extracts indicate the maximum leaching potential of a target analyte under laboratory conditions that simulate the effects of time and weather on the sample. SPLP is useful in those situations where a determination must be made whether or not a potentially contaminated material, if left in situ, will leach toxic substances when exposed to normal weathering. Instead of simulating landfill leachate using dilute acetic acid, as is used in the Toxicity Characterization Leaching Procedure (TCLP), SPLP uses dilute nitric and sulfuric acids in an effort to simulate acid rain mixtures.

During confirmation/SPLP sampling, soil sampling intervals with significant detections above background and RRS-2 values were resampled directly adjacent to the previous boring. These soil samples were analyzed for specific target analytes to generate verification totals. If the sample result was verified to be above RRS-2 values for soil, a water extract was prepared using EPA Method SW1312, SPLP. The water extract was then analyzed to determine if a site-specific RRS-2 value would be appropriate. The analyses are summarized in Table 4.14.

4.7 CONCEPTUAL SITE MODEL

The conceptual site model provides a basis for identifying and evaluating the potential risks to human health in the Baseline Risk Assessment (BLRA). The conceptual site model facilitates consistent and comprehensive evaluation of risks by creating a framework for identifying the paths by which human and ecological receptors may be impacted by the subject SWMUs at NAS Fort Worth JRB.

The elements necessary to construct a complete exposure pathway and develop the conceptual site model include:

- Sources and COPCs
- Release mechanisms
- Transport pathways
- Exposure pathway scenarios
- Receptors

The conceptual site model for potential human environmental exposures to the soils, sediments, surface waters, and groundwater is summarized in Figures 4.1 and 4.2. Figure 4.1 pertains to exposure and risks to contaminants contained in surface soil, while Figure 4.2 pertains to contaminants in subsurface soils. This separation is significant because certain release mechanisms, and corresponding exposure scenarios, such as exposure to dust and volatile emissions from soil, are of concern only if contaminants are in fact, present in surface soil. If surface soil sampling to be conducted during the RFI does not show the presence of contaminants in surface soil, these exposure pathway scenarios can accordingly be eliminated from the BLRA.

The BLRA may be required for closures under Standard 2, and is required for all closures under Standard 3. As each of these SWMUs is recommended for closure under Standard 2, a full BLRA is not required. However, specific elements of the conceptual site model will be discussed in the summaries of each SWMU. These summaries are presented in Section 5.0 of this RFI report.

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TABLES

Table 4.1
Soil Sampling Analysis Summary - 1997
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
THGLTA001	SWMU 22	0.2-0.5, 8.0-8.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA002	SWMU 22	0.2-0.5, 12.5-13.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA003	SWMU 22	0.2-0.5', 12.8-13.3'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA004	SWMU 22	0.2-0.5', 12.5-13.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA005	SWMU 22	0.2-0.5', 9.5-10.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA006	SWMU 22	0.2-0.5', 12.0-12.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA007	SWMU 22	0.2-0.5', 5.0-5.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA008	SWMU 22	0.2-0.5', 3.5-4.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA009	SWMU 22	0 2-0.5', 12.5-13.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA010	SWMU 22	0.2-0.5', 11.0-11.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA011	SWMU 23	0.2-0.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA012	SWMU 23	0.2-0.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA013	SWMU 23	0.2-0.5', 15.0-15.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA014	SWMU 23	0.2-0.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA015	SWMU 23	0.2-0.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA016	SWMU 23	0.2-0.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA017	SWMU 23	0.0-0.5', 12.0-12.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA018	SWMU 23	0.0-0.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA019	SWMU 23	0.2-0.5', 10.5-11.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA020	SWMU 23	0.2-0.5', 13.0-13.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA021	SWMU 25	9.5-10.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA022	SWMU 25	0.0-0.5',11.0-11.5'	VOCs, SVOCs, RCRA Metals, Mercury

Table 4.1 (continued)
Soil Sampling Analysis Summary - 1997
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
THGLTA023	SWMU 25	0.0-0.5', 9.5-10.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA024	SWMU 25	0.0-0.5', 14 5-15.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA025	SWMU 25	0.0-0.5', 10.5-11.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA026	SWMU 25	0.0-0.5', 4.5-5.0'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA027	SWMU 25	0.0-0.5',3.0-3.5'	VOCs, SVOCs, RCRA Metals, Mercury
THGLTA028	SWMU 25	0.0-0.5', 8.5-9.0'	VOCs, SVOCs, RCRA Metals, Mercury
BHGLTA001	SWMU 24	0.0-2.0', 20.0-22.0'	VOCs, SVOCs, RCRA Metals, Mercury
BHGLTA002, DUP	SWMU 24	0.0-2.0', 20.0-22.0'	VOCs, SVOCs, RCRA Metals, Mercury
BHGLTA003	SWMU 24	0.0-2.0', 18.0-20 0'	VOCs, SVOCs, Metals, Mercury
BHGLTA004	SWMU 24	0.0-2 0', 18.0-20.0'	VOCs, SVOCs, RCRA Metals, Mercury
BHGLTA005	SWMU 24	0.0-2.0', 12.0-14.0'	VOCs, SVOCs, RCRA Metals, Mercury
BHGLTA006, DUP	SWMU 24	0.0-2.0', 14.0-16.0'	VOCs, SVOCs, RCRA Metals, Mercury
BHGLTA007	SWMU 24	0.0-2 0',12.0-14.0'	VOCs, SVOCs, RCRA Metals, Mercury

Notes:
VOC - volatile organic compound by SW8260
SVOC - semivolatile organic compound by SW8270
Metals - by SW6010/7470
RCRA - Resource Conservation and Recovery Act

Table 4.2
Soil Sampling Analysis Summary - May/June 1998
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA401	SWMU 22	0.0-0.5', 3.5-6.5', 8 5-11.5', 13.5-16.5'	Appendix IX[1]
BHGLTA402	SWMU 22	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5'	Appendix IX[1]
BHGLTA403	SWMU 22	3.5-6.5', 18.5-21.5', 23 5-26.5'	Appendix IX[1]
BHGLTA404	SWMU 22	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5',18.5-21.5'	Appendix IX[1]
BHGLTA405	SWMU 22	0 0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5',18.5-21.5', 23.5-26.5'	Appendix IX[1]
BHGLTA406, DUP	SWMU 22	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5',18.5-21.5', 23.5-26.5'	Appendix IX[1]
BHGLTA504	SWMU 23	0.0-0.5',3.5-6.5'	Appendix IX[1]
BHGLTA505	SWMU 23	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5',18.5-21.5'	Appendix IX[1]
BHGLTA506, DUP	SWMU 23	0.0-0.5', 3.5-6 5', 8.5-11.5'	Appendix IX[1]
BHGLTA507	SWMU 23	0.0-0.5', 3.5-6.5', 8.5-11.5'	Appendix IX[1]
BHGLTA508	SWMU 23	0.0-0.5', 3.5-6.5', 8.5-11.5'	Appendix IX[1]
BHGLTA509	SWMU 23	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5'	Appendix IX[1]
BHGLTA071	SWMU 24	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5', 18.5-21.5'	Appendix IX[1]
BHGLTA072	SWMU 24	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5', 18.5-21.5'	Appendix IX[1]
BHGLTA073	SWMU 24	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5', 18 5-21.5'	Appendix IX[1]

Table 4.2 (continued)
Soil Sampling Analysis Summary - May/June 1998
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA074	SWMU 24	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5', 18.5-21.5'	Appendix IX[1]
BHGLTA075, DUP	SWMU 24	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5', 18.5-21.5'	Appendix IX[1]
BHGLTA076	SWMU 24	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5', 18.5-21.5'	Appendix IX[1]
BHGLTA812, DUP	SWMU 25	0.0-0 5',3 5-6.5', 8.5-11.5', 13.5-16.5',18.5-21.5'	Appendix IX[1]
BHGLTA813	SWMU 25	0.0-0.5', 3.5-6.5', 8.5-11 5', 13.5-16.5',18.5-21.5'	Appendix IX[1]
BHGLTA814, DUP	SWMU 25	0.0-0.5', 3.5-6.5', 8.5-11.5'	Appendix IX[1]
BHGLTA815	SWMU 25	0.0-0.5', 3.5-6 5', 8 5-11 5', 13.5-16.5',18.5-21.5'	Appendix IX[1]
BHGLTA816, DUP	SWMU 25	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16 5'	Appendix IX[1]
BHGLTA817, DUP	SWMU 25	0.0-0.5'	Appendix IX[1]
BHGLTA818	SWMU 25	0.0-0.5', 3.5-6.5', 8.5-11.5', 13.5-16.5'	Appendix IX[1]

Notes:
[1] The following EPA Methods are used to cover the full Appendix IX list: SW8260A Volatile Organics, SW8270B Semivolatile Organics, SW8080A Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), SW8140 Organophosphorus Pesticides, SW8151 Chlorinated Herbicides, SW8290 Dioxins and Furans, SW9010A/SW9012 Cyanide, SW9030 Sulfide, SW6010A/7000 Trace Elements (Metals), and SW7470A/7471A Mercury

Table 4.3
Soil Sampling Analysis Summary - October 1999
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA407, DUP, MS/MSD	SWMU 22	0.0-0.5', 4.0-6.0', 9.0-11.0', 14.0-16.0', 19.0-21.0'	0.0-0.5' 4.0-6.0':Lead 4.0-6.0', 9.0-11.0', 14.0-16.0', 19.0-21.0':VOCs, SVOCs
BHGLTA408, DUP, MS/MSD	SWMU 22	0.0-0.5'	SVOCs
BHGLTA510	SWMU 23	0.0-0.5'	Lead
BHGLTA511	SWMU 23	4.0-6.0'	Lead, VOCs, SVOCs
BHGLTA080	SWMU 24	0.0-0.5'	Lead
BHGLTA081	SWMU 24	0.0-0.5'	Lead, SVOCs
BHGLTA082	SWMU 24	4.0-6.0', 9.0-11 0', 14.0-16.0'	VOCs
BHGLTA083	SWMU 24	9.0-11.0', 14.0-16.0', 19.0-21.0'	VOCs
BHGLTA084	SWMU 24	0.0-0.5'	Lead
BHGLTA819	SWMU 25	4.0-6.0'	SVOCs
BHGLTA820	SWMU 25	0.0-0.5',14.0-16.0'	0-0.5':Metals, Lead, SVOCs 14.0-16.0': SVOC's
BHGLTA821	SWMU 25	0.0-0.5',14.0-16.0'	0-0.5':Metals, Lead, SVOCs 14.0-16.0': SVOC's
BHGLTA822, MS/MSD	SWMU 25	0.0-0.5',4.0-6.0',9.0-11.0', 14.0-16.0',19.0-21.0'	Appendix IX[1]
BHGLTA829	SWMU 25	0 0-0.5'	Antimony, Barium, Chromium, Lead
BHGLTA830	SWMU 25	0.0-0.5'	Antimony, Barium, Cadmium, Chromium, Lead
BHGLTA831, DUP	SWMU 25	0.0-0.5',4.0-6.0',9.0-11.0', 14.0-16.0',19.0-21.0'	Appendix IX[1]

Notes·
VOC - volatile organic compound by SW820
SVOC - semivolatile organic compound by SW8270
Lead by SW7041
Antimony by SW7041
[1] The following EPA Methods are used to cover the full Appendix IX list: SW8260A Volatile Organics, SW8270B Semivolatile Organics, SW8080A Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), SW8140 Organophosphorus Pesticides, SW8151 Chlorinated Herbicides, SW8290 Dioxins and Furans, SW9010A/SW9012 Cyanide, SW9030 Sulfide, SW6010A/7000 Trace Elements (Metals), and SW7470A/7471A Mercury.

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Table 4.4
Soil Sampling Analysis Summary - January 2000
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA403, MS/MSD	SWMU 22	5.0-7.0'	Dieldrin by SW8081A and SPLP by SW1312/SW8081A
BHGLTA406, MS/MSD	SWMU 22	0.0-0.5', 5.0-7.0', 10.0-12.0', 15.0-17.0', 20.0-22.0'	0.0-0.5': Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Benzo[*k*]fluoranthene, Chrysene, Dibenzo[*a,h*]anthracene, Indeno[1,2,3-*cd*]pyrene by SW8270C, Lead by SW6010B, SPLP by SW1312/SW8270C and SW1312/SW6010B All other intervals: bis(2-Ethylhexyl)phthalate by SW8270C and SPLP by SW1312/SW8270C
BHGLTA408	SWMU 22	0.0-0.5', 2.0-4.0'	Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Benzo[*k*]fluoranthene, Chrysene, Dibenzo[*a,h*]anthracene, Indeno[1,2,3-*cd*]pyrene by SW8270C and SPLP by SW1312/SW8270C
BHGLTA409	SWMU 22	0.0-0.5', 2.0-4.0'	PAHs by SW8270C and SPLP by SW1312/SW8270C
THGLTA002	SWMU 22	0.0-0.5'	Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Benzo[*k*]fluoranthene, Chrysene, Dibenzo[*a,h*]anthracene, Indeno[1,2,3-*cd*])pyrene by SW8270C and SPLP by SW1312/SW8270C
THGLTA003, DUP	SWMU 22	0.0-0.5', 12.0-14.0'	0.0-0.5': Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Benzo[*k*]fluoranthene, Chrysene, Dibenzo[*a,h*]anthracene, Indeno[1,2,3-*cd*]pyrene by SW8270C and SPLP by SW1312/SW8270C 12.0-14.0' and DUP: Lead by SW6010B and SPLP by SW1312/SW6010B
THGLTA008	SWMU 22	0.0-0.5'	Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Benzo[*k*]fluoranthene, Chrysene, Dibenzo[*a,h*]anthracene, Indeno[1,2,3-*cd*]pyrene by 8270C and SPLP by SW1312/SW8270C

Table 4.4 (continued)
Soil Sampling Analysis Summary - January 2000
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA506	SWMU 23	5.0-7.0'	Barium, Beryllium, and Chromium by SW6010B and SPLP by 1312/6010B
BHGLTA509, MS/MSD	SWMU 23	5 0-7.0',10.0-12.0',15.0-17.0'	5.0-7.0',10.0-12.0': Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Benzo[*k*]fluoranthene, Chrysene, Dibenzo[*a,h*]anthracene, Indeno[1,2,3-*cd*]pyrene by SW8270C and SPLP by SW1312/SW8270C, Chromium by SW6010B and SPLP by SW1312/SW6010B 15.0-17.0': O,O,O-TEPA by SW8141 and SPLP by SW1312/SW8141
THGLTA011	SWMU 23	0 0-0.5'	Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Indeno[1,2,3-*cd*]pyrene by 8270C and SPLP by SW1312/SW8270C
THGLTA017	SWMU 23	0.0-0.5',12.0-14.0'	Benzo[*a*]anthracene, Benzo[*a*]pyrene, Benzo[*b*]fluoranthene, Benzo[*k*]fluoranthene, Chrysene, Dibenzo[*a,h*]anthracene, Indeno[1,2,3-*cd*]pyrene by 8270C and SPLP by SW1312/SW8270C

Notes:
SPLP - Synthetic Precipitation Leaching Procedure
O,O,O-TEPA - O,O,O-Triethyl phosphorothioate

Table 4.5
Soil Sampling Analysis Summary - March 2000
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA408, DUP	SWMU 22	4.0-6.0'	PAHs by SW8310
BHGLTA409	SWMU 22	5.0-7.0'	PAHs by SW8310
BHGLTA410	SWMU 22	0.0-0.5',4.0-6.0'	PAHs by SW8310
BHGLTA411	SWMU 22	0.0-0.5',4.0-6.0'	PAHs by SW8310
BHGLTA412, MS/MSD	SWMU 22	0.0-0.5',4.0-6.0'	PAHs by SW8310
BHGLTA512	SWMU 23	14.0-16.0'	O,O,O-TEPA by SW8141
BHGLTA513	SWMU 23	14.0-16.0'	O,O,O-TEPA by SW8141
BHGLTA514, DUP	SWMU 23	14.0-16.0'	O,O,O-TEPA by SW8141
BHGLTA085	SWMU 24	0.0-0 5',4.0-6 0', 9.0-11.0'	0.0-0.5'. Zinc by SW6010B All others: PCE and TCE by SW8260
BHGLTA086	SWMU 24	0.0-0.5',4.0-6.0'	Zinc by SW6010B
BHGLTA087	SWMU 24	0.0-0.5',4.0-6.0'	0.0-0.5': Copper, Lead, and Zinc by SW6010 4.0-6.0': Zinc by SW6010
BHGLTA088	SWMU 24	0.0-0.5'	0.0-0 5': Copper, Lead, and Zinc by SW6010
BHGLTA089	SWMU 24	0.0-0.5', 9.0-11.0', 14.0-16.0'	0.0-0.5': Copper, Lead, and Zinc by SW6010 All others: TCE by SW8260
BHGLTA090, MS/MSD	SWMU 24	0.0-0.5',4.0-6.0', 9.0-11.0',14.0-16.0'	0.0-0.5': Zinc by SW6010B, 2-Hexanone and TCE by SW8260 4.0-6.0' and 9.0-11.0': PCE and TCE by SW8260 14.0-16.0': TCE by SW8260
BHGLTA815	SWMU 25	0.0-0.5'	Barium and Cadmium by SW6010 and SPLP by SW1312/SW6010
BHGLTA816, DUP	SWMU 25	0.0-0.5'	Barium and Cadmium by SW6010 and SPLP by SW1312/SW6010
BHGLTA817	SWMU 25	0.0-0.5'	Cadmium by SW6010
BHGLTA829, MS/MSD	SWMU 25	14.0-16.0', 19.0-21.0'	TCE by SW8260
BHGLTA831	SWMU 25	0.0-0.5'	Chromium by SW6010 and SPLP by SW6010

Table 4.5 (continued)
Soil Sampling Analysis Summary - March 2000
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA832	SWMU 25	0.0-0.5',4.0-6.0', 9 0-11.0',14.0-16.0', 19.0-21.0'	0.0-0.5': Barium, Cadmium, and Lead by SW6010B and PAHs by SW8310 4.0-6.0': Lead by SW6010 and Toluene by SW8260 9.0-11.0': Beryllium and Vanadium by SW6010 and Toluene by SW8260 14.0-16.0': Chromium by SW8260 and Toluene, Acetone, and 2-Butanone by SW8260 19.0-21.0': Chromium by SW6010
BHGLTA833, MS/MSD	SWMU 25	0.0-0.5',4.0-6.0',9.0-11.0',14.0-16.0',19.0-21 0'	0.0-0.5': Barium and Lead by SW6010 and PAHs by SW8310 4.0-6 0': Toluene by SW8260 9.0-11.0': Toluene, Acetone, and Methylene Chloride by SW8260 14.0-16 0': Toluene and Acetone by SW8260 19.0-21.0': Toluene and Acetone by SW8260
BHGLTA834	SWMU 25	0.0-0.5', 4.0-6.0, 9.0-11.0',14.0-16.0',19.0-21.0'	0.0-0.5': Barium and Lead by SW6010 and PAHs by SW8310 4.0-6.0': Toluene by SW8260 9.0-11.0.0': Toluene, Acetone, and Methylene Chloride by SW8260 14.0-16 0'. Toluene and Acetone by SW8260 19.0-21.0': Toluene and Acetone by SW8260
BHGLTA835, DUP	SWMU 25	0.0-0.5'	Cadmium and Lead by SW6010B and PAHs by SW8310
BHGLTA836	SWMU 25	0.0-0.5'	Mercury by SW7471A and SPLP by SW1312 /SW7470A
BHGLTA837, DUP	SWMU 25	0.0-0.5'	Cadmium by SW6010 and SPLP by SW1312/SW6010
BHGLTA838	SWMU 25	0.0-0.5'	PAHs by SW8270 and SPLP by SW8310.
BHGLTA839, MS/MSD	SWMU 25	2.0-4.0'	PAHs by SW8270 and SPLP by SW8310Å
BHGLTA840, MS/MSD	SWMU 25	0.0-0.5'	PAHs by SW8270 and SPLP by SW8310
BHGLTA841	SWMU 25	0.0-0.5'	PAHs by SW83101

Table 4.5 (continued)
Soil Sampling Analysis Summary - March 2000
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA842	SWMU 25	0.0-0.5',10.0-12 0'	0.0-0.5': Barium, Cadmium, Chromium, Copper, Lead, Antimony, and Zinc by SW6010 10.0-12.0': TCE by SW8260K
BHGLTA843	SWMU 25	9.0-11.0'	TCE by SW8260

Notes:
PAH - polynuclear aromatic hydrocarbon
VOC - volatile organic compound
SVOC - semi-volatile organic compound
SPLP - Synthetic Precipitation Leaching Procedure

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Table 4.6
Soil Sampling Analysis Summary - June 2000
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA515 MS/MSD	SWMU 23	4 0-6.0', 9.0-11.0'	VOCs by SW8260B
BHGLTA001 MS/MSD	SWMU 24	0.0-0.5'	PAHs by SW8310 and SPLP by SW1312/SW8310, Cadmium, Lead, and Antimony by SW6010B and SPLP by SW1312/SW6010B
BHGLTA071	SWMU 24	0.0-0.5'	PAHs by SW8270C and SPLP by SW1312/SW8310, Barium by SW6010B and SPLP by SW1312/SW6010B
BHGLTA085	SWMU 24	0.0-0.5', 4.0-6.0'	0.0-0.5': Silver, Cadmium, Lead, and Antimony by SW6010B 4.0-6.0': Barium, Beryllium, Chromium, Lead, and Zinc by SW6010B
BHGLTA087	SWMU 24	4.0-6 0', 9 0-11.0'	4 0-6.0': Lead and Zinc by SW6010B 9.0-11.0': Tetrachloroethene by SW8260B
BHGLTA088	SWMU 24	4.0-6.0', 9.0-11.0'	4.0-6.0': Lead and Zinc by SW6010B 9.0-11.0': Tetrachloroethene by SW8260B
BHGLTA091, DUP	SWMU 24	0.0-0.5', 4.0-6 0'	Lead and Zinc by SW6010B
BHGLTA092	SWMU 24	0.0-0.5', 4.0-6.0'	Lead and Zinc by SW6010B
BHGLTA093	SWMU 24	0.0-0.5'	Silver, Cadmium, Antimony, and Zinc by SW6010B
BHGLTA094	SWMU 24	0.0-0.5'	Zinc by SW6010B
BHGLTA095, DUP	SWMU 24	0.0-0.5',4.0-6.0'	Lead and Zinc by SW6010B
BHGLTA096, DUP	SWMU 24	0.0-0.5', 4.0-6.0', 9.0-11.0', 15.0-17.0', 20.0-22.0'	0.0-0.5' and 4.0-6.0': Lead and Zinc by SW6010B All others: Bis(2-ethylhexyl)phthalate by SW8270C
BHGLTA407	SWMU 22	4.0-6.0'	Lead by SW6010B
BHGLTA815	SWMU 25	0.0-0.5'	Beryllium and Chromium by SW6010B and SPLP by SW1312/SW6010B

Table 4.6 (continued)
Soil Sampling Analysis Summary - June 2000
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Intervals	Analyses
BHGLTA816	SWMU 25	0.0-0.5', 9.0-11.0'	0.0-0.5': Lead and Cadmium by SW6010B and SPLP by SW1312/SW6010B 9.0-11.0': Beryllium and Selenium by SW6010B and SPLP by SW6010B
BHGLTA829	SWMU 25	0.0-0.5'	Chromium by SW6010B and SPLP by SW1312/SW6010B
BHGLTA832	SWMU 25	9.0-11.0'	Beryllium by SW6010B and SPLP by SW1312/SW6010B
BHGLTA835	SWMU 25	0.0-0.5', 4.0-6.0'	0.0-0.5': Lead by SW6010B and SPLP by SW1312/SW6010B 4.0-6.0': Lead by SW6010B
BHGLTA844 MS/MSD	SWMU 25	0.0-0.5', 4.0-6.0'	Lead by SW6010B
BHGLTA845	SWMU 25	0.0-0.5', 4.0-6.0'	Lead by SW6010B
BHGLTA846	SWMU 25	0.0-0.5', 4.0-6.0'	Lead by SW6010B
BHGLTA847	SWMU 25	0.0-0.5'	Barium by SW6010B
BHGLTA848	SWMU 25	0.0-0.5'	Barium by SW6010B
BHGLTA849	SWMU 25	4.0-6.0', 9.0-11.0'	4.0-6.0': Lead by SW6010B 9.0-11.0': Beryllium by SW6010B
BHGLTA850, DUP	SWMU 25	4.0-6.0', 9.0-11.0'	4 0-6.0': Lead by SW6010B 9.0-11.0': Beryllium by SW6010B

Notes:
PAH - polynuclear aromatic hydrocarbon
VOC - volatile organic compound
SPLP - Synthetic Precipitation Leaching Procedure

Table 4.7
Soil Boring Identification Changes
SWMU 24/Waste Burial Area 7

Previous Boring Identification	New Boring Identification
BHGLTA001	BHGLTA031
BHGLTA002	BHGLTA032
BHGLTA003	BHGLTA033
BHGLTA004	BHGLTA034
BHGLTA005	BHGLTA035
BHGLTA006	BHGLTA036
BHGLTA007	BHGLTA037
BHGLTA071	BHGLTA041
BHGLTA072	BHGLTA042
BHGLTA073	BHGLTA043
BHGLTA074	BHGLTA044
BHGLTA075	BHGLTA045
BHGLTA076	BHGLTA046

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Table 4.8
Monitoring Well Completion Details
SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Location Identification	Installation Date	Seal Beginning Depth (ft bgs)	Seal Ending Depth ((ft bgs)	Filter Pack Length (feet)	Top of Casing Elevation (ft msl)	Ground Elevation (ft msl)	Bedrock Depth (ft bgs)	Bedrock Elevation (ft msl)	Total Casing Depth (ft bgs)	Screen Beginning Depth (ft bgs)	Screen Length (feet)
WHGLTA002	25-Aug-97	6.0	8.0	13.0	608.52	608 72	20 00	588.72	20.0	10.0	10.0
WHGLTA003	25-Aug-97	16.0	18.0	13.0	614.22	614.47	30.00	584.47	30.0	20.0	10.0
WHGLTA004	25-Aug-97	9.5	11.5	12.5	614.35	614.55	24.00	590.55	23.5	13.5	10.0
WHGLTA801	28-Oct-99	2.0	3.5	10.5	601.85	601.83	14.50	587.33	14.0	4.0	10.0
WHGLTA803	28-Oct-99	3.0	5.0	7.5	602.54	602.43	10.50	591.93	12.0	7.0	5.0
WITCTA057	20-Apr-00	17.0	19.0	22.0	624.74	622 05	39.50	582.55	41.0	21.0	20 0
WITCTA058	20-Apr-00	16.0	18.0	22.0	624.12	621.52	40.00	581.52	40.0	20.0	20.0
WITCTA059	21-Apr-00	15.0	15.0	22.0	619.47	617.29	35.00	582 29	37 0	17.0	20.0
WITCTA060	21-Apr-00	12.0	14.0	17.0	612.65	609.96	29.75	580.21	31.0	16.0	15.0

Note: All monitoring wells constructed with 2" PVC, 0.1 inch slot size, and 100 percent open screens.

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Table 4.9
Groundwater Sampling Analysis Summary
NAS Fort Worth JRB, Texas

Sample Location	Description	Analyses 1997	Analyses 1998	Analyses 1999	Analyses January 2000	Analyses February 2000	Analyses March 2000
FT09-12D	SWMU 22 - upgradient	NA	NA	NA	NA	NA	O,O,O-TEPA by SW8141
FT09-12E	SWMU 22 - upgradient	NA	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/SW7470A, Appendix IX pesticides by SW8081A	NA	NA
LF04-4F	SWMU 22- upgradient	NA	NA	NA	NA	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
LF04-4B	SWMU 22- downgradient	RCRA Metals by SW6010/7470, VOCs, SVOCs	NA	NA	NA	NA	NA
LF04-4D	SWMU 22 - downgradient	NA	NA	Metals, Chromium, Lead, Mercury, Selenium, Organochlorine Pesticides/ PCBs, VOCs, SVOCs	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/SW7470A, Appendix IX pesticides by SW8081A	NA	NA
LF04-10	SWMU 22 - downgradient	NA	NA	NA	NA	O,O,O-TEPA by SW8141	NA

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Table 4.9 (continued)
Groundwater Sampling Analysis Summary
NAS Fort Worth JRB, Texas

Sample Location	Description	Analyses 1997	Analyses 1998	Analyses 1999	Analyses January 2000	Analyses February 2000	Analyses March 2000
LF04-04	SWMU 22 - downgradient	RCRA Metals by SW6010/7470, VOCs, SVOCs	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/SW7470A, Appendix IX pesticides by SW8081A	NA	NA
WHGLTA003	SWMU 22 - downgradient	RCRA Metals by SW6010/7470, VOCs, SVOCs	NA	NA	NA	O,O,O-TEPA by SW8141	SVOCs by 8270SIM for O,O,O-TEPA
ITMW-01T	SWMU 22 - downgradient	NA	NA	NA	NA	NA	O,O,O-TEPA by SW8141
LF05-5A	SWMU 23- upgradient	NA	NA	NA	NA	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
WHGLTA701	SWMU 23- upgradient	NA	NA	NA	NA	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
WHGLTA702	SWMU 23- inside	NA	Appendix IX[1]	NA	NA	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA

Table 4.9 (continued)
Groundwater Sampling Analysis Summary
NAS Fort Worth JRB, Texas

Sample Location	Description	Analyses 1997	Analyses 1998	Analyses 1999	Analyses January 2000	Analyses February 2000	Analyses March 2000
WHGLTA703	SWMU 23-inside	NA	Appendix IX[1]	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	O,O,O-TEPA by SW8141
LF05-5B	SWMU 23-downgradient	NA	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
LF05-5C	SWMU 23-downgradient	NA	NA	Metals, Chromium, Lead, Selenium, OP Pesticides, VOCs, SVOCs	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA

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Table 4.9 (continued)
Groundwater Sampling Analysis Summary
NAS Fort Worth JRB, Texas

Sample Location	Description	Analyses 1997	Analyses 1998	Analyses 1999	Analyses January 2000	Analyses February 2000	Analyses March 2000
LF05-18	SWMU 23-downgradient	NA	NA	NA	NA	O,O,O-TEPA by SW8141	NA
LF05-19	SWMU 23-downgradient	NA	Full Appendix IX Suite of Analytes	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
LF05-5E	SWMU 24-upgradient	NA	NA	NA	NA	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
WP07-10A	SWMU 24-upgradient	NA	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA

Table 4.9 (continued)
Groundwater Sampling Analysis Summary
NAS Fort Worth JRB, Texas

Sample Location	Description	Analyses 1997	Analyses 1998	Analyses 1999	Analyses January 2000	Analyses February 2000	Analyses March 2000
WP07-10B	SWMU 24-downgradient	NA	NA	Metals, Chromium, Lead, Mercury, Selenium, OP Pesticides, VOCs, SVOCs	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
WP07-10C	SWMU 24-downgradient	RCRA Metals by SW6010 and SW7470, VOCs by SW8260, and SVOCs by SW8270	Full Appendix IX Suite of Analytes	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	O,O,O-TEPA by SW8141, SVOCs by 8270SIM for O,O,O-TEPA
LF05-02	SWMU 25-upgradient	RCRA Metals by SW6010 and SW7470, VOCs by SW8260, and SVOCs by SW8270	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A	NA	NA

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Table 4.9 (continued)
Groundwater Sampling Analysis Summary
NAS Fort Worth JRB, Texas

Sample Location	Description	Analyses 1997	Analyses 1998	Analyses 1999	Analyses January 2000	Analyses February 2000	Analyses March 2000
WHGLTA004	SWMU 25 - inside	RCRA Metals by SW6010 and SW7470, VOCs by SW8260, and SVOCs by SW8270	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B and SW7470A	NA	NA
WHGLTA801	SWMU 25 - inside	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B and SW7470A	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B and SW7470A	NA	NA
WHGLTA803	SWMU 25 - downgradient	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B and SW7470A	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B and SW7470A	NA	NA

Table 4.9 (continued)
Groundwater Sampling Analysis Summary
NAS Fort Worth JRB, Texas

Sample Location	Description	Analyses 1997	Analyses 1998	Analyses 1999	Analyses January 2000	Analyses February 2000	Analyses March 2000
WHGLTA002	SWMU 25 - downgradient	RCRA Metals by SW6010/7470, VOCs, SVOCs	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	O,O,O-TEPA by SW8141	NA
WHGLTA704	SWMU 25 - downgradient	NA	Appendix IX[1]	NA	NA	NA	O,O,O-TEPA by SW8141
FT08-11A	SWMU 25 - downgradient	RCRA Metals by SW6010/7470, VOCs, SVOCs	NA	NA	Appendix IX VOCs by SW8260B, Appendix IX SVOCs by SW8270C, Appendix IX Total Metals by SW6010B/ SW7470A, Appendix IX Organophosphorus pesticides by SW8081A	NA	NA

Notes:
OP Pesticides - Organophosphorus Pesticides
VOC - Volatile Organic Compound
SVOC - Semivolatile Organic Compound
[1] The following EPA Methods are used to cover the full Appendix IX list: SW8260A Volatile Organics, SW8270B Semivolatile Organics, SW8080A Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), SW8140 Organophosphorus Pesticides, SW8151 Chlorinated Herbicides, SW8290 Dioxins and Furans, SW9010A/SW9012 Cyanide, SW9030 Sulfide, SW6010A/7000 Trace Elements (Metals), and SW7470A/7471A Mercury.

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Table 4.10
Surface Water and Sediment Analysis Summary - September 1997
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Media	Analyses
EUHGLTA001	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA001	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA002	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA002	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA003, DUP	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA003, DUP	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA004	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA004	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA005	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA005	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA006	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA006	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA007	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA007	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA009	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA009	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA010	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA010	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA011	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs
EUHGLTA011	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA012, DUP	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs

Table 4.10 (continued)
Surface Water and Sediment Analysis Summary - September 1997
NAS Fort Worth JRB, Texas

Sample Location	Description	Sampling Media	Analyses
EUHGLTA012, DUP	SWMU	Surface Water	Metals, Mercury, Silver, VOCs, SVOCs
EUHGLTA013	SWMU	Sediment	Metals, Mercury, VOCs, SVOCs

Notes:
VOC - volatile organic compound
SVOC - semivolatile organic compound

Table 4.11
Surveying Data
SWMUs 22, 23, 24, and 25
NAS Fort Worth, JRB, Texas

Location	Northing	Easting	Ground Elevation	Top of Casing Elevation
BHGLTA001	6961358.79	2296010.45	620.49	NA
BHGLTA002	6961338.17	2295989.07	620 74	NA
BHGLTA003	6961298 14	2295990.64	621 93	NA
BHGLTA004	6961258.43	2296002.97	622.82	NA
BHGLTA005	6961277.14	2296017.05	622.28	NA
BHGLTA006	6961233 36	2296014.85	622.83	NA
BHGLTA007	6961240.49	2295974 96	622.54	NA
BHGLTA071	6961347.52	2295986.42	620.90	NA
BHGLTA072	6961228.10	2295945.75	623 17	NA
BHGLTA073	6961219 82	2296026.16	622 35	NA
BHGLTA074	6961260.77	2296023.49	622.27	NA
BHGLTA075	6961287.86	2296025.12	622 04	NA
BHGLTA076	6961308 75	2296015.23	621 62	NA
BHGLTA080	6961223.81	2296000 95	622.72	NA
BHGLTA081	6961374 30	2296087 49	618.51	NA
BHGLTA082	6961299.62	2296098.49	619.99	NA
BHGLTA083	6961205 00	2296096 82	621.82	NA
BHGLTA084	6961233.31	2296015.64	622.67	NA
BHGLTA085	6961576.74	2296029.21	*614*	NA
BHGLTA086	6961243.41	2296095 88	621.25	NA
BHGLTA087	6961102.78	2296044.83	*623*	NA
BHGLTA088	6961103.82	2295845 88	*623*	NA
BHGLTA089	6961247 57	2295791.71	*624.5*	NA
BHGLTA090	6961319.45	2295905.25	*622.1*	NA
BHGLTA091	6961664.89	2296027.96	NM	NA
BHGLTA092	6961577.16	2296102.83	NM	NA
BHGLTA093	6961373.74	2296127.03	NM	NA
BHGLTA094	6961242.91	2296176 19	NM	NA
BHGLTA095	6961110.57	2296176.19	NM	NA
BHGLTA096	6961108.30	2295761 77	NM	NA
BHGLTA401	6960460.48	2296370.29	615.12	NA
BHGLTA402	6960725.07	2296383.41	616.24	NA
BHGLTA403	6960647.80	2296238.71	623.5	NA
BHGLTA404	6960863.16	2296108.44	623 03	NA
BHGLTA405	6960487.21	2295935.94	625 68	NA
BHGLTA406	6961035.03	2295857 66	624.30	NA
BHGLTA407	6961104 11	2295926.89	623.17	NA
BHGLTA408	6960450.92	2296431 70	610.73	NA
BHGLTA409	*6960458.06*	*2296398.24*	*615*	NA
BHGLTA410	6960601.67	2296449.81	611 10	NA
BHGLTA411	6960406.09	2296509 23	616.00	NA
BHGLTA412	6960265.12	2296333.45	617.35	NA
BHGLTA504	6961759.27	2295842.31	610.12	NA
BHGLTA505	6961414.33	2295797 05	620.97	NA

Table 4.11
Surveying Data
SWMUs 22, 23, 24, and 25
NAS Fort Worth, JRB, Texas

Location	Northing	Easting	Ground Elevation	Top of Casing Elevation
BHGLTA506	6961606 82	2295971.29	614.45	NA
BHGLTA507	6961710.23	2295912.28	611.62	NA
BHGLTA508	6961627.28	2295827.22	613.20	NA
BHGLTA509	6961433 55	2295933 45	618.85	NA
BHGLTA510	6961638 03	2295874.71	612.14	NA
BHGLTA511	6961376.97	2295952.24	620.65	NA
BHGLTA512	6961493 25	2295926.78	616.50	NA
BHGLTA513	6961435.44	2295989 28	618 75	NA
BHGLTA514	6961376.06	2295887.71	620.25	NA
BHGLTA515	6961439.10	2295671 80	NM	NA
BHGLTA812	6962897.47	2295747.16	613.87	NA
BHGLTA813	6962921.86	2295653 06	615.75	NA
BHGLTA814	6962899.31	2295970 84	601.35	NA
BHGLTA815	6963042.08	2295701.80	616 90	NA
BHGLTA816	6962350.66	2295650 94	614.80	NA
BHGLTA817	6962473.74	2295862 35	599.80	NA
BHGLTA818	6962485.29	2295756.81	612 87	NA
BHGLTA819	6962433.68	2295531 80	617.66	NA
BHGLTA820	6962893.23	2295542.41	618 18	NA
BHGLTA821	6963141.30	2295706.92	616 88	NA
BHGLTA822	6962762.58	2295552.34	616.05	NA
BHGLTA823	6962780.35	2295535.41	615 98	NA
BHGLTA824	6962786.50	2295397.52	616.84	NA
BHGLTA825	6962793 78	2295286.57	618.90	NA
BHGLTA826	6962389.31	2295323.71	620.51	NA
BHGLTA827	6962987.02	2295334.46	618.31	NA
BHGLTA828	6962580.72	2295325.62	618.81	NA
BHGLTA829	6963057 38	2295815.11	615.52	NA
BHGLTA830	6962894.63	2295727.02	614.14	NA
BHGLTA831	6962509.62	2295558.15	617.71	NA
BHGLTA832	6962405 25	2295316.49	NM	NA
BHGLTA833	6962829.73	2295321.70	NM	NA
BHGLTA834	6963074.52	2295433.68	NM	NA
BHGLTA835	6962470.35	2296009.20	NM	NA
BHGLTA836	6962900.04	2295714.93	NM	NA
BHGLTA837	6962491.19	2295850.34	NM	NA
BHGLTA838	6962884.42	2295733.16	NM	NA
BHGLTA839	6962915.67	2295905 03	NM	NA
BHGLTA840	6962384.42	2295701.91	NM	NA
BHGLTA841	6962368.79	2295532.64	NM	NA
BHGLTA842	6963061 50	2295970.14	NM	NA
BHGLTA843	6962900.04	2296063.89	NM	NA
BHGLTA844	6962530.50	2296007.53	NM	NA
BHGLTA845	6962468.07	2296051.60	NM	NA

Table 4.11
Surveying Data
SWMUs 22, 23, 24, and 25
NAS Fort Worth, JRB, Texas

Location	Northing	Easting	Ground Elevation	Top of Casing Elevation
BHGLTA846	6962418 50	2296007.53	NM	NA
BHGLTA847	6963123.57	2295443.84	NM	NA
BHGLTA848	6963061.14	2295342 86	NM	NA
BHGLTA849	6962403.81	2295218.00	NM	NA
BHGLTA850	6962326.69	2295322 66	NM	NA
LF05-DP59	6961422.24	2295820 67	617.29	NA
LF05-DP60	6961674.23	2295891.15	609.96	NA
WP07-DP01	6961246 77	2296008.36	622.56	NA
WP07-DP02	6961266.41	2296008.41	622.57	NA
WP07-DP03	6961283.62	2296007 95	622.21	NA
WP07-DP04	NM	NM	NM	NA
WP07-DP05	6961327 98	2296005.04	621 18	NA
WP07-DP06	6961265 23	2296028.40	621.59	NA
WP07-DP07	6961266.96	2295987.14	622.32	NA
WP07-DP08	6961267.37	2295969 63	622.22	NA
WP07-DP09	6961267.30	2295954.86	622 26	NA
WP07-DP10	6961285.06	2295986 11	622.02	NA
WP07-DP11	6961312.30	2296027.36	621.48	NA
WP07-DP12	6961310.61	2295987.96	621.41	NA
WP07-DP13	6961309.00	2295966.46	621 59	NA
THGLTA001	6960933.71	2296291.78	621.64	NA
THGLTA002	6960724.47	2296344.30	615.40	NA
THGLTA003	6960459.33	2296357.77	615.70	NA
THGLTA004	6960656.05	2296256.34	622.88	NA
THGLTA005	6960409 06	2296112.69	623.76	NA
THGLTA006	6960656.58	2296119.79	625.92	NA
THGLTA007	6960974.55	2296101.43	623.17	NA
THGLTA008	6961022.94	2295862.03	624.08	NA
THGLTA009	6960571.62	2296031.84	624.88	NA
THGLTA010	6960431.93	2295974.69	625.74	NA
THGLTA011	6961631.03	2295951.26	613.05	NA
THGLTA012	6961820.80	2295943 09	607.96	NA
THGLTA013	6961856.11	2295928.84	607.17	NA
THGLTA014	6961571 30	2295908.66	615 12	NA
THGLTA015	6961638.86	2295876.94	612 28	NA
THGLTA016	6961535.31	2295862.17	615.15	NA
THGLTA017	6961471.90	2295805.89	618.44	NA
THGLTA018	6961565.44	2295825.22	615.19	NA
THGLTA019	6961715.93	2295833.22	610.86	NA
THGLTA020	6961750.98	2295857.90	609.97	NA
THGLTA021	6962455.77	2295712.11	614.16	NA
THGLTA022	6963052.52	2295811.04	615.54	NA
THGLTA023	6962897.67	2295721.27	615.14	NA
THGLTA024	6962391.71	2295707.89	613.94	NA

Table 4.11
Surveying Data
SWMUs 22, 23, 24, and 25
NAS Fort Worth, JRB, Texas

Location	Northing	Easting	Ground Elevation	Top of Casing Elevation
THGLTA025	6962875.84	2295743.70	613.28	NA
THGLTA026	6962971 81	2295901 99	609 51	NA
THGLTA027	6962939 56	2295918 40	605.16	NA
THGLTA028	6962883.18	2295957.24	601.30	NA
WHGLTA002	6962377.91	2296111.39	608.72	608.52
WHGLTA003	6961043.88	2298029.84	614.47	614.22
WHGLTA004	6962943 38	2295760 62	614.55	614 35
WHGLTA701	6961835.73	2295332.86	623.31	623.08
WHGLTA702	6961920.16	2295882.07	606.24	609 41
WHGLTA703	6961680 70	2295741.23	612.52	615.07
WHGLTA704	6962141.07	2295831.51	605.72	602.54
WHGLTA801	6962790.06	2295857.80	601 83	601.85
WHGLTA803	6962524 15	2296040.83	602.43	602.54
WITCTA057	6961308.78	2295952 51	622.05	624.74
WITCTA058	6961311 99	2296005.60	621.52	624.12
WITCTA059	6961422.24	2295820.67	617 29	619.47
WITCTA060	6961674.23	2295891.15	609.96	612 65

Note NA - Not Applicable
NM - Not Measured
622 - Approximate elevation based on 2-foot elevation contours

Table 4.12
Project Tasks

Task	Dates
Geophysics Surveys	August - September 1997
Soil Borings SWMU 24	August - September 1997
Test Pits	August - September 1997
Monitoring Well Installation and Development	August - September 1997
Monitoring Well Sampling - Round No.1	August - September 1997
DPT Soil Borings (Appendix IX Screening)	May - June 1998
Monitoring Well Sampling - Round No.2	May - June 1998
DPT Soil Borings (Delineation/SPLP)	October 1999
Monitoring Well Installation and Development	October 1998
Monitoring Well Development	January 2000
Monitoring Well Sampling - Round No.3	January 2000
Monitoring Well Sampling - Round No.4	February - March 2000
DPT Soil Borings (Delineation/SPLP)	March 2000
Bedrock/DNPL Investigation - SWMUs 23 and 24	April 2000
Geophysics Survey - SWMU 24	April 2000
DPT Soil Borings (Delineation/SPLP)	June 2000

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Table 4.13
Comparison of Background Values with MQLs and MDLs of Various Analytical Methods

Analyte	SW6010A ICP (mg/kg)		SW6010A ICP Trace (mg/kg)		SW7000 (GFAA or CV) (mg/kg)		Jacobs Background (mg/kg)	
	MQL	MDL	MQL	MDL	MQL	MDL	Surface	Subsurface
Aluminum	50.0*	1.01*					22035	20260
Antimony	40.0	3.2			0.5*	0.25*	0.56	0.712
Arsenic	60.0	2.7	0.5*	0.46*	0.5	0.25	5.85	6.58
Barium	2.0*	0.04*					233	128.1
Beryllium	0.3*	0.01*					1.02	1.13
Cadmium	4.0	0.37	0.1*	0.1*	0.1	0.05	0.556	0.59
Calcium	10.0*	2.25*					167788	272000
Chromium	7.0*	0.55*			0.5	0.25	25.86	16.31
Cobalt	7.0*	0.84*					11.05	6.19
Copper	6.0*	0.14*					17.37	13.72
Iron	7.0*	0.58*					17717	17469
Lead	50.0	1.8	0.5*	0.14*	0.5	0.25	30.97	12.66
Magnesium	30.0*	5.53*					3003	2420
Manganese	2.0*	0.12*					849	351.7
Molybdenum	8.0*	0.61*					1.46	1.93
Nickel	15.0	0.47			1*	0.2*	14.6	19.76
Potassium	500*	52.2*					2895	1717
Selenium	80.0	3.1			0.5*	0.11*	0.907	0.313
Silver	7.0	0.28			0.1*	0.02*	0.213	0.128
Sodium	30.0*	2 0*					37300	53200
Thallium	40.0	5.6	40.0*	1.0*	0.1	0.05	2.43	1.5
Vanadium	8.0*	0.39*			0.4	0.2	46.3	37.4
Zinc	2.0*	0.17*					38 8	31.3

Note: Gray shading indicate analytes with RFI MQLs greater than Final Background values

* *Analytical methods used in Final Jacobs Basewide Background Study (Jacobs, 1998).*

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Table 4.14
SPLP Sampling Analysis Summary Table
SPLP/ Delineation Phase
NAS Fort Worth JRB, Texas

Sample Location	Location	Sampling Intervals	Analytes
THGLTA002	SWMU 22	Surface	SVOCs
THGLTA003	SWMU 22	Surface	SVOCs
THGLTA008	SWMU 22	Surface	SVOCs
BHGLTA403	SWMU 22	5'	Organochlorine Pesticides/PCBs
BHGLTA406	SWMU 22	Surface	Lead, SVOCs
BHGLTA406	SWMU 22	5',10',15',20'	5'- SVOCs, B2EHP; 10', 15', 20' - B2EHP
BHGLTA408	SWMU 22	Surface, 2-4'	SVOCs
BHGLTA409	SWMU 22	Surface, 2-4'	SVOCs
THGLTA011	SWMU 23	Surface	SVOCs
THGLTA017	SWMU 23	Surface, Trench Bottom	SVOCs
BHGLTA506	SWMU 23	5'	Metals
BHGLTA509	SWMU 23	5',10'	Metals, SVOCs
BHGLTA509	SWMU 23	15'	OP Pesticides
BHGLTA815	SWMU 25	Surface	Metals
BHGLTA816	SWMU 25	Surface,	Metals
BHGLTA816	SWMU 25	10'	Metals
BHGLTA817	SWMU 25	Surface	Metals
BHGLTA829	SWMU 25	Surface	Metals
BHGLTA830	SWMU 25	Surface	Metals
BHGLTA836	SWMU 25	Surface	Metals
BHGLTA837	SWMU 25	Surface	Metals
BHGLTA838	SWMU 25	Surface	SVOCs
BHGLTA839	SWMU 25	3'	SVOCs
BHGLTA840	SWMU 25	Surface	SVOCs

Notes:
OP Pesticides - Organophosphorus Pesticides
VOC - Volatile Organic Compound
SVOC - Semivolatile Organic Compound
B2EHP - bis(2ethylhexyl)phthalate

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FIGURES

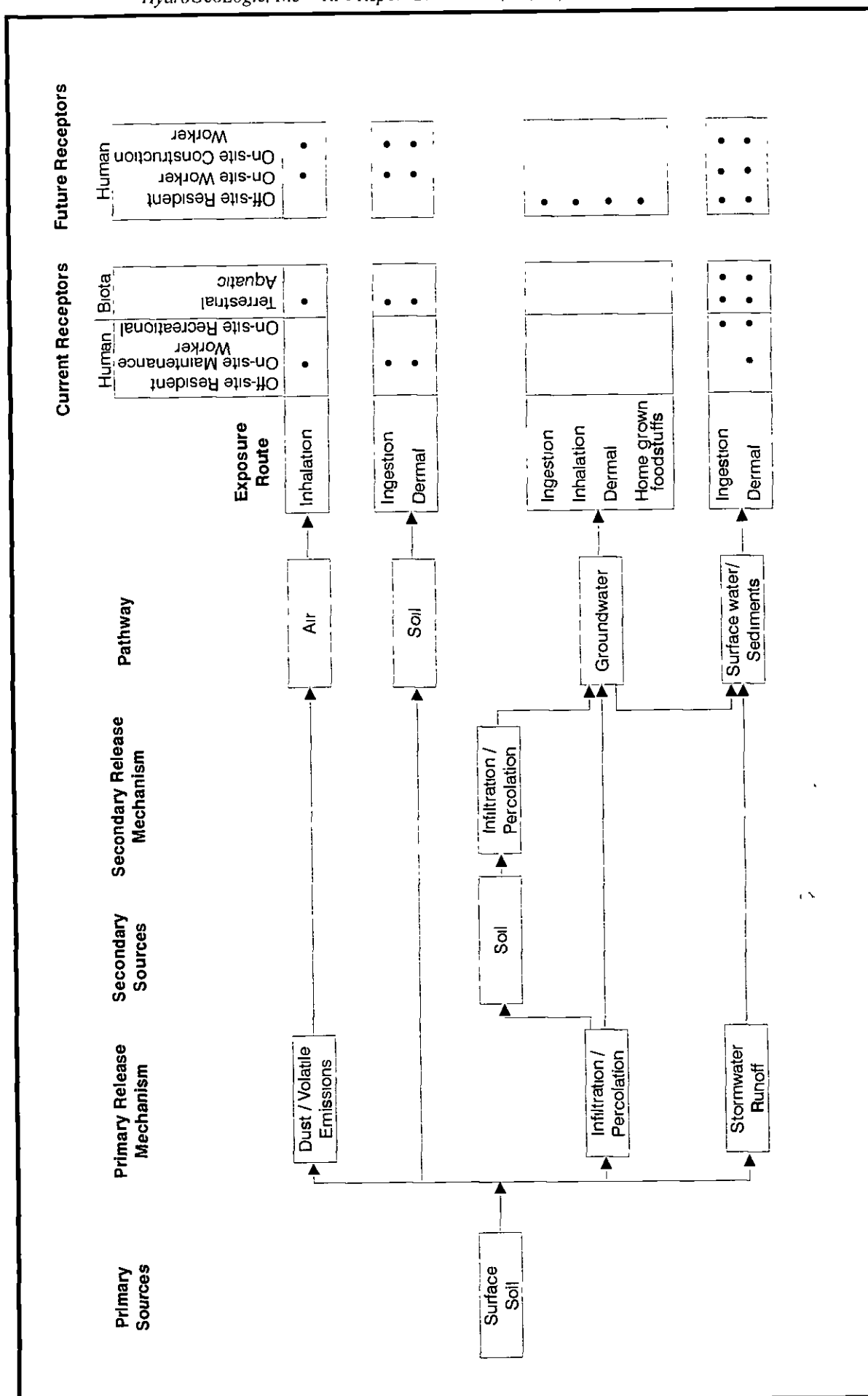

Figure 4.1
Conceptual Exposure Pathway Model for Surface Soil
NAS Fort Worth JRB, Texas

HYDRO GeoLogic Inc.

Filename X:\024c\report\final_RFI_SWMUs 22, 23, 24, and 25\flowchrt cdr
Project AFC001-024C
Created by cfarmer 09/08/00
Revised
Source

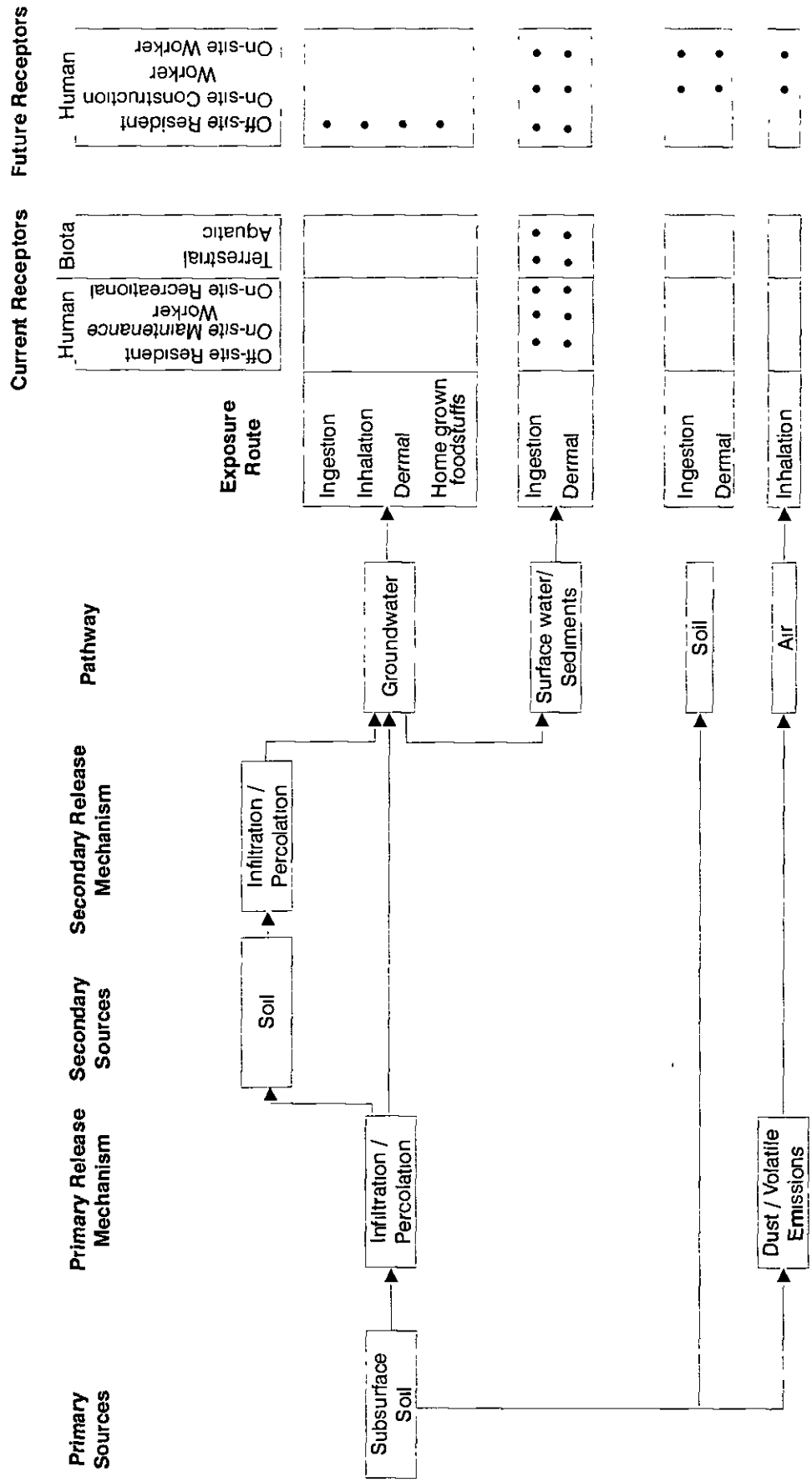

Figure 4.2
Conceptual Exposure Pathway Model for Subsurface Soil
NAS Fort Worth JRB, Texas

HYDRO GeoLogic

Filename X:\024\report\final_RFI_SWMUs 22, 23, 24, and 25\flowchrt cdr
Project AFC001-024C
Created by cfarmer 09/08/00
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TAB

SECTION 5.0

5.0 INVESTIGATION RESULTS

This section presents RFI investigation results for SWMUs 22, 23, 24, and 25. Section 5.1 discusses general trends of soil results common to all four units. Sections 5.2, 5.3, 5.4, and 5.5 present site-specific results from the investigations at each of the SWMUs. Section 5.7 presents general and specific groundwater results for all four units. All analytical data collected as part of this RFI is presented as Appendix J.

5.1 GENERAL OBSERVATIONS OF SOIL ANALYTICAL RESULTS

Analytical results from Appendix IX soil characterization sampling generally revealed low to moderate concentrations of metals, VOCs, SVOCs, pesticides, and sulfide. There were no detections of chlorinated herbicides or dioxins/furans in any soil samples collected and analyzed from SWMUs 22, 23, 24, or 25. The were also no detections of cyanide at SWMUs 22, 23, and 24; however, cyanide was detected below RRS-1 at SWMU 25. With the exception of SWMU 24, nearly all detections of VOCs consisted of Standard 2 concentrations of BTEX and the common laboratory/field artifacts acetone, methylene chloride, and MEK (2-butanone). Standard 2 concentrations of PCE, TCE, and TCE breakdown products were the primary VOCs detected at SWMU 24.

A comparison of the site-specific analytical results obtained during characterization soil sampling to TNRCC RRS-1, which is either the basewide background value (Jacobs, 1998) for inorganics or the MQL for organics, revealed that additional sampling was required at SWMUs 22, 23, 24, and 25. This sampling was necessary to delineate potentially impacted soils to Standard 1. In addition, confirmation samples were needed to determine site-specific MSCs through the use of the SPLP method. Finally, the areal extent of confirmed Standard 3 contaminant concentrations were defined to support the excavation and disposal of Standard 3 soils.

The following subsections discuss global issues and observations that pertain to each SWMU, as well as statistical comparisons of background study results to RFI results. Specific results from soil investigation activities and SPLP/delineation results are discussed subsequent to these global issues. The presentation of specific analytical results is divided into two subsections, including inorganic analytical results and organic analytical results in soil. Analytical tables and figures included throughout Section 5 present all detections over background/RRS-1.

5.1.1 Statistical Significance of Thallium

In the Draft BBS (Jacobs, 1997b), thallium background concentrations in surface soil, subsurface soil, and sediments were determined using Method SW6010 ICP-standard and were reported at 63.9 milligram per kilogram (mg/kg), 64.5 mg/kg, and 69.74 mg/kg, respectively. In the Final BBS (Jacobs, 1998), background concentrations of thallium in surface soil, subsurface soil, and sediments were reported at 2.43 mg/kg, 1.5 mg/kg, and 1.44 mg/kg, respectively, when determined using Method SW6010 ICP-trace. The initial thallium concentrations (ICP-standard) are consistently higher than the Final BBS thallium concentrations (ICP-trace). Because the Draft BBS and the RFI soil samples collected from SWMUs 22, 23, 24, and 25 were both analyzed by the SW6010 ICP-standard method, a statistical analysis was performed to compare thallium soil

concentrations in these two data sets. This direct comparison serves to minimize variation of results due to differing analytical methods.

The method used to conduct the statistical analysis of the two data sets was the non-parametric Wilcox Rank Sum Test described in EPA's guidance manuals for statistical analysis of groundwater monitoring data at RCRA Facilities (EPA, 1992 and 1989). The above test method was used because both data sets and their log-transformed data were determined not to be normally distributed, and the number of non-detects in the combined data set (background and investigative) were greater than 15 percent. All non-detects in both data sets were replaced with half the minimum detection limit as recommended in the EPA's guidance manuals (EPA, 1992 and 1989). Results of the statistical analysis are summarized in Table 5.1.

Table 5.1 illustrates that the mean thallium concentration in background soils is significantly greater than determined in 1998 for soils at SWMUs 22, 23, 24, and 25. The difference in the means is confirmed by the result of the z-static test based on the assumption that there is no difference between the means at the 0.01 confidence level of significance. The approximate z-scores (4.154-surface and 6.092-subsurface) represent a normal approximation of the distribution of the Mann-Witney Static value (709-surface and 2182-subsurface).

To accept or reject the above assumption, the upper z-score is compared against the tabulated critical z-value of the upper 0.01 percentile (i.e. 99 percent level of confidence) of the normal distribution. The critical z-value is 2.326. Since 4.154 and 6.092 are greater than 2.326, the hypothesis that the means are the same is rejected. Therefore, it is concluded that the two means are statistically different and that the thallium concentration values in the RFI data set for SWMUs 22, 23, 24 and 25 are observably lower than those of the Draft BBS. It can be inferred from this analysis that, if the RFI samples collected at these SWMUs were re-analyzed using the ICP-trace method, as were the Final BBS, the results of these analyses would not likely exceed the generated background concentrations.

5.1.2 Statistical Significance of Arsenic

A statistical analysis was also performed to compare arsenic soil concentrations in the RFI data set to arsenic concentrations in the background data set. As with thallium, the method used to conduct the statistical analysis of the two data sets was the non-parametric Wilcox Rank Sum Test described in EPA's guidance manuals for statistical analysis of groundwater monitoring data at RCRA Facilities (EPA, 1992 and 1989). The above test method was used because both data sets and their log-transformed data were not normally distributed, and the number of non-detects in the combined data set (background and investigative) was greater than 15 percent. All non-detects in both data sets were replaced with half the minimum detection limit as recommended in EPA's guidance manuals (EPA, 1992 and 1989). Results of the statistical analysis are summarized in Table 5.2.

Table 5.2 illustrates that the mean arsenic concentration in the background soils is statistically the same as that of the RFI soil samples collected at SWMUs 22, 23, 24, and 25 in 1998. The agreement in the means was confirmed by the result of the z-static test based on the assumption

that there is no difference between the means at the 0.01 confidence level of significance. The approximate z-scores (1.319-surface and 1.346-subsurface) represent a normal approximation of the distribution of the Mann-Witney Static value (348-surface and 1452-subsurface).

To accept or reject the above assumption, the upper z-score is compared against the tabulated critical z-value of the upper 0.01 percentile (i.e. 99 percent level of confidence) of the normal distribution. The critical z-value is 2.326. Since 1.319 and 1.346 are less than 2.326, the hypothesis that the means are the same is accepted. Therefore, it is concluded that the since two means are statistically the same, the arsenic concentration values in the RFI data set for SWMUs 22, 23, 24 and 25 are interpreted as being consistent with those of the Draft BBS.

5.1.3 Matrix Interference

Discrepancies between detected concentrations of soil contaminants in characterization versus confirmation samples appears to occur with some metals and OC pesticides. For metals, it has been concluded that the use of a less definitive method, EPA Method SW6010 ICP-standard, in characterization sampling caused analytical results to be falsely skewed higher than actual metal concentrations in soil. The use of more definitive methods in later sampling rounds (EPA Method SW6010 ICP-trace for multiple metals and SW7740 GFAA for selenium), are believed to be more representative of actual metal concentrations in site soils. According to the laboratory, matrix interference often occurs using Method SW6010 ICP-standard, which generates false-positive detections at low concentrations. This matrix interference is primarily due to the presence of salts. For this reason, confirmation/delineation samples do not always verify the estimated concentrations detected in characterization samples. However, the confirmation/delineation methods are considered the more definitive methods and provide a more accurate representation of the chemical characteristics of site media. Specific examples of matrix interference are listed below:

Selenium: During the Appendix IX broad-spectrum characterization of SWMU 25, and the characterization of SWMUs 29 and 62 (former landfills located approximately 1/4 mile east of SWMU 25 along the base perimeter road) conducted in March and April 1998 under a separate project, selenium was detected above background in 29 of 29 samples (HydroGeoLogic, 1998c). Analysis of these samples using Method SW6010 ICP-standard yielded selenium results ranging from 2.9 F mg/kg to 23 F mg/kg. Background results for surface and subsurface selenium were calculated and reported as 0.907 mg/kg and 0.313 mg/kg, respectively. During the RFI delineation phases of SWMUs 29 and 62 conducted by HydroGeoLogic in 1999, 11 of the 28 sampling intervals were re-sampled and analyzed using the more definitive SW7740 GFAA method. Selenium was not detected at any of these 11 sampling intervals. Selenium was also not detected in any of the 34 delineation sampling intervals near the perimeters of SWMUs 29 and 62. Furthermore, the detection of selenium at the SWMU 25 sampling location, B816-10', was not confirmed using the more definitive SW6010A ICP-trace method in the June 2000 sampling event. Based on the above observations, initial detections of selenium using SW6010 ICP-standard at SWMUs 22, 23, 24, and 25 are believed to be false positives and not a constituent released as a result of past site operations. Therefore, further investigation of selenium is not warranted.

Chromium: Unlike the selenium false positives generated using SW6010 ICP-standard, concentrations of chromium using SW6010 ICP-standard are artificially increased due to matrix interference. Table 5.3 summarizes the initial SW6010 ICP-standard chromium results verses the SW6010 ICP-trace confirmation results at SWMUs 17, 23, 25, 29, and 62. Eleven of twelve detections decreased by approximately 50 percent using the more accurate SW6010 ICP-trace method compared to detections using the SW6010 ICP-standard method. The exception is the B829 surface sample, which increased from an estimated concentration of 41.5 J mg/kg to 111 mg/kg in the confirmation sample. It should be noted that after SPLP analysis was performed on the confirmation sample, the concentration of the extract was below the corresponding industrial groundwater MSC. However, 9 of 9 samples originally detected at concentrations below 40 mg/kg were all found to be below background in confirmation sampling. Based on these observations, it appears that detections of chromium in low concentrations using SW6010 ICP-standard (i.e., less than 40 mg/kg), are inaccurately reported at approximately twice the actual concentration detected using SW6010 ICP-trace. As such, these detections above background are interpreted as being at or below background, and not a constituent released as a result of past site operations.

5.1.4 Anthropogenic Sources of Surficial Lead

According to the *EPA Technical Summary, Volume I, A Summary of Studies Addressing the Source of Soil-Lead*, "Four general types of supporting evidence have been used within the literature in examining leaded gasoline as a source of lead in soil: 1) distance from the roadway, 2) association with ambient air levels, 3) association with traffic volume, and 4) community area pattern. Approximately 40 percent of lead emitted as vehicular exhaust is in sufficiently large particles to be deposited near the roadway" (EPA, 1998).

The EPA Technical Summary provides many examples to demonstrate the relationship of high lead concentrations and proximity to roadways and/or volume of traffic. Specific examples of concentrations near roadways compared to areas not near roadways are provided in this report, and excerpts include:

> A study in Corpus Christie, Texas which revealed that the arithmetic mean of lead concentrations near highways (379 samples) was 250 mg/kg while the arithmetic mean lead concentrations near parks (94 samples) was 55 mg/kg, and the arithmetic mean lead concentrations near schools (12 samples) was 57 mg/kg.
>
> Another study in Beltsville, Maryland demonstrated that lead concentrations decrease as distance from the highway increases. Specifically, at a distance of 8 meters from the highway concentrations on either side of the road were 108.8 mg/kg and 87.37 mg/kg. At a distance of 25 meters from the road, lead concentrations decreased to 37.42 mg/kg and 25.42 mg/kg; and at a distance of 50 meters from the road, lead concentrations again decreased to 14.16 mg/kg and 19.2 mg/kg.

The air base currently known as NAS Fort Worth JRB has been in existence for over 60 years. Before the advent of the interstate highway system, White Settlement Road and Route 183 were the main east-west and north-south thoroughfares in this area of Fort Worth. An aerial photograph from September 1946 shows the former Carswell AFB before runway expansion with White

Settlement Road and Route 183 (Figure 5.1). Leaded gasoline was the primary fuel used in vehicles for the first 40 years NAS Fort Worth JRB was in existence. Consequently, exhaust emissions from cars and trucks using leaded gasoline over a 40-year period are most likely an anthropogenic source of lead found near roadways. Lead was eliminated from gasoline in the early 1980s. Results of surficial lead sampling during the RFI of SWMUs 22, 23, 24, and 25 have shown a pattern of elevated lead concentrations near roadways with concentrations dropping off as the distance increased from current and historical sections of roadway.

A close examination of the locations of soil samples collected in the BBS of NAS Fort Worth JRB reveal that all the samples collected for the BBS were collected well away from historic primary roadways, and many were collected at school and park settings. This collection pattern has introduced a low bias for surface background lead concentrations at NAS Fort Worth JRB, especially where lead is detected above background near roadways that have been historically exposed to elevated lead emissions. Nevertheless, lead detections in soil were delineated and Standard 3 concentrations removed at all four units. The details associated with the lead detections and subsequent removal actions will be presented later in this section.

5.1.5 Anthropogenic Sources of Surficial PAHs

Subsection VI.3, Background Determination, of the TNRCC Consistency Memorandum (TNRCC, 1998a) states, *"Examples of contaminants for which it may be appropriate to establish anthropogenic background concentrations include lead, arsenic, and PAHs. Potential non-specific sources for these contaminants include automobile emissions for lead, wide-spread agricultural use of arsenic in defoliants, and forest fires or fossil fuel combustion of PAHs. There are some commonalities to contaminants for which it may be appropriate to establish anthropogenetic background concentrations, regardless of the source activity that resulted in the contamination. Specifically, if the contaminants are present over large areas (tens of square miles up to hundreds of square miles) and the concentrations are generally low."* As noted above in Section 5.1.4, soil samples collected in the BBS of NAS Fort Worth JRB were collected well away from historic primary roadways, and many were collected at school and park settings. The BBS samples were not collected near runways, taxiways, engine testing facilities, fire training areas, or landfills where refuse was known to have been burned.

SWMUs 22, 23, 24, and 25 are located at an Air Force Base that has been in continuous operation for approximately 60 years. SWMU 25 is located adjacent to Taxiway Foxtrot and Charlie. SWMUs 22, 23, and 24 are also located within 700 to 800 feet of Taxiway Foxtrot. An engine testing facility, Building B4146, is located directly adjacent to the southwest portion of SWMU 25 and it is 500 feet to the northwest of SWMU 23, 1000 feet to the northwest of SWMU 24, and 1300 feet to the northwest of SWMU 22. This facility has been in operation since 1984 and exhaust from the testing of aircraft engines is vented in the direction of these SWMUs. In addition, at least four fire training areas have historically been located adjacent to SWMUs 22, 23, 24, and 25. As all of these facilities are known sources of PAH emissions to the atmosphere, low concentrations of PAHs in surface soil would be expected within and around SWMUs 22, 23, 24, and 25.

5.1.6 Laboratory / Field Artifacts

As described in Section III.2 of the TNRCC Consistency Memorandum (TNRCC, 1998a) regarding laboratory/field artifacts, the VOCs - acetone, methylene chloride, MEK (MEK or 2-butanone), and toluene are common laboratory/field artifacts. The SVOCs - dimethyl phthalate, diethyl phthalate, di-n-butyl phthalate, butylbenzyl phthalate, bis(2-ethylhexyl)phthalete, and di-n-octyl phthalate are also common laboratory/field artifacts.

Acetone, MEK, and methylene chloride were sporadically detected at low concentrations with small standard deviations in RFI soil samples collected at SWMUS 22, 23, 24, and 25. The low concentrations in combination with small standard deviations are indicators of artificially introduced field/laboratory contamination. In contrast, high standard deviations in concentration would indicate a possible release related detection. It is concluded that these detections are laboratory/field artifacts not related to site activities. Although these compounds are presumed not to be representative of site contamination, they have not been censored from report tables and figures showing positive results.

In addition, as depicted the graph shown in Figure 5.2, these compounds are highly soluble and volatile when compared to other VOCs. It can be inferred that since acetone, MEK, and methylene chloride were only sporadically detected in groundwater (if detected at all), that these compounds are not actually present in subsurface soil. It can also be inferred that if these compounds were present in surface soil, they would have immediately volatilized under weather conditions prevailing in the Fort Worth area. Based on the above considerations, no further delineation of these three VOCs is warranted.

5.1.7 Significance of Sulfide in Soil

The analytical method used to determine sulfide concentrations, Method SW9030B, is a titrimetric method yielding screening-level data. After the sample is treated with zinc acetate to produce zinc sulfide, an excess of iodine (with soluble starch) is added to oxidize the sulfide to sulfur. Quantitation is obtained by back-titrating the excess iodine with phenyl arsine oxide or sodium thiosulfate until the blue iodine-starch complex disappears. Data generated by this method is not considered to be definitive by the EPA, but instead equivalent to Level II data quality.

Sulfide was sporadically detected slightly above the quantitation limit in the several soil samples collected at SWMUs 22, 23, 24, and 25. Specifically, sulfide was detected in 14 of 126 analyses (11.1 percent), and it was detected above the RRS-1 value of 25 mg/kg in 10 of 126 analyses (7.9 percent). The concentration range of sulfide above RRS-1 was 28 mg/kg to 73.9 mg/kg with an average concentration of 39.95 mg/kg. Although sulfide is an Appendix IX analyte, no background data is available at NAS Fort Worth JRB for sulfide, and there is no TNRCC MSC for sulfide. HydroGeoLogic made significant attempts to determine a risk based value for sulfide in soils. In 1999, HydroGeoLogic contacted Ms. Zarena Post of the TNRCC regarding available risk standards for sulfides in Texas. Ms. Post is a member of the TNRCC Toxicology and Risk Assessment (TARA) section. After consulting her files and members of her staff, Ms. Post indicated there are no risk standards for sulfides in the state of Texas. Ms. Camarie Perry, also of TARA, confirmed that there are no risk based standards for soil and groundwater to compare

with detected concentrations of sulfide. Ms. Perry consulted Mr. Jeffrey Patterson, a chemist for the Superfund Cleanup program, regarding secondary sources of toxicological information (e.g., journals), but found no specific sulfide information. Ms. Perry also contacted Ms. Ann Strahl, a chemist for TNRCC, for further confirmation.

In addition, information was also obtained which indicates that sulfide can be generated as a byproduct of biological activity of decaying organic matter under anaerobic conditions. According to a study published in the Journal of Atmospheric Chemistry, (Bates and Others, 1994), "*Emissions of sulfur gasses from both natural and anthropogenic sources strongly influence the chemistry of the atmosphere.*" The study cites numerous sources of sulfur and sulfide to the atmosphere such as oceanic emissions of volatile and non-volatile sulfur gasses; terrestrial biogenic emissions from marsh and tidal sources; freshwater emissions, soil emissions, and vegetation emissions.

As the sulfide detections in soils at SWMUs 22, 23, 24, and 25 are isolated and concentrations are low, sulfide detections are not interpreted as being related to a site release to the environment. In addition, as an MSC for sulfide could not be identified, and supplementary health risk information was not available, additional sampling for sulfide did not appear warranted and was not performed in later delineation rounds.

5.1.8 Analytes Reported Under Multiple Methods

General statistics comparing the number of total analyses per analyte with the number of detections per analyte are discussed throughout Section 5.0. Variances in the total number of analytical results per analyte arise for several reasons: (1) some compounds are listed by several analytical methods, and individual samples may have been analyzed using multiple analytical methods with overlapping reporting for these analytes. For example, naphthalene is present on the analyte lists for SW8260 (VOCs), SW8270 (SVOCs), and SW8310 (PAHs). In 1997, naphthalene was routinely reported by both SW8260 and SW8270, so there are more analytical results for naphthalene than there are field samples during this time frame. (2) Metals are often analyzed in groups using EPA Method SW6010, with some individual metals analyzed using the SW7000 GFAA series of methods. For example, lead can be analyzed by SW6010 and SW7421. (3) Some of the broad spectrum analytical methods used in the Appendix IX characterization sampling are often not the most sensitive analytical method for individual analytes. During delineation sampling, the most sensitive analytical methods were used for individual analytes. For example, in 1999/2000, naphthalene was analyzed by SW8270 for confirmation/characterization samples and by SW8310 for delineation samples. (4) Method numbers have changed over the time of the project in response to updated EPA guidance. For example, OC pesticides/PCBs can be reported both by method SW8080 and by SW8081.

It should be noted that Section 5.0 data tables for surface and subsurface detections show only those compounds that were detected over their corresponding RRS-1 value. If a compound was not detected by an individual method, then that method will not be listed in the surface and subsurface detection tables. Appendix J presents all analytical results including rejected and U-qualified (non-detected) data. The total number of analyses per analyte are represented in this

Appendix. For reference, Table 5.4 lists all the analytes reported under multiple analytical method per site.

5.2 SWMU 22

RFI activities conducted at SWMU 22 between 1997 and 2000 included the excavation of 10 exploratory trenches, the installation of 12 DPT soil borings, and the collection of two rounds of groundwater samples from existing monitoring wells. Surface water (Farmers Branch Creek and the un-named tributary adjacent to SWMU 22), and sediment samples collected during the RFI are to be included in a baseline human and ecological risk assessment under a separate project focusing on groundwater, surface water, and sediments in the golf course area. A total of 18 monitoring wells were installed by Radian Corporation between 1985 and 1992 as part of groundwater investigations of SWMU 22 and the basewide TCE plume.

As part of the initial field activities performed by HydroGeoLogic in 1997, soil samples for chemical characterization were collected at excavated test pits from both the ground surface and the subsurface intervals exhibiting the highest photoionization detector (PID) reading. Surface soil samples were collected prior to drilling or excavation activities using a stainless steel hand auger, with a stainless steel sleeve for VOC samples. Subsurface samples of native soil beneath the landfill debris were collected near the center of each 40-foot long test pit and sampled for VOCs, SVOCs, and metals. VOCs and SVOCs were analyzed by EPA Methods SW8260 and SW8270, respectively. Inorganics were analyzed for the RCRA list of metals using EPA Method SW6010 ICP-standard.

In 1998, six DPT locations, BHGLTA401 (B401) - B406, were installed and soil samples collected in 5-foot intervals from the ground surface to the water table. These samples were analyzed for the full suite of Appendix IX compounds [232 compounds and 1,2-dichloroethane (1,2-DCA)]. Six additional soil borings (B407 through B412), were installed to delineate specific compounds or suites of compounds detected at associated source intervals. The analytical data generated during the RFI of SWMU 22 is presented in Appendix J.

Test pit trenching activities at SWMU 22 uncovered various commercial/industrial debris and medical waste throughout the landfill. Observed debris consisted primarily of sheet metal, concrete, rebar, asphalt, metal buckets, wire, oil cans, soda cans, aerosol cans, wooden crates, burned wood, small batteries, industrial plastic, glass, bottles, newspaper, cardboard, trash, aircraft/car parts, fire extinguishers, and fiberglass mesh. Medical waste was encountered consisting of needles, syringes, medical gauze, intravenous (IV) bottles, blue hospital gowns, blue tyvek material, and plastic bags containing medical refuse. Medical waste was encountered in trenches THGLTA001 (T001), T002, T003, T009, and T010 at depths ranging from 2 to10 feet bgs. At test pits where medical wastes were encountered, soil samples were collected by excavating directly to native soil, or were not collected due to health and safety concerns.

5.2.1 Interpretation of Aerial Photographs

Aerial photographs of the SWMU 22 area covering 6 decades were reviewed to identify areas of landfill activity for placement of test pit trenches. Prior to February 1954, with the extension of

the north-south runway and taxiway, the SWMU 22 site appears as a field possibly used for agricultural purposes. Landfill activities at SWMU 22 were first observed in a December 1958 aerial photograph as a series of trenches oriented on a north-south axis with a settling pond in the northeast corner. An aerial photograph of SWMU 22 taken December 1958 is presented with soil boring and test pit locations as Figure 5.3. Continued trenching activities and ground scarring, presumably caused by grading, were noted in aerial photographs from 1962 through 1972. Landfill operations at SWMU 22 appear to have ceased by 1976. All landfill activity associated with SWMU 22 during the period of operation was observed within the perimeter fencing for the landfill.

5.2.2 Geophysical Results

Geophysical surveys at SWMU 22 were performed in 1985 as part of the *IRP Phase II-Confirmation/Quantification Stage I Final Report for Carswell AFB* (Radian, 1986). These surveys consisted of magnetometer, EM profiling, and earth resistivity methods for the purposes of profiling SWMU 22. Significant anomalies, which coincided with elongated burial pits observed in aerial photographs were located in several areas. A contour map depicting the EM anomalies detected using the EM-31 profile instrument is presented in Figure 5.4.

5.2.3 Test Pit Locations

Ten test pits were excavated in the areas where waste disposal trenches were suspected to exist, as identified through aerial photographic and geophysical interpretation. The locations of the waste disposal trenches in 1958 in relation to test pits and soil borings are presented on Figure 5.3. One of the test pit locations (T008) was moved during the site clearance process. This decision was based on visual observations of the area surrounding the proposed test pit location and the proximity of nearby buried electrical utilities. Test pit T008 was moved from immediately east of the former radar station to the northwest corner of the SWMU at a location where a depression in the ground surface had been observed. A surface soil sample and a subsurface soil sample were collected from each of the 10 test pits for analysis. Each test pit was backfilled immediately following the collection of the subsurface soil sample. After backfilling was complete, a clay layer approximately 1-foot in thickness was placed over all trench locations. The areas were then re-seeded.

5.2.4 Soil Boring Locations

Six soil borings, B401 through B406, were installed in the areas where chemical analyses from the test pits indicated elevated concentrations of possible site related contaminants. Soil samples were collected in 5 foot intervals starting at the surface and terminating at the water table. Each soil sample collected from these borings was analyzed for the full suite of Appendix IX constituents.

Seven additional soil borings, B407 through B412 and B096, were installed to delineate specific COPCs to Standard 1 concentrations. Soil samples were collected to delineate specific COPCs at the depth intervals associated with the original detections. Soil boring locations are presented on Figure 5.3.

Concrete and rubble were found throughout much of the landfill. Three Appendix IX intervals were not sampled due to excessive waste or poor recovery within a sampling interval. These intervals included the surface-, 10-, and 15-foot intervals of B403. Several offsets from the original location were attempted to obtain samples from these intervals, but were unsuccessful. Confirmatory soil borings were placed directly adjacent to B403, B406, B408, T002, T003, and T008 to verify initial sampling results and to perform SLPL extractions where analytical totals exceeded RRS-2 values.

5.2.5 Lithologic Findings and Cross Sections

As depicted in Figure 5.5, lithology along a west-east transect (A-A') through borings CAR-P1, B406, T008, T007, T001, and CAR-P2 of SWMU 22 indicates that much of the near-surface soils are composed of a moderately sorted native silty clay that is continuous throughout the length of the transect. The layer ranges in thickness from approximately 17 feet at the west end of the section to about 1 foot near boring T007. Along the east half of the transect where the native silty clay layer is much thinner, the silty clay unit is overlain by a long, fairly thin body of landfill material that reaches a maximum thickness of about 7 feet at boring T001. Most of the landfill body is capped by a thin layer of fill composed of clean sand and sandy clay, but that layer pinches out to a negligible cover at the west end of the landfill where it may be only a few inches thick. The above strata are underlain by a continuous thick layer of well-sorted medium grained yellow to brown to gray sand that extends throughout the length of the transect. The unit has an average thickness of approximately 26 feet across the transect. The base of the sand unit forms a distinct contact between this unconsolidated layer and the Goodland/Walnut bedrock formation, a 28- to 36-foot thick limestone unit that overlies the Paluxy sandstone along this transect. The thickness of the Goodland/Walnut and the upper contact of the Paluxy unit are based on data acquired during the drilling of nearby Paluxy-depth wells, which were abandoned prior to this investigation. The highest surface elevation along the transect, measured at the time of the RFI field investigation, is at boring CAR-P1 at approximately 626 feet above mean sea level (msl). The lowest surface elevation is at CAR-P2, approximately 615 feet above msl. The bedrock elevation along A-A' is approximately 585 feet above msl with a gentle slope to the east evident near CAR-P2.

The west-east transect (B-B') passes through borings FT09-12C, B405, T010, T005, T003, B401, B409, B408, B411, and LF04-4C at the south side of the study area and illustrates a more irregular stratigraphy than that found along transect A-A' (Figure 5.5). The near-surface center of the transect contains a thick (about 10 feet on average), block-shaped landfill body that ends abruptly near boring B401. A very small accumulation of landfill material is also found at boring B409. These landfill areas are capped by a thin layer of fill composed of clean sand and sandy clay; a much thicker deposit of fill (up to 12 feet deep) is found in the vicinity of B405. All of the above strata are underlain by a prominent layer of well-sorted medium grained yellow sand that ranges in thickness from 8 to 20 feet along the transect. The base of the sand unit forms a distinct contact between this unconsolidated layer and the Goodland/Walnut bedrock formation, which is a 40- to 50-foot thick limestone unit that overlies the Paluxy sandstone along this transect. The bedrock elevation along B-B' gently rises from 594 feet at FT09-12C to approximately 596 feet at T005, before sharply falling off to an elevation of 582 feet above msl at LF04-4C.

Lithology observed on a northwest-southeast transect (C-C') through borings LF04-4A, B405, T009, T006, B403, T004, T002, B402, and LF04-4D of SWMW 22 indicates native silty clay soils in a similar configuration as found along transect B-B; A distinct 7 to 8 foot landfill deposit is spread consistently over the thin portion of the silty clay between borings T009 and T002, pinching out at borings B405 and B402. The entire landfill body is covered by a layer of clean fill soil composed of sand and sandy clay. All of the above strata are underlain by the prominent layer of well-sorted medium grained yellow sand that overlies the Goodland/Walnut bedrock formation. Bedrock elevations along C-C' abruptly fall off from an elevation of 602 feet at LF04-4A before leveling out to approximately 590 feet at T006 then falling off again to an elevation of 582 feet above msl at LF04-4D.

The north-south transect (D-D') passes through borings LF04-4B, T005, T006, B404, T007, LF04-4F, and B407 along the center of the study area and shows a somewhat more consistent near-surface stratigraphy than that found along transects B-B' and C-C' (Figure 5.5). The bedrock elevation along D-D' also abruptly falls off from an elevation of 601 feet at LF04-4B to a low of approximately 584 feet at B404 before gently rising to an elevation of 588 feet at LF04-4F and gently sloping off again to an elevation of approximately 585 feet above msl at B407.

The west-east transect (E-E') passes through borings LF04-4B, B403, T001, LF04-03, and LF04-02 at the east side of the study area and is similar to the stratigraphy found along transect D-D' (Figure 5.5). The bedrock elevation along E-E' abruptly falls off from an elevation of 601 feet at LF04-4B before leveling out at an elevation of approximately 584 feet above msl at LF04-03 and LF04-4D.

Groundwater flow follows the general pattern of bedrock slope at SWMU 22 with a distinct flow from the southwest to northeast down the bedrock slope before flowing east along transect A-A' and White Settlement Road. The steep slope depicted in C-C', D-D', and E-E' was most likely formed as an erosion bank cut by river water in the paleo-channel. The bank itself and groundwater flowing off the bank from the southwest influences general groundwater flow in the paleo-channel from the southeasterly flow direction found north and west of SWMU 22 into an easterly flow direction north and east of SWMU 22 (Figure 5.6). Elevation profiles of the groundwater surface are also presented in the cross sections depicted in Figure 5.5.

5.2.6 Soil Analytical Results

Initial surface and subsurface soil samples were collected from six soil borings and ten test pits at SWMU 22. The Appendix IX borings are identified as B401 through B406 and the test pits are identified as T001 through T010 (Figure 5.7). Surface soil samples were collected adjacent to DPT borings and test pits using a stainless steel trowel and bowl. Soil borings used for delineation sampling included B407 through B412 and B096. Due to thick vegetation and trees to the southeast of SWMU 22, borings B408 and B409 were hand augered. Analytical results of surface and subsurface soil sampling initially indicated the presence of some metals and SVOCs at Standard 2 and 3 concentrations. All VOCs detected were at or below Standard 2 concentrations.

The discussion of analytical results in soil has been separated into two sections, inorganic and organic subsections. Note that the inorganic subsection has differing RRS-1 values for surface and subsurface soil for inorganics, while the organic subsection combines surface and subsurface soil because the RRS-1 value is the same. A discussion of each analyte detected over RRS-1 is presented in a separate subsection below. This discussion includes general statistics, interpretation, delineation, and confirmation/SPLP results. Several tables and figures have been prepared to facilitate the reader's review of each section. Analytical results in soil are presented in Figure 5.7; analytical results in surface soil are presented in Table 5.5; analytical results in subsurface soil are presented in Table 5.6; confirmation/SPLP results are presented in Table 5.7; and site-specific MSCs are presented in Table 5.8.

5.2.6.1 Inorganic Analytical Results

Appendix IX metals were detected above background concentrations in surface and subsurface soil samples collected at SWMU 22. In surface soils, detected elements include antimony, arsenic, cadmium, copper, lead, selenium, thallium, and zinc (Table 5.5). Detected elements in subsurface soils include antimony, arsenic, cadmium, chromium, cobalt, lead, mercury, selenium, silver, thallium, vanadium, and zinc. Although calcium, magnesium, manganese, and potassium are not included in the Appendix IX sampling list, these metals were detected in SWMU 22 soils collected in 1997. These metals are not included in the discussion and figures because they are not Appendix IX compounds. Figure 5.7 displays the locations and chemical data that exceeded background concentrations in SWMU 22 soils.

Most metals observed in surface soils were detected at low concentrations, below or just above background concentrations. These detections are considered variations of basewide background levels, not indicative of a site-related spill or release. In surface soil, these inorganics include antimony, cadmium, and copper. In subsurface soil, these inorganics include antimony, cadmium, cobalt, silver, and vanadium. The percentage of detection for these compounds was calculated only for detections above base background values since this concentration represents RRS-1. In addition, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for each of the above compounds is less than five percent of total analyses. Since it is unlikely that these compounds are related to a site release, and the frequency of detection for these compounds is below the five percent threshold described in Section 3.1 of the TNRCC Consistancy Memorandum (TNRCC, 1998a), further delineation of antimony, cadmium, cobalt, copper, silver, and vanadium in SWMU 22 soil is not warranted.

A closer examination of each of these compounds is presented below:

- **Antimony** was detected in 9 of 17 surface soil samples analyzed for metals. Only 1 of the 17 samples exceeded the RRS-1 concentration of 0.56 mg/kg. This detection of antimony at T007 (0.65 J mg/kg) also exceeded the RRS-2 concentration of 0.6 mg/kg; however, the detection was just 16 percent above the surface background value of 0.56 mg/kg. In subsurface soil, antimony was detected in 10 of 34 samples analyzed for metals. Only 1 of the 34 samples analyzed exceeded the RRS-1/RRS-2 concentration of 0.712 mg/kg. This detection of antimony, an estimated concentration of 0.99 J mg/kg at T009, was just 39 percent above the subsurface background value of 0.712 mg/kg. The percentage of

detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for antimony is 3.9 percent (2 of 51 analyses).

- **Cadmium** was detected in 4 of 17 surface soil samples analyzed for metals. Only one of the 17 surface samples exceeded the RRS-1 as well as the RRS-2 concentration of 0.556 mg/kg. This detection of cadmium at T007 (0.73 F mg/kg) in surface soil was only 30 percent above the surface background value of 0.556 mg/kg. Cadmium was detected in 10 of 34 subsurface soil samples analyzed for metals. Of the 34 samples analyzed, only one detection exceeded the RRS-1/RRS-2 concentration of 0.59 mg/kg. This isolated detection of cadmium at T009 (0.63 F mg/kg) was only 7.4 percent above the subsurface background value of 0.59 mg/kg. The percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for cadmium is 3.9 percent (2 of 51 analyses).

- **Cobalt** was detected in 17 of 17 surface soil samples; however, none of the detections exceeded the surface RRS-1 concentration of 11.05 mg/kg. Cobalt was detected in 32 of 34 subsurface soil samples analyzed for metals. Three of the 34 samples exceeded the RRS-1 concentration of 6.19 mg/kg; however, each of these detections was well below the RRS-2 concentration of 610 mg/kg. Specifically, cobalt was detected at B402-5' (8.1 mg/kg), B403-20' (8.2 F mg/kg), and T003-13' (7.8 F mg/kg). All of these detections were less than 25 percent above background. In addition, the percentage of cobalt detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 5.9 percent (3 of 51 analyses).

- **Copper** was detected in all 17 surface soil samples analyzed for metals. Of the 17 samples analyzed, only 1 detection exceeded the RRS-1 concentration of 17.37 mg/kg. This isolated detection of copper, a concentration of 17.4 mg/kg at T005, is well below the RRS-2 concentration 130 mg/kg, and is approximately equal to the surface background value of 17.37 mg/kg. Copper was detected in 31 of 34 subsurface soil samples; however, none of the detections exceeded the RRS-1 concentration of 13.72 mg/kg. The percentage of copper detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 2.0 percent (1 of 51 analyses).

- **Silver** was not detected in surface soil. Silver was detected in 2 of 34 subsurface soil samples analyzed for metals. Both of the samples exceeded the RRS-1 concentration of 0.128 mg/kg; however, each of these detections was well below the RRS-2 concentration of 51 mg/kg. Specifically, silver was detected at two locations in subsurface soil including T003-13' (0.6 F mg/kg), and T006-12' (0.22 F mg/kg). Nevertheless, silver is delineated to the north by T001 and T007; to the east by B401 and B402; to the south by T005 and T010; and to the west by B405, T008, and B406. In addition, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for silver is 3.9 percent (2 of 51 analyses).

- **Vanadium** was detected in all 17 surface soil samples analyzed for metals; however, none of the detections exceeded the RRS-1 concentration of 46.3 mg/kg. Vanadium was also detected in all 34 subsurface soil samples analyzed for metals. Only two of the 34

detections exceeded the RRS-1 concentration of 37.4 mg/kg. Neither detection exceeded the RRS-2 concentration of 72 mg/kg. Detections above RRS-1 included 40.8 J mg/kg, in the 20-foot interval of B403, and 44.0 mg/kg in the 5-foot interval of B404. These isolated detections are delineated by B402 in the east, B401 to the south; B405 and B406 to the west; and SWMU 23 boring B073 to the north. In addition, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for vanadium was 3.9 percent (2 of 51 analyses).

As previously noted in Section 5.1.2, statistical analysis of analytical results for arsenic indicate that detected concentrations of arsenic are statistically the same as developed background concentrations. Similarly, as previously noted in Section 5.1.1, statistical analysis indicated that detected thallium concentrations are actually lower than developed background concentrations. Specific detections and concentration ranges are presented below:

- **Arsenic** was detected in 14 of 17 surface soil samples analyzed for metals. Three of the 17 samples exceeded the surface RRS-1/RRS-2 concentration of 5.85 mg/kg. Specifically, arsenic was detected in surface soil at B402 (15.3 F mg/kg); B404 (15.1 F mg/kg), and B405 (15 F mg/kg). Arsenic was also detected in 23 of 34 subsurface soil samples analyzed for metals. Ten of the 34 detections exceeded the subsurface RRS-1/RRS-2 concentration of 6.58 mg/kg. Detections above RRS-1 ranged from 6.7 mg/kg to 19 mg/kg, with an average concentration of 12.15 mg/kg.

- **Thallium** was detected in 3 of 17 surface soil samples analyzed for metals. Each of the three detections exceeded the RRS-1/RRS-2 concentration of 2.43 mg/kg. Specifically, thallium was detected in surface soil at B402 (14.5 F mg/kg), B404 (13.4 F mg/kg), and B406 duplicate (33.4 F mg/kg). Thallium was also detected in 8 of 34 subsurface soil samples analyzed for metals. All eight of the detections exceeded the RRS-1/RRS-2 concentration of 1.5 mg/kg. Detections above RRS-1 ranged from 5.1 mg/kg to 29.2 mg/kg, with an average concentration of 13.48 mg/kg.

A subset of two metals was inaccurately detected above background due to matrix interference. As noted in Section 5.1.6, detections of selenium and chromium above background resulted from matrix interference inherent with the SW6010-standard analytical method for metals. The matrix interference induces false positive detections of selenium, and artificially elevates concentrations of detected chromium. Detections of chromium below 40 mg/kg using SW6010-standard are interpreted as detections below background. Specific detections and concentration ranges are presented below:

- **Selenium** was detected in 3 of 17 surface soil samples analyzed for metals. Each of the three detections exceeded the RRS-1 concentration of 0.907 mg/kg and the RRS-2 concentration of 5 mg/kg. Specifically, selenium was detected in surface soil at B402 (16.6 F mg/kg), B404 (7.5 F mg/kg), and B405 (15.2 F mg/kg). Selenium was also detected in 13 of 34 subsurface soil samples analyzed for metals. Each of the 13 detections exceeded the RRS-1 concentration of 0.313 mg/kg, with 8 detections exceeding the RRS-2 concentration of 5 mg/kg. Detections above RRS-1 ranged from 3.5 mg/kg to 15.7 mg/kg, with an average concentration of 7.15 mg/kg. Selenium detections within this range of

concentrations using SW6010 ICP-standard are believed to be false positives, and therefore, do not warrant further investigation.

- **Chromium** was detected in all 17 surface soil samples; however, none of the detections exceeded the RRS-1 concentration of 25.86 mg/kg. Chromium was also detected in 31 of 34 subsurface soil samples analyzed for metals. Five of the 34 samples exceeded the RRS-1/RRS-2 concentration of 16.31 mg/kg. Detections above RRS-1 ranged from 16.8 J mg/kg to 22.7 J mg/kg, with an average concentration of 19.0 mg/kg and a standard deviation of 2.41 mg/kg. Specifically, chromium was detected at B402-5' (16.8 J mg/kg), B403-20' (17.4 mg/kg), B404-5' (22.7 mg/kg), B406-10' (18 J mg/kg), and T004-13' (20.1 J mg/kg). These concentrations ranged from 3 to 35 percent over the base background value of 16.31 mg/kg. Although not incorporated by project ARARs, each detection is below the State of Texas background value of 30 mg/kg. (For reference, the State of Texas background values are presented in Table 5.9.) Since it is believed that interference inherent with the SW6010 ICP-standard analytical method for metals artificially elevated detected concentrations of chromium, and as all chromium detections at SWMU 22 are below 30 mg/kg, they are interpreted as being reflective of base background conditions and do not warrant further investigation.

Other inorganic detections observed in SWMU 22 soil included lead, mercury, and zinc at Standard 2 and 3 concentrations. These inorganics are discussed below.

- **Lead** was detected in 18 of 19 surface soil samples analyzed for metals. Five of the 19 samples exceeded the RRS-1/RRS-2 concentration of 30.97 mg/kg. Lead was detected in surface soil at B406 (34.8 F mg/kg), B406-duplicate (42.9 F mg/kg), B406-confirmation (41.5 mg/kg), T007 (32.2 mg/kg), and B407 (81.5 mg/kg).

  Although the highest detection of lead in surface soil within the SWMU boundaries (B406) was only 38 percent above the surface background value of 30.97 mg/kg, it was treated as a Standard 3 detection and confirmation sampling for the original B406 (42.9 F mg/kg) detection was performed. Results of confirmation revealed a similar concentration of 41.5 mg/kg. An SPLP extraction was performed, and the resulting concentration was below the corresponding industrial groundwater MSC (Table 5.8). Lead in surface soil is delineated to the south by the adjacent test pit, T008, and to the east by T007. The detection of lead at B096 at a concentration of 35.2 mg/kg is only 13.6 percent over the background concentration of 30.97 mg/kg. Consequently, this detection is considered to be a natural variation of background and serves as the delineation location for lead to the west of B406. To the north, next to White Settlement Road, lead was detected at a concentration of 81.5 mg/kg at B407; however, the resulting concentration of lead when an SPLP extraction was performed on this sample was below the industrial groundwater MSC. This resulted in a new site-specific MSC of 81.5 mg/kg at SWMU 22. Lead is delineated to the north of SWMU 22 by SWMU 24 borings B089 and B003. The remaining Standard 2 detection of lead in the surface interval of T007 (32.2 mg/kg) is delineated to the north by borings B407, B087, and B095; to the east by T001 and B402; to the south by B404 and B405; and to the west by T008.

Most of the elevated detections of lead in surface soil at SWMU 22 were found in surficial soil at a distance of less than 25 meters along White Settlement Road and the base perimeter road. As these roads have been in existence for over 60 years, emissions from leaded gasoline by cars and trucks over a 40-year period are most likely the anthropogenic source of lead found in SWMU 22 surface soil. A more detailed discussion of the potential sources of lead in surficial soil is presented in Section 5.1.4 above.

Lead was also detected in 26 of 37 subsurface soil samples analyzed for metals. Five of the 36 samples exceeded the RRS-1/RRS-2 concentration of 12.66 mg/kg. Detections above RRS-1 ranged from 13.9 mg/kg to 74.4 mg/kg with an average concentration of 30.98 mg/kg. Specifically, lead was detected in subsurface soil at T002-13' (27.2 mg/kg), T003-13' (74.4 mg/kg), T004-13' (18.0 mg/kg), T006-12' (13.9 mg/kg), and T009-13' (21.4 mg/kg). All of these detections are currently considered Standard 2 since each detection is below the site-specific MSC of 81.5 mg/kg.

The lead detections at T002, T003, and T004 were not confirmed above background by borings B402, B401, and B401-Dup, and B403, respectively. Therefore, lead is presumed to be Standard 1 at these locations. As the lead detections at T006 and T009 were not significantly above background, they are considered to be variations of background, not related to a spill or release. Furthermore, all of these lead detections are delineated by perimeter borings B401, B402, B405, and B404.

- **Mercury** was detected in 14 of 17 surface soil samples; however, none of the detections exceeded the RRS-1 concentration of 0.14 mg/kg. Mercury was also detected in 13 of 34 subsurface soil samples analyzed for this element. Six of the 34 samples exceeded the RRS-1 concentration of 0.035 mg/kg (set at the MDL for mercury); however, these detections were all below the RRS-2 concentration of 0.2 mg/kg. Detections above RRS-1 ranged from 0.049 mg/kg to 0.14 mg/kg, with an average concentration of 0.09 mg/kg and a standard deviation of 0.03 mg/kg.

  Specifically, the six detections of mercury were located at B403-5' (0.14 mg/kg), B404-5' (0.11 mg/kg), T003-13' (0.049 mg/kg), T004-13' (0.084 mg/kg), T006-12' (0.066 mg/kg), and T009-13' (0.12 mg/kg). These concentrations ranged from 0.4 to 4 times the subsurface base background concentration of 0.035 mg/kg. However, all of these detections are at, or below, the surface base background concentration of 0.14 mg/kg. Mercury is delineated to Standard 1 concentrations to the north by T001 and T007; to the east by B402 and B401; to the south by T005 and T010; and to the west by B405, T008, and B406. Although mercury is delineated, it is believed that these detections are variations of background and not the result of a release.

- **Zinc** was detected in 16 of 17 surface soil samples analyzed for metals. Of the 17 samples analyzed, only three detections exceeded the RRS-1 concentration of 38.8 mg/kg. These three detections of zinc in surface soil were located at T008 (43.1 mg/kg), B406 (53.2 mg/kg) and B406-duplicate (65.7 mg/kg). The RRS-2 concentration of zinc is 3100 mg/kg. Note that the detection of zinc at T008 (43.1 mg/kg), located adjacent to and south of B406, is considered to be a natural variation of background since the concentration is

only 11 percent greater than background. The highest detection of zinc in SWMU 22 surface soil (65.7 mg/kg at B406) is not significantly above the surface background value of 38.8 mg/kg, and well below the MSC of 3100 mg/kg. Nevertheless, these Standard 2 detections of zinc at B406 and T008 are delineated to the east by T007, to the south by T009, to the west by SWMU 24 boring B096, and to the north by SWMU 24 borings B089 and B091 (depicted in the analytical results figure for SWMU 24).

Zinc was detected in 32 of 34 subsurface soil samples analyzed for metals. Five of the detections exceeded the RRS-1 concentration of 31.3 mg/kg. Detections above RRS-1 ranged from 34.2 mg/kg to 63.3 mg/kg with an average concentration of 44.54. These detections are also well below the RRS-2 concentration of 3100 mg/kg for zinc. Specifically, zinc detections at B404-5' (34.2 mg/kg), T003-13' (45.1 mg/kg), T004-13' (41 mg/kg), and T006-12' (39.1 mg/kg) are not significantly over background and are regarded as natural variations of the base subsurface background value of 31.3 mg/kg. Note that the detections of zinc at T003 and T004 were not confirmed in companion borings B401 and B404. The remaining detection of zinc at T009-13' (63.3 mg/kg) is delineated to Standard 1 in the north by B406, T008, and T007; in the east at B401 and B402; in the south at T005 and T010; and in the west by B405.

5.2.6.1.1 Sulfides

The analytical method used to determine sulfide concentrations, Method SW9030, is a titration screening method. This method is not considered to be definitive, rather it is designated by the EPA as producing Level 2 data quality (see Section 5.1.6). Sulfides were detected in surface and subsurface soils at two SWMU 22 soil borings.

- **Sulfide** was detected in 2 of 29 soil samples analyzed for this suite of compounds. Each of the two detections exceeded the RRS-1 concentration of 25.0 mg/kg. Sulfide was detected at B405-5' (30.5 S mg/kg). Sulfide was also detected at B406-surface (28 S mg/kg); however it was not confirmed in the B406-surface duplicate. Consequently, the percentage of total confirmed detections of sulfide above RRS-1 at SWMU 22 is 3.4 percent (1 of 29 analyses).

As discussed in Section 5.1.7, sulfide was eliminated from consideration in delineation sampling because it was detected sporadically at low concentrations, and because a specific MSC could not be calculated, or otherwise obtained.

5.2.6.2 Organic Analytical Results

Initial analytical results at SWMU 22 indicated the presence of Standard 2 concentrations of OC pesticides and VOCs. Additionally, a mixture of Standard 2 and 3 concentrations of a subset of SVOCs, commonly associated with asphalt and the combustion of fossil fuels, were found throughout SWMU 22. Two VOCs, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were also detected in SWMU 22 soils; however, as these compounds are not Appendix IX compounds, and were detected at low concentrations and frequency, they are not discussed in the following text. A discussion of general statistics and interpreted results is presented for each Appendix IX analyte.

Where analytes fall into specific categories or associated suites, an interpretive discussion is presented above that group of analytes.

5.2.6.2.1 Organochlorine (OC) Pesticides

A small group of OC Pesticides exhibited a combination of low concentrations and low frequency of occurrence. These compounds included chlordane, dieldrin, and p,p'-DDE. A Standard 3 detection of dieldrin was not confirmed, and it is unlikely that detected concentrations of chlordane and p,p'-DDE are related to a significant site release. The frequency of detection of these compounds is below the five percent threshold described in Section 3.1 of the TNRCC Consistency Memorandum (TNRCC, 1998a). However, these compounds were delineated. A brief set of general statistics is presented below for each of these compounds:

- **Chlordane** was detected in only 1 of 28 soil samples (3.6 percent) analyzed for pesticides. The detection of chlordane in the 5-foot interval of B403 at a concentration of 0.11 mg/kg exceeded the RRS-1 concentration of 0.009 mg/kg; however, the detection is well below the RRS-2 concentration of 0.2 mg/kg.

- **Dieldrin** was detected in only 1 of 29 soil samples (3.4 percent) analyzed for pesticides in the same 5-foot interval of B403 at a concentration of 0.098 mg/kg. Dieldrin exceeded the RRS-1/RRS-2 concentration of 0.01 mg/kg. This detection of dieldrin was not confirmed above RRS-1 in subsequent sampling efforts; therefore dieldrin is presumed to be Standard 1 at SWMU 22.

- **P,P'-DDE** was also detected in only 1 of 28 soil samples (3.6 percent) analyzed for pesticides in the same 5-foot interval of B403 at a concentration of 0.067 mg/kg. P,P'-DDE exceeded the RRS-1 concentration of 0.003 mg/kg; however, it is below the RRS-2 concentration of 0.084 mg/kg.

The Standard 2 detections of chlordane and p,p'-DDE in the 5-foot interval of B403 are delineated to the north by B404, to the east by B402, to the south by B401, and to the west by B405.

5.2.6.2.2 Volatile Organic Compounds

A mixed group of VOCs exhibited a combination of low concentrations and low frequency of occurrence. These compounds included 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2-hexanone, o-xylene, and tetrachloroethene. Since it is unlikely that detected concentrations of these compounds are related to a significant site release, and the frequency of detection for these compounds is below the five percent threshold described in Section 3.1 of the TNRCC Consistency Memorandum (TNRCC, 1998a), further delineation of these compounds is not warranted. Although 1,2,4-trimethylbenene, 1,3,5-trimethylbenzene, and isopropylbenzene are not included in the Appendix IX sampling list, these compounds were detected in SWMU 22 soils collected in 1997. These compounds are not included in the discussion and figures because they are not Appendix IX compounds.

A brief set of general statistics is presented below for each of the Appendix IX compounds detected above RRS-1:

- **1,2,4-Trichlorobenzene** was detected in only 1 of 75 soil samples (1.33 percent) analyzed for VOCs. It was detected in the 5-foot interval of T008 at a concentration of 1.5 F mg/kg. This detection exceeded the RRS-1 concentration of 0.002 mg/kg; however, the detection is well below the RRS-2 concentration of 7 mg/kg.

- **1,2-Dichlorobenzene** was detected in only 1 of 75 soil samples (1.33 percent) analyzed for VOCs. This detection in the 5-foot interval of T008 at a concentration of 1.8 mg/kg exceeded the RRS-1 concentration of 0.002 mg/kg; however, the detection is well below the RRS-2 concentration of 60 mg/kg.

- **1,3-Dichlorobenzene** was detected in only 1 of 75 soil samples (1.33 percent) analyzed for VOCs. This detection in the 5-foot interval of T008 (0.76 F mg/kg) exceeded the RRS-1 concentration of 0.006 mg/kg. An RRS-2 concentration for 1,3-dichlorobenzene is not provided by the TNRCC, and one was not calculated.

- **1,4-Dichlorobenzene** was detected in 2 of 75 soil samples (2.67 percent) analyzed for VOCs. These detections in the 13-foot interval of T002 (0.14 F mg/kg) and the 5-foot interval of T008 (0.76 F mg/kg) exceeded the RRS-1 concentration of 0.002 mg/kg; however, the detection is well below the RRS-2 concentration of 7.5 mg/kg.

- **2-Hexanone** was detected in only 1 of 34 soil samples (2.94 percent) analyzed for VOCs. This detection in the 5-foot interval of B405, at a concentration of 0.007 mg/kg, exceeded the RRS-1 concentration of 0.005 mg/kg. An RRS-2 concentration for 2-hexanone is not provided by the TNRCC, and one was not calculated.

- **O-Xylene** was detected in only 1 of 54 (1.85 percent) soil samples analyzed for VOCs. It was detected in the 8-foot interval of T001 at a concentration of 0.24 mg/kg. This detection exceeded the RRS-1 concentration of 0.005 mg/kg; however, it is well below the RRS-2 concentration of 1000 mg/kg.

- **Tetrachloroethene (PCE)** was detected in 2 of 54 (3.7 percent) soil samples analyzed for VOCs. Only one (1.85 percent) of the detections (0.012 J mg/kg at the 10-foot interval of B407) exceeded the RRS-1 concentration of 0.005 mg/kg. However, the detection is well below the RRS-2 concentration of 0.5 mg/kg. This detection of PCE occurred at B407, which was used as a dual delineation boring for both SWMUs 22 and 24. B407 is located outside of the unit to the south of SWMU 24 and to the north of SWMU 22. It is important to note that the analysis for PCE at B407 was performed to delineate the Standard 2 detections in SWMU 24 and was not associated with any detections of PCE in SWMU 22.

Another subset of VOCs were similarly detected at low concentrations; however, they were detected at frequencies ranging from 5 percent to 12 percent of the samples analyzed (greater than 20 total samples). These VOCs included ethylbenzene, toluene, m&p xylene, and naphthalene.

Although these compounds were detected between 5 percent and 12 percent of samples, they were detected at concentrations well below the MSC and were not detected in groundwater. Therefore, it is presumed that these compounds are not related to a significant release from the unit. Nevertheless, these VOCs, which were primarily detected at T001, T002, T003, and T008, are delineated by borings B083 to the north; B401 and B402 to the east; B402 to the south of T001 and B405 to the south of T002; and to the west by the perimeter road and the adjacent fire training area, SWMU 19. Note that naphthalene samples collected from the same intervals were often and inconstantly analyzed by the laboratory using the SW8260 for VOCs and SW8270 for SVOCs. The inconsistence of analysis resulted in a higher total number of naphthalene analyses.

- **Ethylbenzene** was detected in 3 of 54 soil samples (5.56 percent) analyzed for VOCs. Only two (3.7 percent) of the detections exceeded the RRS-1 concentration of 0.003 mg/kg; however, the detections were well below the RRS-2 concentration of 70 mg/kg. Specifically, ethylbenzene was detected above RRS-1 at T001-8' (0.058 mg/kg) and T003-13' (0.023 mg/kg).

- **M,P-Xylene (Sum of Isomers)** was detected in 6 of 54 soil samples (11.11 percent) analyzed for VOCs. Five of the detections (9.26 percent) exceeded the RRS-1 concentration of 0.005 mg/kg; however, all of the detections were well below the RRS-2 concentration of 1000 mg/kg. The minimum and maximum detections above RRS-1 were 0.0079 mg/kg and 0.29 mg/kg respectively, with an average concentration of 0.07 mg/kg. Specifically, m,p-xylene was detected above RRS-1 at T001-8' (0 29 mg/kg), T002-13' (0.0095 F mg/kg), T003-13' (0.0079 mg/kg), B406-10' (0.009 mg/kg), and B406-20' (0.01 mg/kg). Note that the detections of m,p-xylene at T002-13' and T003-13' were not confirmed by borings B402, and B401, respectively.

- **Naphthalene** was detected in 2 of 11 soil samples (18.2 percent) analyzed for this constituent as a VOC. Both the detections exceeded the RRS-1 concentration of 0.002 mg/kg. However, the detections were well below the RRS-2 concentration of 200 mg/kg. Specifically, naphthalene was detected at T002-13' (0.0088 F mg/kg), and T008-5' (19 J mg/kg). Note that the detections of naphthalene at T002 and T008 were not confirmed by a dual analysis using SW8270, however, the MQL for SW8270 was 0.33 mg/kg.

- **Toluene** was detected in 5 of 54 soil samples (9.26 percent) analyzed for VOCs. All five of the detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, each of the detections was well below the RRS-2 concentration of 100 mg/kg. The minimum and maximum detections above RRS-1 were 0.006 mg/kg and 0.022 mg/kg, respectively. Specifically, toluene was detected at T001-8' (0.013 F mg/kg), T002-13' (0.0071 F mg/kg), T003-surface (0.006 mg/kg), T005-surface (0.022 mg/kg), and B403-25' (0.011 mg/kg). Note that the detection of toluene in the surface interval of T003 was not confirmed by boring B401.

The remaining group of VOCs are considered to be laboratory/field artifacts, consistent with guidelines provided in the TNRCC Consistency Memorandum, Section III (see Section 5.1.6). This group exhibited sporadic detections at low concentrations with low standard deviations. The low concentrations and standard deviations are indicators that the detections are not related to a

release. In contrast, a high standard deviation would indicate hot spots or potential releases near these hot spots. As noted in Section 5.1.6, these compounds exhibit high solubility and volatility. Therefore, they would be expected to either rapidly volatilize under local climate conditions or move into groundwater with precipitation. These compounds were not detected in groundwater and are not believed to be real investigative detections.

- **Acetone**, a common laboratory/field contaminant, was detected in 12 of 34 (35.29 percent) soil samples analyzed for VOCs. Eleven of the detections (32.35 percent) exceeded the RRS-1 concentration of 0.005 mg/kg; however, all of the detections were well below the RRS-2 concentration of 1000 mg/kg. The minimum and maximum detections above RRS-1 were 0.006 mg/kg and 0.16 mg/kg, respectively, with an average concentration of 0.05 mg/kg and a standard deviation of 0.05 mg/kg.

- **Methyl Ethyl Ketone (MEK)**, a common laboratory/field contaminant, was detected in 3 of 34 soil samples (8.82 percent) analyzed for VOCs. All three of the detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, all of the detections were well below the RRS-2 concentration of 6100 mg/kg. Specifically, MEK was detected at B403-20' (0.022 mg/kg), B405-5' (0.013 mg/kg), and B406-20' (0.043 mg/kg).

5.2.6.2.3 Semivolatile Organic Compounds

Many SVOCs were detected in surface soil samples collected within SWMU 22. Variances in the total number of analyses for individual compounds is due to the use of both SW8270 and SW8310, as well as reduced analyte lists for confirmation/delineation samples. The analyte list for EPA Method SW8310 (PAHs), which was used for delineation sampling because of lower detection limits, is a subset of the analyte list for SW8270. Also as noted above, naphthalene samples collected from the same intervals were inconstantly analyzed by the laboratory using both the SW8260 for VOCs, SW8270 for SVOCs and SW8310 for PAHs. The inconsistence of analysis resulted in variations of total number of naphthalene analyses.

Results of initial analyses for SVOCs reveal Standard 2 and Standard 3 concentrations of a suite of SVOCs associated with asphalt and the combustion of fossil fuels. These SVOCs, composed primarily of PAHs, were only detected in surface soil at SWMU 22. The PAHs included acenaphthene, anthracene, benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*g,h,i*]perylene, benzo[*k*]fluoranthene, chrysene, dibenzo[*a,h*] anthracene, fluoranthene, indeno[1,2,3-*c,d*]pyrene, naphthalene, phenanthrene, and pyrene. A brief description of general statistics for each of these compounds is discussed below. This description is followed by a discussion of delineation and confirmation/SPLP results for the whole suite of PAHs.

As presented in Figure 5.7 and Table 5.5, SVOCs detected above background concentrations include a suite of PAHs commonly associated with asphalt:

- **2-Methylnaphthalene** was detected in 6 of 57 soil samples (10.53 percent) analyzed for SVOCs. Only one (1.75 percent) of the detections (1.4 mg/kg in the 8-foot interval of T001) exceeded the RRS-1 concentration of 0.33 mg/kg; however, it was detected well below the MSC of 410 mg/kg.

- **Acenaphthene** was detected in 11 of 65 soil samples (16.92 percent) analyzed for SVOCs and PAHs. Only two of the detections (3.08 percent) exceeded the RRS-1 concentration of 0.33 mg/kg; however, each of the detections was well below the MSC of 610 mg/kg. Both detections above RRS-1 occurred in the surface interval of B408 (1.9 mg/kg and 2.4 mg/kg in the duplicate).

- **Anthracene** was detected in 15 of 65 soil samples (23.08 percent) analyzed for SVOCs and PAHs. Five of the detections (7.7 percent) exceeded the RRS-1 concentration of 0.33 mg/kg; however, all of the detections were well below the MSC of 3100 mg/kg. The minimum and maximum detections above RRS-1 were 0.034 mg/kg and 5.3 mg/kg respectively, with an average concentration of 2.22 mg/kg. Note that the detection of anthracene in the surface interval of T003 was not confirmed by boring B401.

- **Benzo[*a*]anthracene** was detected in 26 of 74 soil samples (35.14 percent) analyzed for SVOCs and PAHs. Twenty two detections (29.73 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.009 mg/kg. Nineteen of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.024 mg/kg and 34.0 mg/kg respectively, with an average concentration of 5.10 mg/kg.

- **Benzo[*a*]pyrene** was detected in 28 of 73 soil samples (38.36 percent) analyzed for SVOCs and PAHs. Twenty one of the detections (28.77 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.015 mg/kg. All 21 of the detections exceeded the MSC of 0.02 mg/kg. The minimum and maximum detections above RRS-1 were 0.025 mg/kg and 37.0 mg/kg respectively, with an average concentration of 5.66 mg/kg.

- **Benzo[*b*]fluoranthene** was detected in 25 of 71 soil samples (35.21 percent) analyzed for SVOCs and PAHs. Twenty of the detections (28.17 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.012 mg/kg. Eighteen of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.014 mg/kg and 39.0 mg/kg respectively, with an average concentration of 7.44 mg/kg.

- **Benzo[*g,h,i*]perylene** was detected in 22 of 65 soil samples (33.85 percent) analyzed for SVOCs. Eleven of the detections (16.92 percent) exceeded the RRS-1 concentration of 0.33 mg/kg. However, each of these detections was well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.39 mg/kg and 13.0 mg/kg respectively, with an average concentration of 3.29 mg/kg.

- **Benzo[*k*]fluoranthene** was detected in 19 of 52 soil samples (36.54 percent) analyzed for SVOCs and PAHs. Fourteen of the detections (26.92 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.011 mg/kg. Eleven of the detections exceeded the MSC of 0.39 mg/kg. The minimum and maximum detections above RRS-1 were 0.014 mg/kg and 22.0 mg/kg respectively, with an average concentration of 4.25 mg/kg.

- **Chrysene** was detected in 29 of 74 soil samples (39.19 percent) analyzed for SVOCs and PAHs. Eighteen of the detections (24.32 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.1 mg/kg. Only four of the detections exceeded the MSC of 3.9 mg/kg. The minimum and maximum detections above RRS-1 were 0.47 mg/kg and 38.0 mg/kg respectively, with an average concentration of 6.93 mg/kg.

- **Dibenzo[*a,h*]anthracene** was detected in 18 of 73 soil samples (24.66 percent) analyzed for SVOCs and PAHs. Seven of the detections (9.59 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.02 mg/kg. All seven detections exceeding RRS-1 also exceeded the MSC of 0.02 mg/kg. The minimum and maximum detections above RRS-1 were 0.03 mg/kg and 4.9 mg/kg respectively, with an average concentration of 1.18 mg/kg.

- **Fluoranthene** was detected in 20 of 65 soil samples (30.8 percent) analyzed for SVOCs and PAHs. Thirteen of the detections (20 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.14 mg/kg. However, all of the detections were well below the MSC of 410 mg/kg. The minimum and maximum detections above RRS-1 were 0.15 mg/kg and 60.0 mg/kg respectively, with an average concentration of 12.13 mg/kg.

- **Fluorene** was detected in 12 of 65 soil samples (18.5 percent) analyzed for SVOCs and PAHs. Only two detections (3.08 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.14 mg/kg. However, all of the detections were well below the MSC of 410 mg/kg. Fluorene was detected at B408-surface (1.8 mg/kg) and B408-surface duplicate (2.2 mg/kg).

- **Indeno[1,2,3-*c,d*]pyrene** was detected in 28 of 73 soil samples (38.36 percent) analyzed for SVOCs and PAHs. A total of 17 detections (23.29 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.03 mg/kg. Sixteen of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.037 mg/kg and 25.0 mg/kg respectively, with an average concentration of 4.51 mg/kg.

- **Phenanthrene** was detected in 22 of 65 soil samples (33.85 percent) analyzed for SVOCs and PAHs. A total of 11 detections (16.92 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.42 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.86 mg/kg and 35.0 mg/kg respectively, with an average concentration of 7.24 mg/kg.

- **Pyrene** was detected in 20 of 66 soil samples (30.30 percent) analyzed for SVOCs and PAHs. A total of 13 detections (19.70 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.18 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum

detections above RRS-1 were 0.4 mg/kg and 45.0 mg/kg respectively, with an average concentration of 9.72 mg/kg.

Most of these PAHs were detected in the surface soil at each of these test pits or borings: T002, T003, T007, T008, B401, B404, B405, B408, and B409. Subsurface PAHs were detected at very low concentrations at T002, B408, and B409. These PAH detections are all delineated vertically and aerially to the north by B407, T001, B073, and B509; to the east by T001, B402, B410, and by very low concentrations at B411; to the south by T005, T010, and by very low concentrations at B412; and to the west by the base perimeter road and the adjacent former fire training area, SWMU 19.

Seven of the delineated PAHs associated with the combustion of asphalt and the combustion of fossil fuels are characterized by low MSCs and were detected at Standard 3 concentrations in SWMU 22 surface soils. These PAHs included benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, chrysene, dibenzo[*a,h*]anthracene, and indeno[1,2,3-*c,d*]pyrene. Confirmation analysis for these PAHs was performed using SW8270 at samples collected at T002, T003, T008, B406, B408, and B409. Analysis of PAH extracts for SPLP was performed using the more definitive SW8310 method to achieve lower reporting limits. Confirmation results showed that PAHs were not confirmed at T002; PAHS were confirmed with significantly lower Standard 3 concentrations at T003; and PAH concentrations in the SPLP extracts were all below their respective industrial groundwater MSC at both T002 and T003 (Figure 5.7). PAHs were confirmed with concentrations similar to original detections at T008, B406, and B408; however, all PAH concentrations in the SPLP extracts from T008, B406, and B408 were below their respective industrial groundwater MSCs. The highest detections of PAHs at SWMU 22 occurred at B409; PAHs concentrations in the SPLP extracts from B409 subsequently were below their corresponding industrial groundwater MSC. The new site-specific MSCs at SWMU 22 for these compounds are presented in Table 5.7.

Other SVOCs detected in SWMU 22 soils included the common laboratory/field artifacts, bis(2-ethylhexyl) phthalate and dibenzofuran, a byproduct associated with the burning of PAHs. Dibenzofuran was only detected in one sampling interval. Naphthalene was also detected at low concentrations in SWMU 22 soils.

- **Bis(2-ethylhexyl)Phthalate (B2EHP),** was detected in 25 of 60 soil samples (41.6 percent) analyzed for SVOCs. Ten of the detections (16.6 percent) exceeded the RRS-1 of 0.33 mg/kg. Nine samples exceeded the RRS-2 concentration 0.6 mg/kg. The minimum and maximum detections above RRS-1 were 0.34 mg/kg and 58.0 mg/kg respectively, with an average concentration of 6.42 mg/kg and a standard deviation of 17.11 mg/kg. Note that four of the detections of B2EHP were from confirmation samples collected at B406. The large standard deviation is due to an outlier with an excessively high concentration of 58 mg/kg at the B406-5' confirmation sample. The second highest concentration of B2EHP was the original detection at the B406-5' (2.2 mg/kg).

  Note that most detections of B2EHP above RRS-1 did not coincide with detections of other SVOCs. B2EHP was detected at B406, B404 and T002; however, the detection of B2EHP at T002 was not confirmed at companion boring B404. Since the highest detections of

B2EHP occurred over multiple intervals at B406 (5-, 10-, 15-, and 20-foot intervals) confirmation sampling was performed. All intervals were confirmed for B2EHP, and with the exception of the 5-foot interval, the concentrations from the SPLP extracts were below the industrial groundwater MSC. The current site-specific MSC for B2EHP at SWMU 22 is 1.3 mg/kg (Table 5.8). B2EHP is delineated to the north by borings B407, B072, and B073; to the east by T007, T001, B402, and B408; to the south by B401, T003, T005, T010, B405, T009, and T006; and to the west by B096.

An IRA initially consisting of 13 cubic yards excavation centered on B406 was completed to remove the remaining Standard 3 B2EHP contaminated soil found in the B406-5' interval. A total of 82 cubic yards of soil were ultimately removed. Confirmation samples were collected on the north, south, east, and west walls at depth of 5 feet bgs. Confirmation floor samples were also collected at a depth of 13-feet bgs in the center of the excavation. The location of the excavation LF4-4A and excavation confirmation sample locations are presented in Figure 5.8. Validated confirmation sampling results demonstrating the removal of B2EHP contaminated soil to concentrations less than or equal to the site-specific MSC are presented in Appendix M. For a complete description of IRA activities, refer to IT Corporation's document entitled Final Completion Report–Remedial Actions at Landfills LF-04, LF-05, LF-08, and Waste Burial Area WP-07 (IT Corporation, 2001).

- **Dibenzofuran** was detected in 5 of 56 soil samples (8.93 percent) analyzed for SVOCs. Two of the detections (3.6 percent) exceeded the RRS-1 of 0.33 mg/kg. Both detections were below the MSC of 41 mg/kg. Each of the detections above RRS-1 occurred in the surface interval of B408 at concentrations of 0.92 mg/kg and 1.3 mg/kg in the duplicate sample. The actual percentages of detection when the duplicate is eliminated is 7.2 percent of total detections, and 1.8 percent of detections over RRS-1.

- **Naphthalene** was detected in 5 of 43 soil samples (11.6 percent) analyzed for SVOCs. All six of the detections exceeded the RRS-1 of 0.33 mg/kg; however, each detection was well below the MSC of 200 mg/kg. Specifically, naphthalene was detected at B406-10' (1.8 mg/kg), B406-15' (18 mg/kg), B406-20' (19 mg/kg), B406-25' (0.93 mg/kg), and T001-8' (1.3 mg/kg). Note that the detection of naphthalene at T008-8' was not confirmed in the split sample analyzed using the more sensitive SW8260 method, and is considered to be a false positive. It should be noted that most of the detections of naphthalene occurred with detections of B2EHP at boring B406 and may be associated with oil staining found in this boring. The detections of naphthalene at B406 are delineated to the north by B407, to the east by B404, to the south by B405, and to the west by the adjacent former fire training area, SWMU 19.

5.3 SWMU 23

SWMU 23 (Landfill 5) is approximately 3.5 acres in size and is located east of Taxiway 197, adjacent to and southeast of SWMU 17, west of the base perimeter road, and to the northwest of SWMU 24 (WP-07). Other significant nearby features include an intermittent tributary to Farmers

Branch Creek on the western border of the landfill, and remnants of the former White Settlement Road to the south of the landfill.

The period of official operation of SWMU 23 was from 1963 to 1975. The landfill was constructed by building a clay berm adjacent to the tributary and subsequently filling the area behind the berm to the present day level. Blocks of concrete observed on the ground surface in the northwest section the landfill served as rip rap to prevent erosion by the intermittent tributary of Farmers Branch Creek.

RFI activities were conducted at SWMU 23 by HydroGeoLogic between 1997 and 2000. These activities included the excavation of 10 exploratory test pits, the installation of 12 DPT soil borings, and the collection of several rounds of groundwater samples from existing monitoring wells. Thirteen monitoring wells were installed by Radian Corporation between 1985 and 1992 during the investigation of the basewide TCE plume.

As with SWMU 22, trenching activities at SWMU 23 uncovered commercial/industrial debris and medical waste throughout the landfill. The debris consisted primarily of concrete, rebar, asphalt, hoses, wood, computer punch cards, metal grates, wire, aluminum cans, diapers, empty oil cans, oil filters, soda cans, baby bottles, tires, battery cables, paint booth wastes, burned wood, plywood, license plates, plastic bags, industrial plastic, Styrofoam, glass, bottles, newspaper, cardboard, and trash. Medical waste consisted of needles, syringes, surgical gloves, surgical masks, rubber gloves, medical gauze, cotton balls, IV bottles, IV bags, medical tubing, bottles, test tubes, blue hospital gowns, blue tyvek material, urine sampling spin down tubes, and plastic bags containing medical refuse. Medical waste was found in each of the SWMU 23 test pits as well as borings B504 and B508 at depths ranging from 2 to 14 feet bgs.

5.3.1 Interpretation of Aerial Photographs

Aerial photographs of the SWMU 23 area covering 6 decades were reviewed to identify areas of activity. Prior to 1950, SWMU 23 did not exist and farm buildings and fields were observed in the area that later became SWMU 23. Activities at SWMU 23 were initially observed in a December 1958 aerial photograph as ground scarring possibly related to grading activities. No further activity was observed in the 1962 aerial; however, in 1964 two trenches with a southwest to northwest orientation were observed in the west-central portion of SWMU 23. No further activity was observed in 1966. A series of ponds are observed in 1967 along the intermittent tributary in the western portion of SWMU 23, presumably due to grading activities in the southern section of SWMU 17. Ground scarring in the southeast and grading activities in the northern portion of SWMU 23 are discernable in 1971. Full scale landfill activities appear to begin in 1975 as a series of three trenches oriented on a north-south axis with a clay berm running parallel to the intermittent tributary of Farmers Branch Creek separating the tributary from SWMU 23 landfill activities. Landfill activities at SWMU 23 appear to have significantly decreased by 1980 and had completely ceased by 1981. An aerial photograph of SWMU 23 taken in March 1975 is presented with soil boring and test pit locations in Figure 5.9.

5.3.2 Geophysical Results

Geophysical surveys at SWMU 23 were performed in 1985 as part of the *IRP Phase II-Confirmation/Quantification Stage I Final Report for Carswell AFB* (Radian, 1986). These surveys consisted of magnetometer, EM profiling, and earth resistivity methods for the purposes of profiling SWMU 23. The clay berm to the west of SWMU 23 is the dominant linear-shaped feature of SWMU 23. Other significant anomalies, which coincided with the elongated north-south burial pits observed in aerial photographs were located in several areas. A contour map depicting anomalies detected by the EM-31 profile instrument is presented in Figure 5.10.

5.3.3 Test Pit Locations

A total of 10 trenches T011 through T020 were installed to characterize the nature of buried materials at SWMU 23. Soil samples for chemical characterization were collected from the ground surface and the subsurface soil intervals exhibiting the highest PID reading at each test pit. Five test pits were excavated in the areas where burial pits were identified through aerial photograph interpretation. The remaining five test pits were excavated along a berm, which was constructed around the future SWMU (as of 1963) in order to redirect the unnamed tributary of Farmers Branch Creek. Surface soil samples were collected prior to drilling or excavation activities using a stainless steel hand auger with a stainless steel sleeve for VOC samples. Subsurface samples of native soil beneath the landfill debris were collected near the center of each 40-foot long excavation and sampled for VOCs, SVOCs, and RCRA metals.

Laboratory analysis was performed on surface soil samples and subsurface soil samples collected from each of the 10 test pits, with the exception of samples obtained from test pits T011 and T012. Subsurface samples from T011-02 and T012-02 were not collected due to waste materials exceeding 15 feet bgs, therefore, native soil was not observed. Subsurface soil samples were also not collected from test pits T014, T015, TA016, and T018 due to health and safety precautions related to buried medical wastes. Each test pit was backfilled immediately following the collection of the subsurface sample. Waste materials were replaced in the test pits in 2-foot lifts to within 2 feet of the ground surface. The remainder of the test pit was backfilled to the ground surface and a clay layer approximately 1 foot in thickness was then graded over the test pit area and re-seeded.

5.3.4 Soil Boring Locations

Six soil borings, B504 through B509, were installed in the areas where chemical analyses from the test pits indicated elevated concentrations of COPCs. Soil samples were collected in five foot intervals starting at the surface and terminating at the surface of the water table. Offsets of approximately one foot were made to obtain samples from intervals with poor recovery. All of these soil samples were analyzed for the full suite of Appendix IX constituents.

Six additional soil borings, B510 through B515 were installed to delineate COPCs to Standard 1 concentrations. Soil samples were collected for specific analyses and intervals associated with the original detections. Soil borings DP-59/WITCTA59 and DP-60/WITCTA60 were installed to ascertain the depth to bedrock and screen for DNAPLs at SWMU 23.

Confirmatory soil borings were placed directly adjacent to T011, T017, B506, and B509 to verify initial sampling results and to perform SPLP extractions if analytical totals exceeded RRS-2 values.

5.3.5 Lithologic Findings and Cross Sections

Lithology along a north-south transect (A-A') through borings WP07-10D, WP07-10A, B505, T017, T018, B508, T019, T020, B504, and W702 indicates that much of the near-surface soils are composed of a moderately sorted native silty clay at the north and south portions of the transect. The near-surface center and much of the north part of the transect are occupied by landfill material that extends from boring B505 northward to boring W702. The landfill reaches a maximum thickness of approximately 13 feet in the center of the transect, then gradually thins toward the north end of the section. Most of the landfill body is capped by a thin layer of artificial fill composed of clean sand and sandy clay; however, small surface exposures of landfill material appear to be present just north of boring B505 and at the northern tip of the transect. A gravelly clay lense is present beneath the native silty clay at the south end of the section, and a smaller lense of similar composition is located beneath the center of the landfill body. A layer of well sorted very fine sand and sandy silt lies below the lense at the south end. The above strata is underlain by a continuous thick layer of well-sorted medium grained yellow sand that extends throughout the length of the transect. The unit ranges in thickness from approximately 26 feet at the south end of the section to about 8 feet at the north end of the transect. The base of the sand unit forms a distinct contact between this unconsolidated layer and the Goodland/Walnut bedrock formation, a 30-foot thick limestone unit that overlies the Paluxy sandstone. The thickness of the Goodland/Walnut and the upper contact of the Paluxy unit are based on data acquired during the drilling of nearby Paluxy-depth wells. The highest surface elevation along the transect is at WP07-10A, approximately 621 feet above msl, and the lowest surface elevation is at W702, approximately 608 feet above msl.

The southwest-northeast transect (B-B') passes through borings LF05-A, B505, B509, and WP07-10C and contains a predominate surface lithology consisting of moderately sorted native silty clay (Figure 5.11). This unit is underlain by a thin sand and silty sand along the southwest portion of the transect, and by a gravelly clay along the northeast portion. One landfill unit is found along this horizon: a V-shaped body that extends from B505 to WP07-10C. The thickness of the landfill at boring B509 is approximately 16 feet thick and is underlain by a thin layer of clayey silt interbedded with sands and silty sands. The landfill is capped by an artificial fill composed of clean sand and sandy clay. All of the above strata is underlain by the prominent layer of well-sorted medium grained yellow sand that ranges in thickness from 13 to 20 feet along the transect and the Goodland/Walnut bedrock formation.

Lithology observed on an northwest-southeast transect (C-C') through borings W701, B701, LF05-5D, T019, T015, T011, B506, and WP07-10C of SWMW 23 indicates native clay soils at W701, LF05-5D, B506, and WP07-10C approximately 10 to 12 feet thick at B506, but averaging 4 to 5 feet thick at the other 3 locations. The clay unit overlies a gravelly clay approximately 7 to 10 feet thick at W701 and WP07-10C, but which thins toward the center of the transect and is absent below the landfill areas. The two clay units overlie a well sorted sand approximately 15 to 20 feet thick which is continuous throughout the transect. Landfill areas across the transect

appear in two distinct units. The northwest body of landfill material, associated with SWMU 17 (Landfill 7), extends from W701 to LF05-5D, reaching a maximum thickness of 17 feet at B701 and tapering to thin wedge-like fringes at the man-made clay berm defining the boundary between SWMU 17 and SWMU 23. The southeast landfill body associated with SWMU 23 extends from LF05-5D to B506, reaching a maximum thickness of 14 feet at T015 and tapering more sharply to a wedged boundary near the base perimeter road.

As seen in cross section B-B' and C-C', the direction of groundwater flow is in generally eastward with a southerly component evident in cross section A-A'. Overall groundwater flow as depicted in Figure 5.6, is to the east southeast with a northeasterly component following the bedrock low along the intermittent stream in the northern section of SWMU 23.

5.3.6 Soil Analytical Results

Initial surface and subsurface analytical samples were collected from six soil borings and ten test pits at SWMU 23. The Appendix IX borings are identified as B504 through B509 and the test pits are identified as T011 through T020 (Figure 5.12). Soil borings used for delineation sampling included B510 through B515 and B704. Analytical results of surface and subsurface soil samples initially indicated the presence of metals and SVOCs at Standard 2 and 3 concentrations. As with SWMU 22, all VOCs detected were at, or below Standard 2 concentrations.

The discussion of analytical results in soil has been separated into two subsections (inorganic and organic results). Note that the inorganic subsection has differing RRS-1 values for surface and subsurface soil for inorganics, while the organic subsection combines surface and subsurface soil because the RRS-1 value is the same. A discussion of each analyte detected over RRS-1 is presented in a separate subsection below. This discussion includes general statistics, interpretation, delineation, and confirmation/SPLP results. Several tables and figures have been prepared to facilitate the reader's review of each section. Analytical results in soil are presented in Figure 5.12; analytical results in surface soil are presented in Table 5.10; analytical results in subsurface soil are presented in Table 5.11; confirmation/SPLP results are presented in Table 5.12; and site-specific MSCs are presented in Table 5.13.

5.3.6.1 Inorganic Analytical Results

Appendix IX metals were detected above RRS-1 in surface and subsurface soil samples collected at SWMU 23. In surface soils, detected elements above RRS-1 include arsenic, cadmium, chromium, copper, iron, lead, mercury, molybdenum, nickel, selenium, silver, thallium, and zinc (Table 5.10). Detected elements above RRS-1 in subsurface soils include arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, selenium, thallium, vanadium, and zinc (Table 5.11). Although, iron, and molybdenum are not included in the Appendix IX sampling list, these metals were detected in SWMU 23 soils collected in 1997. These metals are not included in the discussion and figures because they are not Appendix IX compounds. Figure 5.12 displays the locations and inorganic chemical data that exceeded background concentrations in SWMU 23 soils.

Most metals observed in surface soils were detected at concentrations just below or above background concentrations. These detections are considered natural variations of basewide

background levels, and are not considered to be indicative of a site related spill or release. Many of these detections were not subsequently confirmed above RRS-1 at borings placed next to test pits or confirmation borings. In surface soil, these inorganics include copper, lead, mercury, nickel, silver, and zinc. In subsurface soil, these inorganics include barium, beryllium, chromium, cobalt, vanadium, and zinc.

The percentage of detection for the compounds was calculated only for detections above base background values since this concentration represents RRS-1. In addition, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for each of the above compounds was less than five percent of total analyses. It is unlikely that these compounds are related to a site release, and the frequency of detection for these compounds is below the five percent threshold described in Section III of the TNRCC Consistency Memorandum (TNRCC, 1998a), and/or detections of these compounds were not confirmed during follow-on sampling. Based on these observations, further delineation of barium, beryllium, cobalt, copper, mercury, nickel, silver, vanadium and zinc in SWMU 23 soils is not warranted.

A closer examination of each of these compounds is presented below:

- **Barium** was detected in 18 of 18 surface soil samples; however, no detections were above the RRS-1 concentration of 233 mg/kg. Barium was also detected in 20 of 20 subsurface soil samples analyzed for metals. Only two (5.26 percent) of 38 analyses exceeded the RRS-1 concentration of 128.1 mg/kg. The detection of barium at B505-5' (155 mg/kg) exceeded RRS-1. The detection at B506 -5' (220 J mg/kg) exceeded the RRS-2 concentration of 200 mg/kg; however, this detection was not confirmed above RRS-1 in the B506-5' duplicate (65.3 J mg/kg), nor the B506-5' (43 mg/kg) confirmation sample. Therefore, the original detection at B506-5' is regarded as background, and the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for barium is 2.63 percent (1 of 38 analyses).

- **Beryllium** was detected in 17 of 18 surface soil samples; however, no detections were above the RRS-1 concentration of 1.02 mg/kg. Beryllium was detected in 13 of 20 subsurface soil samples analyzed for metals. Only one (2.63 percent) of the 38 total analyses exceeded the RRS-1 concentration of 1.13 mg/kg. This detection of beryllium at B506 -5' (1.2 J mg/kg) exceeded the RRS-2 concentration of 1.13 mg/kg; however, this detection was not confirmed above RRS-1 in the B506-5' duplicate (0.73 J mg/kg) nor the B506-5' (0.53 mg/kg) confirmation sample. Therefore, the original detection at B506-5' is regarded as background and the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for beryllium is 0.0 percent (0 of 38 analyses).

- **Cobalt** was detected in 18 of 18 surface soil samples. None of the surface detections were above the RRS-1 concentration of 11.05 mg/kg. Cobalt was also detected in 18 of 20 subsurface soil samples. Only two of the detections exceeded the subsurface RRS-1 concentration of 6.19 mg/kg. Each detection was well below the RRS-2 concentration of 610 mg/kg. Specifically, cobalt was detected at B505-5' (9.7 F mg/kg) and B507-5' (7.7

F mg/kg). The percentage of cobalt detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 5.41 percent (2 of 38 analyses).

- **Copper** was detected in 1 of 18 surface soil samples analyzed for metals. Of the 18 samples analyzed, only one detection exceeded the RRS-1 concentration of 17.37 mg/kg. This isolated detection of copper, a concentration of 83.9 mg/kg at T015, is well below the RRS-2 concentration 130 mg/kg. Copper was detected in 19 of 19 subsurface samples; however, none of the detections exceeded the RRS-1 concentration of 13.72 mg/kg. The percentage of copper detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 2.7 percent (1 of 37 analyses).

- **Mercury** was detected in 12 of 18 surface soil samples. Two detections within the same sample interval exceeded the RRS-1 concentration of 0.14 mg/kg; however, only one of the detections exceeded the RRS-2 concentration of 0.2 mg/kg. Specifically, mercury was detected at T020-surface (1.5 J mg/kg) and T020-surface duplicate (0.2 J mg/kg). As both of these detections were not confirmed by companion boring B504, mercury is considered to be below background in SWMU 23 surface soil. Mercury was also detected in 6 of 19 subsurface soil samples at SWMU 23; however, none of the detections was above the RRS-1 concentration of 0.035 mg/kg. As the original detection at T020-surface was a duplicate, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for mercury is 2.5 percent (1 of 39 analyses).

- **Nickel** was detected in 18 of 18 surface soil samples analyzed for metals. Of the 18 samples analyzed, only one detection exceeded the RRS-1 concentration of 14.6 mg/kg. This isolated detection of nickel above RRS-1, a concentration of 44.2 F mg/kg at T015-surface, is well below the RRS-2 concentration 200 mg/kg. Nickel was also detected in 19 of 19 subsurface samples; however, none of the detections exceeded the RRS-1 concentration of 19.76 mg/kg. The percentage of nickel detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 2.7 percent (1 of 37 analyses).

- **Silver** was detected in 1 of 18 surface soil samples. This isolated detection of silver was above the RRS-1 concentration of 0.213 mg/kg. This detection, a concentration of 0.5 F mg/kg at T015-surface, is well below the RRS-2 concentration 51 mg/kg. Silver was not detected in 19 of 19 subsurface samples. The detection of silver in surface soil is considered to be natural variation of background and not the result of a release. In addition, the percentage of silver detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 2.7 percent (1 of 37 analyses).

- **Vanadium** was detected in all 18 surface soil samples analyzed for this constituent; however, none of the detections exceeded the RRS-1 concentration of 46.3 mg/kg. Vanadium was also detected in all 19 subsurface soil samples analyzed for this constituent. Only two of the 19 detections exceeded the RRS-1 concentration of 37.4 mg/kg. Neither detection exceeded the RRS-2 concentration of 72.0 mg/kg. Detections above RRS-1 included a concentration of 57.4 mg/kg in the 5-foot interval of B505, and 38.7 J mg/kg in the 5-foot interval of B506. Note that the detection above RRS-1 at B506-5' was not

confirmed above RRS-1 in the B506-5' duplicate. Consequently, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for vanadium is 2.7 percent (1 of 37 analyses).

- **Zinc** was detected in 18 of 18 surface soil samples analyzed for metals. Three of the detections exceeded the RRS-1 concentration of 38.8 mg/kg. Specifically, the zinc detections were located at B505 (40 mg/kg), B506 (39.1 mg/kg), and T015 (59.4 J mg/kg). Zinc was also detected in 19 of 19 subsurface samples analyzed for metals. Five of the 19 subsurface detections exceeded the RRS-1 concentration of 31.3 mg/kg. Specifically, zinc was detected in subsurface soil at B504-5' (32.5 mg/kg), B505-5' (39.9 mg/kg), B506-5' (38.7 J mg/kg), B508-10' (38 mg/kg), and B509-5' (55.4 mg/kg). All of these detections are not significantly over background, and are regarded as natural variations of the base background values of 38.8 (surface) and 31.3 mg/kg (subsurface). These detections are also well below the RRS-2 concentration of 3100 mg/kg for zinc.

As previously noted in Section 5.1.2, statistical analysis of analytical results for arsenic indicate that detected concentrations of arsenic are statistically the same as developed background concentrations. Similarly, statistical analysis indicated that detected thallium concentrations are actually lower than developed background concentrations. Specific detections and concentration ranges are presented below:

- **Arsenic** was detected in 17 of 18 surface soil samples analyzed for metals. Five of the 18 detections exceeded the surface RRS-1/RRS-2 concentration of 5.85 mg/kg. Specifically, arsenic was detected in surface soil at B505 (12.4 F mg/kg), B506 (7.1 F mg/kg), B507 (6.9 F mg/kg), B508 (6.2 F mg/kg), and T015 (8 F mg/kg). Arsenic was also detected in 13 of 19 subsurface soil samples analyzed for metals. Six of the 34 detections exceeded the subsurface RRS-1/RRS-2 concentration of 6.58 mg/kg. Subsurface detections above RRS-1 ranged from 9.1 mg/kg to 25.5 mg/kg, with an average concentration of 13.55 mg/kg.

- **Thallium** was detected in 4 of 18 surface soil samples analyzed for metals. Each of the four detections exceeded the RRS-1/RRS-2 concentration of 2.43 mg/kg. Specifically, thallium was detected in surface soil at B505 (16.9 F mg/kg), B506 (9.9 F mg/kg), B507 (11.1 F mg/kg), and B508 (11.7 F mg/kg). Thallium was also detected in 7 of 19 subsurface soil samples analyzed for metals. All seven of the detections exceeded the RRS-1/RRS-2 concentration of 1.5 mg/kg. Detections above RRS-1 ranged from 8.1 mg/kg to 23.2 mg/kg, with an average concentration of 15.24 mg/kg.

Another grouping of metals were inaccurately detected above background due to matrix interference. As noted in Section 5.1.3, detections of selenium and chromium above background resulted from matrix interference inherent with the SW6010 ICP-standard analytical method for metals. The matrix interference induces false positive detections of selenium, and artificially elevates concentrations of chromium above background. Detections of chromium below 40 mg/kg using SW6010-standard are interpreted as detections at or below background. Specific detections and concentration ranges are presented below:

- **Selenium** was detected in 2 of 18 surface soil samples analyzed for metals. Each of the two detections exceeded the RRS-1 concentration of 0.907 mg/kg and the RRS-2 concentration of 5.0 mg/kg. Specifically, selenium was detected in surface soil at B505 (5.5 F mg/kg) and T015 (6.1 F mg/kg). Selenium was also detected in 3 of 19 subsurface soil samples analyzed for metals. Each of the three detections exceeded the RRS-1 concentration of 0.313 mg/kg, with one detection exceeding the RRS-2 concentration of 5.0 mg/kg. Specifically the subsurface selenium detections were located at B504-5' (3.8 F mg/kg), B509-5' (6.3 F mg/kg), and B509-10' (3.5 F mg/kg). Selenium detections within this range of concentrations analyzed using SW6010 ICP-standard are believed to be false positives, and therefore do not warrant further investigation.

- **Chromium** was detected in all 18 surface soil samples. Only one of the detections, a concentration of 37.5 mg/kg at T015, exceeded the RRS-1/RRS-2 concentration of 25.86 mg/kg. Chromium was also detected in 20 of 22 subsurface soil samples analyzed for metals. Three of the 34 or 22 samples exceeded the RRS-1/RRS-2 concentration of 16.31 mg/kg. Specifically, chromium was detected in subsurface soil at B505-5' (25 mg/kg), B506-5' (25 J mg/kg), and B509-5' (35.6 mg/kg). The detection of chromium at B506-5' was not confirmed above RRS-1 at B506-5' duplicate (15.3 J mg/kg) and the detection at B509-5' was subsequently not confirmed above RRS-1 in the sample collected at B509-5' (12.4 mg/kg) in January 2000. As the remaining two detections of chromium at SWMU 23 are well below the 40 mg/kg matrix interference threshold for SW6010-standard discussed in Section 5.1.3, they are considered to be below background, and therefore do not warrant further investigation.

Other inorganic detections observed in SWMU 23 soil were detected at Standard 2 and 3 concentrations. These inorganics, discussed below, include cadmium and lead.

- **Cadmium** was detected in 6 of 18 surface soil samples analyzed for metals. Only one of the 18 surface samples, a concentration of 3.4 F at T017, exceeded the RRS-1/RRS-2 concentration of 0.556 mg/kg. Cadmium was also detected in 3 of 19 subsurface soil samples analyzed for metals. Only one of the 19 subsurface samples, a concentration of 2.5 F at B509-5' exceeded the RRS-1/RRS-2 concentration of 0.589 mg/kg. The percentage of detections greater than RRS-1/RRS-2 compared to total analyses in combined surface and subsurface soil for cadmium was 5.4 percent (2 of 37 analyses). Cadmium detections at T017 and B509-5' are delineated to the north by B506 and B508; to the east by B509-surface and SWMU 24 boring B085-5'; to the south by B505 SWMU 24 boring B071; and to the west by B505-5' and SWMU 17 boring B704.

  An IRA consisting of a 5-foot square by 2-foot deep excavation centered on T017 was completed to remove the remaining Standard 3 cadmium contaminated soil found in the surface. A total of two cubic yards of soil were removed. Confirmation samples were collected at a distance of 5 feet from the center of the excavation to the north, south, east, and west. A confirmation floor sample was also collected at a depth of 2 feet bgs in the center of the excavation. Note that an isolated Standard 3 detection of B2EHP was also removed with cadmium contaminated soil.

A second IRA consisting of 5-foot square by 7-foot deep excavation centered on B509 was completed to remove remaining Standard 3 cadmium contaminated soil found in the 5-foot interval. A total of 5 cubic yards of soil were removed. Confirmation samples for cadmium were collected on the north, south, east, and west walls at depth of 5 feet bgs. A cadmium confirmation floor sample was also collected at a depth of 7 feet bgs in the center of the excavation. Note that an isolated Standard 3 detection of lead (discussed below), as well as Standard 2 detections of other metals, VOCs, and SVOCs, were also removed with cadmium contaminated soil.

The location of the excavations are presented in Figure 5.13. The validated confirmation sampling results are presented in Appendix M.

- **Lead** was detected in 18 of 19 surface soil samples analyzed for metals. Only one of the detections, an extreme concentration of 20,000 J mg/kg at T015, exceeded the RRS-1/ RRS-2 concentration of 30.97 mg/kg. This detection was subsequently not confirmed above RRS-1 at companion boring B510 (10.5 mg/kg). Lead was also detected in 17 of 20 subsurface soil samples analyzed for metals. Only one of the detections, a concentration of 57.5 mg/kg at B509-5', exceeded the RRS-1/RRS-2 concentration of 12.66 mg/kg. The detection of lead in the 5-foot interval of B509 is delineated to the north by B506; to the east by SWMU 24 borings B085 and B091; to the south by B511; and to the west by B505.

  As noted above in the discussion of cadmium, an IRA consisting of five foot square by seven foot deep excavation centered on B509 was completed to remove the remaining Standard 3 lead contaminated soil found in the 5-foot interval. Confirmation samples for lead were collected on the north, south, east, and west walls at a depth of 5 feet bgs. A lead confirmation floor sample was also collected at a depth of 7-feet bgs in the center of the excavation. New site-specific MSCs for cadmium (1.52 mg/kg) and lead (24.6 mg/kg) were obtained when excavation confirmation detections were extracted for SPLP and the extraction concentrations were below the corresponding MSC. The validated data from excavation confirmation sampling is provided in Appendix M. For a complete description of IRA activities, refer to IT Corporation's Final Completion Report (IT Corporation, 2001).

5.3.6.1.1 Sulfides

The analytical method used to determine sulfide concentrations, Method SW9030, is a titration screening method. This method is not considered to be definitive, rather it is designated by the EPA as producing Level 2 data quality. Sulfides were detected in subsurface soils at one SWMU 23 soil sample interval.

- **Sulfide** was detected in 1 of 21 soil samples analyzed for this suite of compounds. The detection of sulfide, a concentration of 38.9 S mg/kg at B509-5', exceeded the RRS-1 concentration of 25 mg/kg. Although the percentage of total confirmed detections of sulfide at SWMU 23 was 4.76 percent (1 of 21 analyses), sulfide was removed from the 5-foot interval of B509 along with cadmium and lead contaminated soil.

As discussed in Section 5.1.7, sulfide was eliminated from consideration in delineation sampling because it was detected sporadically at low concentrations, and because a specific MSC could not be calculated or otherwise obtained.

5.3.6.2 Organic Analytical Results

Initial analytical results at SWMU 23 indicated the presence of Standard 2 concentrations of VOCs. Additionally, a mixture of Standard 2 and 3 concentrations of a subset of SVOCs commonly associated with asphalt were sporadically detected in SWMU 23 soils. Three VOCs, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and n-propylbenzene were also detected in SWMU 23 soils; however, as these compounds are not Appendix IX compounds, and were detected with low concentrations and frequency, they are not discussed in the following text. Note that 1,4-dichlorbenzene and naphthalene are analytes that are present on both the SW8260 VOC and the SW8270 list of analytes. These compounds, which were collected from the same sample intervals, were often inconstantly analyzed by the laboratories using either or both SW8260 for VOCs and SW8270 for SVOCs. As the MQL for these compounds is much lower with SW8260, these compounds are discussed only in the VOC section. It should also be noted that soil samples collected form the 13-foot intervals of T013 and T020 were collected below the surface of the groundwater table. Results from these samples do not reflect actual concentrations in soil.

A discussion of general statistics and interpreted results is presented for each Appendix IX analyte detected above RRS-1. Where analytes fall into specific categories or associated suites, an interpretive discussion is presented above that group of analytes.

5.3.6.2.1 Volatile Organic Compounds

Several VOCs, which were detected over RRS-1, exhibited a combination of low concentrations and low frequency of occurrence. These compounds included 1,2-dichlorobenzene and *cis*-1,2-dichloroethene. Since 1,2-dichlorobenzene was not detected in groundwater, and it is unlikely that detected concentrations of these compounds are related to a significant site release; and the frequency of detection for these compounds is below the five percent threshold described in Section III of the TNRCC Consistency Memorandum (TNRCC, 1998a), further delineation of this compound is not warranted. Although *cis*-1-2-dichloroethene detections in groundwater are related to the basewide TCE plume, it is included in this category because the detection was from a soil sample collected below the water table. A brief set of general statistics is presented below for each of these compounds:

- **1,2-Dichlorobenzene** was detected in only 1 of 46 soil samples (2.17 percent) analyzed for this compound. This detection in the 13-foot interval of T020 at a concentration of 0.0078 mg/kg exceeded the RRS-1 concentration of 0.002 mg/kg; however, the detection is well below the RRS-2 concentration of 60 mg/kg.

- ***cis*-1,2-Dichloroethene** was detected in only 3 of 46 soil samples (6.52 percent) analyzed for this compound. Only one detection, a concentration of 0.018 mg/kg in the 15-foot interval of T013, exceeded the RRS-1 concentration 0.005 mg/kg; however, the detection is well below the RRS-2 concentration of 7 mg/kg. One of the detections below RRS-1

(0.001 F mg/kg in the 20-foot interval of LF05-DP60/WITCTA60) was collected below the water table and does not represent concentrations in soil. Consequently, the actual percentage of detection for cis-1,2-dichloroethene is 4.34 percent (2 of 46 samples).

A subset of four VOCs were detected at low concentrations with a frequency of detection ranging from 4 percent to 18 percent of samples analyzed (> 20 total samples). However, these compounds were not detected above RRS-1 in all groundwater samples collected upgradient, downgradient, or within SWMU 23. These VOCs included 2-hexanone, methyl isobutyl ketone, naphthalene, and o-xylene. Although these compounds were detected in between 5 and 13 percent of samples, they were detected just above the MQL and well below the MSC. Therefore, it is presumed that these compounds are not related to a significant release from the unit. Nonetheless, these compounds were delineated to Standard 1.

- **2-Hexanone** was detected in 4 of 18 soil samples (18.18 percent) analyzed for this compound. All four of the detections exceeded the RRS-1 concentration of 0.005 mg/kg. Specifically, 2-hexanone was detected above RRS-1 at B504-surface (0.007 mg/kg), B505-surface (0.007 mg/kg), B506-surface (0.008 mg/kg), and B508-5' (0.04 F mg/kg). An RRS-2 concentration for 2-hexanone is not provided by the TNRCC, and one was not calculated. Detections of 2-hexanene at the above sample locations are delineated to the north by SWMU 17 boring B702; to the east by B507 and B509; to the south by SWMU 24 boring B072; and to the west by SWMU 17 borings B701 and B704.

- **Methyl isobutyl ketone** was detected in 2 of 22 soil samples (9.09 percent) analyzed for this constituent. Only one of the detections, a concentration of 0.014 mg/kg in the 10-foot interval of B508, exceeded the RRS-1 concentration of 0.005 mg/kg. This detection is well below the RRS-2 concentration of 820 mg/kg. The detection of methyl isobutyl ketone is delineated to the north by B504, to the east by B506, to the south by B505, and to the west by B515.

- **Naphthalene** was detected in 6 of 60 soil samples (10 percent) analyzed for VOCs and SVOCs. Five of the detections exceeded the RRS-1 concentration of 0.002 mg/kg. However, each detection was well below the RRS-2 concentration of 200 mg/kg. Specifically, naphthalene was detected above RRS-1 at B509-5' (0.46 F mg/kg), T019-10'(0.0038 mg/kg), T020-13' (0.0029 mg/kg), LF05-DP60/WITCTA60-5' (0.01 mg/kg), and LF05-DP60/WITCTA60-10' (0.014 mg/kg). Detections of naphthalene are delineated to the north by B504; to the east by B506, B507, and B509; to the south by B505; and to the west by B515 and SWMU 17 borings B701 and B704.

- ***O*-Xylene** was detected in 3 of 46 (6.52 percent) soil samples analyzed for this constituent. Only two of the detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, both detections were well below the RRS-2 concentration of 1000 mg/kg. Specifically, *o*-xylene was detected at B508-10' (0.013 mg/kg) and LF05-DP60/WITCTA60-10' (0.013 mg/kg). Detections of *o*-xylene are delineated to the north by B504 and B507; to the east by B506 and B509; to the south by B505; and to the west by B515 and SWMU 17 borings B701 and B704.

Another subset of VOCs were detected at low concentrations and frequency of detection ranging from 2 percent to 13 percent of samples analyzed (> 20 total samples). These VOCs included 1,4-dichlorobenzene, ethylbenzene, m-&p- xylenes, methylene chloride, and toluene. Although these compounds were detected at concentrations well below the MSC, they were detected in groundwater collected from WITCTA60, which was located in the center of the landfill. Note that these compounds were not detected downgradient of SWMU 23. Therefore, it is presumed that these compounds are not related to a significant release from the unit, rather these compounds are related to the well location within the unit and screening interval of the temporary monitoring well. It should also be noted that many of the detections in this group of VOCs were collected from the 13-foot intervals of T013 and T020, below the surface of the groundwater table. Results from these saturated soil samples do not likely reflect actual concentrations in soil.

- **1,4-Dichlorobenzene** was detected in 7 of 60 soil samples (11.67 percent) analyzed for VOCs and SVOCs. Five of the detections exceeded the RRS-1 concentration of 0.002 mg/kg; however, all of the detections were well below the RRS-2 concentration of 7.5 mg/kg. Specifically, 1,4-dichlorobenzene was detected above RRS-1 at B509-5' (0.63 F mg/kg), T019-10' (0.0073 mg/kg), LF05-DP59/WITCTA59-5' (0.055 mg/kg), LF05-DP60/WITCTA60-5' (0.013 mg/kg), and LF05-DP60/WITCTA60-10' (0.12 mg/kg). Detections of 1,4-dichlorobenzene are delineated to the north by B504; to the east by B506 and B507; to the south by B511 and B505; and to the west by B515 and SWMU 17 borings B701 and B704. The detection of 1,4-dichlorobenzene in the 5-foot interval of B509 was removed along with cadmium and lead contaminated soil as part of the SWMU 23 IRA.

- **Ethylbenzene** was detected in 6 of 46 soil samples (13 percent) analyzed for this constituent. Five of the detections exceeded the RRS-1 concentration of 0.003 mg/kg; however, the detections were well below the RRS-2 concentration of 70 mg/kg. Specifically, ethylbenzene was detected above RRS-1 at B508-10' (0.018 mg/kg), B509-5' (0.017 mg/kg), T0020-13' (0.0033 F mg/kg), LF05-DP60/WITCTA60-5' (0.025 mg/kg), and LF05-DP60/ WITCTA60-10' (0.02 mg/kg).

- ***M,P*-Xylene (Sum of Isomers)** was detected in 6 of 46 soil samples (13 percent) analyzed for this constituent. Five of the detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, all of the detections were well below the RRS-2 concentration of 1000 mg/kg. Specifically, *m,p*-xylene was detected above RRS-1 at B508-10' (0.057 mg/kg), B509-5' (0.024 mg/kg), T0020-13' (0.021 mg/kg), LF05-DP60/WITCTA60-5' (0.045 mg/kg), and LF05-DP60/WITCTA60-10' (0.039 mg/kg).

- **Toluene** was detected in 5 of 46 soil samples (10.87 percent) analyzed for this constituent. Three of the detections (6.52 percent) exceeded the RRS-1 concentration of 0.005 mg/kg; however, each of the detections were well below the RRS-2 concentration of 100 mg/kg. Specifically, toluene was detected at B508-10' (0.021 mg/kg), B509-5' (0.008 mg/kg), and LF05-DP60/WITCTA60-10' (0.017 mg/kg).

The detections of ethylbenzene, m,p-xylene, and toluene were co-located at B508-10', B509-5', T0020-13', LF05-DP60/WITCTA60-5', and LF05-DP60/WITCTA60-10'. These detections are

delineated to the north by T013, B504, and B507; to the east by B506 and SWMU 23 boring B071; to the south by B511, B505 and LF05-DP59/WITCTA59; and to the west by B505, LF05-DP59/WITCTA59, B515, and SWMU 17 borings B701 and B704.

Only one VOC, chlorobenzene was detected in both SWMU 23 soil and groundwater downgradient of SWMU 23. However, chlorobenzene was also detected at similar concentrations upgradient of SWMU 23.

- **Chlorobenzene** was detected in only 2 of 46 soil samples (4.35 percent) analyzed for this constituent. Both detections exceeded the RRS-1 concentration of 0.002 mg/kg; however each detection was well below the RRS-2 concentration of 10 mg/kg. Specifically, the detections of chlorobenzene above RRS-1 were located at B505-10' (0.004 mg/kg) and T020-13' (0.013 mg/kg).

As discussed in Section 5.1.6, the remaining group of VOCs are considered to be laboratory/field artifacts. This group exhibited sporadic detections at low concentrations with low standard deviations. The low concentrations and standard deviations are indicators that the detections are not related to a release. In contrast, a high standard deviation would indicate potential source areas. As noted in Section 5.1.6, these compounds exhibit high solubility and volatility. Therefore, they would be expected to either rapidly volatilize under local climate conditions, or move into groundwater with precipitation. These compounds were not consistently detected in groundwater and are not believed to be real investigative detections.

- **Acetone**, a common laboratory/field contaminant, was detected in 11 of 22 (50 percent) soil samples analyzed for this constituent. All eleven of the detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, each of the detections was well below the RRS-2 concentration of 1000 mg/kg. The minimum and maximum detections above RRS-1 were 0.007 mg/kg and 0.5 mg/kg respectively, with an average concentration of 0.12 mg/kg and a standard deviation of 0.18 mg/kg.

- **Methyl Ethyl Ketone (MEK)**, a common laboratory/field contaminant, was detected in 7 of 22 soil samples (9.09 percent) analyzed for this constituent. Six of the seven detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, all of the detections were well below the RRS-2 concentration of 6100 mg/kg. The minimum and maximum detections above RRS-1 were 0.008 mg/kg and 0.14 mg/kg respectively, with an average concentration of 0.04 mg/kg and a standard deviation of 0.0518 mg/kg.

- **Methylene chloride**, a common laboratory/field contaminant, was detected in 1 of 46 soil samples (1.67 percent) analyzed for VOCs. This detection in the 5-foot interval of B515 at a concentration of 0.005 J mg/kg exceeded the RRS-1 concentration of 0.002 mg/kg; however, the detection is well below the RRS-2 concentration of 0.5 mg/kg.

5.3.6.2.2 Semivolatile Organic Compounds

SVOCs were detected in surface and subsurface soil samples collected within SWMU 23. Variances in the total number of analyses for individual compounds is due to the use of both

SW8270 and SW8310, as well as reduced analyte lists for confirmation/delineation samples. The analyte list for EPA Method SW8310 (PAHs), which was used for delineation sampling because of lower detection limits, is a subset of the analyte list for SW8270.

Results of initial analyses for SVOCs reveal Standard 2 and Standard 3 concentrations of a suite of SVOCs associated with asphalt. These SVOCs, composed primarily of PAHs, were more common in the eastern portion of SWMU 23. The PAHs included acenaphthene, anthracene, benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*g,h,i*]perylene, benzo[*k*]fluoranthene, chrysene, dibenzo[*a,h*]anthracene, fluoranthene, indeno[1,2,3-*c,d*]pyrene, naphthalene, phenanthrene, and pyrene. A brief description of general statistics for each of these compounds is discussed below. This description is followed by a discussion of delineation and confirmation/SPLP results for the whole suite of PAHs.

As presented in Figure 5.12 and Tables 5.10 and 5.11. SVOCs detected above background concentrations include a suite of PAHs commonly associated with asphalt:

- **Acenaphthene** was detected in 2 of 38 soil samples (5.26 percent) analyzed for SVOCs and PAHs. Only one of the detections (2.63 percent) exceeded the RRS-1 concentration of 0.33 mg/kg; however, the detection is well below the RRS-2 concentration of 610 mg/kg. Acenaphthene, was detected in the 5-foot interval of B509 with a concentration of 4.2 mg/kg. This interval was removed at excavation LF05-B along with cadmium and lead contaminated soil as part of the IRA at SWMU 23.

- **Anthracene** was detected in 6 of 38 soil samples (15.79 percent) analyzed for SVOCs and PAHs. Two of the detections (5.26 percent) exceeded the RRS-1 concentration of 0.33 mg/kg; however, all of the detections were well below the RRS-2 concentration of 3100 mg/kg. Specifically, anthracene was detected in the 5-foot interval of B509 (9.5 mg/kg) and the surface interval of T017 (0.61 F mg/kg). Both of these intervals were removed at excavations LF05-A amd LF05-B along with cadmium and lead contaminated soil as part of the IRA at SWMU 23.

- **Benzo[*a*]anthracene** was detected in 18 of 44 soil samples (40.91 percent) analyzed for SVOCs and PAHs. Only six detections (13.64 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.009 mg/kg. All six of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.39 mg/kg and 31.0 mg/kg respectively, with an average concentration of 12.33 mg/kg.

- **Benzo[*a*]pyrene** was detected in 21 of 44 soil samples (47.73 percent) analyzed for SVOCs and PAHs. Seven of the 21 detections (15.91 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.015 mg/kg. All seven of the detections exceeded the MSC of 0.02 mg/kg. The minimum and maximum detections above RRS-1 were 0.36 mg/kg and 33.0 mg/kg respectively, with an average concentration of 5.39 mg/kg. Note that the highest detection of benzo[*a*]pyrene at B509-5' was an outlier and was removed along with cadmium and lead at excavation LF05-5B as part of the IRA.

- **Benzo[*b*]fluoranthene** was detected in 22 of 44 soil samples (50 percent) analyzed for SVOCs and PAHs. Eight of the 22 detections (18.18 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.012 mg/kg. All eight detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.35 mg/kg and 50.0 mg/kg respectively, with an average concentration of 7.07 mg/kg. The highest detection of benzo[*b*]fluoranthene at B509-5' was removed along with cadmium and lead at excavation LF05-5B as part of the IRA.

- **Benzo[*g,h,i*]perylene** was detected in 18 of 38 soil samples (47.37 percent) analyzed for SVOCs. Five of the detections (13.16 percent) exceeded the RRS-1 concentration of 0.33 mg/kg. However, each of these detections was well below the RRS-2 concentration of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.36 mg/kg and 24.0 mg/kg respectively, with an average concentration of 5.3 mg/kg.

- **Benzo[*k*]fluoranthene** was detected in 11 of 26 soil samples (42.31 percent) analyzed for SVOCs and PAHs. Three of the detections (11.54 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.011 mg/kg. Two of the detections exceeded the MSC of 0.39 mg/kg. Specifically, benzo[*k*]fluoranthene was detected above RRS-1 at B509-5' (16 mg/kg), T017-surface (0.36 F mg/kg), and T017-13' (0.8 mg/kg).

- **Chrysene** was detected in 22 of 42 soil samples (52.38 percent) analyzed for SVOCs and PAHs. Nine of the detections (21.43 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.1 mg/kg. Only one of the detections exceeded the MSC of 3.9 mg/kg. The minimum and maximum detections above RRS-1 were 0.34 mg/kg and 37.0 mg/kg respectively, with an average concentration of 4.81 mg/kg. The Standard 3 detection of chrysene located at B509-5' (37 J mg/kg) was also removed at excavation LF05-B as part of the IRA at SWMU 23.

- **Dibenzo[*a,h*]anthracene** was detected in 5 of 42 soil samples (11.9 percent) analyzed for SVOCs and PAHs. Two of the detections (4.76 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and/or the SW8310 RRS-1 concentration of 0.2 mg/kg. Both of the detections exceeding RRS-1 also exceeded the MSC of 0.02 mg/kg. Specifically, dibenzo[*a,h*]anthracene was detected at B509-5' (5.1 mg/kg) and T017-surface (0.34 F mg/kg). Both intervals were removed in excavations LF05-A and LF05-B as part of the SWMU 23 IRA.

- **Fluoranthene** was detected in 21 of 38 soil samples (55.3 percent) analyzed for SVOCs and PAHs. Ten of the detections (26.32 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.14 mg/kg. However, all of the detections were well below the MSC of 410 mg/kg. The minimum and maximum detections above RRS-1 were 0.36 mg/kg and 95.0 J mg/kg respectively, with an average concentration of 10.74 mg/kg. The highest detection of fluoranthene at B509-5' was removed along with cadmium and lead at excavation LF05-5B as part of the IRA.

- **Fluorene** was detected in 2 of 38 soil samples (5.3 percent) analyzed for SVOCs and PAHs. Only one detection (2.63 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.14 mg/kg. However, the detections at B408-surface (1.8 mg/kg) and B408-surface duplicate (2.2 mg/kg) were well below the MSC of 410 mg/kg.

- **Indeno[1,2,3-*c,d*]pyrene** was detected in 20 of 44 soil samples (45.5 percent) analyzed for SVOCs and PAHs. All five detections (3.33 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.03 mg/kg. All five of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.34 mg/kg and 27.0 mg/kg respectively, with an average concentration of 5.99 mg/kg.

- ***m*-& *p*-Cresol (Sum of Isomers)** was detected in 2 of 38 soil samples (5.3 percent) analyzed for SVOCs. Only one detection (2.63 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. The detection above RRS-1, which was located at B509-5' (1.7 F mg/kg), was well below the MSC of 51 mg/kg.

- **Phenanthrene** was detected in 16 of 38 soil samples (42.1 percent) analyzed for SVOCs and PAHs. A total of eight detections (21.1 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.42 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.36 mg/kg and 60.0 mg/kg respectively, with an average concentration of 8.28 mg/kg.

- **Pyrene** was detected in 18 of 38 soil samples (47.4 percent) analyzed for SVOCs and PAHs. A total of nine detections (23.7 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.18 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.49 mg/kg and 80.0 mg/kg respectively, with an average concentration of 10.02 mg/kg.

Most of the SVOCs/PAHs detected above RRS-1 in the surface soil were at each of these test pits: T011, T017, T018, and T020. Most subsurface SVOCs/PAHs were detected above RRS-1 at B508-5', B509-5', T017-12'and T020-13'. These SVOC/PAH detections are delineated to the north by B504, T012, and T013; to the east by B506, B507, and B511; to the south by B505 and B511; and to the west by B504 and SWMU 17 boring B704.

Seven of the delineated SVOCs/PAHs are characterized by low MSCs and were detected at Standard 3 concentrations in SWMU 23 soils. These SVOCs/PAHs included benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, chrysene, dibenzo[*a,h*]anthracene, and indeno[1,2,3-*c,d*]pyrene. Confirmation analysis for these SVOCs/PAHs was performed using SW8270 at samples collected at T011-surface, T017-surface, T017-12', B509-5', and B509-10'. Analysis of PAH extracts for SPLP was performed using the more definitive SW8310 method to achieve lower reporting limits. Confirmation results showed that PAHs were not confirmed at T011-surface and B509-10'; PAHS were confirmed with significantly lower Standard 3

concentrations at T017-surface and B509-5', and the concentration of the SPLP extracts for both of these intervals were below the industrial groundwater MSC (Table 5.12). The highest detections of PAHs at SWMU 23 occurred at the confirmation boring for T017-12'. The concentrations of the SPLP extractions from T017-12' for these PAHs were below their corresponding industrial groundwater MSCs. The new site-specific MSCs at SWMU 23 for these compounds are presented in Table 5.13.

Other SVOCs detected in SWMU 23 soils included the common laboratory/field artifacts benzyl butyl phthalate and bis(2-ethylhexyl)phthalate. Dibenzofuran, a byproduct associated with the burning of SVOCs, was only detected above RRS-1 in one sampling interval.

- **Benzyl butyl phthalate**, a common laboratory/field contaminant, was detected in 4 of 38 samples analyzed for SVOCs. Only two detections exceeded the RRS-1 concentration of 0.33 mg/kg; however both detections were well below the RRS-2 concentration of 2000 mg/kg. Specifically, benzyl butyl phthalate was detected above RRS-1 at T015-surface (3.3 mg/kg) and T017-surface (0.75 F). Benzyl butyl phthalate detections are delineated to the north by B504 and B507; to the east by B506 and B509; to the south by B505; and to the west by SWMU 17 boring B704 and B508. The T017 interval was removed at excavations LF05-5A as part of the SWMU 23 IRA.

- **Bis(2-ethylhexyl)Phthalate (B2EHP)**, a common laboratory/field contaminant, was detected in 5 of 38 soil samples (13.16 percent) analyzed for SVOCs. Four of the detections (10.53 percent) exceeded the RRS-1 of 0.33 mg/kg. Only two of the samples exceeded the RRS-2 concentration 0.6 mg/kg. Specifically, B2EHP was detected above RRS-1 at T017-surface (2.4 mg/kg), B509-5' (1.3 F mg/kg), B509-10' (0.36 F mg/kg), and B509-15' (0.37 mg/kg). The Standard 3 concentrations of B2EHP at T017-surface and B509-5' were removed at excavations LF05-5A and LF05-5B along with cadmium and lead contaminated soil during the IRA at SWMU 23. B2EHP detections are delineated to the north by B506 and B508; to the east by SWMU 24 boring B071; to the south by SWMU 24 boring B096 and B505; and to the west by SWMU 17 boring B704 and B505.

- **Dibenzofuran** was detected in 2 of 38 soil samples (5.26 percent) analyzed for SVOCs. One of the detections, a concentration of 1.8 F mg/kg at B509-5' exceeded the RRS-1 of 0.33 mg/kg. This detection was well below the RRS-2 concentration 41 mg/kg. The Standard 1 detection was located at T017-surface. Both intervals were removed at excavations LF05-5A and LF05-5B as part of the SWMU 23 IRA.

5.4 SWMU 24

SWMU 24 is a 0.64 acre triangular strip of land located between the base perimeter road and security fencing, north of SWMU 22 and east of SWMU 23. RFI activities conducted at SWMU 24 between 1997 and 2000 included the installation of 24 DPT soil borings/surface samples locations as well as the collection of five surface soil samples and two rounds of groundwater samples from existing monitoring wells. A total of three monitoring wells were installed by Radian Corporation between 1985 and 1992 as part of groundwater investigation of SWMU 24

and the basewide TCE plume. In April 2000, IT Corporation conducted a geophysical survey and installed 14 DPT borings and two monitoring wells within SWMU 24.

5.4.1 Interpretation of Aerial Photographs

Aerial photographs of the SWMU 24 area covering 6 decades were reviewed to identify areas of landfill activity. Prior to February 1954, the site appears as part of an oval dirt track possibly used for horse racing. In February 1954, with the extension of the north-south runway and taxiway, parked vehicles are observed at SWMU 24 and a dirt road leading north from White Settlement Road to the runway construction area appears just west of the unit. By December 1958, the perimeter fence has been installed and the first landfill activities appear as ground scarring with possible trenches within SWMU 24. An aerial photograph of SWMU 24 and SWMU 22 taken December 1958 is presented with soil boring locations in Figures 5.14 and 5.3. Ground scarring is again observed in the central section of SWMU 24 in 1962. In 1964, apparent trenches are observed along the along the eastern fence line within SWMU 24 and the south central section of the unit. Ground scarring in the central portion of SWMU 24 is also observed in 1964. By 1975, SWMU 24 ground scarring has ceased and the unit has an apparent grass cover (Figure 5.9). No activities were observed until 1980, when parked vehicles and two parallel dark rectangular shapes, possibly trenches, were observed in southwestern corner of the unit. Operations at SWMU 24 appear to have ceased by 1983. All landfill activity associated with SWMU 24 during the period of operation was observed within the perimeter fencing for the unit.

5.4.2 Geophysical Results

As noted in Section 3.0, geophysical surveys at SWMU 24 were performed in February 1991 as part of a RCRA Facility Investigation led by the USACE. Results from this survey revealed nine distinct geophysical anomalies, indicating buried metal objects beneath the ground surface (Figure 3.1, Anomalies A-J). Barrels containing TCE were removed from SWMU 24 in 1991. A post excavation confirmation geophysical survey was performed by IT Corporation in April 2000. As presented in Figure 5.15, this survey identified additional anomalies indicating metallic objects beneath the ground surface. Trenching activities in June 2000 uncovered more drums containing TCE. All anomalies were investigated, contaminated soils were removed, confirmation soil samples were collected for chemical analysis, and a post excavation geophysical survey was performed to verify that all drums were removed. The *Draft Surface Geophysical Report for Waste Pile No. 7 (SWMU 24)* confirming removal of buried metallic objects is presented in Appendix K. Appendix M contains validated analytical results for excavation confirmation samples from IRA actions performed by IT Corporation (IT Corporation, 2001).

5.4.3 Soil Boring Locations

As part of the initial field activities performed by HydroGeoLogic in 1997, soil samples for chemical characterization were collected at six DPT boring locations, B001-B006, in and around the former drum excavation areas to determine if TCE contamination was present in SWMU 24 soils. Samples were collected from both the ground surface and the subsurface intervals exhibiting the highest PID reading. Surface soil samples were collected prior to drilling activities using a stainless steel hand auger, with a stainless steel sleeve for VOC samples. VOCs and SVOCs were

analyzed by EPA Methods SW8260 and SW8270, respectively. Inorganics were analyzed for the RCRA list of metals using EPA Method SW6010 ICP-standard.

In 1998, six additional DPT locations, B071 - B076, were installed and soil samples collected in 5-foot intervals from the ground surface to the water table. These samples were analyzed for the full suite of Appendix IX compounds (232 compounds plus 1,2-DCA). Six soil borings/surface sample locations (B080-084 and B407), were installed in 1999 to delineate specific compounds or suites of compounds detected at associated source intervals. Twelve additional borings/soil sample locations, B085 - B0906 were installed in 2000 to further delineate specific compounds or suites of compounds detected at associated source intervals. A summary of the RFI analytical data generated during the investigation of SWMU 24 is presented in Appendix J.

Soil borings at SWMU 24 encountered primarily clean fill in the near surface and native soil below five feet bgs. The only landfill materials encountered in soil borings was concrete and rubble between 4- and 8-feet bgs.

5.4.4 Lithologic Findings and Cross Sections

The series of geologic cross sections presented in Figure 5.16 incorporates bedrock elevation data from 14 DPT (DP-series) borings and two monitoring wells (WITCTA-series) installed within SWMU 24 during April 2000 as part of the bedrock and DNAPL investigation. Three existing monitoring wells, WP-10A, WP-10B, and WP-10C, as well as two former borings, WP-10D and WP-10E, provided additional bedrock elevation information. Twelve DPT borings (B-series) provided lithologic data to correlate geologic units above bedrock. Two former Paluxy monitoring wells, CAR-P1 and CAR-P2, located approximately 400 feet to the west southwest and 500 feet to the east southeast of the SWMU 24, respectively, provided lithologic data regarding the thickness of the Goodland/Walnut formation and the depth to the Paluxy aquifer.

Lithology along a west-east transect (A-A') through borings B073, B006, B004, B074, B005, B075, B076, B002, B071, B001, and WP07-10C of SWMU 24 indicates a fairly uniform and consistent stratigraphy in sediments throughout the section (Figure 5.16). A native dark reddish brown silty clay is present along the entire length of the transect. This unit reaches a maximum thickness of approximately 8 feet at boring B074. Only one landfill deposit is found along this transect: a small v-shaped body that lies between borings B073 and B004 and which reaches a maximum thickness of about 3 feet in the center of the basin. The landfill is located within a depression in the silt clay where the thickness of that unit is less than 1 foot. It is covered by a silty and sandy clay clean fill material that caps the entire landfill. The native clay unit that runs the length of the transect is underlain by two thinner units that are also fairly consistent throughout the section: a brown gravelly clay with an average thickness of about 4 feet, and a reddish yellow silt with an average thickness of less than 2 feet. Both of these strata overlie a prominent, consistent yellow medium sand, the only unconsolidated unit that maintains a significant thickness (over 20 feet) throughout the transect. The base of the thick sand unit forms a distinct contact between these unconsolidated layers and the Goodland/Walnut bedrock formation, a limestone unit that overlies the Paluxy sandstone at an average depth of 554 feet above msl. A slight downward grade in bedrock surface elevation is observed along transect A-A' between WP07-10A (585 feet msl) and WITCTA057 (583.67 feet msl). A distinct rise in bedrock surface to an elevation of 585

feet msl occurs in between WITCTA057 and DP13 before grading downward again to an inferred secondary low-point of approximately 584 feet msl at B003. A slight rising slope of bedrock is observed east of B003, reaching a high point of approximately 588 feet msl at WP07-10B. The Goodland/Walnut lies at a uniform thickness throughout this transect, approximately 34 feet along the entire section. The thickness of this formation and the depth of the upper contact of the Paluxy unit are based on data acquired during the drilling of nearby Paluxy-depth wells. The highest surface elevation along the transect is at boring B006, approximately 623 feet above msl, and the lowest surface elevation is at boring WP07-10C, approximately 614 feet above msl. As depicted on Figure 5.6 and Figure 5.16, groundwater flow direction is to the east with a gradient of 0.0088 ft/ft along this transect.

The west-east transect (B-B') passes through borings WP07-10A, WP07-10D, B702, B007, B004, B074, and WP07-10B at the south side of the study area and illustrates a slightly more consistent stratigraphy than that found along transect A-A' (Figure 5.16). The native clay that is found within transect A-A' forms a consistent surface exposure along this entire transect, with a nearly horizontal surface elevation. The layer has an average thickness of about 7 feet throughout the cross-section. There was no evidence of landfill material within the borings defining this transect. As in transect A-A', the native clay unit is underlain by two thinner gravelly clay and reddish yellow silt units that are slightly less consistent throughout the section. Both of these strata overlie the prominent, consistent yellow medium sand and the Goodland/Walnut bedrock formation.

Bedrock elevation along transect B-B' is relatively constant at an elevation of approximately 585 feet msl; however, a slight rise to 585.5 feet msl is observed at DP03 and a sharp dip in bedrock surface to 581.67 feet msl is noted at WITCTA058. The surface of the groundwater along this cross-section is level at an elevation of approximately 593 feet msl.

5.4.5 Soil Analytical Results

Analytical results of surface and subsurface soil sampling initially indicated the presence of a number of metals and SVOCs at Standard 2 and 3 concentrations. All VOCs detected were at, or below, Standard 2 concentrations.

The discussion of analytical results in soil has been separated into two sections, inorganic and organic subsections. The inorganic subsection has differing RRS-1 values for surface and subsurface soil for inorganics, while the organic subsection combines surface and subsurface soil because the RRS-1 value is the same. A discussion of each analyte detected over RRS-1 is presented in a separate subsection below. This discussion includes general statistics, interpretation, delineation, and confirmation/SPLP results. Several tables and figures have been prepared to facilitate the reader's review of each section. All analytical results in soil are presented in Figure 5.17; analytical results in surface soil are presented in Table 5.14; analytical results in subsurface soil are presented in Table 5.15; confirmation/SPLP results are presented in Table 5.16; and site-specific MSCs are presented in Table 5.17.

5.4.5.1 Inorganic Analytical Results

Appendix IX metals were detected above background concentrations in surface and subsurface soil samples collected at SWMU 24. In surface soils, detected elements include antimony, arsenic, barium, cadmium, copper, lead, mercury, selenium, silver, thallium, and zinc (Table 5.14). Detected elements in subsurface soils include arsenic, chromium, lead, mercury, selenium, thallium, and zinc. Figure 5.17 displays the locations and chemical data that exceeded background concentrations in SWMU 24 soils.

Many of the metals observed in surface soils were detected at low concentrations, below or just above background concentrations. These detections are considered variations of basewide background levels, not indicative of a site related spill or release. In surface soil, these inorganics include antimony, barium, copper, mercury, and silver. In subsurface soil, these inorganics include chromium, mercury, and zinc. The percentage of detection for these compounds was calculated only for detections above base background values since this concentration represents RRS-1. In addition, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for each of the above compounds is less than five percent of total analyses. Since it is unlikely that these compounds are related to a site release, and the frequency of detection for these compounds is below the five percent threshold described in Section 3.1 of the TNRCC Consistency Memorandum (TNRCC, 1998a), further delineation of antimony, cadmium, cobalt, copper, silver, and vanadium in SWMU 24 soil was not warranted. Nonetheless these elements in the surface soil at B001, B002, B071, B007 are delineated to the north by B085 and SWMU 23 boring B506, to the east by B093 and B073, to the south by B073 and B087, and to the west by B089 and SWMU 23 boring B505.

A closer examination of each of these compounds is presented below:

- **Antimony** was detected in 7 of 16 surface soil samples analyzed for metals. Only one of the 16 samples exceeded the RRS-1 concentration of 0.56 mg/kg. This detection of antimony at B001 (0.75 J mg/kg) also exceeded the MSC concentration of 0.6 mg/kg; however, the detection was not significantly above the surface background value of 0.56 mg/kg. In subsurface soil, antimony was detected in 6 of 30 samples analyzed for metals. None of the detections exceeded the RRS-1/RRS-2 concentration of 0.712 mg/kg. The percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for antimony is 2.2 percent (1 of 46 analyses). Furthermore, the detection of antimony was subsequently not confirmed at B001. This interval was removed at excavation WBA-7A during the IRA at SWMU 24 (Figure 5.18).

- **Barium** was detected in 17 of 17 surface soil samples. Only one detection, a concentration of 441 mg/kg at B071, was detected above the RRS-1 concentration of 233 mg/kg. Barium was also detected in 31 of 31 subsurface soil samples analyzed for metals; however, none of the detections exceeded the RRS-1 concentration of 128.1 mg/kg. Note that the detection of barium at B071-surface was subsequently not confirmed above background in June 2000. Therefore, the original detection at B506-5' is regarded as background, and the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for barium is 2.1 percent (1 of 48 analyses).

- **Cadmium** was detected in 7 of 19 surface soil samples analyzed for metals. Only two of the 19 surface samples exceeded the RRS-1/RRS-2 concentration of 0.556 mg/kg. Specifically, cadmium was detected at B001 (1.4 F mg/kg) and B001-confirmation (0.86 J mg/kg). The concentration of the SPLP extract from the B001-confirmation sample was below the industrial groundwater MSC. The site-specific MSC for cadmium is currently 0.86 mg/kg. Cadmium was not detected in 30 subsurface soil samples analyzed for metals. The percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil was 4.1 percent (2 of 49 analyses). Cadmium was delineated and removed as part of excavation WBA-7A during the IRA at SWMU 24 (Figure 5.18). Detections of cadmium at B001-surface are delineated to the north by SWMU 23 boring B506, to the east by B093, to the south by B076, and to the west by B071.

- **Copper** was detected in all 19 surface soil samples analyzed for metals. Two of the detections exceeded the RRS-1 concentration of 17.37 mg/kg. These isolated detections of copper were located at B007 (62.6 J mg/kg) and B072 (30.5 J mg/kg). Both detections are well below the RRS-2 concentration 130 mg/kg. Copper was detected in 21 of 30 subsurface soil samples; however, none of the detections exceeded the RRS-1 concentration of 13.72 mg/kg. The percentage of copper detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 4.1 percent (2 of 49 analyses). Copper detections in the surface soil at B007 and B072 are delineated to the north by B002 and B003; to the east by B006; to the south by B087; and to the west by B089.

- **Mercury** was detected in 13 of 16 surface soil samples. Only one sample, a concentration of 0.15 mg/kg at B002 exceeded the RRS-1 concentration of 0.14 mg/kg. Mercury was also detected in one of 30 subsurface soil samples. This detection, which also occurred at B002 (0.061 F mg/kg) at a depth of 21 feet bgs, exceeded the RRS-1 concentration of 0.035 mg/kg (the MDL for mercury). Both of these detections at B002 were below the RRS-2 concentration of 0.2 mg/kg and are considered natural variations of background. Furthermore, the percentage of mercury detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 3.33 percent (2 of 60 analyses). The subsurface detection of mercury at B002-21' is delineated to the north by B076; to the east by B001 and B076; to the south by B003 and B072; and to the west by SWMU 23 boring B505.

- **Silver** was detected in one of 16 surface soil samples. This detection, a concentration of 1.3 F mg/kg at B001, exceeded the RRS-1 concentration of 0.213 mg/kg; however it is well below the RRS-2 concentration of 51 mg/kg. Silver was not detected in 32 subsurface samples. The percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for silver is 2.1 percent (1 of 48 analyses).

As previously noted in Section 5.1.2, statistical analysis of analytical results for arsenic indicate that detected concentrations of arsenic are statistically the same as developed background concentrations. Similarly, as previously noted in Section 5.1.1, statistical analysis indicated that detected thallium concentrations are actually lower than developed background concentrations. Specific detections and concentration ranges are presented below:

- **Arsenic** was detected in 14 of 16 surface soil samples analyzed for metals. Five of the 16 samples exceeded the surface RRS-1/RRS-2 concentration of 5.85 mg/kg. Specifically, arsenic was detected above RRS-1 in surface soil at B073 (6.2 F mg/kg), B074 (7.3 F mg/kg), B075 (8.5 F mg/kg), B075-duplicate (8 F mg/kg), and B076 (6.9 F mg/kg). Arsenic was also detected in 13 of 30 subsurface soil samples analyzed for metals. Four of the 30 detections exceeded the subsurface RRS-1/RRS-2 concentration of 6.58 mg/kg. Specifically, arsenic was detected above RRS-1 in subsurface soil at B071-5' (12.5 F mg/kg), B072-10' (6.8 F mg/kg), B073-5' (14 F mg/kg), and B075-5' (17.4 F mg/kg).

- **Thallium** was detected in 5 of 16 surface soil samples analyzed for metals. Each of the five detections exceeded the RRS-1/RRS-2 concentration of 2.43 mg/kg. Specifically, thallium was detected in surface soil at B073 (9.3 F mg/kg), B074 (9.9 F mg/kg), B075 (7.5 F mg/kg), B075-duplicate (8 F mg/kg), and B076 (9.8 F mg/kg). Thallium was also detected in four of 30 subsurface soil samples analyzed for metals. All four of the detections exceeded the RRS-1/RRS-2 concentration of 1.5 mg/kg. Specifically, thallium was detected above RRS-1 in subsurface soil at B071-5' (12.4 F mg/kg), B072-10' (9 F mg/kg), B073-15' (6.6 F mg/kg), and B076-5' (27.3 F mg/kg).

A subset of two metals are believed to have been falsely detected above background due to matrix interference. As presented in detail in Section 5.1.3, detections of selenium and chromium above background resulted from matrix interference inherent with the SW6010 ICP-standard analytical method for metals. The matrix interference induces false positive detections of selenium, and artificially elevates concentrations of detected chromium. Detections of chromium below 40 mg/kg using SW6010 ICP-standard are interpreted as detections at, or below, background. Specific detections and concentration ranges are presented below:

- **Selenium** was detected in 6 of 16 surface soil samples analyzed for metals. Five of the six detections exceeded the RRS-1 concentration of 0.907 mg/kg and the RRS-2 concentration of 5.0 mg/kg. Specifically, selenium was detected above RRS-1 in surface soil at B073 (12.8 F mg/kg), B074 (13.8 F mg/kg), B075 (11.8 F mg/kg), B075-duplicate (13.3 F mg/kg), and B076 (11 F mg/kg). Selenium was also detected in 20 of 30 subsurface soil samples analyzed for metals. Eighteen of the 20 detections exceeded the RRS-1 concentration of 0.313 mg/kg, and 13 of those detections also exceeded the RRS-2 concentration of 5.0 mg/kg. Detections above RRS-1 ranged from 3.4 mg/kg to 17.3 mg/kg, with an average concentration of 7.38 mg/kg. Selenium detections within this range of concentrations using SW6010 ICP-standard are believed to be false positives, and therefore, did not warrant further investigation.

- **Chromium** was detected in all 16 surface soil samples; however, none of the detections exceeded the RRS-1 concentration of 25.86 mg/kg. Chromium was also detected in 29 of 31 subsurface soil samples analyzed for metals. Four of the 34 samples exceeded the RRS-1/RRS-2 concentration of 16.31 mg/kg. Specifically, chromium was detected at B071-5' (16.8 J mg/kg), B073-5' (18.4 F mg/kg), B074-5' (18.5 F mg/kg), and B075-5' (17.4 F mg/kg). These concentrations ranged from 3 percent to 13 percent over the base background value of 16.31 mg/kg. Although not incorporated by project ARARs, each detection is below the State of Texas background value of 30 mg/kg. (For reference, the

State of Texas background values are presented in Table 5.9.) Since it is believed that interference inherent with the SW6010 ICP-standard analytical method for metals artificially elevated detected concentrations of chromium, and as all chromium detections at SWMU 24 are below 20 mg/kg, they are interpreted as being reflective of base background conditions and do not warrant further investigation.

Other inorganic detections observed in SWMU 24 soil included lead and zinc at Standard 2 and 3 concentrations. These inorganics are discussed below.

- **Lead** was detected in all 29 surface soil samples analyzed for this element. Twelve of the 29 samples exceeded the RRS-1/RRS-2 concentration of 30.97 mg/kg. Detections above RRS-1 ranged from 33.7 mg/kg to 3130 mg/kg, with an average concentration of 535.61 mg/kg and a standard deviation of 1145.56 mg/kg. Significant Standard 3 detections of lead in surface soil within the unit were located at B001 (166 mg/kg), B001-confirmation (573 mg/kg), B006-dup (3130 J mg/kg), B007 (166 J mg/kg), B072 (155 F mg/kg), and B080 (351 F mg/kg). The extreme detection of lead at B006 was detected in the duplicate for this sample and not in the parent sample, nor was it confirmed by companion boring B084. Less significant detections of lead within the unit were located at B002 (48.9 J mg/kg), B002-duplicate (33.7 J mg/kg), and B071 (49.7 F mg/kg). Lead in SWMU 24 surface soil is delineated to the north by B085; to the east by B081, B073, B074, B075, B076 and B095; to the west by B089 and SWMU 23 boring B509; and to the south by SWMU 22 locations T008 and B404.

  The dual SWMU 24/SWMU 22 delineation boring B407 (81.5 F mg/kg), located along White Settlement Road, provides the current site-specific MSC of 81.5 mg/kg because the concentration of the SPLP extraction from this boring was below the industrial groundwater MSC. A series of borings were installed to delineate surface lead detected at B407 (81.5 F mg/kg), to the east and west along White Settlement Road. Results show decreasing concentrations to the east at B087 (59.3 mg/kg) and a detection below background at B095. Likewise, decreasing concentrations are observed west of B407 at B088 (49 mg/kg) and B096 (35.2 mg/kg). Lead was also delineated vertically at each of these borings. The detection of lead at B096 at a concentration of 35.2 mg/kg is only 13.6 percent over the background concentration of 30.97 mg/kg. Consequently, this detection is considered to be a natural variation of background and serves as the delineation location for lead to the west of B088.

  It should be noted that most of these southern "delineation" detections of lead south of SWMU 24 were found in surficial soil at a distance of less than 10 meters from White Settlement Road. As this road has been in existence for over 60 years, emissions from leaded gasoline by cars and trucks over a 40-year period are most likely the anthropogenic source of lead found near White Settlement Road. A more detailed discussion of the potential sources of lead in surficial soil is presented in Section 5.1.4.

  Lead was also detected in 27 of 38 subsurface soil samples analyzed for this element. Only one of the detections, a concentration of 13 F mg/kg at B073-5', exceeded the RRS-1/RRS-2 concentration of 12.66 mg/kg. Although this detection of lead is considered to be a

natural variation of background, lead is delineated in subsurface soil. The detection of lead at B073-5' is delineated to the north by B074, to the southeast by B095, to the south by B087, and to the west by B072.

As depicted in Figure 5.18, an IRA consisting of four excavations was implemented to remove lead contaminated surface soil. These excavations were centered on the remaining borings with Standard 3 surficial lead detections greater than the site-specific MSC. Excavation WBA-7A was centered on B001; this 10 square feet by 2 feet deep excavation removed approximately 7.53 cubic yards of soil. Excavation WBA-7B was centered around B080 and B006; this 30 by 20 foot aerial by 2 foot deep excavation removed approximately 58 cubic yards of soil. Excavation WBA-7C was centered on B007; this 10 square feet by 2 feet deep excavation removed approximately 7.53 cubic yards of soil. Excavation WBA-7D was centered on B072; this 10 square feet by 2 feet deep excavation removed approximately 7.53 cubic yards of soil. Validated confirmation sampling results showing that all Standard 3 lead contaminated soil was removed in the excavations is presented in Appendix M.

- **Zinc** was detected in all 30 surface soil samples analyzed for metals. Of the 30 samples analyzed, sixteen detections exceeded the RRS-1 concentration of 38.8 mg/kg. Detections above RRS-1 ranged from 39.6 mg/kg to 994 mg/kg with an average concentration of 128.34 mg/kg and a standard deviation of 232.76 mg/kg. All of the detections were well below the RRS-2 concentration of 3100 mg/kg. The higher Standard 2 concentrations of zinc within the unit were located near the southern section of the unit at B006 (994 J mg/kg), and B007 (157 J mg/kg), and B072 (116 J mg/kg). Note that these locations were removed in excavations WBA-7B, WBA-7C, and WBA-7D, respectively. Zinc in surface soil is delineated to the north by B091; to the east by B081, B093, B094, and B095; to the south by SWMU 22 test pit T007 and progressively lower concentrations at B088 (74.7 mg/kg), and SWMU 22 locations B406 (53.2 mg/kg) and T008 (43.1 mg/kg); to the west by B089, B090, B096, and to the west of B085 by the low concentration at SWMU 23 boring B506. Note that the detections of zinc at T008 (43.1 mg/kg) and B506 (39.1 mg/kg) are considered to be natural variations of the zinc surface background concentration of 38.8 mg/kg.

  Zinc was detected in 34 of 40 subsurface soil samples analyzed for metals. Four of the detections exceeded the RRS-1 concentration of 31.3 mg/kg. Specifically, zinc detections at B073-5' (36.3 J mg/kg), B074-5' (34.2 J mg/kg), and B087-5' (35 mg/kg) are not significantly over background, and are regarded as natural variations of the base subsurface background concentration of 31.3 mg/kg. These detections are also well below the RRS-2 concentration of 3100 mg/kg for zinc.

5.4.5.2 Organic Analytical Results

Initial analytical results at SWMU 24 indicated the presence of Standard 2 concentrations of some VOCs. Additionally, a mixture of Standard 2 and 3 concentrations of a subset of SVOCs, commonly associated with asphalt, were found in the surface soil at SWMU 24. A discussion of general statistics and interpreted results is presented for each Appendix IX analyte. Where

analytes fall into specific categories or associated suites, an interpretive discussion of common observations is presented for that group of analytes.

5.4.5.2.1 Volatile Organic Compounds

A very small subset of VOCs was detected at SWMU 24. These compounds are trichloroethene, tetrachloroethene, dichlorodifluoromethane, 2-hexanone, and acetone. A brief set of general statistics and interpretation is presented below for each of the Appendix IX compounds detected above RRS-1:

- **Dichlorodifluoromethane** was detected in 1 of 53 (1.9 percent) soil samples analyzed for VOCs. This detection, a concentration of 0.007 mg/kg at B071-10', exceeded the RRS-1 concentration of 0.005 mg/kg; however it is well below the RRS-2 concentration of 2000 mg/kg. As the percentage of detections compared to total analyses in combined surface and subsurface soil for dichlorodifluoromethane is 1.9 percent, and this compound was not detected in groundwater, it is believed not to be related to a release from the site. Further investigation of this compound was not warranted.

- **2-Hexanone** was detected in only 4 of 38 soil samples (10.5 percent) analyzed for this compound. Three of the detections (7.9 percent) exceeded the RRS-1 concentration of 0.005 mg/kg. Detections above RRS-1 of 2-hexanone were very low concentrations. These detections occurred at B074-surface (0.007 mg/kg), B075-surface (0.009 mg/kg), and B073-15' (0.006 mg/kg). The detections of 2-hexanone are delineated to the north by B001 and B071; to the east by B082 and B083; to the south by B407; and to the west by B072, B003, and B004. An RRS-2 concentration for 2-hexanone is not provided by the TNRCC, and one was not calculated.

- **Tetrachloroethene (PCE)** was detected in 7 of 59 (11.9 percent) soil samples analyzed for VOCs. Only four (8 percent) of the detections exceeded the RRS-1 concentration of 0.005 mg/kg. However, the detections are well below the RRS-2 concentration of 0.5 mg/kg. These detections of PCE occurred at B075-5' (0.01 mg/kg), B076-5' (0.11 mg/kg), and B076-10' (0.009 mg/kg). PCE was also detected in the SWMU 24 southern delineation boring B407-10' (0.012 J mg/kg), which was used as a dual delineation boring for both SWMUs 22 and 24. B407 is located outside of the unit to the south of SWMU 24 and to the north of SWMU 22. Detections of PCE at B075-5', B076-5', B076-10', and B407-10' are delineated to the north by B071 and B085; to the east by B082, B083, and B087; to the south by SWMU 22 borings B404 and B406; and to the west by B088, B089, and B090.

- **Trichloroethene (TCE)** was detected in 29 of 61 (47.5 percent) soil samples analyzed for VOCs. Nineteen (31.1 percent) of the detections exceeded the RRS-1 concentration of 0.005 mg/kg. Detections above RRS-1 ranged from 0.0057 mg/kg to 0.22 mg/kg with an average concentration of 0.04 mg/kg and a standard deviation of 0.05 mg/kg. All of the detections were well below the RRS-2 concentration of 0.5 mg/kg. Detections of TCE in surface soil above RRS-1 occurred at B002, B003, B005, B006, and B006-duplicate. In the subsurface, detections of TCE occurred primarily in the 5-foot and 10-foot intervals, and with less frequency and lower concentrations in the 15-foot and 20-foot intervals.

Specifically TCE was detected in the subsurface at B007-13' (0.012 F mg/kg), B071-5' (0.039 mg/kg), B072-10' (0.032 mg/kg), B072-15' (0.018 mg/kg), B073-10' (0.069 mg/kg), B073-15' (0.016 mg/kg), B073-20' (0.008 mg/kg), B074-5' (0.021 mg/kg), B074-10' (0.017 mg/kg), B075-5' (0.22 mg/kg), B075-10' (0.056 mg/kg), B075-15' (0.015 mg/kg), B076-5' (0.066 mg/kg), and B076-10' (0.05 mg/kg). All of these Standard 2 detections of TCE are delineated to Standard 1 to the north by B001, B085 and SWMU 23 boring B509; to the east by B082, B083; to the south by B407; and to the west by B072-20', B089, and B090.

The remaining VOC, acetone, is considered to be a laboratory artifact, consistent with guidelines provided in the TNRCC Consistency Memorandum, Section III (see Section 5.1.6 of this report). Acetone exhibited sporadic detections at low concentrations and with low standard deviations. The low concentration above MQL and the low frequency of detection indicate that the detections are not related to a release. As noted in Section 5.1.6, acetone compounds exhibit high solubility and volatility. Therefore, acetone would be expected to either rapidly volatilize under local climate conditions or move into groundwater with precipitation. Acetone was not consistently detected in groundwater and is not believed to be a true investigative detection.

- **Acetone**, a common laboratory contaminant, was detected in 2 of 37 (5.4 percent) soil samples analyzed for VOCs. Both detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, each of the detections was well below the RRS-2 concentration of 1000 mg/kg. Specifically, acetone was detected in B072-5' (0.007 mg/kg) and B072-10' (0.008 mg/kg).

5.4.5.2.2 Semivolatile Organic Compounds

Several SVOCs were detected in surface soil samples collected within SWMU 24. Variances in the total number of analyses for individual compounds is due to the use of both SW8270 and SW8310, as well as reduced analyte lists for confirmation/delineation samples.

Results of initial analyses for SVOCs reveal Standard 2 and Standard 3 concentrations of a suite of SVOCs associated with asphalt and the combustion of fossil fuels. These SVOCs, composed primarily of PAHs, were observed primarily in surface soil at SWMU 24. The PAHs included acenaphthene, anthracene, benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*g,h,i*]perylene, benzo[*k*]fluoranthene, chrysene, dibenzo[*a,h*]anthracene, fluoranthene, fluorene, indeno[1,2,3-*c,d*]pyrene, phenanthrene, and pyrene. A brief description of general statistics and interpretation of detections for each of these compounds is discussed below. This description is followed by a discussion of delineation and confirmation/SPLP results for the whole suite of PAHs.

As presented in Figure 5.17 and Tables 5.14 and 5.15, SVOCs detected above background concentrations include a suite of PAHs commonly associated with asphalt and the combustion of fossil fuels:

- **Acenaphthene** was detected in 3 of 46 soil samples (6.52 percent) analyzed for SVOCs. Only one of the detections, a concentration of 0.68 mg/kg at B071-surface exceeded the

RRS-1 concentration of 0.33 mg/kg; however, the detection was well below the MSC of 610 mg/kg. This detection was not confirmed in the subsequent June 2000 sampling event.

- **Anthracene** was detected in 5 of 46 soil samples (10.9 percent) analyzed for SVOCs. Two of the detections (4.35 percent) exceeded the RRS-1 concentration of 0.33 mg/kg; however, each of the detections was well below the MSC of 3100 mg/kg. Specifically, anthracene was detected above RRS-1 at B001-surface (0.41 F mg/kg) and B071-surface (1.6 mg/kg). Neither of these detections was confirmed in the subsequent June 2000 sampling event.

- **Benzo[*a*]anthracene** was detected in 14 of 46 soil samples (30.4 percent) analyzed for SVOCs. Five of the detections (10.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the MSC of 0.039 mg/kg. Specifically, benzo[*a*]anthracene was detected above RRS-1 at B001-surface (3.7 mg/kg), B002-surface (0.72 F mg/kg), B072-surface duplicate (0.97 mg/kg), B071-surface (10 J mg/kg), and B072-surface (1.2 mg/kg).

- **Benzo[*a*]pyrene** was detected in 14 of 46 soil samples (30.4 percent) analyzed for SVOCs. Five of the detections (10.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. All five of the detections also exceeded the MSC of 0.02 mg/kg. Specifically, benzo[*a*]pyrene was detected above RRS-1 at B001-surface (4.2 mg/kg), B002-surface (0.9 mg/kg), B072-surface duplicate (1.3 mg/kg), B071-surface (12 J mg/kg), and B072-surface (1.2 mg/kg). The B001 and B071 detections were not confirmed in the subsequent June 2000 sampling event. The B072 interval was removed in excavation WBA-7D along with lead contaminated soil during IRA activities (IT Corporation, 2001).

- **Benzo[*b*]fluoranthene** was detected in 15 of 46 soil samples (32.61 percent) analyzed for SVOCs. Nine of the detections (19.6 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. All nine of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.37 mg/kg and 19.0 mg/kg respectively, with an average concentration of 3.45 mg/kg.

- **Benzo[*g,h,i*]perylene** was detected in 15 of 46 soil samples (32.6 percent) analyzed for SVOCs. Five of the detections (10.9 percent) exceeded the RRS-1 concentration of 0.33 mg/kg. However, each of these detections was well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.79 F mg/kg and 10.0 mg/kg respectively, with an average concentration of 3.45 mg/kg.

- **Benzo[*k*]fluoranthene** was detected in 4 of 31 soil samples (12.9 percent) analyzed for SVOCs. Only one of the detections (3.2 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.011 mg/kg. This detection was located at B072-surface with a concentration of 0.76 mg/kg. The B072 interval was removed in excavation WBA-7D along with lead contaminated soil during IRA activities (IT Corporation, 2001).

- **Chrysene** was detected in 13 of 46 soil samples (28.3 percent) analyzed for SVOCs. Five of the detections (10.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.1 mg/kg. None of the detections exceeded the MSC of 3.9 mg/kg. The minimum and maximum detections above RRS-1 were 0.36 F mg/kg and 3.9 mg/kg respectively, with an average concentration of 1.55 mg/kg.

- **Dibenzo[*a,h*]anthracene** was detected in 7 of 46 soil samples (15.2 percent) analyzed for SVOCs and PAHs. Two of the detections (4.35 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. Specifically, dibenzo[*a,h*]anthracene was detected at B001-surface (0.6 F mg/kg) and B071-surface (1.9 mg/kg).

- **Fluoranthene** was detected in 14 of 46 soil samples (30.4 percent) analyzed for SVOCs. Ten of the detections (21.7 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. However, all of the detections were well below the MSC of 410 mg/kg. The minimum and maximum detections above RRS-1 were 0.41 mg/kg and 25.0 mg/kg respectively, with an average concentration of 3.86 mg/kg.

- **Fluorene** was detected in 2 of 46 soil samples (4.3 percent) analyzed for SVOCs. Only one of the detections, a concentration of 0.39 mg/kg at B071-surface exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. The detection was well below the MSC of 410 mg/kg.

- **Indeno[1,2,3-*c,d*]pyrene** was detected in 15 of 46 soil samples (32.6 percent) analyzed for SVOCs. Five of the detections (10.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. All five of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.75 mg/kg and 11.0 J mg/kg respectively, with an average concentration of 3.19 mg/kg.

- **Phenanthrene** was detected in 12 of 46 soil samples (26.1 percent) analyzed for SVOCs. A total of five detections (10.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.51 F mg/kg and 10.0 J mg/kg respectively, with an average concentration of 2.7 mg/kg.

- **Pyrene** was detected in 12 of 46 soil samples (26.1 percent) analyzed for SVOCs. A total of 10 detections (21.7 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.38 F mg/kg and 23.0 J mg/kg respectively, with an average concentration of 3.55 mg/kg.

All of these PAHs were detected in the surface soil. All of the PAHs were detected at B001, B002, B007, B071, B072, and B075. The B001 and B071 detections were not confirmed in the subsequent June 2000 sampling event. The B001, B007, and B072 intervals were also removed in excavations WBA-7A, WBA7C, and WBA-7D, respectively, along with lead contaminated soil during IRA activities (IT Corporation, 2001). The PAH detections at B002 and B075 are related to surficial asphalt from the deteriorating section of the base perimeter road.

Other SVOCs detected in SWMU 24 soils included the common laboratory artifacts bis(2-ethylhexyl) phthalate and diethyl phthalate.

- **Bis(2-ethylhexyl)Phthalate (B2EHP)**, was detected in 4 of 47 soil samples (8.51 percent) analyzed for SVOCs. Only one the detections, a concentration of 0.59 mg/kg in the 5-foot interval of B076 exceeded the RRS-1 of 0.33 mg/kg; however, the detection is below the MSC of 0.6 mg/kg.

- **Diethyl Phthalate** was detected in 1 of 44 soil samples (2.27 percent) analyzed for SVOCs. The only detection was a concentration of 2.3 mg/kg in the 21-foot interval of B002. It exceeded the RRS-1 of 0.33 mg/kg, however, the detection is well below the MSC of 8200 mg/kg.

5.5 SWMU 25

SWMU 25 comprises approximately 12.5 acres and is located south of Taxiway Charlie East; east of Taxiway Foxtrot; north of SWMU 17, a former fire training area, and the engine testing facility (Building 4146); and west of the former fire training area (AOC 19). The base aqueduct, which diverts Farmers Branch Creek under the main runway and Taxiway Foxtrot, bisects the central portion of SWMU 25 in a southwest to northeast orientation. The base perimeter road also crosses the eastern portion of SWMU 25. RFI activities conducted at SWMU 25 between 1997 and 2000 included 2 geophysical surveys, the excavation of 8 exploratory trenches, the installation of 39 DPT soil borings, the installation of 4 monitoring wells, and the collection of 2 rounds of groundwater samples from existing and new monitoring wells.

Test pit trenching activities at SWMU 24 uncovered various commercial/industrial debris throughout the landfill. Observed debris consisted primarily of concrete and rubble, sheet metal, rebar, asphalt, tar, gravel, copper tubing, and metal possibly associated with an aircraft section.

5.5.1 Interpretation of Aerial Photographs

Aerial photographs of the SWMU 25 area covering 6 decades were reviewed to identify areas of landfill activity. Prior to 1950, the SWMU 25 site appears as a field possibly used for agricultural purposes. Increased activity in the form of dirt roads leading to SWMU 26 (Landfill 3) and White Settlement Road appear in 1950. In February 1954, with the extension of the north-south runway and taxiway, ground scarring in the northern portion of the unit associated with the runway and aqueduct construction activities is observed at SWMU 25. In 1958, a fire training area (AOC 19) is visible adjacent to, and east, of the north-central portion of SWMU 25. As presented in Figure 5.19, significant ground scarring occurs throughout much of the unit and a dark area, possibly a large pond, is observed in the central portion of the landfill, over the aqueduct. A parked aircraft is also observed in the southern portion of the unit. No landfill activity appears west of SWMU 25 between Taxiway Foxtrot and the western boundary of the unit. By 1964, the pond in the central portion of the unit is observed as a light grey area, possibly indicating that the "pond" has been filled in and graded. In 1966, the base perimeter road and a road cutting through the central portion of the unit from northeast, then south, then to the southwest leading to the future engine testing facility (hush house) is observed. Reduced activity at SWMU 25 is observed in 1967 and,

with the exception of the south central portion of the unit, vegetation, possibly grass, appears. The south central portion of the unit remains scarred and free of vegetation until 1981 when grass is observed throughout the unit. In 1983 and 1984, ground scarring is again observed west of the hush house road associated with the construction of the hush house (Building 4146). No major activity, other than parked vehicles and the installation of underground utilities, is observed at SWMU 25 after 1984.

5.5.2 Geophysical Results

Geophysical Surveys at SWMU 25 were performed by HydroGeoLogic in August 1997 as part of the initial RFI activities at SWMU 25. A series of geophysical surveys consisting of magnetometer, EM profiling, and earth resistivity methods were performed for the purposes of profiling SWMU 25. A composite geophysical map of the central and eastern portions of the landfill is presented in Figure 5.20. Initial characterization test pits and borings were located at significant anomalies identified by the geophysical investigation. A second series of geophysical surveys were also performed east of SWMU 25 in the Carswell Golf Course at the request of the EPA and the Air Force (Figure 5.21). No significant geophysical anomalies were observed in the Carswell Golf Course study area. A more detailed discussion of the geophysical surveys is presented in the Draft RFI for SWMUs 22, 23, 24, and 25 (HydroGeoLogic, 1997b).

5.5.3 Test Pit Locations

As part of the initial field activities performed by HydroGeoLogic in 1997, soil samples for chemical characterization were collected at excavated test pits from both the ground surface and the subsurface intervals exhibiting the highest PID reading. Eight test pits were excavated in the areas where burial pits were suspected to exist, as identified through aerial photographic and geophysical interpretation. Locations of test pits and soil borings in relation to ground scarring and fill areas, possibly associated with landfill activities, are presented on Figure 5.19. Surface soil samples were collected prior to drilling or excavation activities using a stainless steel hand auger, with a stainless steel sleeve for VOC samples. A surface soil sample was not collected at T021 due to the presence of asphalt on the ground surface. Subsurface samples of native soil beneath the landfill debris were collected near the center of each 40-foot long test pit and sampled for VOCs, SVOCs, and metals. VOCs and SVOCs were analyzed by EPA Methods SW8260 and SW8270, respectively. Inorganics were analyzed for the RCRA list of metals using EPA Method SW6010-standard. Each test pit was backfilled immediately following the collection of the subsurface sample and clay material was placed over top, graded, compacted, and re-seeded.

5.5.4 Soil Boring Locations

In 1998 and 1999, nine DPT borings, B812 through B818, B822, and B831 were installed to collect soil samples in 5-foot intervals from the ground surface to the water table. These samples were analyzed for the full suite of Appendix IX compounds (232 compounds plus 1,2-DCA). Six additional DPT soil borings (B823 through B828), were installed in October 1999 to lithologically define the western extent of SWMU 25. In addition, soil locations B819 through B821, B829, and B830 were installed in October 1999 to confirm and delineate specific compounds or suites of compounds detected at associated source intervals. In March 2000, confirmation/SPLP samples

were collected at B815, B816, B817, B829 and B831; and new DPT locations, B832 through B843, were installed to confirm and further delineate specific compounds or suites of compounds detected at associated source intervals. In June 2000, DPT locations B815, B816, B829, B832, and B835 were sampled to confirm and perform SPLP analysis for specific compounds. Also in June 2000, DPT locations B844 through B850 were installed to delineate specific compounds or suites of compounds to Standard 1 concentrations.

A summary of the RFI analytical data generated during the investigation of SWMU 25 is presented in Appendix J.

5.5.5 Lithologic Findings and Cross Sections

Lithology along a west-east transect (A-A') through borings B826, B831, B816, T024, T021, B818, B817, LF05-06 and LF05-07 of SWMU 25 indicates a variable stratigraphy in the near-surface sediments throughout the section. A native dark brown clay and silty clay is present along portions of the transect: at a thickness of approximately 12 feet at boring B826, then at a thickness of about 7 feet in a discontinuous remnant at boring T021. This unit is underlain by a pale brown silt, only at the west end of the transect, then by a sand layer with clay and gravel that appears only at the west and east ends of the section at an average thickness of about 7 feet. Both of these strata overlie a more consistent layer of brownish yellow clayey gravel, the only unconsolidated unit that is continuous throughout the transect. That layer has an average thickness of approximately 2 feet, thickening to about 5 feet at boring B818. A distinct brown silt, sand, and gravel is present underneath a part of that unit, especially at boring B816. A significant landfill deposit overlies all of these native soils, covering most of the length of the transect, except the east end. The landfill body reaches a maximum thickness of approximately 22 feet in the vicinity of boring B831. A portion of the landfill is capped by a thin layer of artificial fill composed of clean sand and sandy clay, especially areas east of boring B816. The west half of the landfill, including the thickest deposit, appears to be covered by little or no fill material. The base of the above sediments forms a distinct contact between these unconsolidated layers and the Goodland/Walnut bedrock formation, a limestone unit that overlies the Paluxy sandstone. The Goodland/Walnut lies at a uniform thickness throughout this transect, approximately 36 feet along the entire section. The thickness of this formation and the depth of the upper contact of the Paluxy unit are based on data acquired during the drilling of nearby Paluxy-depth wells. The highest surface elevation along the transect is at boring B826, approximately 622 feet above msl, and the lowest surface elevation is at boring LF05-07, approximately 598 feet above msl. Note that the layer of groundwater, approximately 5-feet thick in the western portion of the landfill, thins to approximately 1 foot in thickness in the eastern portion of the transect due to a slight rise in bedrock elevation. In general, the groundwater surface elevation follows the contour of the bedrock surface elevation along this transect.

The west-east transect (B-B') passes through borings B825, B824, B823, B822, LF05-05, T025, B812, B839, T028, and B843 at the north side of the study area and illustrates a slightly more consistent stratigraphy than that found along transect A-A' (Figure 5.22). The near-surface center of the transect contains an elongated landfill body that stretches from the west end of the transect to the vicinity of boring B839. The landfill material averages approximately 8 feet thick across the heart of the deposit, with thicker areas at borings B824 and B822. The entire landfill is capped

by a thin layer of artificial fill composed of clean sand and silty clay, but the cap is very thin above those two thicker areas. The native silty clay that is found in parts of transect A-A' is uniform here, and the top elevation of the unit is much more horizontal than in the former section. The clay layer prominently crosses the entire transect, and it forms the base for all of the landfill deposits in this area. This clay unit is underlain by two sand lenses within the transect: one with a maximum thickness of 5 feet at boring LF05-05, and the other with a maximum thickness of about 8 feet near boring B839. Those sand deposits lie between the above native silty clay and a lower yellowish brown clay and clayey gravel that is continuous across transect A-A', and which is present throughout most of this section except for the east end. That unit overlies a fairly consistent but very thin (average thickness less than 1 foot) sandy gravel layer that represents the bottom of the unconsolidated strata. The base of the sandy gravel unit forms a distinct contact between the unconsolidated strata and the Goodland/Walnut bedrock formation. Groundwater follows a similar pattern to transect A-A' in this section with a slope from west to east.

Lithology observed on an north-south transect (C-C') through borings FT08-11B, W704, P732, B723B, B816, B831, LF05-04, B823, B813, B815, and B821 indicates unconsolidated soils in a more inconsistent pattern than those found along transects A-A' and B-B'. This transect reveals a broad, thick landfill exposure that spans the entire length of the cross-section. The landfill body has a maximum thickness of approximately 22 feet near boring B831 prior to the aqueduct, and it appears to gradually pinch out toward each end of the transect. The native silty clay layer that is fairly consistent below this and other landfills is present along most of the transect, but is completely absent between borings B723 and B831. The underlying sand unit that is sporadically present in transects A-A' and B-B' is found only at the two ends of this section. The lower yellowish brown clay and clayey gravel that is present in the other transects is found in this section at an average thickness of about 2 feet except where it is absent at the south end. The underlying sandy gravel that forms the base of the unconsolidated unit is also found in this cross-section, but many parts are much thicker than in the other transects, with thicknesses up to approximately 8 feet near boring B723. The landfill and all of these native soil units are underlain by the Goodland/Walnut bedrock formation. Groundwater elevation is fairly uniform at an elevation of 596 to 595 feet msl across the transect.

5.5.6 Soil Analytical Results

Analytical results of surface and subsurface soil sampling initially indicated the predominance of surficial metals and SVOCs at Standard 2 and 3 concentrations. All VOCs detected were at, or below, Standard 2 concentrations.

The discussion of analytical results in soil has been separated into two sections, inorganic and organic subsections. The inorganic subsection presents differing RRS-1 values for evaluating surface and subsurface soil analytical results, while the organic subsection combines surface and subsurface soil results because the RRS-1 value is the same. A discussion of each analyte detected over RRS-1 is individually presented below. This discussion includes general statistics, interpretation, delineation, and confirmation/SPLP results. Several tables and figures have been prepared to facilitate the reader's review of each section. Note that analytical results for SWMU 25 are presented on two figures because the large number of samples collected for analysis with associated figure tables would not fit on to a single D-sized figure. Analytical results over RRS-1

from characterization sampling of soil are presented in Figure 5.23; analytical results over RRS-1 from soil confirmation/delineation sampling are presented in Figure 5.24; analytical results in surface soil are presented in Table 5.18; analytical results for subsurface soil are presented in Table 5.19; confirmation/SPLP results are presented in Table 5.20; and site-specific MSCs are presented in Table 5.21.

5.5.6.1 Inorganic Analytical Results

Appendix IX metals were detected above background concentrations in surface and subsurface soil samples collected at SWMU 25. In surface soils, detected elements include antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, lead, mercury, selenium, silver, thallium, and zinc (Table 5.18). Detected elements in subsurface soils include arsenic, barium, beryllium, calcium, chromium, cobalt, lead, manganese, mercury, potassium, selenium, thallium, vanadium, and zinc. Although calcium, manganese, and potassium are not included in the Appendix IX sampling list, these metals were detected in SWMU 25 soils collected in 1997. These metals are not included in the discussion and figures because they are not Appendix IX compounds. Figures 5.23 and 5.24 display the locations and chemical data that exceeded background concentrations in SWMU 25 soils.

Many metals observed in surface soils were detected at low concentrations, below or just above background concentrations. These detections are considered variations of basewide background levels, not indicative of a site related spill or release. In surface soil, these inorganics include antimony, copper, and silver. In subsurface soil, these inorganics include cobalt, mercury, and vanadium. The percentage of detection for these compounds was calculated only for detections above base background values since this concentration represents RRS-1. In addition, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for each of the above compounds is less than five percent of total analyses. Since it is unlikely that these compounds are related to a site release, and the frequency of detection for these compounds is below the five percent threshold described in Section III of the TNRCC Consistency Memorandum (TNRCC, 1998a), further delineation of antimony, cobalt, copper, mercury, silver, and vanadium in SWMU 25 soil is not warranted.

A closer examination of each of these compounds is presented below:

- **Antimony** was detected in 8 of 21 surface soil samples analyzed for metals. Only four of the detections exceeded the RRS-1 concentration of 0.56 mg/kg. These detections of antimony occurred at T022 (0.96 J mg/kg), T022-duplicate (1.0 J mg/kg), T023 (2.0 J mg/kg), and T025 (1.2 J mg/kg). Each detection also exceeded the MSC of 0.6 mg/kg. In subsurface soil, antimony was detected in 7 of 36 samples analyzed for metals. None of the 36 detections exceeded the RRS-1/RRS-2 concentration of 0.712 mg/kg. The percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for antimony is 8.3 percent (4 of 48 analyses). The T022, T023, and T025 detections were not confirmed by companion borings B829, B830, and B812. Consequently, antimony is considered to be below background at SWMU 25.

- **Cobalt** was detected in 19 of 21 surface soil samples; however, none of the detections exceeded the surface RRS-1 concentration of 11.05 mg/kg. Cobalt was detected in 38 of 38 subsurface soil samples analyzed for metals. Three of the 34 samples exceeded the RRS-1 concentration of 6.19 mg/kg; however, each of the detections was well below the RRS-2 concentration of 610 mg/kg. Specifically, cobalt was detected above RRS-1 at B816-10' duplicate (6.3 F mg/kg) but not in the parent sample, T021-10' (6.4 F mg/kg), and T022-11' (6.8 F mg/kg). All of these detections were less than 10 percent above background. In addition, the percentage of cobalt detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 5.1 percent (3 of 59 analyses).

- **Copper** was detected in all 22 surface soil samples analyzed for metals. Of the 22 samples analyzed, three detections exceeded the RRS-1 concentration of 17.37 mg/kg. These detections of copper above RRS-1 occurred at B815 (25.5 mg/kg), T022 duplicate (21.3 J mg/kg) but not in the parent sample; and T023 (47.6 J mg/kg). Each of these detections is well below the RRS-2 concentration 130 mg/kg. Copper was detected in 38 of 38 subsurface soil samples; however, none of the detections exceeded the RRS-1 concentration of 13.72 mg/kg. The percentage of copper detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 5.0 percent (3 of 60 analyses).

- **Mercury** was detected in 13 of 22 surface soil samples. Only one of the detections exceeded the RRS-1 concentration of 0.14 mg/kg and the MSC of 0.2 mg/kg. This detection of mercury at a concentration of 0.43 mg/kg in the surface interval of T023 was subsequently not confirmed by surface sample location B836. Mercury was also detected in 7 of 38 subsurface soil samples analyzed for this element. Only one of the detections, a concentration of 0.12 mg/kg in the 20-foot interval of B813 exceeded the RRS-1 concentration of 0.035 mg/kg (the MDL for mercury); however, this detection was below the MSC of 0.2 mg/kg. Detections of mercury at SWMU 25 are believed to be natural variations of background and are not considered to be related to historical site activities. In addition, the percentage of mercury detections greater than RRS-1 compared to total analyses of combined surface and subsurface soil is 3.33 percent (2 of 60 analyses).

- **Silver** was detected in 3 of 21 surface soil samples analyzed for this element. All three of the detections of silver exceeded the RRS-1 concentration of 0.213 mg/kg; however all of the detections were well below the RRS-2 concentration of 51 mg/kg. Specifically, silver was detected above RRS-1 in surface soil at B831 (0.27 mg/kg), B831 duplicate (0.27 mg/kg), and B815 (2.7 F mg/kg). Silver was not detected in 38 subsurface soil samples analyzed for this element. Silver detections at SWMU 25 are believed to be natural variations of background conditions and are not considered related to historical site activities. The percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for silver is 5.1 percent (3 of 59 analyses).

- **Vanadium** was detected in all 21 surface soil samples analyzed for metals; however, none of the detections exceeded the RRS-1 concentration of 46.3 mg/kg. Vanadium was also detected in all 39 subsurface soil samples analyzed for metals. Six of the 39 detections exceeded the RRS-1 concentration of 37.4 mg/kg. None of the detections exceeded the RRS-2 concentration of 72.0 mg/kg. Specifically, vanadium was detected above RRS-1

at B813-15' (42.7 J mg/kg), B816-10' (45.3 J mg/kg), B816-10' duplicate (43.9 J mg/kg), B818-10' (41.4 J mg/kg), B831-15' (38.3 mg/kg), and B832-10' (42.2 mg/kg). In addition, the percentage of detections greater than RRS-1 compared to total analyses in combined surface and subsurface soil for vanadium was 10 percent (6 of 60 analyses). As all vanadium detections are less than 17 percent over the background concentration of 37.4 mg/kg, detections of vanadium at SWMU 25 are believed to be natural variations of background conditions and not considered related to historical site activities.

As previously noted in Section 5.1.2, statistical analysis of analytical results for arsenic indicate that detected concentrations of arsenic are statistically the same as developed background concentrations. Similarly, as previously noted in Section 5.1.1, statistical analysis indicated that detected thallium concentrations are actually lower than developed background concentrations. Specific detections and concentration ranges at SWMU 25 are presented below:

- **Arsenic** was detected in 16 of 21 surface soil samples analyzed for metals. Five of the samples exceeded the surface RRS-1/RRS-2 concentration of 5.85 mg/kg. Specifically, arsenic was detected above RRS-1 in surface soil at B813 (8 F mg/kg), B814 (8.5 F mg/kg), B814 duplicate (6.2 F mg/kg), B816 (6.5 F mg/kg), and B818 (8.9 F mg/kg). Arsenic was also detected in 28 of 38 subsurface soil samples analyzed for metals. Ten of the 38 detections exceeded the subsurface RRS-1/RRS-2 concentration of 6.58 mg/kg. Detections above RRS-1 ranged from 7.5 mg/kg to 23.6 mg/kg, with an average concentration of 12.31 mg/kg.

- **Thallium** was detected in 5 of 18 surface soil samples analyzed for metals. Each of the five detections exceeded the RRS-1/RRS-2 concentration of 2.43 mg/kg. Specifically, thallium was detected in surface soil at B812 (10.8 F mg/kg), B816 (19.3 F mg/kg), B817 (19.1 F mg/kg), B817 duplicate (17.2 F mg/kg), and B818 (21.6 F mg/kg). Thallium was also detected in 11 of 30 subsurface soil samples analyzed for metals. All 11 of the detections exceeded the RRS-1/RRS-2 concentration of 1.5 mg/kg. Detections above RRS-1 ranged from 9.8 mg/kg to 36.3 mg/kg, with an average concentration of 23.8 mg/kg.

A subset of two metals were inaccurately detected above background due to matrix interference. As presented in Section 5.1.3, detections of selenium and chromium above background resulted from matrix interference inherent with the SW6010 ICP-standard analytical method for metals. The matrix interference induces false positive detections of selenium, and artificially elevates concentrations of detected chromium. Detections of chromium below 40 mg/kg using SW6010 ICP-standard are interpreted as detections below background. Specific detections and concentration ranges at SWMU 25 are presented below:

- **Selenium** was detected in 5 of 18 surface soil samples analyzed for metals. Each of the five detections exceeded the RRS-1 concentration of 0.907 mg/kg and the RRS-2 concentration of 5.0 mg/kg. Specifically, selenium was detected in surface soil at B812 (5.9 F mg/kg), B816 (8.4 F mg/kg), B817 (5.5 F mg/kg), B817 duplicate (6.3 F mg/kg), and B818 (13.5 F mg/kg). Selenium was also detected in 12 of 30 subsurface soil samples analyzed for metals. Each of the 12 detections exceeded the RRS-1 concentration of 0.313 mg/kg, with 9 detections exceeding the RRS-2 concentration of 5.0 mg/kg. Detections

above RRS-1 ranged from 0.59 mg/kg to 19.4 mg/kg, with an average concentration of 9.12 mg/kg. Selenium detections within this range of concentrations using SW6010-standard are believed to be false positives, and therefore, did not warrant further investigation.

- **Chromium** was detected in 26 of 27 surface soil samples analyzed for metals. Eight of the detections exceeded the RRS-1/RRS-2 concentration of 25.86 mg/kg. Detections above RRS-1 ranged from 26.1 mg/kg to 94.4 mg/kg, with an average concentration of 46.24 mg/kg. Significant Standard 3 detections of chromium only occurred in the surface soil of SWMU 25. These locations were B815 (94.4 mg/kg), T022 (42.5 J mg/kg), T023 (63.5 mg/kg) and T025 (56.4 F mg/kg). Confirmation/SPLP sampling and analysis was performed for each of these detections. The detection of 94.4 mg/kg at B815 was confirmed below RRS-1 at a concentration of 9.6 mg/kg; the detection of 42.5 J mg/kg at T022 was confirmed at a much higher concentration of 111 mg/kg in companion boring B829 and the concentration of the SPLP extraction from this boring was below the industrial groundwater MSC; the detection of 63.5 mg/kg at B830 was confirmed at a lower concentration of 31.7 mg/kg and the concentration of the SPLP extraction from this boring was below the industrial groundwater MSC. The current site-specific MSC at SWMU 25 for chromium is 111 mg/kg. Chromium in surface soil is delineated to the north by the Standard 1 confirmation detection at B815; to the east by B842, B814, and B817; to the south by B816 with a concentration 27.2 mg/kg, which is considered to be a natural variation of background, and farther to the south at SWMU 17 borings B702 and B703 (depicted in Figure 5.12); and to the west by B831 and B822. The confirmed Standard 3 detection at T022/B829 was removed in excavation LF-8E and confirmation samples were collected in the surface north, south, east and west along the excavation walls (IT Corporation, 2001). Chromium is Standard 2 at SWMU 25.

  Chromium was also detected in 37 of 40 subsurface soil samples analyzed for metals. Ten of the 40 samples exceeded the RRS-1/RRS-2 concentration of 16.31 mg/kg. Detections above RRS-1 ranged from 17.1 mg/kg to 26.4 mg/kg, with an average concentration of 21.81 mg/kg. These concentrations were not significantly over the base background value of 16.31 mg/kg. Although not incorporated by project ARARs, each detection is below the State of Texas background value of 30 mg/kg. For reference, the State of Texas background values are presented in Table 5.9. Since it is believed that interference inherent with the SW6010 ICP-standard analytical method for metals artificially elevated detected concentrations of chromium, and as all subsurface chromium detections at SWMU 25 are below 30 mg/kg, they are interpreted as being reflective of base background conditions and do not warrant further investigation.

Other inorganic detections observed in SWMU 25 soil included barium, beryllium, cadmium, lead, and zinc at Standard 2 and 3 concentrations. These inorganics are discussed below.

- **Barium** was detected in 31 of 31 surface soil samples. Twelve of the detections were above the RRS-1/RRS-2 concentration of 233 mg/kg. Detections above RRS-1 ranged from 347 mg/kg to 23100 mg/kg, with an average concentration of 3188 mg/kg and a standard deviation of 6382 mg/kg. Significant Standard 3 detections of barium in surface

soil occurred at B815 (23100 mg/kg), T022 (1630 J mg/kg), T023 (3620 mg/kg), and T025 (3900 J mg/kg). Confirmation/SPLP sampling and analysis was performed for each of these detections. The detection of 23100 mg/kg at B815 was confirmed at a much lower concentration of 1140 mg/kg and the concentration of the SPLP extraction was below the industrial groundwater MSC. The detection of 1630 J mg/kg at B829 was confirmed at a higher concentration of 3340 mg/kg and the concentration of the SPLP extraction was below the industrial groundwater MSC. The detection of 3620 mg/kg at T023 was confirmed at a lower concentration of 1160 mg/kg, and the concentration of the SPLP extraction was below the groundwater MSC. The current site-specific MSC for barium is 3340 mg/kg. Barium detections in SWMU 25 surface soil are delineated to the north by B821 and B847; to the east by B842, T026, T027, T028, and B817; to the south by B818, and SWMU 17 borings B702 and B703; and to the west by B832, B833, and B848.

Barium was also detected in 38 of 38 subsurface soil samples analyzed for metals. Only four of 38 analyses exceeded the RRS-1 concentration of 128.1 mg/kg. The detection of barium at B812-5' (131 mg/kg), B816-10' (136 mg/kg), B816-10' duplicate (142 mg/kg), and T024-15' (145 J mg/kg), exceeded RRS-1. None of the subsurface detections exceeded the MSC of 200 mg/kg. Although these Standard 2 detections of barium in subsurface soil are believed to be natural variations of background, the detections are delineated to the north by B815; to the east by B814 and B817; to the south by SWMU 17 borings B701 and B702; and to the west by B831, B822, and B813.

- **Beryllium** was detected in 22 of 27 surface soil samples. Only one of the detections, a concentration of 14.4 mg/kg at B815, exceeded the RRS-1 concentration of 1.02 mg/kg. This detection of beryllium was subsequently not confirmed above RRS-1 with a concentration of 0.28 mg/kg. Beryllium was detected in 34 of 44 subsurface soil samples analyzed for metals. Four the detections exceeded the RRS-1 concentration of 1.13 mg/kg. All four of these detections exceeded the RRS-2 concentration of 1.13 mg/kg. Specifically, beryllium was detected at B816-10' (1.2 mg/kg) and B816-10' duplicate (1.2 mg/kg), however, these detections were subsequently not confirmed above RRS-1 with a concentration of 0.7 mg/kg using the more definitive SW6010-trace method. Other detections of beryllium occurred at B832-10' (1.2 mg/kg) and the B832-10' confirmation (1.3 mg/kg). The concentration of the SPLP extraction from the confirmation sample was below the industrial groundwater MSC and the current site-specific MSC for beryllium is 1.3 mg/kg. Beryllium in the subsurface at B832 is delineated to the north by B822, to the east by B831, to the south by B850, and to the west by B849.

- **Cadmium** was detected in 24 of 32 surface soil samples analyzed for metals. Eleven of the detections exceeded the RRS-1/RRS-2 concentration of 0.556 mg/kg. Detections above RRS-1 ranged from 0.57 mg/kg to 5.4 mg/kg, with an average concentration of 1.24 mg/kg. Cadmium was detected in 6 of 38 subsurface soil samples analyzed for metals; however, none of the detections exceeded the RRS-1/RRS-2 concentration of 0.59 mg/kg. Significant Standard 3 detections of cadmium in surface soil occurred at B816 (0.99 F mg/kg), B817 (0.96 F mg/kg), and T023 (5.4 mg/kg). Confirmation/SPLP sampling and analysis was performed for each of these detections. The detection of 0.99 F mg/kg at B816 was confirmed at a much lower concentration of 0.57 mg/kg and the concentration

of the SPLP extraction from this boring was below the groundwater MSC. The detection of 0.96 F mg/kg at B817 was confirmed below RRS-1 at a concentration of 0.42 mg/kg. The detection of 5.4 mg/kg at T023 was confirmed at a lower concentration of 0.83 mg/kg and this detection of the concentration of the SPLP extraction from this boring was below the industrial groundwater MSC. The current site-specific MSC for cadmium is 0.83 mg/kg. Cadmium in surface soil is delineated to the north by B815, to the east by B814 and the unconfirmed detection at B817; to the south by the confirmation detection of 0.57 mg/kg at B816, which is considered to be a natural variation of background; and to the west by B831, B822, and B813. The confirmed Standard 3 detection at T022/B829 was removed in excavation LF-08E and confirmation samples were collected in the surface north, south, east and west along the excavation walls (IT Corporation, 2001). Cadmium is Standard 2 at SWMU 25.

- **Lead** was detected in 36 of 36 surface soil samples analyzed for metals. Nineteen of the 36 samples exceeded the RRS-1/RRS-2 concentration of 30.97 mg/kg. Detections above RRS-1 ranged from 54.6 mg/kg to 1050 mg/kg, with an average concentration of 269 mg/kg. Most significant Standard 3 detections of lead only occurred in the surface soil of SWMU 25. These locations were B815 (363 mg/kg), T022 (325 mg/kg), T022 duplicate (430 J mg/kg), B829 (1050 mg/kg), B812 (245 J mg/kg), B812 duplicate (168 F mg/kg), T025 (387 J mg/kg), T023 (519 J mg/kg), B830 (519 J mg/kg), B816 (89.4 mg/kg), and B835 (83.7 mg/kg). The only significant detection of lead in subsurface soil occurred at T027-3' (136 J mg/kg). As displayed in Table 5.20, confirmation/SPLP sampling and analysis was performed for many of these detections. All detections of lead over 100 mg/kg analyzed for confirmation were confirmed and the concentrations of the SPLP extractions were above the industrial groundwater MSC. However, detections of lead below 90 mg/kg were confirmed at lower concentrations and the concentrations of the SPLP extractions were below the industrial groundwater MSC. For example, the detection of lead at B835 (83.7 mg/kg) was confirmed at a concentration of 54.6 J mg/kg. The detection of lead at B816 (89.4 mg/kg) was confirmed at a concentration of 69.2 J mg/kg. The concentrations of the SPLP extractions from both of these borings were below the industrial groundwater MSC. The current site-specific MSC for lead is 69.2 mg/kg. Lead in surface soil is delineated to the north by B821; to the east by B842, B814, and B845; to the south by B846 and the SWMU 17 boring B704; and to the west by B832, B833, and B834.

As depicted in Figure 5.25, a total of five excavations were completed as part of an IRA to remove SWMU 25 soil contaminated with Standard 3 detections of metals, in particular lead. Excavation LF-8A was centered on test pits T023 and T025 as well as borings B812 and B830. The dimensions of excavation LF-8A were 4448 square feet by 2 feet deep to remove approximately 358 cubic yards of soil. An additional smaller excavation within LF-8A, centered on B812 and measuring 100 square feet by 8 feet deep, removed approximately 23 cubic yards of soil. This additional excavation was used to remove lead contaminated soil in the 5-foot interval of B812. Excavation LF-8D measured 100 square feet by 2 feet deep and was centered on B815. Excavation LF-8E, centered on T022 and B829, measured 450 square feet by 2 feet deep, and approximately 34 cubic yards of soil were removed. Excavation LF-8F, centered on T027, was 450 square feet by 5 feet deep,

and approximately 84 cubic yards of soil were removed. Excavation confirmation samples were collected from each side wall and multiple floor samples were collected. IRA excavation confirmation results show that all target CPOCs were removed in the excavations. The validated IRA results are presented in Appendix M. Contaminants driving the need for the excavations are highlighted in red on Figures 8.23 and 8.24.

Lead was also detected in 42 of 46 subsurface soil samples analyzed for metals. Six of the 46 samples exceeded the RRS-1/RRS-2 concentration of 12.66 mg/kg. Detections above RRS-1 ranged from 13.5 mg/kg to 136 mg/kg with an average concentration of 45.02 mg/kg. Significant detections of lead in subsurface soil occurred at B812-5' (73.2 mg/kg) and T027-3' (136 J mg/kg). These intervals were both removed in excavations LF-08A and LF-08F as part of IRA activities at SWMU 25 (IT Corporation, 2001). Less significant detections of lead in subsurface soil occurred at B816-5' (13.3 F), B832-5' (17.5 mg/kg) B849-5' (13.5 J mg/kg), and B850-5' (16.6 F mg/kg). These detections are considered to be natural variations of background conditions not related to site activities.

All of the detections of lead remaining in SWMU 25 soils are considered Standard 2 since each detection is below the site-specific MSC of 69.2 mg/kg.

- **Zinc** was detected in 23 of 24 surface soil samples analyzed for metals. Twelve of the 24 detections exceeded the RRS-1 concentration of 38.8 mg/kg. Detections above RRS-1 ranged from 40 mg/kg to 419 mg/kg with an average concentration of 108.51 mg/kg. These detections are well below the RRS-2 concentration of 3100 mg/kg for zinc. Significant detections of zinc in surface soils occurred at B815 (299 J mg/kg) and T022 duplicate (109 J mg/kg), but with a lower concentration in the parent sample (84.4 J mg/kg), T023 (419 J mg/kg), and T025 (64.4 J mg/kg). These sample intervals were all removed in excavations LF-8D, LF-8E, and LF-8A as part of the IRA to remove lead contaminated soil. Zinc is delineated in surface soil to the north by excavations LF-8D, LF-8E, and LF-8A; to the east by B842, B814, and B817; to the south by a low concentration above background at B816 (43.7 J mg/kg); and to the west by low concentrations above background at B831 (40.0 mg/kg) and B820 (40.6 mg/kg), as well as less than RRS-1 concentrations at B822.

- Zinc was detected in 35 of 35 subsurface soil samples analyzed for metals. Eight of the detections exceeded the RRS-1 concentration of 31.3 mg/kg. Detections above RRS-1 ranged from 32.4 mg/kg to 80.4 mg/kg with an average concentration of 41.85 mg/kg. These detections are also well below the RRS-2 concentration of 3100 mg/kg for zinc. Specifically, zinc detections were at B812-5' (38.1 J mg/kg), B813-15' (39.5 J mg/kg), B816-10' (35.3 J mg/kg), B816-10' duplicate (35.8 J mg/kg), B831-15' (32.4 F mg/kg), B831-20' (33.8 mg/kg), T024-15' (39.5 J mg/kg), and T027-3' (80.4 J mg/kg). With the exception of the T027-3' detection that was removed in excavation LF-8F, the other detections are not significantly over background and are regarded as natural variations of the base subsurface background value of 31.3 mg/kg.

5.5.6.1.1 Sulfides

The analytical method used to determine sulfide concentrations, Method SW9030, is a titration screening method. This method is not considered to be definitive, but rather is designated by the EPA as producing Level 2 data quality (see Section 5.1.7). Sulfides were detected in subsurface soils at two SWMU 25 soil borings (B812 and B822).

- **Sulfide** was detected in 11 of 42 soil samples analyzed for this compound. Seven of the detections exceeded the RRS-1 concentration of 25.0 mg/kg. Detections above RRS-1 ranged from 33.6 mg/kg to 73.9 mg/kg with an average concentration of 43.16 mg/kg. The percentage of total confirmed detections of sulfide at SWMU 25 was 16.7 percent (7 of 42 analyses).

  As discussed in Section 5.1.6, sulfide was eliminated from consideration in delineation sampling because it was detected sporadically at low concentrations, and because a specific MSC could not be calculated or otherwise obtained.

5.5.6.2 Organic Analytical Results

Initial analytical results at SWMU 25 indicated the presence of Standard 2 concentrations of VOCs. Additionally, a mixture of Standard 2 and 3 concentrations of a subset of SVOCs, commonly associated with asphalt, were found throughout SWMU 25. A discussion of general statistics and interpreted results is presented for each Appendix IX analyte. Where analytes fall into specific categories or associated suites, an interpretive discussion is presented above that group of analytes.

5.5.6.2.1 Volatile Organic Compounds

A mixed subset of VOCs exhibited a combination of low concentrations and low frequency of occurrence. These compounds included 2-hexanone, methyl isobutyl ketone, and tetrachloroethene. Since it is unlikely that detected concentrations of these compounds are related to a significant site release, and the frequency of detection for these compounds is below the five percent threshold described in Section III of the TNRCC Consistency Memorandum (TNRCC, 1998a), further delineation of these compounds is not warranted.

A brief set of general statistics is presented below for each of the Appendix IX compounds detected above RRS-1:

- **2-Hexanone** was detected in only 2 of 46 soil samples (4.35 percent) analyzed for this compound. This detection in the surface interval of B814, at a concentration of 0.006 J mg/kg, exceeded the RRS-1 concentration of 0.005 mg/kg. An RRS-2 concentration for 2-hexanone is not provided by the TNRCC, and one was not calculated.

- **Methyl Isobutyl Ketone** was detected in 1 of 46 soil samples (2.17 percent) analyzed for this compound. This detection, a concentration of 0.016 J mg/kg at the surface interval

of B815, exceeded the RRS-1 concentration of 0.005 mg/kg. The detection of methyl isobutyl ketone was well below the RRS-2 concentration of 820 mg/kg.

- **Tetrachloroethene (PCE)** was detected in 2 of 63 (3.2 percent) of the soil samples analyzed for VOCs. Both detections exceeded the RRS-1 concentration of 0.005 mg/kg. However, the detections were well below the RRS-2 concentration of 0.5 mg/kg. The detection of PCE at B812-surface duplicate (0.056 J mg/kg) was not confirmed by the parent sample. The detection of PCE at B816-10' (0.007 mg/kg) was also not confirmed by the B816-10' duplicate sample.

Another subset of VOCs were similarly detected at low concentrations; however, they were detected at frequencies ranging from 8 percent to 22 percent of samples analyzed (> 20 total samples). These VOCs included *cis*-1,2-dichlorethene, toluene, and trichloroethene. As these compounds were detected at low concentrations well below the MSC, it is presumed that these compounds are not related to a significant release from the unit. Nevertheless, these VOCs, were delineated.

- ***cis*-1,2-Dichlorobenzene** was detected in 5 of 63 soil samples (7.94 percent) analyzed for VOCs. Only one detection (1.6 percent), a concentration of 0.008 mg/kg in the 15-foot interval of B812, exceeded the RRS-1 concentration of 0.005 mg/kg. However, this detection is well below the RRS-2 concentration of 7 mg/kg. Although the concentrations and frequency of detection is low, *cis*-1,2-dichlorobenzene is delineated to the north by B815, to the east by B814, to the south by B816, and to the west by B822.

- **Toluene** was detected in 16 of 74 soil samples (21.6 percent) analyzed for this compound. Eight of the detections (10.8 percent) exceeded the RRS-1 concentration of 0.005 mg/kg. However, each of these detections was well below the RRS-2 concentration of 100 mg/kg. The minimum and maximum detections above RRS-1 were 0.007 mg/kg and 0.027 mg/kg respectively, with an average concentration of 0.02 mg/kg and a standard deviation of 0.01 mg/kg. Specifically, toluene was detected above RRS-1 at B815-surface (0.017 J mg/kg), B822-5' (0.024 mg/kg), B822-10' (0.013 mg/kg), B822-15' (0.007 mg/kg), B822-20' (0.027 mg/kg), B831-5' (0.01 mg/kg), B831-10' (0.023 mg/kg), and B831-15' (0.009 mg/kg). These Standard 2 detections of toluene are delineated to the north by B813 and B815; to the east by B814 and B817; to the south by B816; and to the west by B832 and B833.

- **Trichloroethene (TCE)** was detected in 9 of 68 (13.2 percent) soil samples analyzed for VOCs. Five (7.4 percent) of the detections exceeded the RRS-1 concentration of 0.005 mg/kg. Detections above RRS-1 ranged from 0.0059 mg/kg to 0.052 mg/kg, with an average concentration of 0.02 mg/kg and a standard deviation of 0.02 mg/kg. All of the detections were well below the RRS-2 concentration of 0.5 mg/kg. Detections of TCE above RRS-1 occurred at B812-15' (0.052 mg/kg), B814-10' (0.012 mg/kg), T022-11' (0.0059 F mg/kg), W801-5' (0.016 J mg/kg), and B812-surface duplicate (0.026 J mg/kg), but not in the B812 parent sample. The detection of TCE at T022-11' was not confirmed by companion boring B829. The detection of TCE in B814 was collected below the water table (which contains TCE), and likely does not reflect an actual soil concentration. All

of the Standard 2 detections of TCE are delineated to the north by B815; to the east by B842, B843, and B817; to the south by B816; and to the west by B831 and B832.

The remaining group of VOCs are considered to be laboratory artifacts, consistent with guidelines provided in the TNRCC Consistency Memorandum, Section III (see Section 5.1.6). This group exhibited sporadic detections at low concentrations with low standard deviations. The low concentrations and standard deviations are indicators that the detections are not related to a release. In contrast, a high standard deviation would indicate hot spots or potential releases areas. As presented in Section 5.1.6, these compounds exhibit high solubility and volatility. Therefore, they would be expected to either rapidly volatilize under local climate conditions or move into groundwater with precipitation. These compounds were not detected in groundwater and are not believed to be real investigative detections.

- **Acetone**, a common laboratory contaminant, was detected in 16 of 54 (29.63 percent) soil samples analyzed for this compound. All 16 of the detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, all of the detections were well below the RRS-2 concentration of 1000 mg/kg. The minimum and maximum detections above RRS-1 were 0.006 mg/kg and 0.19 mg/kg respectively, with an average concentration of 0.05 mg/kg and a standard deviation of 0.05 mg/kg.

- **Methyl Ethyl Ketone (MEK)**, a common laboratory contaminant, was detected in 4 of 47 soil samples (8.51 percent) analyzed for this compound. All four of the detections exceeded the RRS-1 concentration of 0.005 mg/kg; however, all of the detections were well below the RRS-2 concentration of 6100 mg/kg. These sporadic detections of MEK were located at B813-15' (0.01 mg/kg), B818-10' (0.021 mg/kg), B831-15' (0.008 mg/kg), and B832-15' (0.045 mg/kg).

- **Methylene chloride**, a common laboratory contaminant, was detected in 6 of 65 soil samples (9.23 percent) analyzed for VOCs. Five of the detections exceeded the RRS-1 concentration of 0.002 mg/kg; however, all of the detections were well below the RRS-2 concentration of 0.5 mg/kg. Sporadic detections of methylene chloride above RRS-1 were located at B822-surface (0.007 mg/kg), B822-10' (0.003 mg/kg), B831-surface duplicate (0.003 J mg/kg), but not above RRS-1 in the B831 parent sample (0.002 J mg/kg), W801-surface (0.003 mg/kg),and W803-surface (0.003 mg/kg).

5.5.6.2.2 Semivolatile Organic Compounds

Several SVOCs were detected in surface soil samples collected within SWMU 25. Variances in the total number of analyses for individual compounds is due to the use of both SW8270 and SW8310, as well as reduced analyte lists for confirmation/delineation samples. The analyte list for EPA Method SW8310 (PAHs), which was used for delineation sampling because of lower detection limits, is a subset of the analyte list for SW8270.

Results of initial analyses for SVOCs reveal Standard 2 and Standard 3 concentrations of a suite of SVOCs associated with asphalt and the combustion of fossil fuels. These SVOCs, composed primarily of PAHs, were only detected in surface soil at SWMU 25. The PAHs included

acenaphthene, anthracene, benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*g,h,i*]perylene, benzo[*k*]fluoranthene, chrysene, dibenzo[*a,h*]anthracene, fluoranthene, indeno[1,2,3-*c,d*]pyrene, naphthalene, phenanthrene, and pyrene. A brief description of general statistics for each of these compounds is discussed below. This description is followed by a discussion of delineation and confirmation/SPLP results for the whole suite of PAHs.

As presented in Figures 5.23 and 5.24, and Table 5.18 and 5.19, SVOCs detected above background concentrations include a suite of PAHs commonly associated with asphalt:

- **Acenaphthene** was detected in 8 of 78 soil samples (10.3 percent) analyzed for SVOCs. Four of the detections (5.1 percent) exceeded the RRS-1 concentration of 0.33 mg/kg; however, each of the detections was well below the MSC of 610 mg/kg. The detections above RRS-1 occurred in the surface interval of B817-surface (0.62 J mg/kg), B817-surface duplicate (0.36 J mg/kg), B840-surface (2.5 mg/kg), and B812- surface duplicate (0.7 J mg/kg), but not in the parent sample.

- **Anthracene** was detected in 18 of 78 soil samples (23.1 percent) analyzed for SVOCs. Nine of the detections (11.5 percent) exceeded the RRS-1 concentration of 0.33 mg/kg; however, all of the detections were well below the MSC of 3100 mg/kg. The minimum and maximum detections above RRS-1 were 0.42 mg/kg and 5.4 mg/kg respectively, with an average concentration of 2.4 mg/kg.

- **Benzo[*a*]anthracene** was detected in 26 of 78 soil samples (33.3 percent) analyzed for SVOCs and PAHs. Twenty two detections (28.2 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.009 mg/kg. Seventeen of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.0096 mg/kg and 40.0 mg/kg respectively, with an average concentration of 5.25 mg/kg.

- **Benzo[*a*]pyrene** was detected in 30 of 78 soil samples (38.5 percent) analyzed for SVOCs and PAHs. Twenty three of the detections (29.5 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.015 mg/kg. All 23 of the detections exceeded the MSC of 0.02 mg/kg. The minimum and maximum detections above RRS-1 were 0.024 mg/kg and 45.0 mg/kg respectively, with an average concentration of 5.9 mg/kg.

- **Benzo[*b*]fluoranthene** was detected in 33 of 78 soil samples (42.3 percent) analyzed for SVOCs and PAHs. Twenty three of the detections (29.5 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.012 mg/kg. Twenty one of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.021 mg/kg and 51.0 mg/kg respectively, with an average concentration of 7.06 mg/kg.

- **Benzo[*g,h,i*]perylene** was detected in 28 of 76 soil samples (36.9 percent) analyzed for SVOCs. Eighteen of the detections (23.7 percent) exceeded the RRS-1 concentration of 0.33 mg/kg. However, each of these detections was well below the MSC of 310 mg/kg.

The minimum and maximum detections above RRS-1 were 0.39 mg/kg and 37.0 mg/kg respectively, with an average concentration of 4.73 mg/kg.

- **Benzo[*k*]fluoranthene** was detected in 19 of 61 soil samples (31.2 percent) analyzed for SVOCs and PAHs. Twelve of the detections (19.7 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.011 mg/kg. Eight of the detections exceeded the MSC of 0.39 mg/kg. The minimum and maximum detections above RRS-1 were 0.014 mg/kg and 31.0 mg/kg respectively, with an average concentration of 4.46 mg/kg.

- **Chrysene** was detected in 29 of 78 soil samples (37.2 percent) analyzed for SVOCs and PAHs. Eighteen of the detections (23.1 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.1 mg/kg. Ten of the detections exceeded the MSC of 3.9 mg/kg. The minimum and maximum detections above RRS-1 were 0.46 mg/kg and 46.0 mg/kg respectively, with an average concentration of 8.03 mg/kg.

- **Dibenzo[*a,h*]anthracene** was detected in 21 of 78 soil samples (26.9 percent) analyzed for SVOCs and PAHs. Sixteen of the detections (20.5 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.02 mg/kg. All sixteen detections also exceeded the MSC of 0.02 mg/kg. The minimum and maximum detections above RRS-1 were 0.021 mg/kg and 4.6 mg/kg respectively, with an average concentration of 1.14 mg/kg.

- **Fluoranthene** was detected in 32 of 78 soil samples (41 percent) analyzed for SVOCs and PAHs. Twenty one of the detections (26.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.14 mg/kg. However, all of the detections were well below the MSC of 410 mg/kg. The minimum and maximum detections above RRS-1 were 0.36 mg/kg and 81.0 mg/kg respectively, with an average concentration of 12.55 mg/kg.

- **Fluorene** was detected in 7 of 78 soil samples (9 percent) analyzed for SVOCs and PAHs. Three of the detections (3.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.14 mg/kg. However, all of the detections were well below the MSC of 410 mg/kg. Fluorene was detected at B812-surface duplicate (0.62 J mg/kg) but was not confirmed by the parent sample. Likewise, fluorene was detected at B817-surface (0.41 J mg/kg) but was not confirmed in the duplicate. The highest detection of fluorine remaining at SWMU 25 occurred at B840 (1.5 mg/kg).

- **Indeno[1,2,3-*c,d*]pyrene** was detected in 30 of 80 soil samples (37.5 percent) analyzed for SVOCs and PAHs. A total of twenty 23 detections (29 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.03 mg/kg. Twenty one of the detections exceeded the MSC of 0.039 mg/kg. The minimum and maximum detections above RRS-1 were 0.032 mg/kg and 45.0 mg/kg respectively, with an average concentration of 4.45 mg/kg.

- **Phenanthrene** was detected in 25 of 78 soil samples (32 percent) analyzed for SVOCs and PAHs. A total of 16 detections (20.5 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.42 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.4 mg/kg and 43.0 mg/kg respectively, with an average concentration of 7.67 mg/kg.

- **Pyrene** was detected in 30 of 78 soil samples (38.4 percent) analyzed for SVOCs and PAHs. A total of 21 detections (26.9 percent) exceeded the SW8270 RRS-1 concentration of 0.33 mg/kg and the SW8310 RRS-1 concentration of 0.18 mg/kg. However, all of the detections were well below the MSC of 310 mg/kg. The minimum and maximum detections above RRS-1 were 0.36 mg/kg and 110 mg/kg respectively, with an average concentration of 15.1 mg/kg.

Most of the significant detections of PAHs occurred in surface soil at each of these test pits or borings: T022, T023, T024, T025, T026, T027, B812, B813, B815, B816, B817, B820, B838, B840 and W801. Subsurface PAHs were detected at very low concentrations at T024-15', B816-5', and B815-15'. These PAH detections are delineated to the north by B821, to the east by B814 and very low concentrations at B835, to the south by SWMU 17 borings B702 and B704, and to the west by B819, B831, B822, and by very low concentrations at B833 and B834.

Seven of the delineated PAHs, associated with asphalt and the combustion of fossil fuels, are characterized by low MSCs and were detected at Standard 3 concentrations in SWMU 25 surface soils. These PAHs included benzo[*a*]anthracene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, chrysene, dibenzo[*a,h*]anthracene, and indeno[1,2,3-*c,d*]pyrene. As presented in Table 5.20, confirmation analysis for these PAHs was performed using SW8270 for samples collected at B838-surface for T025, B839-3' for T027, and B840-surface for T024. Analysis of PAH extracts for SPLP was performed using the more definitive SW8310 method to achieve lower reporting limits. Confirmation results showed that PAHs were not confirmed at B838/T027; PAHS were confirmed with significantly lower Standard 3 concentrations at T838/T025; and the PAH concentrations of the SPLP extracts from both T002 and T003 were below the industrial groundwater MSC (Figure 5.7). The highest detections of PAHs at SWMU 25 occurred at B840/T024; the PAH concentrations in the SPLP extract from B840 subsequently was below the industrial groundwater MSC. The new site-specific MSCs at SWMU 25 for these compounds are presented in Table 5.21.

Other SVOCs detected in SWMU 25 soils included the common laboratory artifact bis(2-ethylhexyl) phthalate and dibenzofuran, a byproduct associated with the burning of PAHs. Note that dibenzofuran was only detected in one sampling interval.

- **Bis(2-ethylhexyl)Phthalate (B2EHP),** was detected in 18 of 69 soil samples (26.1 percent) analyzed for SVOCs. Seven of the detections (10.1 percent) exceeded the RRS-1 of 0.33 mg/kg. Five samples exceeded the RRS-2 concentration 0.6 mg/kg. The minimum and maximum detections above RRS-1 were 0.34 mg/kg and 7.5 mg/kg respectively, with an average concentration of 2.57 mg/kg and a standard deviation of 2.73 mg/kg. Specifically, B2EHP was detected at B812-surface duplicate (4.7 J mg/kg) but was not confirmed in the

parent sample, B815-surface (0.8 mg/kg), B816-surface (0.34 mg/kg), T022-surface (0.81 mg/kg), T025-surface (0.52 F mg/kg), and T027-surface (7.5 mg/kg). All of these intervals were removed in excavations LF-8A, LF-8D, LF-8E and LF-8F as part of the IRA to remove soils contaminated with Standard 3 concentrations of metals (IT Corporation, 2001). The lone remaining detection of B2EHP occurred as an isolated detection at B813-15' (3.3 mg/kg). All of the detections of B2EHP are delineated to the north by B815, to the east by B814, to the south by B816, and to the west by B820

- **Dibenzofuran** was detected in 4 of 69 soil samples (5.8 percent) analyzed for SVOCs. The detection of 0.37 J mg/kg at B812-duplicate was not confirmed by the parent sample. Therefore it is presumed that the duplicate detection was a false positive. Dibenzofuran is presumed not to be present above RRS-1 in SWMU 25 soil.

5.6 GENERAL DISCUSSION OF GROUNDWATER RESULTS

Most analytes detected in groundwater near SWMUs 22, 23, 24, and 25 are associated with the basewide TCE plume affecting NAS Fort Worth JRB. Analytical results from monitoring wells located upgradient of SWMUs 22, 23, and 25 had significantly higher concentrations of chlorinated solvents than associated downgradient wells. However, concentrations of chlorinated solvents detected at SWMU 24 between 1997 and 2000 were nearly identical in both the upgradient and downgradient wells. These relationships have continued through several rounds of groundwater sampling between 1997 and 2000. It is important to note that groundwater contamination in the landfill area of NAS Fort Worth JRB, which includes SWMUs 22, 23, 24, and 25, is being addressed and remediated under a separate environmental restoration program. Groundwater elevations and flow directions in July 2000 are presented in Figure 5.6. Analytical results in groundwater are presented in Figure 5.26 and Table 5.22.

In addition to TCE, other VOCs likely associated with the basewide TCE plume exist in groundwater in the vicinity, both upgradient and downgradient, of SWMUs 22, 23, 24, and 25. These VOCs include: *cis* 1,2-dichloroethene; 1,1-dichloroethane 1,1-dichloroethene, *trans* 1,2-dichloroethene; tetrachloroethene; and vinyl chloride. These VOCs are being addressed with the basewide TCE plume under a separate and ongoing environmental restoration project.

It should be noted that quarterly groundwater monitoring is conducted on wells in the vicinity of SWMUs 22, 23, 24, and 25, in support of monitoring the basewide TCE plume. Groundwater data generated as part of the quarterly sampling, primarily VOC data, has not been provided in this report.

5.6.1 O,O,O-Triethyl Phosphorothioate and Matrix Interference

O,O,O-TEPA was first detected in WP07-10B in October 1999. Because O,O,O,-TEPA was also detected upgradient of WP07-10B in the 15-foot interval of the SWMU 23 boring, B509, several more rounds of groundwater sampling were performed to delineate the aerial extent of O,O,O,-TEPA in groundwater. However, during the last round of sampling in March 2000, O,O,O,-TEPA detections using EPA Method 8141 were not confirmed by Gas Chromatography/Mass Spectroscopy (GC/MS) in the Selective Ion Monitoring (SIM) mode using EPA Method SW8270-

SIM. The laboratory concluded that the analyte found and reported from the SW8141 GC run was not O,O,O-TEPA because all 15 detections of O,O,O-TEPA by SW8141 were not confirmed when analyzed using the more sensitive SW8270-SIM method. O,O,O,-TEPA was subsequently not confirmed by the SW8141 GC analysis when a differing temperature profile was employed. The compound found in the samples appears to behave similarly to O,O,O-TEPA but it is not an Appendix IX compound. A more detailed explanation of the O,O,O-TEPA confirmation analysis approach is outlined in a letter prepared by the analytical laboratory, Severn Trent Laboratories, Inc. This letter was attached to a letter submitted to the TNRCC by the USAF to document O,O,O-TEPA is not an Appendix IX compound. The TNRCC concurs (letter in Appendix L) and therefore, O,O,O-TEPA is not shown on any analytical tables.

5.6.2 SWMU 22 Groundwater Sampling Results

Groundwater analytical samples were collected between September 1997 and January 2000 from a total of four monitoring wells (FT19-12E, LF04-04, LF04-4B, and LF04-4D), in the vicinity of SWMU 22 (Figure 5.26). Three of these wells are located just outside the perimeter of the unit. Two wells are located hydraulically downgradient (LF04-04 and LF04-4D), one well is located hydraulically upgradient (FT09-12E), and the other well is located hydraulically cross-to-down gradient of SWMU 22 (LF04-4B).

There was only one detection of one metal, antimony, above the RRS-1 concentration. The Standard 2 antimony detection was from a sample collected at the upgradient monitoring well FT09-12E (Figure 5.26 and Table 5.22). Antimony was not detected in any samples collected from monitoring wells downgradient of SWMU 22.

A total of eight VOCs were detected above RRS-1 in groundwater samples collected from monitoring wells at SWMU 22. Six of these VOCs are attributable to the basewide TCE plume. The remaining two VOCs, chlorobenzene and dichlorodifluoromethane, were detected in samples from one monitoring well each, LF04-4D and FT09-12E, respectively. Monitoring well FT09-12E is located upgradient from SWMU 22, in the direction of a former fire training area (SWMU 19). Additionally, there were no detections of dichlorodifluoromethane during the SWMU 22 soil investigation. Therefore, without detections in site soils, and only an upgradient detection of dichlorodifluoromethane, it is concluded that this groundwater constituent is not related to past activities at SWMU 22. Chlorobenzene was detected in the sample collected from well LF04-4D, the duplicate to this parent sample, and in a subsequent sampling event. All detections are below RRS-2 and chlorobenzene is delineated by samples collected from wells FT09-12E, LF04-4B and LF04-04. Because this compound was not detected in any soil samples collected from SWMU 22, and since chlorobenzene was also detected in groundwater samples collected from monitoring wells both up and down gradient of SWMUs 23 and 24, chlorobenzene detections at LF04-4D are not likely the result of past activities at SWMU 22.

The was only one SVOC detected above RRS-1 in groundwater near SWMU 22. This SVOC, bis(2-ethylhexyl)phthalate, was not detected in the original parent sample, but was detected at a concentration above RRS-2 in the associated duplicate sample collected from monitoring well LF04-4D in 1999. This detection could not be confirmed in a subsequent sampling round (January 2000). This SVOC was not detected in any other wells at SWMU 22. As part of the soil

investigation at SWMU 22, bis(2-ethylhexyl)phthalate was detected at two sampling locations above RRS-2. The most significant of these detections was at boring BHGLTA406-5' (Figure 5.7). An interim remedial action to remove this elevated detection of bis(2-ethylhexyl)phthalate was successfully completed in the summer of 2000. Based on delineation of the compound in SWMU 22 soils, on removal of identified elevated concentrations of the SVOC in site soils, on detections of the compound in groundwater being limited to one well, and on the fact that this detection in groundwater could not be confirmed during a follow-on sampling event, it appears reasonable to conclude that groundwater has not been impacted by concentrations of bis(2-ethylhexyl)phthalate in site soils.

5.6.3 SWMU 23 Groundwater Sampling Results

Groundwater analytical samples were collected between May 1998 and April 2000 from six monitoring wells (WHGLTA702, WHGLTA703, LF05-5B, LF05-5C, WP07-10C, and WP07-10A), in the vicinity of SWMU 23. Four of these wells (LF05-5B, LF05-5C, WP07-10C, and WP07-10A), are located hydraulically downgradient of SWMU 23. One monitoring well (WHGLTA703), is located directly upgradient of SWMU 23, between SWMU 23 and SWMU 17. The remaining monitoring well (WHGLTA702) is located up-to-cross gradient of SWMU 23. Two temporary wells, WITCTA059 and WITCTA060, were installed inside SWMU 23 to screen for the presence of DNAPL within site limits. Although these two monitoring wells were not part of the two RFI groundwater sampling events, VOC data from groundwater samples collected at these locations is integrated into this overall discussion and associated figures. Monitoring wells WITCTA059 and WITCTA060, have since been abandoned.

Samples collected from RFI wells indicated the presence of several inorganics above RRS-1 concentrations. Arsenic, cobalt, iron, manganese, mercury, nickel, potassium, and silver were all detected above RRS-1. Iron, manganese, and potassium are not Appendix IX compounds required to be sampled for by the base RCRA Permit. Silver, mercury, and nickel were detected at Standard 2 concentrations in only one sample each, and all detections occurred in either up- or cross-gradient monitoring wells (WHGLTA703 and WHGLTA702). Mercury and nickel were not confirmed in subsequent sampling rounds. Confirmation sampling was not performed for silver. Cobalt was detected at Standard 2 concentrations at the upgradient monitoring well (WHGLTA703) and the up-to-cross-gradient monitoring well (WHGLTA702). Cobalt was not detected in later sampling rounds, nor was it detected in any downgradient monitoring wells.

Arsenic was detected above RRS-1 in three monitoring wells near SWMU 23. Two of these wells (WHGLTA703 and WHGLTA702), are located upgradient and cross-gradient, respectively, of SWMU 23. Arsenic was detected in one monitoring well located downgradient of SWMU 23 (WP07-10C). Arsenic was not detected in two other immediately downgradient monitoring wells (LF05-5B and LF05-5C). All detections of arsenic in groundwater near SWMU 23 were Standard 2 concentrations, and the highest concentration detected was at upgradient monitoring well WHGLTA703.

Cobalt, silver, nickel, and mercury were not detected in SWMU 23 soils above RRS-2. The isolated detections of these inorganics at monitoring wells located upgradient of SWMU 22 offers further evidence that they are not constituents of concern for SWMU 23 soils. Arsenic was

detected at six sampling locations in SWMU 23 soils. One of these six locations was excavated as a result of an interim remedial action targeted for a separate compound. Of the five sampling locations remaining, detected concentrations were evaluated to be statistically the same as basewide background concentrations (see Section 5.1.2). Considering the fact that the highest arsenic detections in groundwater were upgradient of SWMU 23, these groundwater findings do not appear to contradict the evaluation and findings of the soil investigation.

A total of 15 VOCs were detected above RRS-1 in groundwater samples collected from wells at SWMU 23. Of these 15 VOCs, 8 are likely related to the basewide TCE plume. The remaining seven VOCs detected above RRS-1 include: benzene, chlorobenzene, chloroform, 1,4-dichlorobenzene, methylene chloride, toluene, and total xylenes. Methylene chloride, toluene,1,4-dichlorobenzene, and total xylenes were only detected in one sampling round collected from temporary well WITCTA060, and were detected at concentrations below RRS-2. This well was installed as a temporary well, along with WITCTA059. These temporary wells were installed inside of SWMU 23 to screen for the presence of DNAPL within site limits and were only sampled once before they were abandoned. These three VOCs were also detected in a low number of soil samples collected from SWMU 23, and it may be possible that these compounds have impacted groundwater inside the unit. However, all isolated detections in soil and groundwater are at Standard 2 concentrations and are delineated within site limits.

Benzene was only detected in one sample collected from one monitoring well (WP07-10C), at SWMU 23. This well is also located in the downgradient direction from SWMU 24. However, benzene was not detected in any soil samples collected from either SWMU 23 or SWMU 24. Therefore, it does not appear as though benzene has been released from either of these two units to groundwater.

Chlorobenzene was detected in samples collected from three monitoring wells, LF05-5C, WP07-10C, and WHGLTA703. All chlorobenzene detections were above RRS-1, but below RRS-2 concentrations. Chlorobenzene was detected in one out of five samples collected from upgradient monitoring well WHGLTA703. The concentrations detected in the upgradient monitoring well, WHGLTA703, are comparable to those detected in the downgradient monitoring wells (LF05-5C and WP07-10C). Chlorobenzene concentrations in groundwater are delineated by monitoring wells LF05-19, WHGLTA704, WHGLTA701, and LF0404B. Chlorobenzene was only detected above RRS-1 in 2 out of a total of 46 soil samples collected from SWMU 23. Based on this information, and that this compound is also present in samples collected from upgradient monitoring wells, it is unlikely that SWMU 23 is a source for these low chlorobenzene detections in groundwater.

Chloroform was detected samples collected from three monitoring wells, WHGLTA701, WITCTA060, and LF05-5C at concentrations above RRS-1, but below RRS-2. Monitoring well WHGLTA701 is located upgradient of SWMU 23, and contained sample concentrations equal to that detected in the downgradient well, LF05-5C. As previously mentioned, WITCTA060 was installed inside SWMU 23 to screen for the presence of DNAPL within site limits. Only one sample was collected from this well because of its location within the unit. Chloroform was not

detected in any soil samples collected from SWMU 23. Based on this information, it does not appear that chloroform was released from SWMU 23.

No SVOCs were detected above RRS-1 in any groundwater samples collected at SWMU 23.

5.6.4 SWMU 24 Groundwater Sampling Results

Groundwater analytical samples were collected between September 1997 and March 2000 from five groundwater monitoring wells, four of which are located hydraulically downgradient from SWMU 24. These four wells are identified as WP07-10C, WP07-10B, LF05-19, and WHGLTA003 (Figure 5.26). In similar fashion to SWMU 23, two temporary wells, WITCTA057 and WITCTA058, were installed inside SWMU 24 to screen for the presence of DNAPL in the area. Monitoring well WP07-10A was used as an upgradient monitoring well for SWMU 24.

Six metals were detected above RRS-1 in groundwater samples collected from two wells at SWMU 24 (Figure 5.26 and Table 5.22). These metals include aluminum, arsenic, chromium, copper, manganese, and vanadium. Aluminum and manganese are not Appendix IX compounds required to be sampled for by the base RCRA Permit. Chromium, copper, and vanadium were all only detected in one round of sampling from monitoring well WHGLTA003. None of these constituents was detected in the either of the two monitoring wells located more directly downgradient from SWMU 24 than monitoring well WHGLTA003. Therefore, these detections are likely a result of variation in background concentrations, or a result of a source other than SWMU 24.

Arsenic was detected above RRS-1 at monitoring well WP07-10C. Arsenic was not detected in other SWMU 24 downgradient wells, but was detected at monitoring wells upgradient of SWMUs 23 and 25. Arsenic was detected above RRS-1 at five sampling locations in SWMU 24 soils. Detected concentrations at these five locations were evaluated to be statistically the same as basewide background concentrations (see Section 5.1.2). Considering the fact that arsenic detections in groundwater are limited to Standard 2 concentrations at one downgradient monitoring well, and that similar concentrations were detected upgradient of SWMUs 23 and 25, these groundwater findings do not appear to contradict the evaluation and findings of the soil investigation.

A total of 12 VOCs were detected above RRS-1 in groundwater samples collected from 5 wells at SWMU 24. Of these 12 VOCs, 7 are associated with the basewide TCE plume and are being addressed with groundwater under a separate project. The remaining five VOCs include benzene, chlorobenzene, chloroform, 1,4-dichlorobenzene, and 1,2-dichloropropane. As discussed with SWMU 23, sampling results from monitoring well WP07-10C indicate concentrations of benzene and chlorobenzene above RRS-1, but below RRS-2. Detections of chloroform were at low concentrations up and down gradient of SWMU 24, and there we no detections of chloroform in SWMU 24 soils.

1,4-dichlorobenzene was only detected in the two temporary monitoring wells, WITCTA057 and WITCTA058, at concentrations above RRS-1, but below RRS-2. These samples were collected

within the unit and may not be representative of the groundwater outside, and downgradient of this unit. This compound was not detected in any soil samples collected from SWMU 24.

Only one sample contained a concentration of 1,2-dichloropropane above RRS-1. This sample result was below RRS-2, and was not detected in the subsequent sampling round. In addition, this compound was not detected in any soil samples from SWMU 24.

Only one SVOC was detected above RRS-1 in groundwater near SWMU 24, bis(2-ethylhexyl)phthalate. This detection also exceeded RRS-2. However, this detection could not be confirmed by consecutive sampling events. This compound was only detected in one soil sample from SWMU 24 at a Standard 2 concentration.

5.6.5 SWMU 25 Groundwater Sampling Results

Groundwater analytical samples were collected between September 1997 and January 2000 from six groundwater monitoring wells, five of which are located along the perimeter and hydraulically downgradient from SWMU 25. The six wells are identified as LF05-02, FT08-11A, WHGLTA002, WHGLTA004, WHGLTA801, and WHGLTA803 (Figure 5.26).

Arsenic, copper, chromium, and lead were detected in samples at four of the monitoring wells. Arsenic was detected above RRS-1 in only one well, upgradient monitoring well LF05-02. Copper was detected above RRS-1 in one round of groundwater samples collected from two different monitoring wells (FT08-11A and WHGLTA002). Neither of these detections were duplicated in a subsequent sampling round (Figure 5.26 and Table 5.22). Chromium and lead were detected above RRS-1 at one monitoring well (WHGLTA004). Chromium was detected just slightly over background, and lead was not confirmed in a subsequent sampling round. Based on this sampling data, which indicates very low and sporadic detections of metals in groundwater, it appears reasonable to conclude that metals contamination of groundwater has not resulted from past activities at SWMU 25.

A total of six VOCs were detected above RRS-1 in groundwater samples collected from five wells at SWMU 25. All six of these VOCs are associated with the basewide TCE plume. No SVOCs were detected above RRS-1 in groundwater samples collected at SWMU 25.

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TABLES

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Table 5.1
Thallium Statistical Data
Surface and Subsurface Soil

Data Source	Sample Count	Mean	Standard Deviation	Ranked Sum	Mann-Witney Static	Approximate z-score for Mann-Whitney Static
Background Surface Soil 1997	30	35.44	25.03	1168	709	4 154
SWMUs 22-25 Surface Soil 1998 RFI data	29	8.39	8.70	596		
Background Subsurface Soil 1997	30	34.66	19.98	2516	2182	6.092
SWMUs 22-25 Subsurface Soil 1998 RFI data	83	6.40	10.09	3794		

Table 5.2
Arsenic Statistical Data
Surface and Subsurface Soil

Data Source	Sample Count	Mean	Standard Deviation	Ranked Sum	Mann-Witney Static	Approximate z-score for Mann-Whitney Static
Background Surface Soil 1997	30	3.50	1.06	813	348	1.319
SWMUs 22-25 Surface Soil 1998 RFI data	29	5.39	5.06	957		
Background Subsurface Soil 1997	30	3.03	1.13	2069	1452	1.346
SWMUs 22-25 Subsurface Soil 1998 RFI data	83	4.71	6.52	4524		

Table 5.3
Comparison of Chromium Results
SW6010 ICP-Standard vs SW6010 ICP-Trace
NAS Fort Worth, JRB, Texas

Location	Boring	Depth	Analyte	GWP-Ind (mg/kg)	Bkgd	Initial Result SW6010 ICP-Standard (mg/kg)	Confirmation Result SW6010 ICP-Trace (mg/kg)	SPLP Result (mg/L)	GW-Ind (mg/L)
SWMU 25	B815	Surface	Chromium	10	25 86	94.4	9.6	0.0082	0.1
SWMU 25	B829	Surface	Chromium	10	25.86	42.5 J	111	0.1 F	0.1
SWMU 25	B830	Surface	Chromium	10	25.86	63.5	31.7	0.0236 U	0.1
SWMU 17	B718	Subsurface	Chromium	10	16.31	26.4	13.4 J	None	0.1
SWMU 23	B506	Subsurface	Chromium	10	16.31	25 J	12.4	0 0323	0.1
SWMU 23	B509	Subsurface	Chromium	10	16.31	9.9	3.7 F	None	0.1
SWMU 23	B509	Subsurface	Chromium	10	16.31	35.6	9 2	0.0018 F	0.1
SWMU 29	B230	Subsurface	Chromium	10	16.31	16.5	8.5 J	None	0.1
SWMU 29	B230	Subsurface	Chromium	10	16 31	16.8	11 J	None	0.1
SWMU 62	B624	Subsurface	Chromium	10	16.31	21.3	5.8 F	None	0.1
SWMU 62	B624	Subsurface	Chromium	10	16.31	21.5	12.8 J	None	0.1
SWMU 62	B624	Subsurface	Chromium	10	16.31	18.4	14.2 J	None	0.1

Note: Gray shading indicates Standard 3 concentrations.

Table 5.4
Analytes Reported Under Multiple Analytical Methods in Soil Per Site
NAS Fort Worth, JRB, Texas

Site	Analyte	First Possible Method	Detected with First Method	Second Possible Method	Detected With Second Method
LF04	Lead	SW6010	Yes	SW7421	Yes
LF04	Chlordane	SW8080	No	SW8081	Yes
LF04	Dieldrin	SW8080	No	SW8081	Yes
LF04	p,p'-DDE	SW8080	No	SW8081	Yes
LF04	PCB-1260 (Arochlor 1260)	SW8080	No	SW8081	Yes
LF04	1,2,4-Trichlorobenzene	SW8260	Yes	SW8270	No
LF04	1,2-Dichlorobenzene	SW8260	Yes	SW8270	No
LF04	1,3-Dichlorobenzene	SW8260	Yes	SW8270	No
LF04	1,4-Dichlorobenzene	SW8260	Yes	SW8270	Yes
LF04	Naphthalene	SW8260	Yes	SW8310	No
LF04	Acenaphthene	SW8270	Yes	SW8310	Yes
LF04	Acenaphthylene	SW8270	Yes	SW8310	No
LF04	Anthracene	SW8270	Yes	SW8310	Yes
LF04	Benzo[*a*]anthracene	SW8270	Yes	SW8310	Yes
LF04	Benzo[*a*]pyrene	SW8270	Yes	SW8310	Yes
LF04	Benzo[*b*]fluoranthene	SW8270	Yes	SW8310	Yes
LF04	Benzo[*g,h,i*]perylene	SW8270	Yes	SW8310	Yes
LF04	Benzo[*k*]fluoranthene	SW8270	Yes	SW8310	Yes
LF04	Chrysene	SW8270	Yes	SW8310	Yes
LF04	Dibenzo[*a,h*]anthracene	SW8270	Yes	SW8310	Yes
LF04	Fluoranthene	SW8270	Yes	SW8310	Yes
LF04	Fluorene	SW8270	Yes	SW8310	Yes
LF04	Indeno[1,2,3-*c,d*]pyrene	SW8270	Yes	SW8310	Yes
LF04	Phenanthrene	SW8270	Yes	SW8310	Yes
LF04	Pyrene	SW8270	Yes	SW8310	Yes
LF05	Lead	SW6010	Yes	SW7421	Yes
LF05	1,2,4-Trichlorobenzene	SW8260	Yes	SW8270	No
LF05	1,2-Dichlorobenzene	SW8260	Yes	SW8270	No
LF05	1,3-Dichlorobenzene	SW8260	Yes	SW8270	No
LF05	1,4-Dichlorobenzene	SW8260	Yes	SW8270	Yes
LF05	Naphthalene	SW8260	Yes	SW8270	Yes
LF08	Antimony	SW6010	Yes	SW7041	No
LF08	Lead	SW6010	Yes	SW7421	Yes
LF08	Selenium	SW6010	Yes	SW7740	No
LF08	Silver	SW6010	Yes	SW7761	Yes
LF08	Thallium	SW6010	Yes	SW7841	No
LF08	Chlordane	SW8080	No	SW8081	Yes
LF08	Dieldrin	SW8080	No	SW8081	Yes
LF08	p,p'-DDE	SW8080	No	SW8081	Yes
LF08	PCB-1260 (Arochlor 1260)	SW8080	No	SW8081	Yes
LF08	1,2,4-Trichlorobenzene	SW8260	Yes	SW8270	No
LF08	1,2-Dichlorobenzene	SW8260	Yes	SW8270	No
LF08	1,3-Dichlorobenzene	SW8260	Yes	SW8270	No
LF08	1,4-Dichlorobenzene	SW8260	Yes	SW8270	Yes
LF08	Naphthalene	SW8260	Yes	SW8310	No
LF08	Acenaphthene	SW8270	Yes	SW8310	Yes
LF08	Acenaphthylene	SW8270	Yes	SW8310	No

Table 5.4
Analytes Reported Under Multiple Analytical Methods in Soil Per Site
NAS Fort Worth, JRB, Texas

Site	Analyte	First Possible Method	Detected with First Method	Second Possible Method	Detected With Second Method
LF08	Anthracene	SW8270	Yes	SW8310	Yes
LF08	Benzo[*a*]anthracene	SW8270	Yes	SW8310	Yes
LF08	Benzo[*a*]pyrene	SW8270	Yes	SW8310	Yes
LF08	Benzo[*b*]fluoranthene	SW8270	Yes	SW8310	Yes
LF08	Benzo[*g,h,i*]perylene	SW8270	Yes	SW8310	Yes
LF08	Benzo[*k*]fluoranthene	SW8270	Yes	SW8310	Yes
LF08	Chrysene	SW8270	Yes	SW8310	Yes
LF08	Dibenzo[*a,h*]anthracene	SW8270	Yes	SW8310	Yes
LF08	Fluoranthene	SW8270	Yes	SW8310	Yes
LF08	Fluorene	SW8270	Yes	SW8310	Yes
LF08	Indeno[1,2,3-*c,d*]pyrene	SW8270	Yes	SW8310	Yes
LF08	Phenanthrene	SW8270	Yes	SW8310	Yes
LF08	Pyrene	SW8270	Yes	SW8310	Yes
WP07	Antimony	SW6010	Yes	SW7041	No
WP07	Lead	SW6010	Yes	SW7421	Yes
WP07	Silver	SW6010	Yes	SW7761	Yes
WP07	Chlordane	SW8080	No	SW8081	Yes
WP07	Dieldrin	SW8080	No	SW8081	Yes
WP07	p,p'-DDE	SW8080	No	SW8081	Yes
WP07	PCB-1260 (Arochlor 1260)	SW8080	No	SW8081	Yes
WP07	1,2,4-Trichlorobenzene	SW8260	Yes	SW8270	No
WP07	1,2-Dichlorobenzene	SW8260	Yes	SW8270	No
WP07	1,3-Dichlorobenzene	SW8260	Yes	SW8270	No
WP07	1,4-Dichlorobenzene	SW8260	Yes	SW8270	Yes
WP07	Naphthalene	SW8260	Yes	SW8270	Yes

Table 5.5
Surface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA401 .00 ft 1998-05-21	BHGLTA402 .00 ft 1998-05-26	BHGLTA404 00 ft 1998-05-20	BHGLTA405 00 ft 1998-05-21	BHGLTA406 00 ft 1998-05-21
SW6010	Aluminum	22035	22035	No	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	- -	- -	- -	- -
SW6010	Arsenic	5 85	5 85	Yes	- -	[(15.3 F)]	[(15.1 F)]	[(15 F)]	- -
SW6010	Barium	233	233	Yes	54 9	81 1	88	44	51
SW6010	Beryllium	1 02	1 02	Yes	- -	- -	1	- -	0 49 F
SW6010	Cadmium	0 556	0 556	Yes	- -	- -	- -	- -	- -
SW6010	Calcium	167788	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	10 F	18 8 J	19 4 J	12 5 F	9 6 F
SW6010	Cobalt	11 05	610	Yes	3 5 F	5 8 F	6 2 F	5 3 F	3 5 F
SW6010	Copper	17 37	130	Yes	6 1 F	8 5	9 8	8 4 F	9 4 F
SW6010	Iron	17717	N/A	No	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	10 8 F	7 5 F	8 2 F	- -	[(34.8 F)]
SW7421		30 97	30 97	Yes	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	0 05	0 04 F	0 05	0 02 F	0 03 F
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	4 1 F	11 2 F	12 6 F	11 4 F	8 F
SW6010	Potassium	2895	N/A	No	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	- -	[(16.6 F)]	[(7.5 F)]	[(15.2 F)]	- -
SW6010	Sodium	37300	N/A	No	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	- -	[(14.5 F)]	[(13.4 F)]	- -	- -
SW6010	Vanadium	46 3	72	Yes	21 5 F	35 8	36 4	25 2 F	23 9 F
SW6010	Zinc	38 8	3100	Yes	32 1	30 6	32	25 6	(53.2)
SW9030	Sulfide	25	N/A	Yes	- -	- -	- -	- -	(28 S)
SW8270	Naphthalene	0 33	200	Yes	- -	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	- -	- -	- -	- -
SW8270	4-Nitrophenol	1 7	N/A	Yes	- -	- -	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	0 094 F	- -	0 064 F	0 065 F	0 1 F
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	0 2 F	- -	0 099 F	0 15 F	0 2 F
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(0.76)]	- -	[(0.45)]	[(1)]	[(1.6)]
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	[(0.76)]	- -	[(0.48)]	[(1.1)]	[(1.9)]
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(1.1)]	- -	[(0.77)]	[(1.5)]	[(2.6)]
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	(0.51)	- -	(0.39)	(0.89)	(1.4)
SW8310		0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	[(0.43)]	- -	0 26 F	[(0.66)]	- -
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 06 F	- -	0 067 F	0 078 F	0 042 F
SW8270	Chrysene	0 33	3 9	Yes	(0.94)	- -	(0.58)	(1.4)	(2.1)
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	0 13 F	- -	0 073 F	0 18 F	0 27 F
SW8310		0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	0 04 F	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	(2.1)	- -	(1.3)	(2.9)	(3.7)
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	0 077 F	- -	0 049 F	0 038 F	0 052 F
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	[(0.57)]	- -	[(0.4)]	[(0.95)]	[(1.6)]
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	(1.2)	- -	(0.86)	(1.2)	(1.5)
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	(1.6)	- -	(1.3)	(2.4)	(3.3)
SW8310		0 18	310	Yes	na	na	na	na	na

Notes
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na = Not analysed
N/A = *Not applicable, no value*
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All concentrations are in mg/kg

Table 5.5
Surface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA406 Dup 00 ft 1998-05-21	BHGLTA406 00 ft 2000-01-04	BHGLTA407 00 ft 1999-10-07	BHGLTA408 00 ft 1999-10-04	BHGLTA408 Dup 00 ft 1999-10-04
SW6010	Aluminum	22035	22035	No	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	na	na	na	na
SW6010	Arsenic	5 85	5 85	Yes	- -	na	na	na	na
SW6010	Barium	233	233	Yes	58 8	na	na	na	na
SW6010	Beryllium	1 02	1 02	Yes	0 5 F	na	na	na	na
SW6010	Cadmium	0 556	0 556	Yes	- -	na	na	na	na
SW6010	Calcium	167788	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	11 F	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	4 2 F	na	na	na	na
SW6010	Copper	17 37	130	Yes	12 1 F	na	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	[(42.9 F)]	[(41.5 J)]	na	na	na
SW7421		30 97	30 97	Yes	na	na	[(81.5 F)]	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	0 04	na	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	10 5 F	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	- -	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	[(33.4 F)]	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	23 4 F	na	na	na	na
SW6010	Zinc	38 8	3100	Yes	(65.7)	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	- -	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	na	na	**(0.4 J)**	**(0.62 J)**
SW8260	Toluene	0 005	100	Yes	- -	na	na	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	na	na	0 18 F	0 27 F
SW8270	4-Nitrophenol	1 7	N/A	Yes	- -	na	na	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	0 16 F	na	na	**(1.9 J)**	**(2.4 J)**
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	(0.34 F)	na	na	**(4 J)**	**(5.3 J)**
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(1.9)]	[(2.2)]	na	[(20 J)]	[(19 J)]
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	[(2.2)]	[(2.7)]	na	[(20 J)]	[(20 J)]
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(3.4)]	[(2.8)]	na	[(29 J)]	[(28 J)]
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	(1.9)	na	na	**(13 J)**	**(10 J)**
SW8310		0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	[(1.1)]	[(2.9)]	na	[(6.2 J)]	[(7 J)]
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 061 F	na	na	- -	0 098 F
SW8270	Chrysene	0 33	3 9	Yes	(2.5)	(3)	na	[(20 J)]	[(21 J)]
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	[(0.38)]	[(0.38 F)]	na	[(2.8 J)]	[(2.6 J)]
SW8310		0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	0 047 F	na	na	**(0.92 J)**	**(1.3 J)**
SW8270	Fluoranthene	0 33	410	Yes	(4.8)	na	na	**(60 J)**	**(58 J)**
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	0 1 F	na	na	**(1.8 J)**	**(2.2 J)**
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	[(2)]	[(2)]	na	[(11 J)]	[(10 J)]
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	(2.2)	na	na	**(26 J)**	**(35 J)**
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	(4.2)	na	na	**(45 J)**	**(45 J)**
SW8310		0 18	310	Yes	na	na	na	na	na

Notes
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Table 5.5
Surface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA408 00 ft 2000-01-04	BHGLTA409 00 ft 2000-01-04	BHGLTA410 00 ft 2000-03-10	BHGLTA411 00 ft 2000-03-10	BHGLTA412 00 ft 2000-03-10
SW6010	Aluminum	22035	22035	No	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	na	na	na	na	na
SW6010	Arsenic	5 85	5 85	Yes	na	na	na	na	na
SW6010	Barium	233	233	Yes	na	na	na	na	na
SW6010	Beryllium	1 02	1 02	Yes	na	na	na	na	na
SW6010	Cadmium	0 556	0 556	Yes	na	na	na	na	na
SW6010	Calcium	167788	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	na	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	na	na	na
SW6010	Copper	17 37	130	Yes	na	na	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na	na
SW6010	Lead	30 97	30.97	Yes	na	na	na	na	na
SW7421		30 97	30 97	Yes	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	na	na	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	na	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	na	na	na
SW6010	Zinc	38 8	3100	Yes	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	na	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	na	na	na
SW8270	4-Nitrophenol	1 7	N/A	Yes	na	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na	na
SW8310	Acenaphthene	1 2	610	Yes	na	na	- -	- -	0 086 F
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	0 00083 F	- -	0 0054 F
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(18)]	[(34)]	na	na	na
SW8310		0 009	0 039	Yes	na	na	0 0044 F	0 0087 F	(0.024)
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	[(19)]	[(37)]	na	na	na
SW8310		0 015	0 02	Yes	na	na	0 0072 F	0 013 F	[(0.037)]
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(23)]	[(39)]	na	na	na
SW8310		0 012	0 039	Yes	na	na	0 0056 F	(0.014)	(0.036)
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na	na
SW8310		0 05	310	Yes	na	na	0 005 F	0 013 F	0 022 F
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	[(16)]	[(22)]	na	na	na
SW8310		0 011	0 39	Yes	na	na	0 0037 F	0 0083 F	(0.02)
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	[(19)]	[(38)]	na	na	na
SW8310		0 1	3 9	Yes	na	na	0 006 F	0 012 F	0 03 F
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	[(2)]	[(4.9)]	na	na	na
SW8310		0 02	0 02	Yes	na	na	0 0093 F	- -	[(0.045)]
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na	na
SW8310		0 14	410	Yes	na	na	0 018 F	0 029 F	0 083 F
SW8270	Fluorene	0 33	410	Yes	na	na	na	na	na
SW8310		0 14	410	Yes	na	na	0 0051 F	0 012 F	0 0092 F
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	[(13)]	[(25)]	na	na	na
SW8310		0 03	0 039	Yes	na	na	0 0066 F	0 012 F	0 027 F
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na	na
SW8310		0 42	310	Yes	na	na	0.0044 F	0 008 F	0 03 F
SW8270	Pyrene	0 33	310	Yes	na	na	na	na	na
SW8310		0 18	310	Yes	na	na	0 021 F	0 022 F	0 073 F

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Table 5.5
Surface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA001 00 ft 1997-08-21	THGLTA002 00 ft 1997-08-21	THGLTA002 Dup 00 ft 1997-08-21	THGLTA002 00 ft 2000-01-04	THGLTA003 00 ft 1997-08-21
SW6010	Aluminum	22035	22035	No	12500	8410	7560	na	6010
SW6010	Antimony	0 56	0 6	Yes	0 36 F	0 46 F	0 33 F	na	0 44 F
SW6010	Arsenic	5 85	5 85	Yes	3 7 J	4 J	3 9 J	na	5 3 J
SW6010	Barium	233	233	Yes	71 5	56 5	51 6	na	57 1
SW6010	Beryllium	1 02	1 02	Yes	0 66	0 55	0 45	na	0 42
SW6010	Cadmium	0 556	0 556	Yes	0 28 F	0 34 F	- -	na	- -
SW6010	Calcium	167788	N/A	No	(178000)	115000	93900	na	81800
SW6010	Chromium (total)	25 86	25 86	Yes	11 2	9 9	8 5	na	7 8 F
SW6010	Cobalt	11 05	610	Yes	4 F	4 8 F	3 7 F	na	3 9 F
SW6010	Copper	17 37	130	Yes	5 5 F	6 4 F	6 1 F	na	6 6 F
SW6010	Iron	17717	N/A	No	12200	12000	9740	na	10300
SW6010	Lead	30 97	30 97	Yes	9 8	17	17 1	na	12 1
SW7421		30 97	30 97	Yes	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	2180 J	1720 J	1480 J	na	1230 J
SW6010	Manganese	849	1400	No	202	369	291	na	365
SW7471	Mercury	0 14	0 2	Yes	0 012 F	0 026 F	0 024 F	na	0 011 F
SW6010	Molybdenum	1 46	51	No	0 47 F	0 55 F	0 43 F	na	0 64 F
SW6010	Nickel	14 6	200	Yes	9 5 F	10 5 F	8 F	na	8 2 F
SW6010	Potassium	2895	N/A	No	1490	1050	969	na	787
SW6010	Selenium	0 907	5	Yes	- -	- -	- -	na	- -
SW6010	Sodium	37300	N/A	No	60	61 5	57 1 F	na	54 5 F
SW6010	Thallium	2 43	2 43	Yes	- -	- -	- -	na	- -
SW6010	Vanadium	46 3	72	Yes	23 7	23 5	19 9	na	19 7
SW6010	Zinc	38 8	3100	Yes	19 4	20 2	20 3	na	19 5
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	- -	- -	na	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	na	(0 006)
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	- -	- -	na	- -
SW8270	4-Nitrophenol	1 7	N/A	Yes	- -	- -	- -	na	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	0 33 F	- -	na	0 26 F
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	- -	(0.83 F)	- -	na	(0.64 F)
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	[(2.8 F)]	[(1.6 F)]	- -	[(2.4 F)]
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	0 055 F	[(3 F)]	- -	- -	[(2.7 F)]
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	0 076 F	[(4)]	- -	- -	[(3.4)]
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	0 042 F	(2.1 F)	- -	na	(2 F)
SW8310		0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	- -	na
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	na	- -
SW8270	Chrysene	0 33	3 9	Yes	0 054 F	(3.2 F)	(1.8)	- -	(2.8 F)
SW8310		0 1	3.9	Yes	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	0 16 F	- -	- -	- -
SW8310		0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	- -	na	- -
SW8270	Fluoranthene	0 33	410	Yes	0 12 F	(8.5)	- -	na	(6.8)
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	- -	0 32 F	- -	na	0 24 F
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	0 04 F	[(2.2 F)]	- -	- -	[(2 F)]
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	0 057 F	(4.9)	- -	na	(4)
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	- -	(6.5)	(3.3)	na	(5.3)
SW8310		0 18	310	Yes	na	na	na	na	na

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Table 5.5
Surface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA003 00 ft 2000-01-04	THGLTA004 00 ft 1997-08-21	THGLTA005 00 ft 1997-08-22	THGLTA006 00 ft 1997-08-22	THGLTA007 00 ft 1997-08-22
SW6010	Aluminum	22035	22035	No	na	9920	7250	6290	4880
SW6010	Antimony	0 56	0 6	Yes	na	0 33 F	0 35 F	0 34 F	[(0.65 J)]
SW6010	Arsenic	5 85	5 85	Yes	na	3 J	4 J	3 6 J	3 5 J
SW6010	Barium	233	233	Yes	na	51 7	49 6	44 4	40 3
SW6010	Beryllium	1.02	1.02	Yes	na	0 61	0 44	0 38	0 33 F
SW6010	Cadmium	0 556	0 556	Yes	na	- -	- -	- -	[(0.73 F)]
SW6010	Calcium	167788	N/A	No	na	100000	84700	56500	(176000)
SW6010	Chromium (total)	25 86	25 86	Yes	na	9 8	8 1	7 F	8 6
SW6010	Cobalt	11 05	610	Yes	na	4 6 F	3 8 F	3 2 F	2 3 F
SW6010	Copper	17 37	130	Yes	na	7 5	(17.4)	8 2	5 8 F
SW6010	Iron	17717	N/A	No	na	11600	4830	8570	7400
SW6010	Lead	30 97	30 97	Yes	na	8 7	10 4	6 5	[(32.2)]
SW7421		30 97	30 97	Yes	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	1910 J	1370 J	1100 J	1640 J
SW6010	Manganese	849	1400	No	na	162	240	227	204
SW7471	Mercury	0 14	0 2	Yes	na	- -	0 021 F	- -	0 015 F
SW6010	Molybdenum	1 46	51	No	na	0 21 F	0 25 F	0 25 F	0 58 F
SW6010	Nickel	14 6	200	Yes	na	10 5 F	8 5 F	7 1 F	6 1 F
SW6010	Potassium	2895	N/A	No	na	1230	813	707	996
SW6010	Selenium	0 907	5	Yes	na	- -	- -	- -	- -
SW6010	Sodium	37300	N/A	No	na	46 7 F	40 7 F	34 2 F	138
SW6010	Thallium	2 43	2 43	Yes	na	- -	- -	- -	- -
SW6010	Vanadium	46 3	72	Yes	na	21 2	18 3	16 5	14 8
SW6010	Zinc	38 8	3100	Yes	na	17 7	18 5	13 4	24 5
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	na	- -	(0.022)	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	- -	- -	- -	- -
SW8270	4-Nitrophenol	1 7	N/A	Yes	na	- -	0 16 F	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	na	- -	- -	- -	- -
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	- -	- -	- -	- -
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(0.56)]	- -	- -	- -	[(1.1 F)]
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	[(0.61)]	- -	0 045 F	- -	[(1.4 F)]
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(0.62)]	- -	- -	- -	[(1.8 F)]
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	0 032 F	0 052 F	0 031 F	(1.1 F)
SW8310		0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	[(0.75)]	na	na	na	na
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	- -	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	(0.71)	- -	0 032 F	- -	(1.4 F)
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -	0 28 F
SW8310		0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	na	- -	- -	- -	(3 F)
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	na	- -	- -	- -	- -
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	[(0.45)]	- -	0 048 F	- -	[(1.1 F)]
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	- -	0 047 F	- -	(1.1 F)
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	- -	- -	- -	(2.6 F)
SW8310		0 18	310	Yes	na	na	na	na	na

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.5
Surface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA008 00 ft 1997-08-22	THGLTA008 00 ft 2000-01-04	THGLTA009 00 ft 1997-08-25	THGLTA010 00 ft 1997-08-25
SW6010	Aluminum	22035	22035	No	6580	na	4000	1830
SW6010	Antimony	0 56	0 6	Yes	0 42 F	na	- -	- -
SW6010	Arsenic	5 85	5 85	Yes	3 8 J	na	1 9 J	5 2 J
SW6010	Barium	233	233	Yes	45 4	na	36 1	32 8
SW6010	Beryllium	1 02	1 02	Yes	0 42	na	0 47	0 21 F
SW6010	Cadmium	0 556	0 556	Yes	0 52 F	na	- -	- -
SW6010	Calcium	167788	N/A	No	(183000)	na	(233000)	12800
SW6010	Chromium (total)	25 86	25 86	Yes	8 5	na	6 2 F	3 F
SW6010	Cobalt	11 05	610	Yes	3 F	na	2 8 F	2 4 F
SW6010	Copper	17 37	130	Yes	12 8	na	5 8 F	2 7 F
SW6010	Iron	17717	N/A	No	8170	na	4650	5390
SW6010	Lead	30 97	30 97	Yes	29.7	na	10 5 J	4 3 J
SW7421		30 97	30 97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	1980 J	na	1810	365
SW6010	Manganese	849	1400	No	222	na	108 J	305 J
SW7471	Mercury	0 14	0 2	Yes	0 09 F	na	0 026 F	- -
SW6010	Molybdenum	1 46	51	No	0 51 F	na	0 41 F	0 45 F
SW6010	Nickel	14 6	200	Yes	6 9 F	na	7 2 F	4 6 F
SW6010	Potassium	2895	N/A	No	1240	na	776 J	365 F
SW6010	Selenium	0 907	5	Yes	- -	na	- -	- -
SW6010	Sodium	37300	N/A	No	99 3	na	97 3	- -
SW6010	Thallium	2 43	2 43	Yes	- -	na	- -	- -
SW6010	Vanadium	46 3	72	Yes	18 5	na	20 9	11 3
SW6010	Zinc	38 8	3100	Yes	(43.1)	na	- -	7 3 J
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	na	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	na	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	na	- -	- -
SW8270	4-Nitrophenol	1 7	N/A	Yes	- -	na	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	na	- -	- -
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	0 25 F	na	- -	- -
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(2.4 F)]	[(1.9)]	- -	0 16 F
SW8310		0 009	0 039	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	[(3.2 F)]	[(2.2)]	- -	0 21 F
SW8310		0 015	0 02	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(4.6)]	[(2.7)]	- -	0 29 F
SW8310		0 012	0 039	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	(2.9 F)	na	- -	0 17 F
SW8310		0 05	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	[(1.9)]	na	na
SW8310		0 011	0 39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	na	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	(3.3)	(2.5)	- -	0 22 F
SW8310		0 1	3 9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	Yes	0 16 F	0 22 F	- -	0 039 F
SW8310		0 02	0 02	Yes	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	- -	na	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	(6)	na	- -	(0.46 F)
SW8310		0 14	410	Yes	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	- -	na	- -	- -
SW8310		0 14	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	[(2.8 F)]	[(1.5)]	- -	0 17 F
SW8310		0 03	0 039	Yes	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	(1.7 F)	na	- -	0 14 F
SW8310		0 42	310	Yes	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	(5.4)	na	- -	(0.4 F)
SW8310		0 18	310	Yes	na	na	na	na

Notes
RRS-1 = Risk Reduction Standard 1
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N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
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Values above RRS-1 are bold and are enclosed in (parentheses)
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All concentrations are in mg/kg

675 219

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA401 05 ft 1998-05-21	BHGLTA401 10 ft 1998-05-21	BHGLTA401 15 ft 1998-05-21	BHGLTA402 05 ft 1998-05-26	BHGLTA402 10 ft 1998-05-26
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	--	--	--	--	--
SW6010	Arsenic	6 58	6 58	Yes	3 F	--	2 6 F	[(16 F)]	3 1 F
SW6010	Barium	128 1	200	Yes	13 1	18 8	5 6	65 5	3 6
SW6010	Beryllium	1 13	1 13	Yes	--	--	--	0 86	--
SW6010	Cadmium	0 59	0 59	Yes	--	--	--	--	--
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	4 F	2 8 F	3 2 F	[(16 8 J)]	3 4 F
SW6010	Cobalt	6 19	610	Yes	1 8 F	1 3 F	1 3 F	(8 1)	1 9 F
SW6010	Copper	13 72	130	Yes	2 7 F	1 8 F	1 9 F	8 8	2 F
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	--	--	--	5 3 F	--
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	--	--	--	--	--
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	4 2 F	3 1 F	2 5 F	13 6 F	2 3 F
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	[(5 7 F)]	(5 F)	(3 5 F)	[(12 3 F)]	[(5 3 F)]
SW6010	Silver	0 128	51	Yes	--	--	--	--	--
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	--	--	--	[(17 F)]	--
SW6010	Vanadium	37 4	72	Yes	9 3	6 F	6 F	35 7	7 1
SW6010	Zinc	31 3	3100	Yes	6 2	5 6	5 3	26	5 9
SW9030	Sulfide	25	N/A	Yes	--	--	--	--	--
SW8081	Chlordane	0 009	0 2	Yes	--	--	--	--	--
SW8081	Dieldrin	0 01	0 01	Yes	--	--	--	--	--
SW8081	p,p'-DDE	0 003	0 084	Yes	--	--	--	--	--
SW8081	PCB-1260	1	1	Yes	--	--	--	--	--
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1,2 4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1 3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1 3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	--	--	--	--	--
SW8260	Acetone	0 005	1000	Yes	--	--	--	--	0 005
SW8260	Ethylbenzene	0 003	70	Yes	--	--	--	--	--
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	--	--	--	--	--
SW8260	Methyl ethyl ketone	0 005	6100	Yes	--	--	--	--	--
SW8260	Methylene chloride	0 002	0 5	Yes	--	--	--	--	--
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	--	--	--	--	--
SW8260	*o*-Xylene	0 005	1000	Yes	--	--	--	--	--
SW8260	Tetrachloroethene	0 005	0 5	Yes	--	--	--	--	--
SW8260	Toluene	0 005	100	Yes	--	--	--	--	--
SW8270	2-Methylnaphthalene	0 33	410	Yes	--	--	--	--	--
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	--	--	--	--	--
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	--	--	--	--	--
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 061 F	--	--	0 13 F	0 22 F
SW8270	Chrysene	0 33	3 9	Yes	--	--	--	--	--
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	--	--	--	--	--
SW8270	Fluoranthene	0 33	410	Yes	--	--	--	--	--
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	--	--	--	--	--
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	--	--	--	--	--
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
-- = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675 220

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA402 15 ft 1998-05-26	BHGLTA403 05 ft 1998-05-20	BHGLTA403 05 ft 2000-01-05	BHGLTA403 20 ft 1998-06-03	BHGLTA403 25 ft 1998-06-03
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	--	--	na	--	--
SW6010	Arsenic	6 58	6 58	Yes	--	5 9 F	na	[(16 1 F)]	--
SW6010	Barium	128 1	200	Yes	5 7	36 8	na	77 6	4 4
SW6010	Beryllium	1 13	1 13	Yes	--	0 4	na	0 93	--
SW6010	Cadmium	0 59	0 59	Yes	0 37 F	--	na	--	--
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	2 9 F	7 5 J	na	[(17 4)]	3 F
SW6010	Cobalt	6 19	610	Yes	--	3 1 F	na	(8 2 F)	2 2 F
SW6010	Copper	13 72	130	Yes	9 7	5 1 F	na	7 7 F	--
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	9 F	5 9 F	na	7 F	2 5 F
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	0 02 F	(0 14)	na	--	--
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	2 4 F	3 3 F	na	16 1 F	2 4 F
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	(4 1 F)	--	na	[(15 7 F)]	[(5 3 F)]
SW6010	Silver	0 128	51	Yes	--	--	na	--	--
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	--	[(7 F)]	na	[(29 2 F)]	[(5 1 F)]
SW6010	Vanadium	37 4	72	Yes	7	17 1	na	(40 8 J)	7 8 J
SW6010	Zinc	31 3	3100	Yes	12 5	19 1	na	28 5 J	5 3 J
SW9030	Sulfide	25	N/A	Yes	--	--	na	--	--
SW8081	Chlordane	0 009	0 2	Yes	--	(0 11)	na	na	na
SW8081	Dieldrin	0 01	0 01	Yes	--	[(0 098)]	--	na	na
SW8081	p,p'-DDE	0 003	0 084	Yes	--	(0 067)	na	na	na
SW8081	PCB-1260	1	1	Yes	--	--	na	na	na
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1,2 4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	--	--	na	--	--
SW8260	Acetone	0 005	1000	Yes	(0 006)	--	na	(0 13)	(0 069)
SW8260	Ethylbenzene	0 003	70	Yes	--	--	na	--	--
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	--	--	na	--	--
SW8260	Methyl ethyl ketone	0 005	6100	Yes	--	--	na	(0 022)	--
SW8260	Methylene chloride	0 002	0 5'	Yes	--	0 002	na	--	--
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	--	--	na	--	0 036 F
SW8260	*o*-Xylene	0 005	1000	Yes	--	--	na	--	--
SW8260	Tetrachloroethene	0 005	0 5	Yes	--	--	na	--	--
SW8260	Toluene	0 005	100	Yes	--	--	na	--	(0 011)
SW8270	2-Methylnaphthalene	0 33	410	Yes	--	--	na	--	0 054 F
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	--	--	na	--	--
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	--	--	na	--	0 043 F
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	--	--	na	--	0 071 F
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	--	--	na	--	--
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	--	--	na	--	--
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 31 F	0 18 F	na	--	--
SW8270	Chrysene	0 33	3 9	Yes	--	--	na	--	0 064 F
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	--	--	na	--	--
SW8270	Fluoranthene	0 33	410	Yes	--	--	na	--	0 046 F
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c d*]pyrene	0 33	0 33	Yes	--	--	na	--	0 04 F
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	--	--	na	--	0 078 F
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	--	--	na	--	0 052 F
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
-- = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675, 221

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA404 05 ft 1998-05-20	BHGLTA404 10 ft 1998-05-20	BHGLTA404 15 ft 1998-05-20	BHGLTA404 20 ft 1998-05-20	BHGLTA405 05 ft 1998-05-21
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	--	--	--	--	--
SW6010	Arsenic	6 58	6 58	Yes	[(15 9 F)]	--	2 6 F	--	--
SW6010	Barium	128 1	200	Yes	107	6 3	7 1	2 7	63 6
SW6010	Beryllium	1 13	1 13	Yes	1	--	--	--	--
SW6010	Cadmium	0 59	0 59	Yes	--	--	--	--	--
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	[(22 7 J)]	3 2 F	2 3 F	2 2 F	11 9 F
SW6010	Cobalt	6 19	610	Yes	4 8 F	1 3 F	1 4 F	0 81 F	3 F
SW6010	Copper	13 72	130	Yes	9 5 F	1 5 F	2 F	1 1 F	7 6 F
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	5 F	2 1 F	2 7 F	--	--
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	(0 11)	--	--	--	--
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	14 3 F	2 2 F	2 1 F	1 4 F	5 7 F
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	--	--	--	--	--
SW6010	Silver	0 128	51	Yes	--	--	--	--	--
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	[(12 3 F)]	--	--	--	--
SW6010	Vanadium	37 4	72	Yes	(44)	6 6	6 4 F	5 F	27 4 F
SW6010	Zinc	31 3	3100	Yes	(34.2)	4 4	5 3	3 7	21 6
SW9030	Sulfide	25	N/A	Yes	--	--	--	--	(30 5 S)
SW8081	Chlordane	0 009	0 2	Yes	--	--	--	--	--
SW8081	Dieldrin	0 01	0 01	Yes	--	--	--	--	--
SW8081	p,p'-DDE	0 003	0 084	Yes	--	--	--	--	--
SW8081	PCB-1260	1	1	Yes	--	--	--	--	--
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1 2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	--	--	--	--	(0 007)
SW8260	Acetone	0 005	1000	Yes	--	(0 008)	(0 009)	(0 01)	(0 063)
SW8260	Ethylbenzene	0 003	70	Yes	--	--	--	--	0 002 F
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	--	--	--	--	--
SW8260	Methyl ethyl ketone	0 005	6100	Yes	--	--	--	--	(0 013)
SW8260	Methylene chloride	0 002	0 5	Yes	--	--	0 002	0 002	--
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	--	--	--	--	--
SW8260	*o*-Xylene	0 005	1000	Yes	--	--	--	--	--
SW8260	Tetrachloroethene	0 005	0 5	Yes	--	--	--	--	--
SW8260	Toluene	0 005	100	Yes	--	--	--	--	--
SW8270	2-Methylnaphthalene	0 33	410	Yes	--	--	--	--	--
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	--	--	--	--	--
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	--	--	--	--	--
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	(0 34 F)	--	--	0 29 F	--
SW8270	Chrysene	0 33	3 9	Yes	--	--	--	--	--
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	--	--	--	--	--
SW8270	Fluoranthene	0 33	410	Yes	--	--	--	--	--
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	--	--	--	--	--
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	--	--	--	--	--
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	--	--	--	--	--
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
-- = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675' 222

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA405 10 ft 1998-05-21	BHGLTA405 15 ft 1998-05-21	BHGLTA405 20 ft 1998-05-21	BHGLTA405 25 ft 1998-06-04	BHGLTA406 05 ft 1998-05-22
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	[(10 6 F)]	- -	- -	- -	[(19 F)]
SW6010	Barium	128 1	200	Yes	49 5	88 1	11 8	9	71
SW6010	Beryllium	1 13	1 13	Yes	0 66	- -	- -	- -	0 57 F
SW6010	Cadmium	0 59	0 59	Yes	- -	- -	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	11 9	3 3 F	4 3 F	6 9 J	12 9 F
SW6010	Cobalt	6 19	610	Yes	3 5 F	2 5 F	1 9 F	1 6 F	5 4 F
SW6010	Copper	13 72	130	Yes	8 1	2 9 F	3 4 F	2 8 F	6 4 F
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	3 9 F	5 5 F	- -	2 2 F	- -
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	10 F	3 7 F	4 1 F	3 9 F	8 1 F
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	[(8 1 F)]	- -	- -	[(6 3 F)]	- -
SW6010	Silver	0 128	51	Yes	- -	- -	- -	- -	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	[(11 2 F)]	- -	- -	[(9 7 F)]	- -
SW6010	Vanadium	37 4	72	Yes	24 7	6 F	9 8 F	11 3 J	26 F
SW6010	Zinc	31 3	3100	Yes	19 6	5 3	7 8 F	7 6	22 6
SW9030	Sulfide	25	N/A	Yes	- -	- -	- -	- -	- -
SW8081	Chlordane	0 009	0 2	Yes	- -	- -	- -	na	- -
SW8081	Dieldrin	0 01	0 01	Yes	- -	- -	- -	na	- -
SW8081	p p'-DDE	0 003	0 084	Yes	- -	- -	- -	na	- -
SW8081	PCB-1260	1	1	Yes	- -	- -	- -	na	- -
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1 2 4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1 2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	(0 017)	(0 007)	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	- -	- -	- -
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	- -	- -	- -	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -	- -
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	- -	- -	- -	- -
SW8260	*o* -Xylene	0 005	1000	Yes	- -	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	- -	- -	- -	- -
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	- -	- -	- -	- -
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	- -	- -	0 17 F
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 098 F	- -	0 096 F	- -	[(2 2)]
SW8270	Chrysene	0 33	3 9	Yes	- -	- -	- -	- -	- -
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	- -	- -	- -	- -
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	- -	- -
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	- -	- -	- -	- -	- -
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675 223

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA406 05 ft 2000-01-05	BHGLTA406 10 ft 1998-05-22	BHGLTA406 10 ft 2000-01-05	BHGLTA406 15 ft 1998-05-22	BHGLTA406 16 ft 2000-01-05
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	- -	na	- -	na
SW6010	Arsenic	6 58	6 58	Yes	na	[(11 8 F)]	na	- -	na
SW6010	Barium	128 1	200	Yes	na	64 4	na	4 7	na
SW6010	Beryllium	1 13	1 13	Yes	na	0 94	na	- -	na
SW6010	Cadmium	0 59	0 59	Yes	na	- -	na	- -	na
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	[(18 J)]	na	4 6 F	na
SW6010	Cobalt	6 19	610	Yes	na	5 3 F	na	0 96 F	na
SW6010	Copper	13 72	130	Yes	na	8 5	na	- -	na
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	7 4 F	na	- -	na
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	- -	na	- -	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	11 9 F	na	1 7 F	na
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	[(13 1 F)]	na	(4 7 F)	na
SW6010	Silver	0 128	51	Yes	na	- -	na	- -	na
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	[(16 3 F)]	na	- -	na
SW6010	Vanadium	37 4	72	Yes	na	29 2	na	7 4 F	na
SW6010	Zinc	31 3	3100	Yes	na	30	na	3 7	na
SW9030	Sulfide	25	N/A	Yes	na	- -	na	- -	na
SW8081	Chlordane	0 009	0 2	Yes	na	- -	na	- -	na
SW8081	Dieldrin	0 01	0 01	Yes	na	- -	na	- -	na
SW8081	p,p'-DDE	0 003	0 084	Yes	na	- -	na	- -	na
SW8081	PCB-1260	1	1	Yes	na	- -	na	0 12 F	na
SW8260	1 2,4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	- -	na	- -	na
SW8260	Acetone	0 005	1000	Yes	na	(0 033)	na	- -	na
SW8260	Ethylbenzene	0 003	70	Yes	na	- -	na	- -	na
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	(0 009)	na	- -	na
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	- -	na	- -	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	- -	na	- -	na
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	(1 8)	na	(18)	na
SW8260	*o* -Xylene	0 005	1000	Yes	na	- -	na	- -	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	- -	na	- -	na
SW8260	Toluene	0 005	100	Yes	na	- -	na	- -	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	0 11 F	na	- -	na
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	- -	na	- -	na
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	- -	na	- -	na
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	- -	na	- -	na
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	- -	na	- -	na
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	0 049 F	na	- -	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	[(58)]	[(0 92)]	[(1 2)]	[(1.4 F)]	[(0 91)]
SW8270	Chrysene	0 33	3 9	Yes	na	- -	na	- -	na
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	- -	na	- -	na
SW8270	Fluoranthene	0 33	410	Yes	na	- -	na	- -	na
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	- -	na	- -	na
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	- -	na	- -	na
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	- -	na	- -	na
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675 224

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA406 20 ft 1998-05-22	BHGLTA406 21 ft 2000-01-05	BHGLTA406 25 ft 1998-05-22	BHGLTA407 05 ft 1999-10-05	BHGLTA407 Dup 05 ft 1999-10-05
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	na	- -	na	na
SW6010	Arsenic	6 58	6 58	Yes	- -	na	5 3 F	na	na
SW6010	Barium	128 1	200*	Yes	9 1	na	4 7	na	na
SW6010	Beryllium	1 13	1 13	Yes	- -	na	- -	na	na
SW6010	Cadmium	0 59	0 59	Yes	- -	na	- -	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	3 4 F	na	2 9 F	na	na
SW6010	Cobalt	6 19	610	Yes	0 97 F	na	- -	na	na
SW6010	Copper	13 72	130	Yes	- -	na	1 9 F	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	- -	na	- -	na	na
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	na	- -	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	1 3 F	na	2 1 F	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	- -	na	(3 8 F)	na	na
SW6010	Silver	0 128	51	Yes	- -	na	- -	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	- -	na	- -	na	na
SW6010	Vanadium	37 4	72	Yes	5 7 F	na	7 6 F	na	na
SW6010	Zinc	31 3	3100	Yes	4 4	na	7 6	na	na
SW9030	Sulfide	25	N/A	Yes	- -	na	- -	na	na
SW8081	Chlordane	0 009	0 2	Yes	- -	na	- -	na	na
SW8081	Dieldrin	0 01	0 01	Yes	- -	na	- -	na	na
SW8081	p,p'-DDE	0 003	0 084	Yes	- -	na	- -	na	na
SW8081	PCB-1260	1	1	Yes	0 13 F	na	0 027 F	na	na
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1 2 4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1 2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	- -	na	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	(0 16)	na	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	na	- -	- -	- -
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	(0 01)	na	0 004 F	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	(0 043)	na	- -	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	0 002	na	- -	- -	- -
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	(19)	na	(0 93)	- -	na
SW8260	*o*-Xylene	0 005	1000	Yes	- -	na	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	na	- -	- -	0 002 F
SW8260	Toluene	0 005	100	Yes	- -	na	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	na	0 066 F	- -	na
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	na	- -	- -	na
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	na	- -	- -	na
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -	na	- -	- -	na
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	na	- -	- -	na
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	na	- -	- -	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	[(1 1 F)]	[(1 3)]	0 16 F	- -	na
SW8270	Chrysene	0 33	3 9	Yes	- -	na	- -	- -	na
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	- -	na	- -	- -	na
SW8270	Fluoranthene	0 33	410	Yes	- -	na	- -	- -	na
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -	na	- -	- -	na
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	- -	na	- -	- -	na
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	- -	na	- -	- -	na
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

6.75 2.25

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA407 05 ft 2000-06-15	BHGLTA407 10 ft 1999-10-05	BHGLTA407 15 ft 1999-10-05	BHGLTA407 20 ft 1999-10-05	BHGLTA408 03 ft 2000-01-04
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	na	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na	na
SW7421		12 96	12 66	Yes	2 F	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na	na
SW6010	Silver	0 128	51	Yes	na	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8081	Chlordane	0 009	0 2	Yes	na	na	na	na	na
SW8081	Dieldrin	0 01	0 01	Yes	na	na	na	na	na
SW8081	p,p'-DDE	0 003	0 084	Yes	na	na	na	na	na
SW8081	PCB-1260	1	1	Yes	na	na	na	na	na
SW8260	1 2 4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1 3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	--	--	--	na
SW8260	Acetone	0 005	1000	Yes	na	--	--	--	na
SW8260	Ethylbenzene	0 003	70	Yes	na	--	--	--	na
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	--	--	--	na
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	--	--	--	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	--	--	--	na
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	--	--	--	na
SW8260	*o* -Xylene	0 005	1000	Yes	na	--	--	--	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	(0 012 J)	--	--	na
SW8260	Toluene	0 005	100	Yes	na	--	--	--	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	--	--	--	na
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	--	--	--	0 2 F
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	--	--	--	0 2 F
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	--	--	--	0 21 F
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	--	--	--	0 22 F
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	--	--	--	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	--	--	--	na
SW8270	Chrysene	0 33	3 9	Yes	na	--	--	--	0 24 F
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	--	--	--	na
SW8270	Fluoranthene	0 33	410	Yes	na	--	--	--	na
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	--	--	--	0 15 F
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	--	--	--	na
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	--	--	--	na
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
-- = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675 226

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA408 05 ft 2000-03-01	BHGLTA408 Dup 05 ft 2000-03-01	BHGLTA409 03 ft 2000-01-04	BHGLTA409 05 ft 2000-03-01	BHGLTA410 05 ft 2000-03-10
SW6010	Aluminum	20260	20260	No	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	na	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na	na
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na	na
SW6010	Silver	0 128	51	Yes	na	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8081	Chlordane	0 009	0 2	Yes	na	na	na	na	na
SW8081	Dieldrin	0 01	0 01	Yes	na	na	na	na	na
SW8081	p,p'-DDE	0 003	0 084	Yes	na	na	na	na	na
SW8081	PCB-1260	1	1	Yes	na	na	na	na	na
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	na	na	na	na	na
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na	na
SW8260	Ethylbenzene	0 003	70	Yes	na	na	na	na	na
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	na	na	na	na	na
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na	na
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na	na	na	na
SW8260	*o*-Xylene	0 005	1000	Yes	na	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	na	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	na	na	na
SW8310	Acenaphthene	1 2	610	Yes	- -	0 15 F	na	- -	- -
SW8310	Anthracene	0 44	3100	Yes	0 007 F	0 012 F	na	0 0071 F	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	[(0 38)]	na	na
SW8310		0 009	0 039	Yes	(0 024 J)	[(0 043 J)]	na	(0 028)	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	[(0 4)]	na	na
SW8310		0 015	0 02	Yes	[(0 025 J)]	[(0 043 J)]	na	[(0 031)]	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	[(0 4)]	na	na
SW8310		0 012	0 039	Yes	- -	[(0 05 F)]	na	- -	- -
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	0 02 F	0 03 F	na	0 026 F	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	[(0 46)]	na	na
SW8310		0 011	0 39	Yes	0 011 F	(0 021 J)	na	(0 014)	- -
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	(0 47)	na	na
SW8310		0 1	3 9	Yes	0 025 F	0 046 F	na	0 029 F	- -
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	- -	[(0 03 J)]	na	0 02 F	- -
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na	na
SW8310		0 14	410	Yes	0 075 F	(0 15 F)	na	0 078 F	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	0 27 F	na	na
SW8310		0 03	0 039	Yes	0 02 F	(0 037 J)	na	0 023 F	- -
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na	na
SW8310		0 42	310	Yes	0 034 F	0 063 F	na	0 039 F	- -
SW8270	Pyrene	0 33	310	Yes	na	na	na	na	na
SW8310		0 18	310	Yes	0 066 F	0 12 F	na	0 071 F	- -

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

:675 :227

Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA411 05 ft 2000-03-10	BHGLTA412 05 ft 2000-03-10	THGLTA001 08 ft 1997-08-27	THGLTA002 13 ft 1997-09-02	THGLTA003 13 ft 1997-09-03
SW6010	Aluminum	20260	20260	No	na	na	5610	7400	12400
SW6010	Antimony	0 712	0 712	Yes	na	na	- -	0 25 F	0 36 F
SW6010	Arsenic	6 58	6 58	Yes	na	na	3 2 J	4 4 J	{(7 3)}
SW6010	Barium	128 1	200	Yes	na	na	42 1	47 9 1	107
SW6010	Beryllium	1 13	1 13	Yes	na	na	0 6	0 45 J	0 53 J
SW6010	Cadmium	0 59	0 59	Yes	na	na	- -	0 22 F	0 48 F
SW6010	Calcium	272000	N/A	No	na	na	82400	156000	87000
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	7 2 F	2 7 F	13 J
SW6010	Cobalt	6 19	610	Yes	na	na	5 F	4 1 F	(7 8 F)
SW6010	Copper	13 72	130	Yes	na	na	5 3 F	5 6 F	9
SW6010	Iron	17469	N/A	No	na	na	7870	8360	11400
SW6010	Lead	12 66	12 66	Yes	na	na	7 4 J	{(27 2)}	{(74.4)}
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	1680 J	1730 J	2050 J
SW6010	Manganese	351 7	1400	No	na	na	91 3 J	140 J	325 J
SW7471	Mercury	0 035	0 2	Yes	na	na	- -	0 011 F	(0 049 F)
SW6010	Molybdenum	1 93	51	No	na	na	0 56 F	0 18 F	0 76 F
SW6010	Nickel	19 76	200	Yes	na	na	9 3 F	9 2 F	12 7 F
SW6010	Potassium	1717	N/A	No	na	na	121 F	1360 J	1490
SW6010	Selenium	0 313	5	Yes	na	na	- -	- -	- -
SW6010	Silver	0 128	51	Yes	na	na	- -	- -	(0 6 F)
SW6010	Sodium	53200	N/A	No	na	na	436	81 8	248
SW6010	Thallium	1 5	1 5	Yes	na	na	- -	- -	- -
SW6010	Vanadium	37 4	72	Yes	na	na	20 8	18 6 J	25 9 J
SW6010	Zinc	31 3	3100	Yes	na	na	16 7 J	19 8	(45 1)
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8081	Chlordane	0 009	0 2	Yes	na	na	na	na	na
SW8081	Dieldrin	0 01	0 01	Yes	na	na	na	na	na
SW8081	*p p'*-DDE	0 003	0 084	Yes	na	na	na	na	na
SW8081	PCB-1260	1	1	Yes	na	na	na	na	na
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	na	na	- -	- -	- -
SW8260	1 2,4-Trimethylbenzene	0 007	N/A	No	na	na	- -	(0 011 F)	- -
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	- -	- -	- -
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	- -	- -	- -
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	- -	(0 14)	- -
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na	na
SW8260	Ethylbenzene	0 003	70	Yes	na	na	(0 058)	- -	(0 023)
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	(0 13)	- -	0 0041 F
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	na	(0 29)	(0 0095 F)	(0 0079)
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	- -	- -	- -
SW8260	Naphthalene	0 002	200	Yes	na	na	- -	(0 0088 F)	- -
SW8270	Naphthalene	0 33	200	Yes	na	na	(1 3)	- -	- -
SW8260	*o* -Xylene	0 005	1000	Yes	na	na	(0 24)	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	na	na	(0 013 F)	(0 0071 F)	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	(1 4)	- -	- -
SW8310	Acenaphthene	1 2	610	Yes	- -	- -	na	na	na
SW8310	Anthracene	0 44	3100	Yes	- -	- -	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	- -	- -	- -
SW8310		0 009	0 039	Yes	- -	- -	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	- -	- -	- -
SW8310		0 015	0 02	Yes	- -	- -	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	- -	- -	- -
SW8310		0 012	0 039	Yes	- -	- -	na	na	na
SW8310	Benzo[*g h,i*]perylene	0 05	310	Yes	- -	- -	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na	na
SW8310		0 011	0 39	Yes	- -	- -	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	- -	{(2 1)}	- -
SW8270	Chrysene	0 33	3 9	Yes	na	na	- -	- -	- -
SW8310		0 1	3 9	Yes	- -	- -	na	na	na
SW8310	Dibenzo[*a h*]anthracene	0 02	0 02	Yes	- -	- -	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	0 067 F	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	na	na	- -	- -	- -
SW8310		0 14	410	Yes	- -	- -	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	- -	- -	- -
SW8310		0 03	0 039	Yes	- -	- -	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	0 2 F	- -	- -
SW8310		0 42	310	Yes	- -	- -	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	- -	- -	- -
SW8310		0 18	310	Yes	- -	- -	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in {(parentheses and brackets)}
All concentrations are in mg/kg

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Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA003 13 ft 2000-01-05	THGLTA003 Dup 13 ft 2000-01-05	THGLTA004 13 ft 1997-09-03	THGLTA005 10 ft 1997-09-03	THGLTA006 12 ft 1997-09-04
SW6010	Aluminum	20260	20260	No	na	na	8690	7830	12700 J
SW6010	Antimony	0 712	0 712	Yes	na	na	0 39 F	0 5 F	0 31 F
SW6010	Arsenic	6 58	6 58	Yes	na	na	[(7 9)]	3 9	3 9 I
SW6010	Barium	128 1	200	Yes	na	na	83 5	66	52 J
SW6010	Beryllium	1 13	1 13	Yes	na	na	0 4 J	0 46 J	0 64 J
SW6010	Cadmium	0 59	0 59	Yes	na	na	0 39 F	0 08 F	0 45 F
SW6010	Calcium	272000	N/A	No	na	na	250000	54900	106000
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	[(20 1 J)]	8 8 F	11 8 F
SW6010	Cobalt	6 19	610	Yes	na	na	5 3 F	4 2 F	4 2 F
SW6010	Copper	13 72	130	Yes	na	na	9 1	8 9	7 8
SW6010	Iron	17469	N/A	No	na	na	13300	11100	11000 J
SW6010	Lead	12 66	12 66	Yes	4 2	4 6	[(18)]	7	[(13 9)]
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	(2740 J)	2060 J	2060 J
SW6010	Manganese	351 7	1400	No	na	na	(508 J)	241 J	169 J
SW7471	Mercury	0 035	0 2	Yes	na	na	(0 084 F)	0 017 F	(0 066 F)
SW6010	Molybdenum	1 93	51	No	na	na	1 9 F	0 48 F	0 23 F
SW6010	Nickel	19 76	200	Yes	na	na	8 6 F	9 7 F	10 3 F
SW6010	Potassium	1717	N/A	No	na	na	1120	1190	(1940 J)
SW6010	Selenium	0 313	5	Yes	na	na	--	--	--
SW6010	Silver	0 128	51	Yes	na	na	--	--	(0 22 F)
SW6010	Sodium	53200	N/A	No	na	na	123	62 1 F	105
SW6010	Thallium	1 5	1 5	Yes	na	na	--	--	--
SW6010	Vanadium	37 4	72	Yes	na	na	26 6 J	18 2 J	25 J
SW6010	Zinc	31 3	3100	Yes	na	na	(41)	21 2	(39 1)
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8081	Chlordane	0 009	0 2	Yes	na	na	na	na	na
SW8081	Dieldrin	0 01	0 01	Yes	na	na	na	na	na
SW8081	p,p'-DDE	0 003	0 084	Yes	na	na	na	na	na
SW8081	PCB-1260	1	1	Yes	na	na	na	na	na
SW8260	1 2,4-Trichlorobenzene	0 002	7	Yes	na	na	--	--	--
SW8260	1 2 4-Trimethylbenzene	0 007	N/A	No	na	na	--	--	--
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	--	--	--
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	--	--	--
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	na	na	--	--	--
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	--	--	--
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na	na
SW8260	Ethylbenzene	0 003	70	Yes	na	na	--	--	--
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	--	--	--
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	na	--	--	--
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	--	--	--
SW8260	Naphthalene	0 002	200	Yes	na	na	--	--	--
SW8270	Naphthalene	0 33	200	Yes	na	na	--	--	--
SW8260	*o* -Xylene	0 005	1000	Yes	na	na	--	--	--
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	--	--	--
SW8260	Toluene	0 005	100	Yes	na	na	--	--	--
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	--	--	--
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	--	--	--
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	--	--	--
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	--	--	--
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na	na
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	--	--	--
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	--	--	--
SW8270	Chrysene	0 33	3 9	Yes	na	na	--	--	--
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	--	--	--
SW8270	Fluoranthene	0 33	410	Yes	na	na	--	--	--
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	--	--	--
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	--	--	--
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	--	--	--
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
-- = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
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All concentrations are in mg/kg

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Table 5.6
Subsurface Soil Detections
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA007 05 ft 1997-09-04	THGLTA007 Dup 05 ft 1997-09-04	THGLTA008 05 ft 1997-09-04	THGLTA009 13 ft 1997-09-05	THGLTA010 11 ft 1997-09-05
SW6010	Aluminum	20260	20260	No	5430 J	6590 J	7240 J	10900 J	7480 J
SW6010	Antimony	0 712	0 712	Yes	0 4 F	0 43 F	0 2 F	[(0 99 J)]	0 37 F
SW6010	Arsenic	6 58	6 58	Yes	[(10 2 J)]	[(6 7 J)]	2 7 J	3 J	1 5 J
SW6010	Barium	128 1	200	Yes	23 9 J	27 6 J	32 J	80 9 J	35 5 J
SW6010	Beryllium	1 13	1 13	Yes	0 35 F	0 42 J	0 42 J	0 54 J	0 51 J
SW6010	Cadmium	0 59	0 59	Yes	0 33 F	0 25 F	0 3 F	[(0 63 F)]	- -
SW6010	Calcium	272000	N/A	No	(320000)	(306000)	240000	178000	18600
SW6010	Chromium (total)	16 31	16 31	Yes	- -	- -	- -	8 3 F	9 1 F
SW6010	Cobalt	6 19	610	Yes	5 4 F	3 F	3 1 F	2 7 F	5 3 F
SW6010	Copper	13 72	130	Yes	3 9 F	5 3 F	4 2 F	10 2	7 8 F
SW6010	Iron	17469	N/A	No	11300 J	10600 J	7040 J	17000 J	12000 J
SW6010	Lead	12 66	12 66	Yes	3 9 F	7 5	6 7	[(21 4)]	7 3
SW7421		12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	(2540 J)	2300 J	1430 J	2230 J	1520 J
SW6010	Manganese	351 7	1400	No	169 J	160 J	82 8 J	179 J	78 4 J
SW7471	Mercury	0 035	0 2	Yes	0 0087 F	0 014 F	0 0096 F	(0 12 F)	0 023 F
SW6010	Molybdenum	1 93	51	No	0 61 F	0 55 F	- -	0 3 F	- -
SW6010	Nickel	19 76	200	Yes	11 3 F	9 F	6 3 F	8 9 F	10 8 F
SW6010	Potassium	1717	N/A	No	840 J	1060 J	1080 J	1700 J	1020 J
SW6010	Selenium	0 313	5	Yes	- -	- -	- -	- -	- -
SW6010	Silver	0 128	51	Yes	- -	- -	- -	- -	- -
SW6010	Sodium	53200	N/A	No	170	197	99 5	137	191
SW6010	Thallium	1 5	1 5	Yes	- -	- -	- -	- -	- -
SW6010	Vanadium	37 4	72	Yes	22 8 J	27 4 J	13 6 J	21 9 J	16 6 J
SW6010	Zinc	31 3	3100	Yes	- -	19 2 F	- -	(63 3)	19 3
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8081	Chlordane	0 009	0 2	Yes	na	na	na	na	na
SW8081	Dieldrin	0 01	0 01	Yes	na	na	na	na	na
SW8081	p,p'-DDE	0 003	0 084	Yes	na	na	na	na	na
SW8081	PCB-1260	1	1	Yes	na	na	na	na	na
SW8260	1,2,4-Trichlorobenzene	0 002	7	Yes	- -	- -	(1 5 F)	- -	- -
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	- -	- -	(5 8 J)	- -	- -
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	- -	- -	(1 8)	- -	- -
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	- -	- -	(1 5 F)	- -	- -
SW8260	1,3-Dichlorobenzene	0 006	N/A	Yes	- -	- -	(0 76 F)	- -	- -
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	- -	- -	(0 76 F)	- -	- -
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na	na
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	- -	- -	- -
SW8260	Isopropylbenzene	0 008	N/A	No	- -	- -	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -	- -
SW8260	Naphthalene	0 002	200	Yes	- -	- -	(19 J)	- -	- -
SW8270	Naphthalene	0 33	200	Yes	- -	- -	- -	- -	- -
SW8260	o-Xylene	0 005	1000	Yes	- -	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	- -	- -	- -	- -
SW8310	Acenaphthene	1 2	610	Yes	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[a]anthracene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[a]pyrene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[b]fluoranthene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 012	0 039	Yes	na	na	na	na	na
SW8310	Benzo[g,h,i]perylene	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[k]fluoranthene	0 33	0 39	Yes	na	na	na	na	na
SW8310		0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	- -	- -	- -	- -	- -
SW8310		0 1	3 9	Yes	na	na	na	na	na
SW8310	Dibenzo[a,h]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	- -	- -	- -	- -
SW8310		0 14	410	Yes	na	na	na	na	na
SW8270	Indeno[1,2,3-c,d]pyrene	0 33	0 33	Yes	- -	- -	- -	- -	- -
SW8310		0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	- -	- -
SW8310		0 42	310	Yes	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	- -	- -	- -	- -	- -
SW8310		0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable no value
- - = Not detected

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Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

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Table 5.7
Confirmation/SPLP Results
SWMU 22/Landfill 4
NAS Forth Worth, JRB, Texas

Location	Depth	Method	Analyte	RRS1 (mg/kg)	RRS2 (mg/kg)	Initial Result (mg/kg)	Confirmation Result (mg/kg)	GW-Ind (mg/L)	SPLP Result (mg/L)
THGLTA002	Surface	SW8270	Benzo[*a*]anthracene	0.33	0.33	2.8 F	ND	0 00039	ND
THGLTA002	Surface	SW8270	Benzo[*a*]pyrene	0.33	0.33	3 F	ND	0 0002	ND
THGLTA002	Surface	SW8270	Benzo[*b*]fluoranthene	0.33	0.33	4	ND	0.00039	ND
THGLTA002	Surface	SW8270	Benzo[*k*]fluoranthene	0.33	0 39	na	ND	0 0039	ND
THGLTA002	Surface	SW8270	Chysene	0 33	3.9	3 2 F	ND	0 039	ND
THGLTA002	Surface	SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	0.16 F	ND	0.0002	ND
THGLTA002	Surface	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	2.2 F	ND	0 0002	ND
THGLTA003	Surface	SW8270	Benzo[*a*]anthracene	0.33	0.33	2.4 F	0.56	0.00039	ND
THGLTA003	Surface	SW8270	Benzo[*a*]pyrene	0 33	0 33	2.7 F	0.61	0 0002	ND
THGLTA003	Surface	SW8270	Benzo[*b*]fluoranthene	0.33	0.33	3.4	0.62	0.00039	ND
THGLTA003	Surface	SW8270	Benzo[*k*]fluoranthene	0 33	0.39	na	0.75	0 0039	ND
THGLTA003	Surface	SW8270	Chrysene	0 33	3.9	2.8 F	0.71	0 039	ND
THGLTA003	Surface	SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	ND	ND	0 0002	ND
THGLTA003	Surface	SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	2 F	0.45	0.0002	ND
THGLTA003	12-14' (Duplicate)	SW6010	Lead	12 66	12.66	74.4	4.6 4.2	0.015	0 0075 F 0.0065 F
THGLTA008	Surface	SW8270	Benzo[*a*]anthracene	0 33	0.33	2.4 F	1.9	0 00039	ND
THGLTA008	Surface	SW8270	Benzo[*a*]pyrene	0.33	0 33	3 2 F	2 2	0.0002	ND
THGLTA008	Surface	SW8270	Benzo[*b*]fluoranthene	0.33	0.33	4.6	2.7	0.00039	ND
THGLTA008	Surface	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	na	1.9	0 0039	ND
THGLTA008	Surface	SW8270	Chrysene	0 33	3.9	3.3	2 5	0 039	ND
THGLTA008	Surface	SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	0.16 F	0 22 F	0.0002	ND
THGLTA008	Surface	SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	2 8 F	1 5	0 0002	ND
BHGLTA403	5'	SW8081	Dieldrin	0 01	0.01	0.098	ND	0 000018	ND
BHGLTA406	Surface	SW6010	Lead	30 97	30 97	42.9 F	41.5	0 015	ND
BHGLTA406	Surface	SW8270	Benzo[*a*]anthracene	0 33	0.33	1 9	2.2	0 00039	ND

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Table 5.7
Confirmation/SPLP Results
SWMU 22/Landfill 4
NAS Forth Worth, JRB, Texas

Location	Depth	Method	Analyte	RRS1 (mg/kg)	RRS2 (mg/kg)	Initial Result (mg/kg)	Confirmation Result (mg/kg)	GW-Ind (mg/L)	SPLP Result (mg/L)
BHGLTA406	Surface	SW8270	Benzo[*a*]pyrene	0 33	0.33	2.2	2.7	0.0002	ND
BHGLTA406	Surface	SW8270	Benzo[*b*]fluoranthene	0 33	0.33	3.4	2.8	0.00039	ND
BHGLTA406	Surface	SW8270	Benzo[*k*]fluoranthene	0.33	0 39	1.1	2.9	0.0039	ND
BHGLTA406	Surface	SW8270	Chrysene	0.33	3.9	2.5	3	0 039	ND
BHGLTA406	Surface	SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	0.38	0.38 F	0 0002	ND
BHGLTA406	Surface	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	2	2	0.0002	ND
BHGLTA406	5'	SW8270	bis(2-Ethylhexyl)phthalate	0.33	0.6	2.2	58	0 006	1.3 J
BHGLTA406	10'	SW8270	bis(2-Ethylhexyl)phthalate	0.33	0.6	0.92	1.2	0.006	ND
BHGLTA406	15'	SW8270	bis(2-Ethylhexyl)phthalate	0.33	0 6	1.4 F	0.91	0 006	ND
BHGLTA406	20'	SW8270	bis(2-Ethylhexyl)phthalate	0 33	0.6	1.1 F	1.3	0.006	ND
BHGLTA408	Surface (Duplicate)	SW8270	Benzo[*a*]anthracene	0.33	0 33	20 19	18	0.00039	ND
BHGLTA408	Surface (Duplicate)	SW8270	Benzo[*a*]pyrene	0 33	0.33	20 20	19	0.0002	ND
BHGLTA408	Surface (Duplicate)	SW8270	Benzo[*b*]fluoranthene	0 33	0 33	29 28	23	0.00039	ND
BHGLTA408	Surface (Duplicate)	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	6.2 7	16	0.0039	ND
BHGLTA408	Surface (Duplicate)	SW8270	Chrysene	0.33	3.9	20 21	19	0.039	ND
BHGLTA408	Surface (Duplicate)	SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	2.8 2 6	2	0 0002	ND
BHGLTA408	Surface (Duplicate)	SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	11 10	13	0.0002	ND
BHGLTA408	3-5'	SW8270	Benzo[*a*]anthracene	0.33	0 33	na	0.2 F	0 00039	ND
BHGLTA408	3-5'	SW8270	Benzo[*a*]pyrene	0.33	0 33	na	0.2 F	0 0002	ND
BHGLTA408	3-5'	SW8270	Benzo[*b*]fluoranthene	0.33	0 33	na	0.21 F	0 00039	ND
BHGLTA408	3-5'	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	na	0 22 F	0 0039	ND
BHGLTA408	3-5'	SW8270	Chrysene	0 33	3 9	na	0 24 F	0.039	ND

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Table 5.7
Confirmation/SPLP Results
SWMU 22/Landfill 4
NAS Forth Worth, JRB, Texas

Location	Depth	Method	Analyte	RRS1 (mg/kg)	RRS2 (mg/kg)	Initial Result (mg/kg)	Confirmation Result (mg/kg)	GW-Ind (mg/L)	SPLP Result (mg/L)
BHGLTA408	3-5'	SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	na	ND	0 0002	ND
BHGLTA408	3-5'	SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	na	0.15 F	0.0002	ND
BHGLTA409	Surface	SW8270	Benzo[*a*]anthracene	0.33	0 33	na	34	0.00039	ND
BHGLTA409	Surface	SW8270	Benzo[*a*]pyrene	0 33	0.33	na	37	0.0002	ND
BHGLTA409	Surface	SW8270	Benzo[*b*]fluoranthene	0.33	0.33	na	39	0.00039	ND
BHGLTA409	Surface	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	na	22	0.0039	ND
BHGLTA409	Surface	SW8270	Chrysene	0.33	3.9	na	38	0.039	ND
BHGLTA409	Surface	SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	na	4.9	0 0002	ND
BHGLTA409	Surface	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	na	25	0.0002	ND
BHGLTA409	3-5'	SW8270	Benzo[*a*]anthracene	0.33	0.33	na	0 38	0 00039	ND
BHGLTA409	3-5'	SW8270	Benzo[*a*]pyrene	0.33	0.33	na	0.4	0.0002	ND
BHGLTA409	3-5'	SW8270	Benzo[*b*]fluoranthene	0.33	0.33	na	0.4	0.00039	ND
BHGLTA409	3-5'	SW8270	Benzo[*k*]fluoranthene	0.33	0 39	na	0 46	0 0039	ND
BHGLTA409	3-5'	SW8270	Chrysene	0 33	3.9	na	0.47	0 039	ND
BHGLTA409	3-5'	SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	na	ND	0.0002	ND
BHGLTA409	3-5'	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	na	0.27 F	0.0002	ND

Note. Gray shading indicates Standard 3 concentrations
na - Not Analyzed
ND - < RRS-1

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Table 5.8
Site Specific MSCs
SWMU 22/Landfill 4
NAS Fort Worth JRB, Texas

Boring	Depth	Method	Analyte	GWP-Ind MSC mg/kg	Bkgd mg/kg	Previous Result mg/kg	Result Site-specific MSC mg/kg	SPLP Result mg/L	GW-Ind MSC mg/L
BHGLTA407	Surface	SW6010	Lead	1.5	30.97	81.5	81.5	0 0029	0 015
BHGLTA406	20'	SW8270	bis(2-Ethylhexyl)phthalate	0.6	0.33	1.1 F	1 3	ND	0.006
BHGLTA409	Surface	SW8270C/SW8310	Benzo[*a*]anthracene	0.039	0.33	na	34	0 00015 U	0 00039
BHGLTA409	Surface	SW8270C/SW8310	Benzo[*a*]pyrene	0.02	0.33	na	37	0.00017 F	0 0002
BHGLTA409	Surface	SW8270C/SW8310	Benzo[*b*]fluoranthene	0.039	0.33	na	39	0 00027	0 00039
BHGLTA409	Surface	SW8270C/SW8310	Benzo[*k*]fluoranthene	0.39	0.33	na	22	0.00011 F	0 0039
BHGLTA409	Surface	SW8270C/SW8310	Chrysene	3.9	0.33	na	38	0.00023 F	0 039
BHGLTA409	Surface	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0 02	0.33	na	4 9	0 00034 U	0 0002
BHGLTA409	Surface	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0.039	0.33	na	25	0.00028 F	0 00039

Note Gray shading indicates Standard 3 concentration
na - Not Analyzed

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Table 5.9
State of Texas Background Values

Texas-Specific Background Concentration	
Metal	**Median Background Concentration mg/kg**
Aluminum	30000.0
Antimony	1.0
Arsenic	5.9
Barium	300.0
Beryllium	1.5
Boron	30.0
Total Chromium	30.0
Cobalt	7.0
Fluorine	190.0
Iron	15000.0
Lead	15.0
Manganese	300.0
Mercury	0.0
Nickel	10.0
Selenium	0.3
Strontium	100.0
Tin	0.9
Titanium	2000.0
Thallium	9.3
Vanadium	50.0
Zinc	30.0

Note Table derived from TAC 350 51

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Table 5.10
Surface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA504 00 ft 1998-05-14	BHGLTA505 00 ft 1998-05-14	BHGLTA506 00 ft 1998-05-13	BHGLTA507 00 ft 1998-05-13
SW6010	Aluminum	22035	22035	No	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	- -	- -	- -
SW6010	Arsenic	5 85	5.85	Yes	- -	[(12.4 F)]	[(7.1 F)]	[(6.9 F)]
SW6010	Barium	233	233	Yes	36.5	85 5	47 7	105
SW6010	Beryllium	1.02	1.02	Yes	0.54 F	0 97	0 52	0 62
SW6010	Cadmium	0.556	0 556	Yes	- -	- -	- -	- -
SW6010	Calcium	167788	N/A	No	na	na	na	na
SW6010	Chromium (total)	25 86	25.86	Yes	12 8 F	21.9	10 9	10 9
SW6010	Cobalt	11.05	610	Yes	1 9 F	4 9 F	3 6 F	5.2 F
SW6010	Copper	17 37	130	Yes	7 9 F	9	5 8	7 2
SW6010	Iron	17717	N/A	No	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	- -	20 7 F	11 F	7 2 F
SW7421	Lead	30.97	30 97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na
SW7471	Mercury	0 14	0.2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1.46	51	No	na	na	na	na
SW6010	Nickel	14 6	200	Yes	6 3 F	12 F	7 7 F	10 3 F
SW6010	Potassium	2895	N/A	No	na	na	na	na
SW6010	Selenium	0 907	5	Yes	- -	[(5.5 F)]	- -	- -
SW6010	Silver	0 213	51	Yes	- -	- -	- -	- -
SW6010	Sodium	37300	N/A	No	na	na	na	na
SW6010	Thallium	2 43	2.43	Yes	- -	[(16.9 F)]	[(9.9 F)]	[(11.1 F)]
SW6010	Vanadium	46 3	72	Yes	26 1 F	39 4	23 4	26 9
SW6010	Zinc	38 8	3100	Yes	22.2	(40)	(39.1)	20 4
SW8260	2-Hexanone	0 005	N/A	Yes	(0.007)	(0.007)	(0.008)	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	(0.01)	- -
SW8260	Methyl isobutyl ketone	0 005	820	Yes	- -	- -	0.003 F	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0.33	Yes	- -	0.063 F	0.067 F	0 099 F
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	0 084 F	0 082 F	0 13 F
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -	0.1 F	0 13 F	0 21 F
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	- -	0.092 F	0 053 F	0 1 F
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	0 057 F	0 051 F	0 067 F
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0.6	Yes	- -	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	- -	0 076 F	0 088 F	0 14 F
SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	Yes	- -	0 054 F	- -	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	0.11 F	0 16 F	0 28 F
SW8270	Fluorene	0.33	410	Yes	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	Yes	- -	0.093 F	0 061 F	0 12 F
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	0 055 F	0 075 F
SW8270	Pyrene	0.33	310	Yes	- -	0 093 F	0 14 F	0 23 F

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.10
Surface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA508 00 ft 1998-05-13	BHGLTA509 00 ft 1998-05-14	BHGLTA510 00 ft 1999-10-08	THGLTA011 00 ft 1997-08-25
SW6010	Aluminum	22035	22035	No	na	na	na	8860
SW6010	Antimony	0.56	0 6	Yes	- -	- -	na	- -
SW6010	Arsenic	5 85	5 85	Yes	**[(6.2 F)]**	3 4 F	na	3 4 J
SW6010	Barium	233	233	Yes	107	16	na	74.2
SW6010	Beryllium	1 02	1 02	Yes	0.56	- -	na	0 73
SW6010	Cadmium	0 556	0 556	Yes	- -	- -	na	- -
SW6010	Calcium	167788	N/A	No	na	na	na	39900
SW6010	Chromium (total)	25 86	25 86	Yes	11.2	4.8 F	na	12.7
SW6010	Cobalt	11.05	610	Yes	6 9	2 2 F	na	4.5 F
SW6010	Copper	17 37	130	Yes	7	3 2 F	na	9 2
SW6010	Iron	17717	N/A	No	na	na	na	9440
SW6010	Lead	30.97	30 97	Yes	13 5 F	4 8 F	na	15 6 J
SW7421	Lead	30 97	30.97	Yes	na	na	10 5	na
SW6010	Magnesium	3003	N/A	No	na	na	na	1240
SW6010	Manganese	849	1400	No	na	na	na	226 J
SW7471	Mercury	0 14	0 2	Yes	- -	- -	na	0 033 F
SW6010	Molybdenum	1 46	51	No	na	na	na	0 54 F
SW6010	Nickel	14 6	200	Yes	8 7 F	3 9 F	na	8 5 F
SW6010	Potassium	2895	N/A	No	na	na	na	1510 J
SW6010	Selenium	0 907	5	Yes	- -	- -	na	- -
SW6010	Silver	0 213	51	Yes	- -	- -	na	- -
SW6010	Sodium	37300	N/A	No	na	na	na	38 1 F
SW6010	Thallium	2 43	2 43	Yes	**[(11.7 F)]**	- -	na	- -
SW6010	Vanadium	46 3	72	Yes	19 6	10 6	na	26.1
SW6010	Zinc	38 8	3100	Yes	21 9	12 7	na	29 4 J
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	na	na
SW8260	Acetone	0 005	1000	Yes	- -	- -	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	- -	- -	na	na
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	na	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	na	0 079 F
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	0 12 F	na	**[(0.44 F)]**
SW8270	Benzo[*a*]pyrene	0.33	0 33	Yes	- -	0.16 F	na	**[(0.53 F)]**
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	0 042 F	0 25 F	na	**[(0.73 F)]**
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	0 14 F	na	**(0.44 F)**
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	- -	0.095 F	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	na	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	na	- -
SW8270	Chrysene	0 33	3.9	Yes	- -	0 17 F	na	**(0.55 F)**
SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	Yes	- -	- -	na	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	na	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	0 055 F	na	- -
SW8270	Fluoranthene	0.33	410	Yes	0 05 F	**(0.36 J)**	na	**(1.3)**
SW8270	Fluorene	0.33	410	Yes	- -	- -	na	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	- -	0 12 F	na	**[(0.43 F)]**
SW8270	Phenanthrene	0 33	310	Yes	- -	0 1 F	na	**(0.48 F)**
SW8270	Pyrene	0.33	310	Yes	0 039 F	0 25 F	na	**(1.1)**

Notes:

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in **[(parentheses and brackets)]**
All concentrations are in mg/kg

Table 5.10
Surface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA011 00 ft 2000-01-04	THGLTA011 Dup 00 ft 2000-01-04	THGLTA012 00 ft 1997-08-25	THGLTA012 Dup 00 ft 1997-08-25
SW6010	Aluminum	22035	22035	No	na	na	4660 J	7360 J
SW6010	Antimony	0.56	0.6	Yes	na	na	- -	- -
SW6010	Arsenic	5 85	5.85	Yes	na	na	2 9 J	3 5 J
SW6010	Barium	233	233	Yes	na	na	61.6	84 3
SW6010	Beryllium	1.02	1 02	Yes	na	na	0 46	0 65
SW6010	Cadmium	0 556	0.556	Yes	na	na	- -	- -
SW6010	Calcium	167788	N/A	No	na	na	49700	42700
SW6010	Chromium (total)	25 86	25.86	Yes	na	na	6 2 F	8 4
SW6010	Cobalt	11 05	610	Yes	na	na	4.3 F	4.4 F
SW6010	Copper	17.37	130	Yes	na	na	5 1 F	5.6 F
SW6010	Iron	17717	N/A	No	na	na	5630	7760
SW6010	Lead	30.97	30 97	Yes	na	na	9.3 J	9.2 J
SW7421	Lead	30 97	30 97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	na	969	1300
SW6010	Manganese	849	1400	No	na	na	317 J	248
SW7471	Mercury	0 14	0 2	Yes	na	na	0 012 F	0 015 F
SW6010	Molybdenum	1 46	51	No	na	na	0 44 F	0 45 F
SW6010	Nickel	14 6	200	Yes	na	na	8 2 F	9 1 F
SW6010	Potassium	2895	N/A	No	na	na	848 J	994 J
SW6010	Selenium	0.907	5	Yes	na	na	- -	- -
SW6010	Silver	0 213	51	Yes	na	na	- -	- -
SW6010	Sodium	37300	N/A	No	na	na	- -	41 F
SW6010	Thallium	2 43	2.43	Yes	na	na	- -	- -
SW6010	Vanadium	46.3	72	Yes	na	na	17.6	23
SW6010	Zinc	38.8	3100	Yes	na	na	15.8 J	18 7 J
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na
SW8270	Acenaphthene	0.33	610	Yes	na	na	- -	- -
SW8270	Anthracene	0 33	3100	Yes	na	na	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	0 053 F	0 074 F
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	- -	0 071 F	0 095 F
SW8270	Benzo[*b*]fluoranthene	0.33	0 33	Yes	- -	- -	0 096 F	0 13 F
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	na	na	0 069 F	0 085 F
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na
SW8270	Benzyl butyl phthalate	0.33	2000	Yes	na	na	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	na	na	0 066 F	0 1 F
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	- -	- -
SW8270	Dibenzofuran	0 33	41	Yes	na	na	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	na	na	0.14 F	0 21 F
SW8270	Fluorene	0 33	410	Yes	na	na	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -	- -	0 064 F	0 08 F
SW8270	Phenanthrene	0.33	310	Yes	na	na	0 039 F	0 063 F
SW8270	Pyrene	0.33	310	Yes	na	na	0.13 F	0 18 F

Notes.
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
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N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.10
Surface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA013 00 ft 1997-08-25	THGLTA014 00 ft 1997-08-25	THGLTA015 00 ft 1997-08-25	THGLTA016 00 ft 1997-08-25
SW6010	Aluminum	22035	22035	No	6960	3900	4910	3870
SW6010	Antimony	0 56	0.6	Yes	- -	- -	- -	- -
SW6010	Arsenic	5.85	5.85	Yes	2 9 J	2 4 J	**[(8 F)]**	1 9 J
SW6010	Barium	233	233	Yes	59 9	36 9	221	39.8
SW6010	Beryllium	1 02	1.02	Yes	0 59	0 37	0 32 F	0 37
SW6010	Cadmium	0 556	0 556	Yes	- -	- -	- -	0 088 F
SW6010	Calcium	167788	N/A	No	109000	53100	61400	32300
SW6010	Chromium (total)	25 86	25 86	Yes	7.2 F	5 6 F	**[(37.5)]**	5 7 F
SW6010	Cobalt	11 05	610	Yes	3 4 F	3 F	9 2 F	2 9 F
SW6010	Copper	17 37	130	Yes	4.4 F	6.7	**(83.9)**	4 9 F
SW6010	Iron	17717	N/A	No	5650	4740	**(118000)**	4560
SW6010	Lead	30 97	30.97	Yes	7 J	6 9 J	**[(20000 J)]**	14 7 J
SW7421	Lead	30 97	30 97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	1950	921	889	854
SW6010	Manganese	849	1400	No	230 J	140 J	447 J	153 J
SW7471	Mercury	0.14	0 2	Yes	0 013 F	0 011 F	0.039 F	0 014 F
SW6010	Molybdenum	1 46	51	No	0.28 F	0 35 F	**(16 F)**	0 37 F
SW6010	Nickel	14 6	200	Yes	7 4 F	5 8 F	**(44.2 F)**	5 7 F
SW6010	Potassium	2895	N/A	No	1070 J	605 J	426 F	766 J
SW6010	Selenium	0.907	5	Yes	- -	- -	**[(6.1 F)]**	- -
SW6010	Silver	0 213	51	Yes	- -	- -	**(0.5 F)**	- -
SW6010	Sodium	37300	N/A	No	57 8 F	35 F	75 1 F	- -
SW6010	Thallium	2 43	2.43	Yes	- -	- -	- -	- -
SW6010	Vanadium	46.3	72	Yes	16.8	13 9	12 2 F	11.9
SW6010	Zinc	38.8	3100	Yes	14 1 J	16 7 J	**(59.4 J)**	33 J
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Acetone	0.005	1000	Yes	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0.33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	0 037 F	0 057 F	0 053 F
SW8270	Benzo[*b*]fluoranthene	0 33	0.33	Yes	- -	- -	0 077 F	0 07 F
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	- -	0.036 F	0 054 F	0.036 F
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	**(3.3)**	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0 6	Yes	- -	- -	0 29 F	- -
SW8270	Chrysene	0 33	3.9	Yes	- -	0 038 F	0 057 F	0.056 F
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Dibenzofuran	0.33	41	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	- -	- -	0.1 F	0 11 F
SW8270	Fluorene	0 33	410	Yes	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	- -	- -	0.051 F	0 037 F
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	0 042 F
SW8270	Pyrene	0.33	310	Yes	- -	- -	- -	- -

Notes:

RRS-1 = Risk Reduction Standard 1
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na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
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All concentrations are in mg/kg.

Table 5.10
Surface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA017 00 ft 1997-08-25	THGLTA017 00 ft 2000-01-04	THGLTA018 00 ft 1997-09-02	THGLTA019 00 ft 1997-09-02
SW6010	Aluminum	22035	22035	No	4440	na	15500	7830
SW6010	Antimony	0 56	0 6	Yes	- -	na	0 2 F	0 2 F
SW6010	Arsenic	5 85	5.85	Yes	2 1 J	na	4 5 J	3 J
SW6010	Barium	233	233	Yes	47 1	na	73 5 J	44 6 J
SW6010	Beryllium	1.02	1.02	Yes	0 42	na	0 71 J	0 47 J
SW6010	Cadmium	0.556	0.556	Yes	[(3.4 F)]	na	0 29 F	0 18 F
SW6010	Calcium	167788	N/A	No	66700	na	133000	57300
SW6010	Chromium (total)	25 86	25 86	Yes	6 4 F	na	13.4 F	8 2 F
SW6010	Cobalt	11 05	610	Yes	3 F	na	4 8 F	3.2 F
SW6010	Copper	17.37	130	Yes	6.4 F	na	6 6 F	5 7 F
SW6010	Iron	17717	N/A	No	5120	na	11300	8060
SW6010	Lead	30 97	30 97	Yes	16 J	na	10 7	8.4
SW7421	Lead	30.97	30.97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	1140	na	2620 J	1530 J
SW6010	Manganese	849	1400	No	162 J	na	288 J	160 J
SW7471	Mercury	0.14	0.2	Yes	0 014 F	na	0 018 F	0 007 F
SW6010	Molybdenum	1.46	51	No	0 34 F	na	0 14 F	0 23 F
SW6010	Nickel	14.6	200	Yes	6 4 F	na	10 5 F	7 5 F
SW6010	Potassium	2895	N/A	No	742 J	na	2360 J	1470 J
SW6010	Selenium	0 907	5	Yes	- -	na	- -	- -
SW6010	Silver	0 213	51	Yes	- -	na	- -	- -
SW6010	Sodium	37300	N/A	No	49 1 F	na	60 9 F	50 9 F
SW6010	Thallium	2 43	2 43	Yes	- -	na	- -	- -
SW6010	Vanadium	46.3	72	Yes	12 6	na	25 9 J	16 J
SW6010	Zinc	38 8	3100	Yes	20.4 J	na	32	23 5
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Acetone	0.005	1000	Yes	na	na	na	na
SW8260	Methyl isobutyl ketone	0.005	820	Yes	na	na	na	na
SW8270	Acenaphthene	0.33	610	Yes	0 25 F	na	- -	- -
SW8270	Anthracene	0 33	3100	Yes	**(0.61 F)**	na	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	**[(1.9)]**	0 3 F	**[(0.42 F)]**	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	**[(2)]**	0 33 F	**[(0.42 F)]**	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0 33	Yes	**[(2.8)]**	**[(0.35 F)]**	**[(0.53 F)]**	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	**(1.3)**	na	**(0.36 F)**	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0.39	Yes	na	**(0.36 F)**	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	**(0.75 F)**	na	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0.6	Yes	**[(2.4)]**	na	- -	- -
SW8270	Chrysene	0 33	3.9	Yes	**(2.2)**	**(0.41)**	**(0.54 F)**	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	**[(0.34 F)]**	- -	- -	- -
SW8270	Dibenzofuran	0.33	41	Yes	0.08 F	na	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	0.083 F	na	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	**(5.5)**	na	**(1.3)**	- -
SW8270	Fluorene	0.33	410	Yes	0 15 F	na	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	**[(1.4)]**	0 24 F	0 3 F	- -
SW8270	Phenanthrene	0.33	310	Yes	**(3.4)**	na	**(0.64 F)**	- -
SW8270	Pyrene	0.33	310	Yes	**(4.6)**	na	**(1.2)**	- -

Notes:

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All concentrations are in mg/kg.

Table 5.10
Surface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA020 00 ft 1997-09-02	THGLTA020 Dup 00 ft 1997-09-02
SW6010	Aluminum	22035	22035	No	7110	7660
SW6010	Antimony	0 56	0 6	Yes	0.21 F	0 24 F
SW6010	Arsenic	5.85	5 85	Yes	3.3 J	3 4 J
SW6010	Barium	233	233	Yes	56 J	52 5 J
SW6010	Beryllium	1 02	1 02	Yes	0 5 J	0 54 J
SW6010	Cadmium	0 556	0 556	Yes	0.2 F	0 16 F
SW6010	Calcium	167788	N/A	No	97500	84400
SW6010	Chromium (total)	25 86	25 86	Yes	6 6 F	7 1 F
SW6010	Cobalt	11.05	610	Yes	4.1 F	3 8 F
SW6010	Copper	17 37	130	Yes	5 3 F	5 2 F
SW6010	Iron	17717	N/A	No	7400	7740
SW6010	Lead	30.97	30 97	Yes	9.1	8 8
SW7421	Lead	30 97	30.97	Yes	na	na
SW6010	Magnesium	3003	N/A	No	1540 J	1550 J
SW6010	Manganese	849	1400	No	254 J	215 J
SW7471	Mercury	0 14	0 2	Yes	**[(1.5 J)]**	**(0.2 J)**
SW6010	Molybdenum	1.46	51	No	0 24 F	0 21 F
SW6010	Nickel	14.6	200	Yes	7 9 F	8.1 F
SW6010	Potassium	2895	N/A	No	1230 J	1250 J
SW6010	Selenium	0 907	5	Yes	- -	- -
SW6010	Silver	0.213	51	Yes	- -	- -
SW6010	Sodium	37300	N/A	No	52 F	47 9 F
SW6010	Thallium	2 43	2.43	Yes	- -	- -
SW6010	Vanadium	46.3	72	Yes	17 J	18 5 J
SW6010	Zinc	38 8	3100	Yes	20 5	19.6
SW8260	2-Hexanone	0.005	N/A	Yes	na	na
SW8260	Acetone	0.005	1000	Yes	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na
SW8270	Acenaphthene	0.33	610	Yes	- -	- -
SW8270	Anthracene	0.33	3100	Yes	- -	- -
SW8270	Benzo[*a*]anthracene	0.33	0.33	Yes	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0.39	Yes	na	na
SW8270	Benzyl butyl phthalate	0.33	2000	Yes	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0.6	Yes	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	0 19 F	0 33 F
SW8270	Fluorene	0.33	410	Yes	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	- -
SW8270	Pyrene	0 33	310	Yes	- -	0 32 F

Notes:
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All concentrations are in mg/kg.

Table 5.11
Subsurface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA504 05 ft 1998-05-14	BHGLTA505 05 ft 1998-05-18	BHGLTA505 10 ft 1998-05-18	BHGLTA505 15 ft 1998-05-18	BHGLTA505 20 ft 1998-05-18	BHGLTA506 05 ft 1998-05-13
SW6010	Aluminum	20260	20260	No	na	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	--	--	--	--	--	--
SW6010	Arsenic	6 58	6 58	Yes	6 5 F	[(25.5 F)]	--	--	--	[(12.4 F)]
SW6010	Barium	128 1	200	Yes	45	(155)	13 9	2 1	3 1	[(220 J)]
SW6010	Beryllium	1 13	1 13	Yes	0 51	1 1	--	--	--	[(1 2 J)]
SW6010	Cadmium	0 59	0 59	Yes	--	--	--	--	--	--
SW6010	Calcium	272000	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	10	[(25)]	4 7 F	2 1 F	2 4 F	[(25 J)]
SW6010	Cobalt	6 19	610	Yes	3 4 F	(9.7 F)	1 6 F	1 3 F	1 1 F	5 6 F
SW6010	Copper	13 72	130	Yes	5 7 F	9 1 F	2 7 F	2 2 F	1 3 F	7 2 J
SW6010	Iron	17469	N/A	No	na	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	5 5 F	7 8 F	--	--	2 F	11 7 F
SW7421	Lead	12 96	12 66	Yes	na	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	0 03 F	--	--	--	--	--
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	7 F	16 F	3 6 F	1 7 F	1 8 F	14 8 F
SW6010	Potassium	1717	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	(3.8 F)	--	--	--	--	--
SW6010	Sodium	53200	N/A	No	na	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	[(10.5 F)]	[(23.2 F)]	--	--	--	[(21 1 F)]
SW6010	Vanadium	37 4	72	Yes	20 6	(57.4)	8 3	4 6 F	5 8 F	(38 7)
SW6010	Zinc	31 3	3100	Yes	(32.5)	(39.9)	6 9	3 8	4 8	(38 7 J)
SW9030	Sulfide	25	N/A	Yes	--	--	--	--	--	--
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	--	--	0 002 F	--	--	--
SW8260	1,2-Dichloroethene, *trans-*	0 003	10	Yes	--	--	--	--	--	--
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na	na
SW8270	1,4-Dichlorobenzene	0 33	7 5	Yes	--	--	--	--	--	--
SW8260	2-Hexanone	0 005	N/A	Yes	--	--	--	--	--	--
SW8260	Acetone	0 005	1000	Yes	(0 062)	(0 028)	(0 015)	--	--	(0 072)
SW8260	Chlorobenzene	0 002	10	Yes	--	--	(0 004)	--	--	--
SW8260	Ethylbenzene	0 003	70	Yes	--	--	--	--	--	--
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na	na
SW8260	*m- & p-Xylene (sum of isomers)*	0 005	1000	Yes	--	--	--	--	--	--
SW8260	Methyl ethyl ketone	0 005	6100	Yes	(0 009)	--	--	--	--	(0 008)
SW8260	Methyl isobutyl ketone	0 005	820	Yes	--	--	--	--	--	--
SW8260	Methylene chloride	0 002	0 5	Yes	--	--	--	--	--	--
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	--	--	--	--	--	--
SW8260	*n*-Butylbenzene	0 005	N/A	No	na	na	na	na	na	na
SW8260	*n*-Propylbenzene	0 002	N/A	No	na	na	na	na	na	na
SW8260	*o*-Xylene	0 005	1000	Yes	--	--	--	--	--	--
SW8260	*p*-Isopropyltoluene	0 006	N/A	No	na	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	--	--	--	--	--	--
SW8260	Trichloroethene	0 005	0 5	Yes	--	--	0 001 F	--	--	--
SW8270	2-Methylnaphthalene	0 33	410	Yes	--	--	--	--	--	--
SW8270	Acenaphthene	0 33	610	Yes	--	--	--	--	--	--
SW8270	Anthracene	0 33	3100	Yes	--	--	--	--	--	--
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	--	--	--	--	--	--
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	--	--	--	--	--	--
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	0 057 F	--	--	--	--	--
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	--	--	--	--	--	--
SW8270	Benzo[k]fluoranthene	0 33	0 39	Yes	--	--	--	--	--	--
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	0 045 F	--	--	--	--	--
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	--	--	--	--	--	--
SW8270	Chrysene	0 33	3 9	Yes	0 047 F	--	--	--	--	--
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	--	--	--	--	--	--
SW8270	Dibenzofuran	0 33	41	Yes	--	--	--	--	--	--
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	--	--	--	--	--	0 058 F
SW8270	Fluoranthene	0 33	410	Yes	0 085 F	--	--	--	--	--
SW8270	Fluorene	0 33	410	Yes	--	--	--	--	--	--
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	--	--	--	--	--	--
SW8270	*m- & p*-Cresol (sum of isomers)	0 33	51	Yes	--	--	--	--	--	--
SW8270	Phenanthrene	0 33	310	Yes	0 044 F	--	--	--	--	--
SW8270	Pyrene	0 33	310	Yes	0 065 F	--	--	--	--	--

Notes
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-- = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

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Table 5.11
Subsurface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA506 Dup 05 ft 1998-05-13	BHGLTA506 05 ft 2000-01-05	BHGLTA506 10 ft 1998-05-13	BHGLTA507 05 ft 1998-05-13	BHGLTA507 10 ft 1998-05-13	BHGLTA508 05 ft 1998-05-13
SW6010	Aluminum	20260	20260	No	na	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	na	- -	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	[(12 5 F)]	na	- -	[(12.5 F)]	- -	[(9 3 F)]
SW6010	Barium	128 1	200	Yes	65 3 J	43	6 2	64 1	3	87
SW6010	Beryllium	1 13	1 13	Yes	0 73 J	0 53	- -	0 79	- -	0 73
SW6010	Cadmium	0 59	0 59	Yes	- -	na	- -	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	15 3 J	12 4	- -	16 2	- -	14 3 F
SW6010	Cobalt	6 19	610	Yes	4 4 F	na	1 4 F	(7.7 F)	0 97 F	5 8 F
SW6010	Copper	13 72	130	Yes	4 6 F	na	1 6 F	5 4 F	1 5 F	7 1 F
SW6010	Iron	17469	N/A	No	na	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	4 F	na	2 7 F	6 9 F	2 F	7 2 F
SW7421	Lead	12 96	12 66	Yes	na	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	na	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	9 4 F	na	2 7 F	10 F	1 6 F	10 2 F
SW6010	Potassium	1717	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	- -	na	- -	- -	- -	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	[(15.7 F)]	na	- -	- -	- -	[(13 4 F)]
SW6010	Vanadium	37 4	72	Yes	27 9	na	4 4 F	27 1	4 8 F	29 6
SW6010	Zinc	31 3	3100	Yes	24 J	na	4	24 9	4 2	25 2
SW9030	Sulfide	25	N/A	Yes	- -	na	- -	- -	- -	- -
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -	na	- -	- -	- -	- -
SW8260	1,2-Dichloroethene, *trans-*	0 003	10	Yes	- -	na	- -	- -	- -	- -
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na	na
SW8270	1,4-Dichlorobenzene	0 33	7 5	Yes	- -	na	- -	- -	- -	- -
SW8260	2-Hexanone	0 005	N/A	Yes	- -	na	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	(0 43)	na	(0.025)	(0 021)	(0.007)	- -
SW8260	Chlorobenzene	0 002	10	Yes	- -	na	- -	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	na	- -	- -	- -	- -
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	- -	na	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	(0 059)	na	0 005	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 005	820	Yes	- -	na	- -	- -	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	na	- -	- -	- -	- -
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	na	- -	- -	- -	0 047 F
SW8260	*n* -Butylbenzene	0 005	N/A	No	na	na	na	na	na	na
SW8260	*n* -Propylbenzene	0 002	N/A	No	na	na	na	na	na	na
SW8260	*o* -Xylene	0 005	1000	Yes	- -	na	- -	- -	- -	- -
SW8260	*p* -Isopropyltoluene	0 006	N/A	No	na	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	- -	na	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	na	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	na	- -	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	na	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	na	- -	- -	- -	0 066 F
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	na	- -	- -	- -	0 28 F
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	na	- -	- -	- -	[(0 36 F)]
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -	na	- -	- -	- -	[(0 54)]
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	na	- -	- -	- -	0 27 F
SW8270	Benzo[k]fluoranthene	0 33	0 39	Yes	- -	na	- -	- -	- -	0 19 F
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	na	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	na	- -	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	- -	na	- -	- -	- -	(0.4)
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	na	- -	- -	- -	0 052 F
SW8270	Dibenzofuran	0 33	41	Yes	- -	na	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	na	0 065 F	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	na	- -	- -	- -	(0.88)
SW8270	Fluorene	0 33	410	Yes	- -	na	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -	na	- -	- -	- -	0 29 F
SW8270	*m* - & *p* -Cresol (sum of isomers)	0 33	51	Yes	- -	na	- -	- -	- -	0 042 F
SW8270	Phenanthrene	0 33	310	Yes	- -	na	- -	- -	- -	(0.42)
SW8270	Pyrene	0 33	310	Yes	- -	na	- -	- -	- -	(0.61)

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.11
Subsurface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA508 10 ft 1998-05-13	BHGLTA509 05 ft 1998-05-15	BHGLTA509 05 ft 2000-01-05	BHGLTA509 10 ft 1998-05-15	BHGLTA509 10 ft 2000-01-05	BHGLTA509 15 ft 1998-05-15
SW6010	Aluminum	20260	20260	No	na	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	na	- -	na	- -
SW6010	Arsenic	6 58	6 58	Yes	- -	[(9.1 F)]	na	6 3 F	na	2 8 F
SW6010	Barium	128 1	200	Yes	57 6	74 2	na	22 7	na	6 3
SW6010	Beryllium	1 13	1 13	Yes	0 63 F	0 82	na	- -	na	- -
SW6010	Cadmium	0 59	0 59	Yes	- -	[(2.5 F)]	na	- -	na	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	10 8 F	[(35 6)]	9 2	9 9	3 7 F	2 8 F
SW6010	Cobalt	6 19	610	Yes	4 2 F	4 3 F	na	3 6 F	na	0 74 F
SW6010	Copper	13 72	130	Yes	5 F	9	na	8 7	na	1 8 F
SW6010	Iron	17469	N/A	No	na	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	- -	[(57 5)]	na	6 7 F	na	2 2 F
SW7421	Lead	12 96	12 66	Yes	na	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	na	0 03 F	na	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	6 5 F	9 8 F	na	12 2 F	na	2 5 F
SW6010	Potassium	1717	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	- -	[(6 3 F)]	na	(3 5 F)	na	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	- -	[(14 7 F)]	na	[(8 1 F)]	na	- -
SW6010	Vanadium	37 4	72	Yes	27 9 F	29 1	na	20 5	na	5 9 F
SW6010	Zinc	31 3	3100	Yes	(38)	(55 4)	na	17 7	na	5 4
SW9030	Sulfide	25	N/A	Yes	- -	(38 9 S)	na	- -	na	- -
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	na	na	na	na	na
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	na	na	na	na	na
SW8260	1,2-Dichloroethene, *cis*-	0 005	7	Yes	- -	- -	na	- -	na	- -
SW8260	1,2-Dichloroethene, *trans*-	0 003	10	Yes	- -	- -	na	- -	na	- -
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	na	na	na	na	na
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	na	na	na	na	na
SW8270	1,4-Dichlorobenzene	0 33	7 5	Yes	- -	(0.63 F)	na	- -	na	- -
SW8260	2-Hexanone	0 005	N/A	Yes	(0.04)	- -	na	- -	na	- -
SW8260	Acetone	0 005	1000	Yes	(0.5)	(0 11)	na	- -	na	- -
SW8260	Chlorobenzene	0 002	10	Yes	- -	- -	na	- -	na	- -
SW8260	Ethylbenzene	0 003	70	Yes	(0 018)	(0 017)	na	- -	na	- -
SW8260	Isopropylbenzene	0 008	N/A	No	na	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	(0 057)	(0 024)	na	- -	na	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	(0.14)	(0.021)	na	(0 008)	na	- -
SW8260	Methyl isobutyl ketone	0 005	820	Yes	(0 014)	- -	na	- -	na	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	na	- -	na	- -
SW8260	Naphthalene	0 002	200	Yes	na	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	(0 46 F)	na	- -	na	- -
SW8260	*n*-Butylbenzene	0 005	N/A	No	na	na	na	na	na	na
SW8260	*n*-Propylbenzene	0 002	N/A	No	na	na	na	na	na	na
SW8260	*o*-Xylene	0 005	1000	Yes	(0.013)	- -	na	- -	na	- -
SW8260	*p*-Isopropyltoluene	0 006	N/A	No	na	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	(0.021)	(0.008)	na	- -	na	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	na	- -	na	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	0 29 F	na	- -	na	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	(4.2)	na	- -	na	- -
SW8270	Anthracene	0 33	3100	Yes	0 061 F	(9.5)	na	0 045 F	na	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	0 19 F	[(31 J)]	0 18 F	0 18 F	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	0 2 F	[(33 J)]	0 2 F	0 18 F	- -	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	0 29 F	[(50 J)]	0 21 F	0 28 F	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	0 16 F	(24 J)	na	0 12 F	na	- -
SW8270	Benzo[k]fluoranthene	0 33	0 39	Yes	0 1 F	[(16)]	0 2 F	0 1 F	- -	- -
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	na	- -	na	0 036 F
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	[(1 3 F)]	na	(0.36 F)	na	(0.37)
SW8270	Chrysene	0 33	3 9	Yes	0 25 F	[(37 J)]	0 23 F	0 23 F	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	[(5.1)]	- -	- -	- -	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	(1.8 F)	na	- -	na	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	na	- -	na	- -
SW8270	Fluoranthene	0 33	410	Yes	(0.51)	(95 J)	na	(0.58 J)	na	- -
SW8270	Fluorene	0 33	410	Yes	- -	(3.3)	na	- -	na	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	0 16 F	[(27 J)]	0 14 F	0 14 F	- -	- -
SW8270	*m* - & *p* -Cresol (sum of isomers)	0 33	51	Yes	0 2 F	(1.7 F)	na	- -	na	- -
SW8270	Phenanthrene	0 33	310	Yes	(0 36 F)	(60 J)	na	0 3 F	na	- -
SW8270	Pyrene	0 33	310	Yes	(0.49)	(80 J)	na	(0 49 J)	na	- -

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675 248

Table 5.11
Subsurface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA511 05 ft 1999-10-08	BHGLTA515 05 ft 2000-06-15	BHGLTA515 10 ft 2000-06-15	LF05-DP059 05 ft 2000-04-26	LF05-DP059 10 ft 2000-04-26	LF05-DP059 15 ft 2000-04-26
SW6010	Aluminum	20260	20260	No	na	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	na	na	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	7 8 F	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na	na
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	na	--	--	--	--	--
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	na	--	--	--	--	--
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	--	--	--	--	--	--
SW8260	1,2-Dichloroethene, *trans-*	0 003	10	Yes	--	--	--	--	--	--
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	na	--	--	--	--	--
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	na	--	--	(0 055)	0 002 F	--
SW8270	1,4-Dichlorobenzene	0 33	7 5	Yes	--	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	--	na	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	--	na	na	na	na	na
SW8260	Chlorobenzene	0 002	10	Yes	--	--	--	--	--	--
SW8260	Ethylbenzene	0 003	70	Yes	--	--	--	0 003 F	--	--
SW8260	Isopropylbenzene	0 008	N/A	No	na	--	--	--	--	--
SW8260	*m-* & *p-*Xylene (sum of isomers)	0 005	1000	Yes	--	--	--	0 002 F	--	--
SW8260	Methyl ethyl ketone	0 005	6100	Yes	--	na	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	--	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	--	(0 005 J)	--	--	--	--
SW8260	Naphthalene	0 002	200	Yes	na	--	--	--	--	--
SW8270	Naphthalene	0 33	200	Yes	--	na	na	na	na	na
SW8260	*n*-Butylbenzene	0 005	N/A	No	na	--	--	--	--	--
SW8260	*n*-Propylbenzene	0 002	N/A	No	na	--	--	--	--	--
SW8260	*o*-Xylene	0 005	1000	Yes	--	--	--	--	--	--
SW8260	*p*-Isopropyltoluene	0 006	N/A	No	na	--	--	--	--	--
SW8260	Toluene	0 005	100	Yes	0 004 F	--	--	0 004 F	--	--
SW8260	Trichloroethene	0 005	0 5	Yes	--	--	--	--	--	--
SW8270	2-Methylnaphthalene	0 33	410	Yes	--	na	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	--	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	--	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	--	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	--	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	--	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	--	na	na	na	na	na
SW8270	Benzo[k]fluoranthene	0 33	0 39	Yes	--	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	--	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	--	na	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	--	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	--	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	--	na	na	na	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	--	na	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	--	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	--	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	--	na	na	na	na	na
SW8270	*m-* & *p-*Cresol (sum of isomers)	0 33	51	Yes	--	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	--	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	--	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
-- = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

675 249

Table 5.11
Subsurface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	LF05-DP059 20 ft 2000-04-26	LF05-DP059 25 ft 2000-04-26	LF05-DP060 05 ft 2000-04-26	LF05-DP060 10 ft 2000-04-26	LF05-DP060 15 ft 2000-04-26	LF05-DP060 20 ft 2000-04-26
SW6010	Aluminum	20260	20260	No	na	na	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	na	na	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	na	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na	na
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	- -	- -	(0.021)	(0 038)	- -	- -
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	- -	- -	- -	- -	- -	- -
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -	- -	- -	- -	- -	0 001 F
SW8260	1,2-Dichloroethene, *trans-*	0 003	10	Yes	- -	- -	- -	- -	- -	- -
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	- -	- -	(0.006)	(0 01)	- -	- -
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	- -	- -	(0.013)	(0.12)	- -	- -
SW8270	1,4-Dichlorobenzene	0 33	7 5	Yes	na	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na	na	na
SW8260	Chlorobenzene	0 002	10	Yes	- -	- -	- -	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	(0 025)	(0 02)	- -	- -
SW8260	Isopropylbenzene	0 008	N/A	No	- -	- -	0 003 F	0 004 F	- -	- -
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	(0.045)	(0 039)	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -	- -	- -
SW8260	Naphthalene	0 002	200	Yes	- -	- -	(0 01)	(0 014)	- -	- -
SW8270	Naphthalene	0 33	200	Yes	na	na	na	na	na	na
SW8260	*n* -Butylbenzene	0 005	N/A	No	- -	- -	- -	0 002 F	- -	- -
SW8260	*n* -Propylbenzene	0 002	N/A	No	- -	- -	(0 003)	(0.005)	- -	- -
SW8260	*o* -Xylene	0 005	1000	Yes	- -	- -	0 002 F	(0 013)	- -	- -
SW8260	*p* -Isopropyltoluene	0 006	N/A	No	- -	- -	0 002 F	0 005 F	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	(0 017)	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	0 003 F	- -	- -	- -	0 003 F
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na	na	na
SW8270	Benzo[k]fluoranthene	0 33	0 39	Yes	na	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na	na	na
SW8270	Di-*n*-butyl phthalate	0 33	1000	Yes	na	na	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na	na	na
SW8270	*m* - & *p* -Cresol (sum of isomers)	0 33	51	Yes	na	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)].
All concentrations are in mg/kg

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Table 5.11
Subsurface Soil Detections
SWMU 23/Landfill 5
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA013 15 ft 1997-09-09	THGLTA017 12 ft 1997-09-08	THGLTA017 13 ft 2000-01-05	THGLTA019 10 ft 1997-09-09	THGLTA020 13 ft 1997-09-09
SW6010	Aluminum	20260	20260	No	522 J	1500 J	na	3630 J	4670 J
SW6010	Antimony	0 712	0 712	Yes	- -	- -	na	0 15 F	0 14 F
SW6010	Arsenic	6 58	6 58	Yes	0 29 F	2	na	2 2	2 2
SW6010	Barium	128 1	200	Yes	6 7	22 3	na	40 3	40 7
SW6010	Beryllium	1 13	1 13	Yes	0 078 F	0 21 F	na	0 34 F	0 39 F
SW6010	Cadmium	0 59	0 59	Yes	- -	- -	na	0 15 F	0 089 F
SW6010	Calcium	272000	N/A	No	815	31500	na	94900	44000
SW6010	Chromium (total)	16 31	16 31	Yes	1 7 F	1 9 F	na	8 8 F	4 2 F
SW6010	Cobalt	6 19	610	Yes	- -	2 1 F	na	2 8 F	3 3 F
SW6010	Copper	13 72	130	Yes	1 1 F	2 5 F	na	3 6 F	5 1 F
SW6010	Iron	17469	N/A	No	2020	4640	na	4850	4300
SW6010	Lead	12 66	12 66	Yes	2 8 J	3 2 J	na	6 7 J	7 1 J
SW7421	Lead	12 96	12 66	Yes	na	na	na	na	na
SW6010	Magnesium	2420	N/A	No	88 2	422	na	965	1020
SW6010	Manganese	351 7	1400	No	19 5	104	na	218	83
SW7471	Mercury	0 035	0 2	Yes	0 0087 F	0 008 F	na	0 013 F	0 028 F
SW6010	Molybdenum	1 93	51	No	- -	0 28 F	na	0 26 F	0 29 F
SW6010	Nickel	19 76	200	Yes	1 9 F	3 4 F	na	5 1 F	5 4 F
SW6010	Potassium	1717	N/A	No	88 1 F	265 F	na	507 F	719
SW6010	Selenium	0 313	5	Yes	- -	- -	na	- -	- -
SW6010	Sodium	53200	N/A	No	20 F	34 8 F	na	76 4	149
SW6010	Thallium	1 5	1 5	Yes	- -	- -	na	- -	- -
SW6010	Vanadium	37 4	72	Yes	4 9 F	9 1 F	na	13 5	12
SW6010	Zinc	31 3	3100	Yes	3 5	7 7	na	15	13 5
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8260	1,2,4-Trimethylbenzene	0 007	N/A	No	- -	- -	na	(0 0071 F)	- -
SW8260	1,2-Dichlorobenzene	0 002	60	Yes	- -	- -	na	- -	(0.0078)
SW8260	1,2-Dichloroethene, cis-	0 005	7	Yes	(0 018)	- -	na	- -	- -
SW8260	1,2-Dichloroethene, *trans-*	0 003	10	Yes	0 0016 F	- -	na	- -	- -
SW8260	1,3,5-Trimethylbenzene	0 003	N/A	No	- -	- -	na	- -	- -
SW8260	1,4-Dichlorobenzene	0 002	7 5	Yes	- -	- -	na	(0 0073)	0 0014 F
SW8270	1,4-Dichlorobenzene	0 33	7 5	Yes	- -	- -	na	- -	- -
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na	na
SW8260	Chlorobenzene	0 002	10	Yes	- -	- -	na	- -	(0 013)
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	na	- -	(0 0033 F)
SW8260	Isopropylbenzene	0 008	N/A	No	- -	- -	na	- -	- -
SW8260	*m-* & *p*-Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	na	- -	(0 021)
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	na	- -	- -
SW8260	Naphthalene	0 002	200	Yes	- -	- -	na	(0 0038)	(0 0029)
SW8270	Naphthalene	0 33	200	Yes	- -	- -	na	- -	- -
SW8260	*n*-Butylbenzene	0 005	N/A	No	- -	- -	na	0 0016 F	- -
SW8260	*n*-Propylbenzene	0 002	N/A	No	- -	- -	na	- -	- -
SW8260	*o*-Xylene	0 005	1000	Yes	- -	- -	na	- -	- -
SW8260	*p*-Isopropyltoluene	0 006	N/A	No	- -	- -	na	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	na	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	0 0037 F	- -	na	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	- -	na	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	na	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	na	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	[(0 39 F)]	[(1)]	- -	0 28 F
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	[(0 45 F)]	[(0.95)]	- -	0 28 F
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -	[(0 51 F)]	[(1.1)]	- -	0 3 F
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	(0 41 F)	na	- -	0 26 F
SW8270	Benzo[k]fluoranthene	0 33	0 39	Yes	na	na	[(0 8)]	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	na	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	na	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	- -	(0.51 F)	(1.3)	- -	(0 34 F)
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -	0 15 F	- -	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	na	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	na	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	(1.1)	na	- -	(0.82)
SW8270	Fluorene	0 33	410	Yes	- -	- -	na	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -	[(0.34 F)]	[(0 78)]	- -	0 22 F
SW8270	*m-* & *p*-Cresol (sum of isomers)	0 33	51	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	- -	(0.45 F)	na	- -	(0.47 F)
SW8270	Pyrene	0 33	310	Yes	- -	(0.94)	na	- -	(0 72 F)

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.12
Confirmation/SPLP Results
SWMU 23/Landfill 5
NAS Fort Worth, JRB, Texas

Location	Depth	Method	Analyte	RRS1 (mg/kg)	RRS2 (mg/kg)	Initial Result (mg/kg)	Confirmation Result (mg/kg)	GW-Ind (mg/L)	SPLP Result (mg/L)
THGLTA011	Surface	SW8270	Benzo[*a*]anthracene	0.33	0.33	0.44 F	0.33 U	0.00039	0.000011 U
	(Duplicate)						0.33 U		0.000011 U
THGLTA011	Surface	SW8270	Benzo[*a*]pyrene	0.33	0 33	0.53 F	0.33 U	0 0002	0.000011 U
	(Duplicate)						0 33 U		0.000011 U
THGLTA011	Surface	SW8270	Benzo[*b*]fluoranthene	0.33	0.33	0.73 F	0 33 U	0 00039	0 000011 U
	(Duplicate)						0.33 U		0.000011 U
THGLTA011	Surface	SW8270	Benzo[*k*]fluoranthene	0 33	0 39	na	na	0.0039	na
	(Duplicate)						na		na
THGLTA011	Surface	SW8270	Chrysene	0.33	3.9	0.55 F	na	0.039	na
	(Duplicate)						na		na
THGLTA011	Surface	SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	ND	na	0 0002	na
	(Duplicate)						na		na
THGLTA011	Surface	SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	0.43 F	0.33 U	0.0002	0.000011 U
	(Duplicate)						0.33 U		0.000011 U
THGLTA017	Surface	SW8270	Benzo[*a*]anthracene	0.33	0.33	1.9	0.3 F	0.00039	0 00001 U
THGLTA017	Surface	SW8270	Benzo[*a*]pyrene	0.33	0 33	2	0.33 F	0 0002	0.00001 U
THGLTA017	Surface	SW8270	Benzo[*b*]fluoranthene	0.33	0 33	2.8	0.35 F	0 00039	0 00001 U
THGLTA017	Surface	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	na	0.36 F	0.0039	0.00001 U
THGLTA017	Surface	SW8270	Chrysene	0.33	3.9	2.2	0.41	0 039	0.00001 U
THGLTA017	Surface	SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	0.34 F	ND	0.0002	0 00001 U
THGLTA017	Surface	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	1.4	0 24 F	0.0002	0.00001 U
THGLTA017	12-12.5'	SW8270	Benzo[*a*]anthracene	0.33	0.33	0.39 F	1	0.00039	0.00001 U
THGLTA017	12-12.5'	SW8270	Benzo[*a*]pyrene	0.33	0.33	0 45 F	0.95	0.0002	0 00001 U
THGLTA017	12-12 5'	SW8270	Benzo[*b*]fluoranthene	0.33	0.33	0.51 F	1.1	0.00039	0.00001 U
THGLTA017	12-12.5'	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	na	0.8	0.0039	0 00001 U
THGLTA017	12-12.5'	SW8270	Chrysene	0.33	3 9	0 51 F	1.3	0 039	0 00001 U
THGLTA017	12-12 5'	SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	ND	0 15 F	0 0002	0 00001 U

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Table 5.12
Confirmation/SPLP Results
SWMU 23/Landfill 5
NAS Fort Worth, JRB, Texas

Location	Depth	Method	Analyte	RRS1 (mg/kg)	RRS2 (mg/kg)	Initial Result (mg/kg)	Confirmation Result (mg/kg)	GW-Ind (mg/L)	SPLP Result (mg/L)
THGLTA017	12-12 5'	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	0.34 F	0.78	0.0002	0.00001 U
BHGLTA506	5'	SW6010	Barium	128.1	128.1	220 J	43	2	0 715
BHGLTA506	5'	SW6010	Beryllium	0.957	0.957	1.2 J	0.53	0.004	0.001
BHGLTA506	5'	SW6010	Chromium (total)	16.31	16.31	25 J	12 4	0.1	0.0323
BHGLTA509	5'	SW6010	Chromium (total)	16.31	16.31	35.6	9.2	0.1	0.0018 F
BHGLTA509	5'	SW8270	Benzo[*a*]anthracene	0.33	0.33	31 J	0.18 F	0.00039	0.00001 U
BHGLTA509	5'	SW8270	Benzo[*a*]pyrene	0.33	0.33	33 J	0 2 F	0 0002	0 00001 U
BHGLTA509	5'	SW8270	Benzo[*b*]fluoranthene	0.33	0 33	50 J	0.21 F	0 00039	0.00001 U
BHGLTA509	5'	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	16	0.2 F	0 0039	0.00001 U
BHGLTA509	5'	SW8270	Chrysene	0.33	3.9	37 J	0.23 F	0.039	0.00001 U
BHGLTA509	5'	SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	5.1	0.33 U	0.0002	0.00001 U
BHGLTA509	5'	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	27 J	0.14 F	0.0002	0.00001 U
BHGLTA509	10'	SW6010	Chromium (total)	16.31	16.31	9.9	3.7 F	0 1	0.0223 F
BHGLTA509	10'	SW8270	Benzo[*a*]anthracene	0.33	0.33	0.18 F	0.33 U	0.00039	0.00001 U
BHGLTA509	10'	SW8270	Benzo[*a*]pyrene	0.33	0 33	0.18 F	0.33 U	0.0002	0.00001 U
BHGLTA509	10'	SW8270	Benzo[*b*]fluoranthene	0 33	0.33	0.28 F	0.33 U	0.00039	0.00001 U
BHGLTA509	10'	SW8270	Benzo[*k*]fluoranthene	0.33	0.39	0 1 F	na	0.0039	0.00001 U
BHGLTA509	10'	SW8270	Chrysene	0.33	3.9	0.23 F	na	0 039	0 00001 U
BHGLTA509	10'	SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	ND	na	0.0002	0.00001 U
BHGLTA509	10'	SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	0 14 F	0.33 U	0 0002	0.00001 U

Note: Gray shading indicates Standard 3 concentrations.
na - Not Analyzed
ND - < RRS-1

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Table 5.13
Site-Specific MSCs
SWMU 23/Landfill 5
NAS Fort Worth, JRB, Texas

Boring	Depth	Method	Analyte	GWP-Ind MSC (mg/L)	Bkgd (mg/kg)	Previous Result (mg/kg)	Result and/or Site-Specific MSC (mg/kg)	SPLP Result (mg/L)	GW-Ind MSC (mg/L)	Inside Dig Area
BHGLTA506	5'	SW6010	Barium	200	128.1	220 J	43	0.715	2	no
BHGLTA506	5'	SW6010	Beryllium	0.4	0 957	1.2 J	0 53	0.001	0.004	no
THGLTA017	0'	SW6010	Cadmium	0.5	0 556	3.4	1 52	0 00028 F	0.005	LF05-5A
BHGLTA509	5'	SW6010	Chromium	10	16 31	35.6	9 2	0.0018 F	0.1	LF05-5B
BHGLTA509	5'	SW6010	Lead	1 5	12 66	57.5	24.6	0.005 U	0 015	LF05-5B
THGLTA017	12'	SW8310	Benzo[*a*]anthracene	0.039	0.33	0.39 F	1	0.00001 U	0.00039	no
THGLTA017	12'	SW8310	Benzo[*a*]pyrene	0.02	0.33	0.45 F	0 95	0 00001 U	0 0002	no
THGLTA017	12'	SW8310	Benzo[*b*]fluoranthene	0.039	0.33	0.51 F	1.1	0 00001 U	0.00039	no
THGLTA017	12'	SW8310	Benzo[*k*]fluoranthene	0.39	0.33	na	0 8	0.00001 U	0.0039	no
THGLTA017	12'	SW8310	Chrysene	3.9	0 33	0.51 F	1.3	0.00001 U	0.039	no
THGLTA017	12'	SW8310	Dibenzo[*a,h*]anthracene	0 02	0 33	ND	0 15 F	0.00001 U	0.0002	no
THGLTA017	12'	SW8310	Indeno[1,2,3-*c,d*]pyrene	0.039	0 33	0 34 F	0 78	0.00001 U	0.00039	no

Note: Gray shading indicates Standard 3 concentrations

na - Not Analyzed

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Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA001 00 ft 1997-08-26	BHGLTA001 00 ft 2000-06-15	BHGLTA002 00 ft 1997-08-26	BHGLTA002 Dup 00 ft 1997-08-26
SW6010	Aluminum	22035	22035	No	7050	na	8590	11000
SW6010	Antimony	0 56	0.6	Yes	**[(0.75 J)]**	na	0 41 F	0 35 F
SW6010	Arsenic	5 85	5.85	Yes	3 8 J	na	3 8 J	3 4 J
SW6010	Barium	233	233	Yes	60 2	na	110 J	66 9 J
SW6010	Beryllium	1 02	1.02	Yes	0 43	na	0.65	0 65
SW6010	Cadmium	0.556	0.556	Yes	**[(1.4 F)]**	**[(0.86 J)]**	0.47 F	0 37 F
SW6010	Calcium	167788	N/A	No	129000	na	42200	47100
SW6010	Chromium (total)	25 86	25 86	Yes	11	na	14 4	12 6
SW6010	Cobalt	11 05	610	Yes	3 3 F	na	5.7 F	3 9 F
SW6010	Copper	17 37	130	Yes	17 2	na	10 3	10 1
SW6010	Iron	17717	N/A	No	10200	na	10100	10500
SW6010	Lead	30.97	30.97	Yes	**[(166)]**	na	**[(48.9 J)]**	**[(33.7 J)]**
SW7421	Lead	30 97	30 97	Yes	na	**[(573)]**	na	na
SW6010	Magnesium	3003	N/A	No	1750 J	na	1420 J	1660 J
SW6010	Manganese	849	1400	No	253	na	474 J	256 J
SW7471	Mercury	0.14	0.2	Yes	0.075 F	na	**(0.15)**	0 1 F
SW6010	Molybdenum	1 46	51	No	0 84 F	na	0 67 F	0 43 F
SW6010	Nickel	14 6	200	Yes	7 6 F	na	9 8 F	8 8 F
SW6010	Potassium	2895	N/A	No	1420 F	na	1790	2130
SW6010	Selenium	0 907	5	Yes	- -	na	- -	- -
SW6010	Silver	0 213	51	Yes	**(1.3 F)**	na	- -	- -
SW6010	Sodium	37300	N/A	No	97 6	na	40 2 F	51 3 F
SW6010	Thallium	2 43	2.43	Yes	- -	na	- -	- -
SW6010	Vanadium	46 3	72	Yes	17 3	na	23 9	22 4
SW6010	Zinc	38.8	3100	Yes	**(87.8)**	na	**(39.6)**	**(44.1)**
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na
SW8270	Naphthalene	0.33	200	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	na	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	0 0041 F	na	**(0.02)**	- -
SW8270	Acenaphthene	0 33	610	Yes	0 16 F	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	**(0.41 F)**	- -	0 069 F	0 11 F
SW8270	Benzo[*a*]anthracene	0.33	0 33	Yes	**[(3.7)]**	0.17 F	**[(0.72 F)]**	**[(0.97)]**
SW8270	Benzo[*a*]pyrene	0.33	0.33	Yes	**[(4.2)]**	0 21 F	**[(0.9)]**	**[(1.3)]**
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	**[(5.6)]**	0 25 F	**[(1.3)]**	**[(1.8)]**
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	**(2 J)**	0 2 F	**(0.79 F)**	**(1.1 J)**
SW8270	Benzo[*k*]fluoranthene	0 33	0.39	Yes	na	0 17 F	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	na	- -	- -
SW8270	Chrysene	0 33	3.9	Yes	**(3.9)**	0 22 F	**(0.89)**	**(1.3)**
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	**[(0.6 F)]**	- -	0 16 F	0.23 F
SW8270	Dibenzofuran	0 33	41	Yes	- -	na	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	**(4.9 J)**	**(0.42)**	**(1.8 J)**	**(2.5 J)**
SW8270	Fluorene	0 33	410	Yes	0 079 F	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	Yes	**[(2.3 J)]**	0 2 F	**[(0.78 F)]**	**[(1.1 J)]**
SW8270	Phenanthrene	0.33	310	Yes	**(1.6 J)**	0 14 F	**(0.51 F)**	**(0.74 F)**
SW8270	Pyrene	0.33	310	Yes	**(4.6 J)**	**(0.43)**	**(1.6 J)**	**(2.2 J)**

Notes

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All concentrations are in mg/kg

Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA003 00 ft 1997-08-26	BHGLTA004 00 ft 1997-08-26	BHGLTA005 00 ft 1997-08-27	BHGLTA006 00 ft 1997-08-27
SW6010	Aluminum	22035	22035	No	7790	8660	11100	6390
SW6010	Antimony	0.56	0 6	Yes	0 56 F	0.43 F	0 43 F	- -
SW6010	Arsenic	5 85	5.85	Yes	4.7 J	4 J	4 J	2 7 J
SW6010	Barium	233	233	Yes	43 9	80 6	79	70 7 J
SW6010	Beryllium	1 02	1.02	Yes	0.48	0.54	0 84	0 69 J
SW6010	Cadmium	0 556	0 556	Yes	- -	- -	- -	- -
SW6010	Calcium	167788	N/A	No	131000	47700	22400	11200 J
SW6010	Chromium (total)	25 86	25 86	Yes	9 2	14 4	12 9	9 5
SW6010	Cobalt	11 05	610	Yes	3 7 F	3 6 F	6 4 F	4 8 F
SW6010	Copper	17.37	130	Yes	9 2	6 7 F	8 6 J	6 4 F
SW6010	Iron	17717	N/A	No	12000	11300	11200	7650
SW6010	Lead	30 97	30 97	Yes	24 3	19 3	16 3 J	10 2 J
SW7421	Lead	30.97	30 97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	1700 J	1350 J	1560 J	941 J
SW6010	Manganese	849	1400	No	256	183	298 J	296 J
SW7471	Mercury	0 14	0 2	Yes	0 027 F	0 014 F	0 015 F	0 036 F
SW6010	Molybdenum	1.46	51	No	0 76 F	0 66 F	0 68 F	0 61 F
SW6010	Nickel	14 6	200	Yes	8 1 F	9 1 F	10 6 F	8 8 F
SW6010	Potassium	2895	N/A	No	1430	1520	1350 J	1140 J
SW6010	Selenium	0 907	5	Yes	- -	- -	0 54 F	- -
SW6010	Silver	0 213	51	Yes	- -	- -	- -	- -
SW6010	Sodium	37300	N/A	No	92 8	45 2 F	55 6 F	24 7 F
SW6010	Thallium	2 43	2 43	Yes	- -	- -	- -	- -
SW6010	Vanadium	46 3	72	Yes	19 6	19.6	26	22.2
SW6010	Zinc	38.8	3100	Yes	27.4	25	26 J	13 9 J
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	0 0015 F	- -	- -	- -
SW8260	Trichloroethene	0.005	0.5	Yes	**(0.017)**	0 0047 F	**(0.0057 F)**	**(0.0099 F)**
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0.33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0.33	0.33	Yes	0 23 F	- -	0 049 F	0 049 F
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	0 29 F	- -	0.056 F	0.059 F
SW8270	Benzo[*b*]fluoranthene	0 33	0.33	Yes	**[(0.39 F)]**	- -	0 075 F	0 086 F
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	0 28 F	- -	0 036 F	0 04 F
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	0 29 F	- -	0 058 F	0 065 F
SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	Yes	0 076 F	- -	- -	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	**(0.52 F)**	- -	- -	0.1 F
SW8270	Fluorene	0 33	410	Yes	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	Yes	0.26 F	- -	0 039 F	0 043 F
SW8270	Phenanthrene	0 33	310	Yes	0 16 F	- -	- -	- -
SW8270	Pyrene	0 33	310	Yes	**(0.46 F)**	- -	- -	- -

Notes:

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Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA006 Dup 00 ft 1997-08-27	BHGLTA007 00 ft 1997-08-27	BHGLTA071 00 ft 1998-05-28	BHGLTA071 00 ft 2000-06-15
SW6010	Aluminum	22035	22035	No	5700	8300	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	0 37 F	- -	na
SW6010	Arsenic	5.85	5.85	Yes	2 6 J	3 2 J	- -	na
SW6010	Barium	233	233	Yes	50.9 J	73 2	**[(441)]**	38 7 F
SW6010	Beryllium	1 02	1 02	Yes	0 48 J	0.73	- -	na
SW6010	Cadmium	0.556	0.556	Yes	- -	0.25 F	- -	na
SW6010	Calcium	167788	N/A	No	74400 J	41500	na	na
SW6010	Chromium (total)	25 86	25.86	Yes	7 4 F	13 4	12.3 F	na
SW6010	Cobalt	11.05	610	Yes	3 1 F	4 5 F	3.1 F	na
SW6010	Copper	17.37	130	Yes	15 9 J	**(62.6 J)**	8 6 F	na
SW6010	Iron	17717	N/A	No	6620	9080	na	na
SW6010	Lead	30.97	30.97	Yes	**[(3130 J)]**	**[(166 J)]**	**[(49.7 F)]**	na
SW7421	Lead	30 97	30 97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	1140 J	1310 J	na	na
SW6010	Manganese	849	1400	No	175 J	197 J	na	na
SW7471	Mercury	0.14	0 2	Yes	0 07 F	0 011 F	0 03 F	na
SW6010	Molybdenum	1.46	51	No	0 6 F	0.55 F	na	na
SW6010	Nickel	14 6	200	Yes	5 7 F	8 2 F	6 1 F	na
SW6010	Potassium	2895	N/A	No	1050 J	1390 J	na	na
SW6010	Selenium	0 907	5	Yes	- -	- -	- -	na
SW6010	Silver	0 213	51	Yes	- -	- -	- -	na
SW6010	Sodium	37300	N/A	No	81 1	65 2	na	na
SW6010	Thallium	2 43	2.43	Yes	- -	- -	- -	na
SW6010	Vanadium	46 3	72	Yes	16 1	24 6	17 9 F	na
SW6010	Zinc	38 8	3100	Yes	**(994 J)**	**(157 J)**	**(50.5 J)**	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	- -	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	- -	na
SW8270	Naphthalene	0 33	200	Yes	- -	- -	0.041 F	- -
SW8260	Tetrachloroethene	0 005	0.5	Yes	- -	- -	- -	na
SW8260	Trichloroethene	0 005	0.5	Yes	**(0.0075 F)**	0 0029 F	0 002 F	na
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	**(0.68)**	- -
SW8270	Anthracene	0.33	3100	Yes	- -	- -	**(1.6)**	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	0 081 F	0 32 F	**[(10 J)]**	- -
SW8270	Benzo[*a*]pyrene	0.33	0 33	Yes	0.092 F	0.32 F	**[(12 J)]**	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	0.13 F	**[(0.45 F)]**	**[(19 J)]**	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	0 058 F	0 21 F	**(10 J)**	- -
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	na	na	- -	- -
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	0 047 F	na
SW8270	Chrysene	0.33	3.9	Yes	0 095 F	**(0.36 F)**	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	- -	0 063 F	**[(1.9)]**	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	0 16 F	na
SW8270	Fluoranthene	0.33	410	Yes	0 16 F	**(0.56 F)**	**(25 J)**	- -
SW8270	Fluorene	0.33	410	Yes	- -	- -	**(0.39)**	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	0 062 F	0 23 F	**[(11 J)]**	- -
SW8270	Phenanthrene	0.33	310	Yes	0.056 F	0 18 F	**(10 J)**	- -
SW8270	Pyrene	0.33	310	Yes	0 14 F	**(0.5 F)**	**(23 J)**	- -

Notes:

RRS-1 = Risk Reduction Standard 1
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All concentrations are in mg/kg

Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA072 00 ft 1998-05-27	BHGLTA073 00 ft 1998-05-27	BHGLTA074 00 ft 1998-05-27	BHGLTA075 00 ft 1998-05-28
SW6010	Aluminum	22035	22035	No	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	- -	- -	- -
SW6010	Arsenic	5 85	5 85	Yes	- -	**[(6.2 F)]**	**[(7.3 F)]**	**[(8.5 F)]**
SW6010	Barium	233	233	Yes	61 2	65 6	73 1	68 9
SW6010	Beryllium	1 02	1 02	Yes	- -	- -	- -	- -
SW6010	Cadmium	0.556	0 556	Yes	- -	0 39 F	0 47 F	- -
SW6010	Calcium	167788	N/A	No	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	12.4 F	13 7	16.7	12 6
SW6010	Cobalt	11 05	610	Yes	3 7 F	4 4 F	4 3 F	4 4 F
SW6010	Copper	17 37	130	Yes	**(30.5 J)**	8.5 J	10 8 J	9 J
SW6010	Iron	17717	N/A	No	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	**[(155 F)]**	28 9 F	18 1 F	28 7 F
SW7421	Lead	30 97	30 97	Yes	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na
SW7471	Mercury	0.14	0 2	Yes	0 03 F	- -	- -	0 04 F
SW6010	Molybdenum	1 46	51	No	na	na	na	na
SW6010	Nickel	14 6	200	Yes	9 7 F	8.7 F	8 5 F	8 3 F
SW6010	Potassium	2895	N/A	No	na	na	na	na
SW6010	Selenium	0 907	5	Yes	- -	**[(12.8 F)]**	**[(13.8 F)]**	**[(11.8 F)]**
SW6010	Silver	0 213	51	Yes	- -	- -	- -	- -
SW6010	Sodium	37300	N/A	No	na	na	na	na
SW6010	Thallium	2 43	2.43	Yes	- -	**[(9.3 F)]**	**[(9.9 F)]**	**[(7.5 F)]**
SW6010	Vanadium	46 3	72	Yes	15 6 F	23 9	27.7	23 7
SW6010	Zinc	38 8	3100	Yes	**(116 J)**	**(84.3 J)**	**(57.1 J)**	**(58.6 J)**
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	**(0.007)**	**(0.009)**
SW8260	Methyl isobutyl ketone	0.005	820	Yes	- -	- -	- -	0 004 F
SW8270	Naphthalene	0.33	200	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0.005	0.5	Yes	- -	- -	0 002 F	0 005 F
SW8270	Acenaphthene	0 33	610	Yes	0 068 F	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	0 13 F	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(1.2)]	- -	0 14 F	0 21 F
SW8270	Benzo[*a*]pyrene	0.33	0 33	Yes	[(1.2)]	- -	0 14 F	0 24 F
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(1.7)]	0 061 F	0 19 F	**[(0.37 F)]**
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	**(0.69)**	- -	0 084 F	0 2 F
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	[(0.76)]	- -	0 093 F	- -
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	**(1.3)**	- -	0 16 F	0 26 F
SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	Yes	0 16 F	- -	- -	- -
SW8270	Dibenzofuran	0.33	41	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	**(2 J)**	0.046 F	0 33 F	**(0.41)**
SW8270	Fluorene	0.33	410	Yes	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	Yes	[(0.75)]	- -	0 095 F	0 23 F
SW8270	Phenanthrene	0 33	310	Yes	**(0.64 J)**	- -	0 14 F	0 11 F
SW8270	Pyrene	0 33	310	Yes	**(1.9)**	- -	0 23 F	**(0.38 F)**

Notes
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Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA075 Dup 00 ft 1998-05-28	BHGLTA076 00 ft 1998-05-28	BHGLTA080 00 ft 1999-10-07	BHGLTA081 00 ft 1999-10-07
SW6010	Aluminum	22035	22035	No	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	- -	na	na
SW6010	Arsenic	5 85	5 85	Yes	**[(8 F)]**	**[(6.9 F)]**	na	na
SW6010	Barium	233	233	Yes	66 4	44 9	na	na
SW6010	Beryllium	1 02	1.02	Yes	- -	- -	na	na
SW6010	Cadmium	0 556	0 556	Yes	- -	- -	na	na
SW6010	Calcium	167788	N/A	No	na	na	na	na
SW6010	Chromium (total)	25.86	25.86	Yes	12.8	9	na	na
SW6010	Cobalt	11.05	610	Yes	4 3 F	3.8 F	na	na
SW6010	Copper	17 37	130	Yes	9 5 J	4 5 F	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na
SW6010	Lead	30.97	30 97	Yes	28 F	6 9 F	na	na
SW7421	Lead	30 97	30.97	Yes	na	na	**[(351 F)]**	17 5
SW6010	Magnesium	3003	N/A	No	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na
SW7471	Mercury	0 14	0.2	Yes	0.04 F	- -	na	na
SW6010	Molybdenum	1.46	51	No	na	na	na	na
SW6010	Nickel	14 6	200	Yes	9 1 F	7 7 F	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na
SW6010	Selenium	0 907	5	Yes	**[(13.3 F)]**	**[(11 F)]**	na	na
SW6010	Silver	0 213	51	Yes	- -	- -	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na
SW6010	Thallium	2 43	2.43	Yes	**[(8 F)]**	**[(9.8 F)]**	na	na
SW6010	Vanadium	46.3	72	Yes	22.8	16 8	na	na
SW6010	Zinc	38 8	3100	Yes	(62.1 J)	16.7 J	na	28 8
SW8260	2-Hexanone	0 005	N/A	Yes	0.005 F	- -	na	na
SW8260	Methyl isobutyl ketone	0.005	820	Yes	0 003 F	- -	na	na
SW8270	Naphthalene	0 33	200	Yes	- -	- -	na	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	na	na
SW8260	Trichloroethene	0 005	0.5	Yes	- -	0 004 F	na	na
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	na	- -
SW8270	Anthracene	0.33	3100	Yes	- -	- -	na	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	0 25 F	- -	na	- -
SW8270	Benzo[*a*]pyrene	0 33	0.33	Yes	0 29 F	- -	na	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	**[(0.42)]**	- -	na	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	0 28 F	- -	na	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	0.16 F	- -	na	- -
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	na	- -
SW8270	Chrysene	0.33	3.9	Yes	0 29 F	- -	na	- -
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	- -	- -	na	- -
SW8270	Dibenzofuran	0 33	41	Yes	- -	- -	na	- -
SW8270	Fluoranthene	0.33	410	Yes	(0.44)	- -	na	- -
SW8270	Fluorene	0.33	410	Yes	- -	- -	na	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	Yes	0 27 F	- -	na	0 26 F
SW8270	Phenanthrene	0.33	310	Yes	0.13 F	- -	na	- -
SW8270	Pyrene	0 33	310	Yes	(0.42)	- -	na	- -

Notes

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Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA084 00 ft 1999-10-07	BHGLTA085 00 ft 2000-03-09	BHGLTA085 00 ft 2000-06-15	BHGLTA086 00 ft 2000-03-10
SW6010	Aluminum	22035	22035	No	na	na	na	na
SW6010	Antimony	0 56	0.6	Yes	na	na	na	na
SW6010	Arsenic	5 85	5 85	Yes	na	na	na	na
SW6010	Barium	233	233	Yes	na	na	na	na
SW6010	Beryllium	1.02	1.02	Yes	na	na	na	na
SW6010	Cadmium	0 556	0 556	Yes	na	na	- -	na
SW6010	Calcium	167788	N/A	No	na	na	na	na
SW6010	Chromium (total)	25.86	25 86	Yes	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	na	na
SW6010	Copper	17 37	130	Yes	na	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	na	na
SW7421	Lead	30 97	30.97	Yes	27 9 F	na	7 5 F	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na
SW7471	Mercury	0 14	0.2	Yes	na	na	na	na
SW6010	Molybdenum	1.46	51	No	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na
SW6010	Selenium	0 907	5	Yes	na	na	na	na
SW6010	Silver	0 213	51	Yes	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	na	na
SW6010	Zinc	38 8	3100	Yes	na	(62.5)	na	(61.5)
SW8260	2-Hexanone	0.005	N/A	Yes	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na
SW8270	Naphthalene	0.33	200	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0.33	0.33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0.33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na
SW8270	Chrysene	0 33	3.9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na
SW8270	Fluoranthene	0.33	410	Yes	na	na	na	na
SW8270	Fluorene	0.33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	na	na	na	na
SW8270	Phenanthrene	0.33	310	Yes	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	na	na

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
I = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA087 00 ft 2000-03-10	BHGLTA088 00 ft 2000-03-14	BHGLTA089 00 ft 2000-03-09	BHGLTA090 00 ft 2000-03-09
SW6010	Aluminum	22035	22035	No	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	na	na	na	na
SW6010	Arsenic	5 85	5.85	Yes	na	na	na	na
SW6010	Barium	233	233	Yes	na	na	na	na
SW6010	Beryllium	1.02	1.02	Yes	na	na	na	na
SW6010	Cadmium	0.556	0.556	Yes	na	na	na	na
SW6010	Calcium	167788	N/A	No	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	na	na
SW6010	Copper	17 37	130	Yes	9 5 F	7 7 F	7.9 F	na
SW6010	Iron	17717	N/A	No	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	na	na
SW7421	Lead	30 97	30 97	Yes	[(59.3)]	[(49)]	27 8	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na
SW6010	Selenium	0.907	5	Yes	na	na	na	na
SW6010	Silver	0 213	51	Yes	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na
SW6010	Thallium	2.43	2 43	Yes	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	na	na
SW6010	Zinc	38.8	3100	Yes	**(52.2)**	**(74.7)**	38 1	**(51.5)**
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	- -
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na
SW8270	Naphthalene	0.33	200	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	- -
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0.33	0 33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0.33	0.33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	Yes	na	na	na	na
SW8270	Dibenzofuran	0.33	41	Yes	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na
SW8270	Fluorene	0.33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na
SW8270	Pyrene	0.33	310	Yes	na	na	na	na

Notes.

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA091 00 ft 2000-06-15	BHGLTA092 00 ft 2000-06-15	BHGLTA093 00 ft 2000-06-15	BHGLTA094 00 ft 2000-06-15
SW6010	Aluminum	22035	22035	No	na	na	na	na
SW6010	Antimony	0.56	0.6	Yes	na	na	na	na
SW6010	Arsenic	5 85	5.85	Yes	na	na	na	na
SW6010	Barium	233	233	Yes	na	na	na	na
SW6010	Beryllium	1 02	1 02	Yes	na	na	na	na
SW6010	Cadmium	0.556	0.556	Yes	na	na	- -	na
SW6010	Calcium	167788	N/A	No	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	na	na
SW6010	Copper	17 37	130	Yes	na	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	na	na
SW7421	Lead	30 97	30 97	Yes	7.6 J	11 8	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na
SW6010	Selenium	0.907	5	Yes	na	na	na	na
SW6010	Silver	0.213	51	Yes	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na
SW6010	Thallium	2.43	2.43	Yes	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	na	na
SW6010	Zinc	38 8	3100	Yes	22 4 F	23.6 F	22 9 F	25.1 F
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Methyl isobutyl ketone	0.005	820	Yes	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0.33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	Yes	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na
SW8270	Fluoranthene	0.33	410	Yes	na	na	na	na
SW8270	Fluorene	0.33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0'33	0 33	Yes	na	na	na	na
SW8270	Phenanthrene	0.33	310	Yes	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	na	na

Notes.

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.14
Surface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA095 00 ft 2000-06-15	BHGLTA096 00 ft 2000-06-15
SW6010	Aluminum	22035	22035	No	na	na
SW6010	Antimony	0.56	0 6	Yes	na	na
SW6010	Arsenic	5 85	5 85	Yes	na	na
SW6010	Barium	233	233	Yes	na	na
SW6010	Beryllium	1.02	1.02	Yes	na	na
SW6010	Cadmium	0 556	0 556	Yes	na	na
SW6010	Calcium	167788	N/A	No	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	na	na
SW6010	Cobalt	11 05	610	Yes	na	na
SW6010	Copper	17 37	130	Yes	na	na
SW6010	Iron	17717	N/A	No	na	na
SW6010	Lead	30.97	30 97	Yes	na	na
SW7421	Lead	30 97	30 97	Yes	10 6 F	[(35.2)]
SW6010	Magnesium	3003	N/A	No	na	na
SW6010	Manganese	849	1400	No	na	na
SW7471	Mercury	0.14	0 2	Yes	na	na
SW6010	Molybdenum	1.46	51	No	na	na
SW6010	Nickel	14 6	200	Yes	na	na
SW6010	Potassium	2895	N/A	No	na	na
SW6010	Selenium	0 907	5	Yes	na	na
SW6010	Silver	0 213	51	Yes	na	na
SW6010	Sodium	37300	N/A	No	na	na
SW6010	Thallium	2 43	2.43	Yes	na	na
SW6010	Vanadium	46 3	72	Yes	na	na
SW6010	Zinc	38.8	3100	Yes	25 F	20.4 F
SW8260	2-Hexanone	0 005	N/A	Yes	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na
SW8260	Trichloroethene	0.005	0 5	Yes	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na
SW8270	Benzo[*a*]anthracene	0.33	0.33	Yes	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na
SW8270	Chrysene	0.33	3 9	Yes	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na
SW8270	Fluorene	0 33	410	Yes	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	Yes	na	na
SW8270	Phenanthrene	0.33	310	Yes	na	na
SW8270	Pyrene	0.33	310	Yes	na	na

Notes:

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
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N/A = Not applicable, no value
- - = Not detected

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Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA001 21 ft 1997-08-26	BHGLTA002 21 ft 1997-08-26	BHGLTA003 19 ft 1997-08-26	BHGLTA004 19 ft 1997-08-26
SW6010	Aluminum	20260	20260	No	851	1380	610	831
SW6010	Antimony	0 712	0 712	Yes	0 22 F	0 24 F	0 25 F	0 26 F
SW6010	Arsenic	6.58	6 58	Yes	1 3 J	1 5 J	1 8 J	1 4 J
SW6010	Barium	128 1	200	Yes	6.7	8.5	5 8	6 2
SW6010	Beryllium	1.13	1 13	Yes	0 12 F	0 13 F	0 12 F	0 1 F
SW6010	Calcium	272000	N/A	No	47500	24700	21200	14400
SW6010	Chromium (total)	16 31	16 31	Yes	8.3	9.2	9.3	7 6 F
SW6010	Cobalt	6.19	610	Yes	1 F	1 F	1 7 F	1 7 F
SW6010	Copper	13.72	130	Yes	2.5 F	2 3 F	2 4 F	2 2 F
SW6010	Iron	17469	N/A	No	3900	4580	5060	4830
SW6010	Lead	12 66	12 66	Yes	3 5	2 9	2 8	2 4
SW7421	Lead	12.96	12.66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	423 J	372 J	230 J	223 J
SW6010	Manganese	351.7	1400	No	54 6	57.7	68 1	79 3
SW7471	Mercury	0 035	0.2	Yes	- -	(0.061 F)	- -	- -
SW6010	Molybdenum	1 93	51	No	1.2 F	1 2 F	1 4 F	1 F
SW6010	Nickel	19 76	200	Yes	2 2 F	2 8 F	3 F	3 2 F
SW6010	Potassium	1717	N/A	No	180 F	228 F	137 F	155 F
SW6010	Selenium	0 313	5	Yes	- -	0 23 F	0 26 F	- -
SW6010	Sodium	53200	N/A	No	58.4	43 6 F	36 1 F	27 3 F
SW6010	Thallium	1 5	1 5	Yes	- -	- -	- -	- -
SW6010	Vanadium	37 4	72	Yes	5 7 F	6 8 F	5 4 F	5 4 F
SW6010	Zinc	31 3	3100	Yes	5 6	5.5	5 5	- -
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Acrylonitrile	0.04	0 053	Yes	na	na	na	na
SW8260	Dichlorodifluoromethane	0.005	2000	Yes	- -	- -	- -	- -
SW8260	*m* - & *p* -Xylene (sum of isomers)	0.005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0.5	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0.5	Yes	- -	- -	0 0017 F	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	0 031 F	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0.6	Yes	- -	- -	- -	- -
SW8270	Diethyl phthalate	0.33	8200	Yes	- -	(2.3)	- -	- -

Notes.
RRS-1 = Risk Reduction Standard 1
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All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA005 13 ft 1997-08-27	BHGLTA006 15 ft 1997-08-27	BHGLTA007 13 ft 1997-08-27	BHGLTA071 05 ft 1998-05-28
SW6010	Aluminum	20260	20260	No	575	492	na	na
SW6010	Antimony	0 712	0 712	Yes	0 3 F	0 33 F	na	- -
SW6010	Arsenic	6 58	6.58	Yes	2.2 J	2 3 J	na	[(12.5 F)]
SW6010	Barium	128 1	200	Yes	9.1	5 3	na	117
SW6010	Beryllium	1.13	1.13	Yes	0 18 F	0 18 F	na	0.98
SW6010	Calcium	272000	N/A	No	8340	14700	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	5 1 F	2 9 F	na	[(16.8)]
SW6010	Cobalt	6.19	610	Yes	2 2 F	1 4 F	na	5.3 F
SW6010	Copper	13.72	130	Yes	2 4 F	1 8 F	na	7 4 J
SW6010	Iron	17469	N/A	No	6370	4680	na	na
SW6010	Lead	12 66	12 66	Yes	3 1 J	2 6 J	na	7 F
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	182 J	155 J	na	na
SW6010	Manganese	351.7	1400	No	182 J	65.9 J	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	na	- -
SW6010	Molybdenum	1 93	51	No	0 3 F	0 5 F	na	na
SW6010	Nickel	19.76	200	Yes	4 1 F	2 8 F	na	11 7 F
SW6010	Potassium	1717	N/A	No	76 8 F	94 2 F	na	na
SW6010	Selenium	0 313	5	Yes	- -	- -	na	[(15.8 F)]
SW6010	Sodium	53200	N/A	No	22 2 F	20 6 F	na	na
SW6010	Thallium	1.5	1 5	Yes	- -	- -	na	[(12.4 F)]
SW6010	Vanadium	37 4	72	Yes	8 7 F	5 8 F	na	32.2
SW6010	Zinc	31 3	3100	Yes	7 7 J	5 3 J	na	27 3 J
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	- -
SW8260	Acetone	0.005	1000	Yes	na	na	na	- -
SW8260	Acrylonitrile	0.04	0 053	Yes	na	na	na	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	- -	- -	- -
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0.5	Yes	- -	- -	- -	0 002 F
SW8260	Trichloroethene	0 005	0.5	Yes	- -	- -	(0.012 F)	(0.039)
SW8270	Benzo[*g,h,i*]perylene	0'33'	310	Yes	- -	- -	na	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0 6	Yes	- -	- -	na	- -
SW8270	Diethyl phthalate	0.33	8200	Yes	- -	- -	na	- -

Notes·

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
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Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)].
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA071 10 ft 1998-05-28	BHGLTA071 15 ft 1998-05-28	BHGLTA071 20 ft 1998-05-28	BHGLTA072 05 ft 1998-05-27
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	2 4 F	2 8 F	- -	- -
SW6010	Barium	128 1	200	Yes	6 6	4	4 2	59.1
SW6010	Beryllium	1 13	1.13	Yes	- -	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	4.5 F	3 2 F	2 3 F	12 3 F
SW6010	Cobalt	6 19	610	Yes	- -	- -	- -	4 5 F
SW6010	Copper	13.72	130	Yes	2.4 F	1 5 F	- -	6.1 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	2 6 F	- -	- -	- -
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	3 2 F	1 7 F	0 96 F	9 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0.313	5	Yes	**[(8.7 F)]**	**[(5.1 F)]**	- -	**[(15.7 F)]**
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	- -	- -	- -	- -
SW6010	Vanadium	37.4	72	Yes	7 7	7 5	4 4 F	24 5 F
SW6010	Zinc	31 3	3100	Yes	7 1 J	5 6 J	3.9 J	24 J
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	- -	**(0.007)**
SW8260	Acrylonitrile	0 04	0 053	Yes	- -	0 012 F	- -	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	**(0.007)**	- -	- -	- -
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	- -	0 001 F	- -	- -
SW8260	Tetrachloroethene	0.005	0 5	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	- -	0 004 F
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	- -
SW8270	Diethyl phthalate	0 33	8200	Yes	- -	- -	- -	- -

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)].
All concentrations are in mg/kg

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA072 10 ft 1998-05-27	BHGLTA072 15 ft 1998-05-27	BHGLTA072 20 ft 1998-05-27	BHGLTA073 05 ft 1998-05-27
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0.712	0.712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6.58	6.58	Yes	**[(6.8 F)]**	3.4 F	- -	**[(14 F)]**
SW6010	Barium	128 1	200	Yes	25 2	12 3	3	95 2
SW6010	Beryllium	1.13	1 13	Yes	- -	- -	- -	1 1 F
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	11 8	4 F	- -	**[(18.4 F)]**
SW6010	Cobalt	6.19	610	Yes	3 7 F	3.9 F	- -	5 5 F
SW6010	Copper	13.72	130	Yes	6 2 J	2.5 F	- -	12 5 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	4.2 F	2 4 F	- -	**[(13 F)]**
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19.76	200	Yes	7 8 F	3.6 F	1 2 F	15 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0.313	5	Yes	**[(10.7 F)]**	**[(5.9 F)]**	**(4.4 F)**	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	**[(9 F)]**	- -	- -	- -
SW6010	Vanadium	37 4	72	Yes	20 3	8 6	4 4 F	35 8 F
SW6010	Zinc	31 3	3100	Yes	21 3 J	8 8 J	- -	**(36.3 J)**
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	- -	- -
SW8260	Acetone	0.005	1000	Yes	**(0.008)**	- -	- -	- -
SW8260	Acrylonitrile	0 04	0 053	Yes	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	- -	- -	- -
SW8260	*m* - & *p* -Xylene (sum of isomers)	0.005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	0 002 F
SW8260	Trichloroethene	0 005	0 5	Yes	**(0.032)**	**(0.018)**	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	- -
SW8270	Diethyl phthalate	0 33	8200	Yes	- -	- -	- -	- -

Notes:

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)].
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA073 10 ft 1998-05-27	BHGLTA073 15 ft 1998-05-27	BHGLTA073 20 ft 1998-05-27	BHGLTA074 05 ft 1998-05-27
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0.712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	- -	- -	- -	- -
SW6010	Barium	128 1	200	Yes	7 4	7.4	3 3	97
SW6010	Beryllium	1.13	1.13	Yes	- -	- -	- -	0 96 F
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16 31	Yes	3 9 F	4 4 F	2 4 F	**[(18.5 F)]**
SW6010	Cobalt	6.19	610	Yes	- -	- -	- -	5 5 F
SW6010	Copper	13 72	130	Yes	3 9 F	2 F	- -	8 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	3 F	- -	- -	- -
SW7421	Lead	12 96	12.66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351.7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	3 F	2 8 F	1 3 F	11 8 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	**[(5.5 F)]**	**[(5.7 F)]**	**(3.8 F)**	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	- -	**[(6.6 F)]**	- -	- -
SW6010	Vanadium	37 4	72	Yes	8 5	8 4	5 2 F	31 8 F
SW6010	Zinc	31 3	3100	Yes	8 1 J	6.9 J	- -	**(34.2 J)**
SW8260	2-Hexanone	0.005	N/A	Yes	- -	**(0.006)**	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Acrylonitrile	0 04	0 053	Yes	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	- -	- -	- -
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	**(0.069)**	**(0.016)**	**(0.008)**	**(0.021)**
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	- -
SW8270	Diethyl phthalate	0 33	8200	Yes	- -	- -	- -	- -

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA074 10 ft 1998-05-27	BHGLTA074 15 ft 1998-05-27	BHGLTA074 20 ft 1998-05-27	BHGLTA075 05 ft 1998-05-28
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	- -	- -	- -	[(17.4 F)]
SW6010	Barium	128 1	200	Yes	25 4	4 5	3.7	78.1
SW6010	Beryllium	1 13	1 13	Yes	- -	- -	- -	0 94 F
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	5.3 F	3 1 F	3 F	[(18.3 F)]
SW6010	Cobalt	6 19	610	Yes	3 2 F	- -	- -	4 7 F
SW6010	Copper	13 72	130	Yes	2 9 F	- -	- -	6 9 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	7 7 F	1 9 F	2 4 F	11 7 F
SW7421	Lead	12.96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351.7	1400	No	na	na	na	na
SW7471	Mercury	0.035	0.2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	4 1 F	1 9 F	1 6 F	12 9 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	- -	[(6 F)]	[(5.5 F)]	[(17.3 F)]
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	- -	- -	- -	- -
SW6010	Vanadium	37 4	72	Yes	13 8 F	7 7	5 6 F	28 4 F
SW6010	Zinc	31 3	3100	Yes	11 9 J	6.1 J	- -	31 1 J
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Acrylonitrile	0 04	0 053	Yes	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	- -	- -	- -
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0.5	Yes	- -	- -	- -	**(0.01)**
SW8260	Trichloroethene	0 005	0 5	Yes	**(0.017)**	- -	- -	**(0.22)**
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0 6	Yes	- -	- -	- -	- -
SW8270	Diethyl phthalate	0 33	8200	Yes	- -	- -	- -	- -

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
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- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA075 10 ft 1998-05-28	BHGLTA075 15 ft 1998-05-28	BHGLTA075 20 ft 1998-05-28	BHGLTA076 05 ft 1998-05-28
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6.58	6.58	Yes	- -	- -	- -	- -
SW6010	Barium	128 1	200	Yes	45.5	9 4	3 4	75 1
SW6010	Beryllium	1.13	1.13	Yes	0 64 F	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16.31	Yes	10 8 F	3 9 F	3 5 F	15 6 F
SW6010	Cobalt	6 19	610	Yes	4 4 F	- -	- -	4 6 F
SW6010	Copper	13 72	130	Yes	7 4 F	1.9 F	- -	5 9 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12.66	Yes	10 6 F	2.6 F	1 8 F	- -
SW7421	Lead	12.96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	10 8 F	2 5 F	2 F	11.9 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	- -	**[(5.4 F)]**	**[(5.5 F)]**	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	- -	- -	- -	**[(27.3 F)]**
SW6010	Vanadium	37 4	72	Yes	23 3 F	7.2	6.1 F	30 2 F
SW6010	Zinc	31 3	3100	Yes	25 J	6 7 J	6 8 J	25 6 J
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Acrylonitrile	0 04	0.053	Yes	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	- -	- -	- -
SW8260	*m*- & *p*-Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	**(0.11)**
SW8260	Trichloroethene	0 005	0 5	Yes	**(0.056)**	**(0.015)**	- -	**(0.066)**
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	**(0.59)**
SW8270	Diethyl phthalate	0 33	8200	Yes	- -	- -	- -	- -

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA076 10 ft 1998-05-28	BHGLTA076 15 ft 1998-05-28	BHGLTA076 20 ft 1998-05-28	BHGLTA082 05 ft 1999-10-07
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0.712	0 712	Yes	- -	- -	- -	na
SW6010	Arsenic	6 58	6 58	Yes	- -	- -	- -	na
SW6010	Barium	128 1	200	Yes	10 8	4.6	4 1	na
SW6010	Beryllium	1 13	1 13	Yes	- -	- -	- -	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16.31	Yes	3 4 F	- -	2 9 F	na
SW6010	Cobalt	6.19	610	Yes	- -	- -	- -	na
SW6010	Copper	13 72	130	Yes	- -	- -	- -	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	- -	- -	- -	na
SW7421	Lead	12.96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0.2	Yes	- -	- -	- -	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	2 4 F	1 1 F	1 5 F	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	**(3.4 F)**	**(5 F)**	**(3.4 F)**	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1 5	Yes	- -	- -	- -	na
SW6010	Vanadium	37 4	72	Yes	5 8 F	5 5 F	4 F	na
SW6010	Zinc	31 3	3100	Yes	7 3 J	- -	4 1 J	na
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	- -	- -
SW8260	Acetone	0.005	1000	Yes	- -	- -	- -	- -
SW8260	Acrylonitrile	0 04	0 053	Yes	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	- -	- -	- -
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0.5	Yes	**(0.009)**	- -	- -	- -
SW8260	Trichloroethene	0 005	0.5	Yes	**(0.05)**	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	- -	- -	- -	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0.6	Yes	- -	- -	- -	na
SW8270	Diethyl phthalate	0 33	8200	Yes	- -	- -	- -	na

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)].
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA082 10 ft 1999-10-07	BHGLTA082 15 ft 1999-10-07	BHGLTA083 10 ft 1999-10-07	BHGLTA083 15 ft 1999-10-07
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16 31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12.66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0.035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19.76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na
SW6010	Zinc	31.3	3100	Yes	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Acrylonitrile	0 04	0 053	Yes	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	- -	- -	- -
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0.5	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	0 003 F	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0.6	Yes	na	na	na	na
SW8270	Diethyl phthalate	0 33	8200	Yes	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA083 20 ft 1999-10-07	BHGLTA085 05 ft 2000-03-09	BHGLTA085 05 ft 2000-06-15	BHGLTA085 10 ft 2000-03-09
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0.712	Yes	na	na	na	na
SW6010	Arsenic	6.58	6.58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	114	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	- -	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	12 7	na
SW6010	Cobalt	6.19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12.66	12 66	Yes	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	na	na	4 7 F	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351.7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	22.4 F	na
SW8260	2-Hexanone	0 005	N/A	Yes	- -	na	na	na
SW8260	Acetone	0 005	1000	Yes	- -	na	na	na
SW8260	Acrylonitrile	0.04	0 053	Yes	- -	na	na	na
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	- -	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	- -	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	na	- -
SW8260	Trichloroethene	0 005	0.5	Yes	- -	- -	na	- -
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na
SW8270	Diethyl phthalate	0 33	8200	Yes	na	na	na	na

Notes.
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA086 05 ft 2000-03-14	BHGLTA087 05 ft 2000-03-14	BHGLTA087 05 ft 2000-06-15	BHGLTA087 10 ft 2000-06-15
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na
SW6010	Barium	128.1	200	Yes	na	na	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16.31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12.66	Yes	na	na	6 2 F	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1.5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	22 6 F	25 9 F	(35)	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Acrylonitrile	0 04	0 053	Yes	na	na	na	na
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	- -
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0 6	Yes	na	na	na	na
SW8270	Diethyl phthalate	0 33	8200	Yes	na	na	na	na

Notes:

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA088 05 ft 2000-06-15	BHGLTA088 10 ft 2000-06-15	BHGLTA089 10 ft 2000-03-09	BHGLTA089 15 ft 2000-03-09
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na
SW6010	Arsenic	6.58	6.58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1.13	1 13	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na
SW6010	Cobalt	6.19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12 66	Yes	12.1	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351.7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37.4	72	Yes	na	na	na	na
SW6010	Zinc	31.3	3100	Yes	27.3 F	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Acrylonitrile	0 04	0 053	Yes	na	na	na	na
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	- -	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na
SW8270	Diethyl phthalate	0 33	8200	Yes	na	na	na	na

Notes.

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg.

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA090 05 ft 2000-03-09	BHGLTA090 10 ft 2000-03-09	BHGLTA090 15 ft 2000-03-09	BHGLTA091 05 ft 2000-06-15
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0.712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1 13	1.13	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	na	na	na	4 7 F
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1.93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37.4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	29 1 F
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na
SW8260	Acetone	0.005	1000	Yes	na	na	na	na
SW8260	Acrylonitrile	0 04	0 053	Yes	na	na	na	na
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	na	na	na	na
SW8260	*m*- & *p*-Xylene (sum of isomers)	0.005	1000	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	- -	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na
SW8270	Diethyl phthalate	0 33	8200	Yes	na	na	na	na

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA092 05 ft 2000-06-15	BHGLTA095 05 ft 2000-06-15	BHGLTA096 05 ft 2000-06-15	BHGLTA096 10 ft 2000-06-15
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1 13	1.13	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16.31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12 66	Yes	9 3	6.9 F	5 8 F	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0.035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	25 2 F	- -	24 F	na
SW8260	2-Hexanone	0.005	N/A	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Acrylonitrile	0 04	0 053	Yes	na	na	na	na
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Trichloroethene	0 005	0.5	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	0.108 F
SW8270	Diethyl phthalate	0 33	8200	Yes	na	na	na	na

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.15
Subsurface Soil Detections
SWMU 24/Waste Burial Area 7
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX List	BHGLTA096 15 ft 2000-06-15	BHGLTA096 20 ft 2000-06-15
SW6010	Aluminum	20260	20260	No	na	na
SW6010	Antimony	0 712	0.712	Yes	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na
SW6010	Barium	128 1	200	Yes	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na
SW6010	Calcium	272000	N/A	No	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na
SW6010	Cobalt	6 19	610	Yes	na	na
SW6010	Copper	13 72	130	Yes	na	na
SW6010	Iron	17469	N/A	No	na	na
SW6010	Lead	12 66	12 66	Yes	na	na
SW7421	Lead	12.96	12.66	Yes	na	na
SW6010	Magnesium	2420	N/A	No	na	na
SW6010	Manganese	351 7	1400	No	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na
SW6010	Molybdenum	1 93	51	No	na	na
SW6010	Nickel	19 76	200	Yes	na	na
SW6010	Potassium	1717	N/A	No	na	na
SW6010	Selenium	0 313	5	Yes	na	na
SW6010	Sodium	53200	N/A	No	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na
SW6010	Vanadium	37 4	72	Yes	na	na
SW6010	Zinc	31.3	3100	Yes	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na
SW8260	Acetone	0 005	1000	Yes	na	na
SW8260	Acrylonitrile	0 04	0 053	Yes	na	na
SW8260	Dichlorodifluoromethane	0 005	2000	Yes	na	na
SW8260	*m* - & *p* -Xylene (sum of isomers)	0 005	1000	Yes	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na
SW8260	Trichloroethene	0 005	0.5	Yes	na	na
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0.6	Yes	0.14 F	0.2 F
SW8270	Diethyl phthalate	0 33	8200	Yes	na	na

Notes:

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
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All concentrations are in mg/kg

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Table 5.16
Confirmation/SPLP Results
SWMU 24/Waste Burial Area 7
NAS Fort Worth, JRB, Texas

Boring	Depth	Method	Analyte	GWP-Ind MSC mg/kg	Bkgd mg/kg	Previous Result mg/kg	Result Site-specific MSC mg/kg	SPLP Result mg/L	GW-Ind MSC mg/L
BHGLTA001	Surface	SW6010	Antimony	0.6	0 56	0.75 J	0 32 U	0.00054	0.006
BHGLTA071	Surface	SW6010	Barium	200	233	441	38.7	1.0 U	2
BHGLTA001	Surface	SW6010	Cadmium	0.5	0.556	1 4 F	0.86	0.06 U	0.005
BHGLTA407	Surface	SW6010	Lead	1.5	30.97	81.5	81.5	0.0029	0.015
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*a*]anthracene	0 039	0.33	10 J	0.4 U	0.00013 U	0.00039
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*a*]pyrene	0.02	0 33	12 J	0.4 U	0.00024 U	0 0002
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*b*]fluoranthene	0.039	0.33	19 J	0.4 U	0.000079 J	0 00039
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*k*]fluoranthene	0.39	0.33	na	0.4 U	0.00018 U	0.0039
BHGLTA001	Surface	SW8270C/SW8310	Chrysene	3 9	0.33	3 9	0.4 U	0 0015 U	0 039
BHGLTA071	Surface	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0.02	0 33	1.9	0.4 U	0 00031 U	0.0002
BHGLTA071	Surface	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0.039	0 33	11 J	0 4 U	0.00044 U	0.00039
BHGLTA001	Surface	SW8270C/SW8310	Benzo[*a*]anthracene	0.039	0 33	3.7	0.17 J	0.00013 U	0 00039
BHGLTA001	Surface	SW8270C/SW8310	Benzo[*a*]pyrene	0.02	0.33	4.2	0 21 J	0.00023 U	0.0002
BHGLTA001	Surface	SW8270C/SW8310	Benzo[*b*]fluoranthene	0.039	0.33	5.6	0 25 J	0.00018U	0 00039
BHGLTA001	Surface	SW8270C/SW8310	Benzo[*k*]fluoranthene	0 39	0 33	na	0.17 J	0.00017 U	0.0039
BHGLTA001	Surface	SW8270C/SW8310	Chrysene	3.9	0 33	3.9	0 22 J	0.0015 U	0.039
BHGLTA001	Surface	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0.02	0.33	0.6 F	0 41 U	0.0003 UJ	0 0002
BHGLTA001	Surface	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0 039	0.33	2.3 J	0.2 J	0 00043 UJ	0.00039

Note: **Gray shading indicates Standard 3 concentrations.**
na - Not Analyzed

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Table 5.17
Site-Specific MSCs
SWMU 24/Waste Burial Area 7
NAS Fort Worth, JRB, Texas

Boring	Depth	Method	Analyte	GWP-Ind MSC mg/kg	Bkgd mg/kg	Previous Result mg/kg	Result Site-specific MSC mg/kg	SPLP Result mg/L	GW-Ind MSC mg/L
BHGLTA001	Surface	SW6010	Antimony	0.6	0.56	0.75 J	0.32 U	0.00054	0.006
BHGLTA071	Surface	SW6010	Barium	200	233	441	38.7	1 0 U	2
BHGLTA001	Surface	SW6010	Cadmium	0.5	0.556	1.4 F	0.86	0.06 U	0.005
BHGLTA407	Surface	SW6010	Lead	1 5	30.97	81.5	81.5	0.0029	0.015
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*a*]anthracene	0.039	0 33	10 J	0.17 J	0.00013 U	0 00039
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*a*]pyrene	0.02	0.33	12 J	0.21 J	0 00023 U	0 0002
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*b*]fluoranthene	0.039	0.33	19 J	0.25 J	0 00018U	0.00039
BHGLTA071	Surface	SW8270C/SW8310	Benzo[*k*]fluoranthene	0 39	0.33	na	0.17 J	0.00017 U	0 0039
BHGLTA071	Surface	SW8270C/SW8310	Chrysene	3.9	0 33	3.9	0 22 J	0.0015 U	0 039
BHGLTA071	Surface	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0 02	0 33	1.9	0.41 U	0 0003 UJ	0.0002
BHGLTA071	Surface	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0.039	0 33	11 J	0 2 J	0.00043 UJ	0 00039

Note: Gray shading indicates Standard 3 concentrations

na - Not Analyzed

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Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA812 00 ft 1998-06-02	BHGLTA812 Dup 00 ft 1998-06-02	BHGLTA813 00 ft 1998-05-12	BHGLTA814 00 ft 1998-05-18	BHGLTA814 Dup 00 ft 1998-05-18	BHGLTA815 00 ft 1998-05-12
SW6010	Aluminum	22035	22035	No	na	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	- -	- -	- -	- -	- -
SW6010	Arsenic	5 85	5 85	Yes	- -	- -	[(8 F)]	[(8 5 F)]	[(6.2 F)]	- -
SW6010	Barium	233	233	Yes	[(1220 J)]	[(580)]	127	15 8	13 2	[(23100)]
SW6010	Beryllium	1 02	1 02	Yes	0 69 J	0 42 F	0 52	- -	- -	[(14 4)]
SW6010	Cadmium	0 556	0 556	Yes	[(1 F)]	- -	- -	- -	- -	- -
SW6010	Calcium	167788	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	[(26 1)]	22 1 F	21 7	4 4 F	3 1 F	[(94 4)]
SW6010	Cobalt	11 05	610	Yes	1 5 F	- -	3 F	2 F	1 2 F	- -
SW6010	Copper	17 37	130	Yes	13 2 J	7 6 F	7 3 F	3 4 F	2 6 F	(25 5)
SW6010	Iron	17717	N/A	No	na	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	[(245 J)]	[(168 F)]	[(64.5 F)]	6 3 F	3 8 F	[(363)]
SW7421	Lead	30 97	30 97	Yes	na	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	0 03 F	0 02 F	- -	- -	- -	0 03 F
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	5 2 F	- -	5 9 F	3 2 F	2 7 F	2 7 F
SW6010	Potassium	2895	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	[(5.9 F)]	- -	- -	- -	- -	- -
SW6010	Silver	0 213	51	Yes	- -	- -	- -	- -	- -	(2.7 F)
SW7761	Silver	0 213	51	Yes	na	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	[(10.8 F)]	- -	- -	- -	- -	- -
SW6010	Vanadium	46 3	72	Yes	11 1 F	6 6 F	18 9 J	11 2 F	8 F	11 2 F
SW6010	Zinc	38 8	3100	Yes	(72 4 J)	(47.4 J)	34 7	13 3 J	10 7 J	(299)
SW9010	Cyanide	0 5	20	Yes	- -	- -	- -	- -	- -	- -
SW9030	Sulfide	25	N/A	Yes	- -	- -	- -	- -	(37.5 SJ)	- -
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	0 004 F	(0.006 J)	- -	- -
SW8260	*m* - & *p* -Xylene (sum of	0 005	1000	Yes	0 001 F	- -	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 005	820	Yes	- -	- -	- -	- -	- -	(0 016 J)
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -	- -	- -
SW8270	Naphthalene	0 33	200	Yes	- -	0 087 F	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	(0 056 J)	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	0 003 F	- -	- -	0 001 F	- -	(0 017 J)
SW8260	Trichloroethene	0 005	0 5	Yes	- -	(0 026 J)	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	- -	- -	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	(0 7 J)	0 094 F	- -	- -	- -
SW8270	Acenaphthylene	0 33	610	Yes	- -	0 13 F	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	0 038 F	(1 9 J)	0 22 F	- -	- -	0 06 F
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(0 44 J)]	[(13 J)]	[(1.2)]	- -	- -	[(0 58)]
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	[(0 67 J)]	[(12 J)]	[(1.5)]	- -	- -	[(0 82)]
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	na	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(0.94 J)]	[(17 J)]	[(2 2)]	- -	- -	[(1 3)]
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	(0.61 J)	(5 2 J)	(1)	- -	- -	(0 53)
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	(0 38 J)	[(7.7 J)]	[(0 8)]	- -	- -	[(0 6)]
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	0 035 F	0 26 F	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 33 F	[(4.7 J)]	- -	- -	- -	[(0 8)]
SW8270	Chrysene	0 33	3 9	Yes	(0 62 J)	[(13 J)]	(1 5)	- -	- -	(0 91)
SW8310	Chrysene	0 1	3 9	Yes	na	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	[(0.5 J)]	0 22 F	- -	- -	0 12 F
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	- -	(0 37 J)	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	0 12 F	0 25 F	- -	- -	0 098 F
SW8270	Fluoranthene	0 33	410	Yes	(0.87 J)	(27 J)	(3 2)	- -	- -	(1.2)
SW8310	Fluoranthene	0 14	410	Yes	na	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	- -	(0.62 J)	0 043 F	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	[(0 61 J)]	[(10 J)]	[(1.1)]	- -	- -	[(0.57)]
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	0 28 F	(11 J)	(1.5)	- -	- -	(0 4)
SW8310	Phenanthrene	0 42	310	Yes	na	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	(0.98 J)	(23 J)	(2 8)	- -	- -	(1.1)
SW8310	Pyrene	0 18	310	Yes	na	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA815 00 ft 2000-03-08	BHGLTA815 00 ft 2000-06-14	BHGLTA816 00 ft 1998-06-02	BHGLTA816 00 ft 2000-03-09	BHGLTA816 Dup 00 ft 2000-03-09	BHGLTA816 00 ft 2000-06-14
SW6010	Aluminum	22035	22035	No	na	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	na	na	- -	na	na	na
SW6010	Arsenic	5 85	5 85	Yes	na	na	[(6 5 F)]	na	na	na
SW6010	Barium	233	233	Yes	[(1140)]	na	[(347)]	na	na	na
SW6010	Beryllium	1 02	1 02	Yes	0 28 J	0 65	- -	0 54	0 44	na
SW6010	Cadmium	0 556	0 556	Yes	na	na	[(0.99 F)]	[(0 57)]	0 53	0 07 F
SW6010	Calcium	167788	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	na	9 6 F	[(27 2)]	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	3 2 F	na	na	na
SW6010	Copper	17 37	130	Yes	na	na	14 7	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	[(89 4)]	na	na	na
SW7421	Lead	30 97	30 97	Yes	na	na	na	na	na	[(69 2 J)]
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	na	na	0 05	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	8 7 F	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	na	na	[(8 4 F)]	na	na	na
SW6010	Silver	0 213	51	Yes	na	na	- -	na	na	na
SW7761	Silver	0 213	51	Yes	na	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	na	na	[(19.3 F)]	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	21 J	na	na	na
SW6010	Zinc	38 8	3100	Yes	na	na	(43.7 J)	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	0 13 F	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	- -	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	- -	na	na	na
SW8260	*m*- & *p*-Xylene (sum of	0 005	1000	Yes	na	na	- -	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	- -	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	- -	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na	- -	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	- -	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	- -	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	- -	na	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	- -	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	0 14 F	na	na	na
SW8270	Acenaphthylene	0 33	610	Yes	na	na	0 048 F	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	(0.42)	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	[(8 6)]	na	na	na
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	[(9.1 J)]	na	na	na
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	na	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	[(13)]	na	na	na
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	(6.3)	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	[(5.7)]	na	na	na
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	- -	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	(0.34)	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	[(9 1 J)]	na	na	na
SW8310	Chrysene	0 1	3 9	Yes	na	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	[(1.5)]	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	- -	na	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	- -	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	(12)	na	na	na
SW8310	Fluoranthene	0 14	410	Yes	na	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	na	na	0 077 F	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	[(7)]	na	na	na
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	(2.8)	na	na	na
SW8310	Phenanthrene	0 42	310	Yes	na	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	(15)	na	na	na
SW8310	Pyrene	0 18	310	Yes	na	na	na	na	na	na

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA817 00 ft 1998-06-01	BHGLTA817 Dup 00 ft 1998-06-01	BHGLTA817 00 ft 2000-03-09	BHGLTA818 00 ft 1998-06-03	BHGLTA820 00 ft 1999-10-07	BHGLTA821 00 ft 1999-10-07
SW6010	Aluminum	22035	22035	No	na	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	- -	na	- -	na	na
SW6010	Arsenic	5 85	5 85	Yes	- -	- -	na	[(8 9 F)]	na	na
SW6010	Barium	233	233	Yes	60 3	65 3	na	111	[(669)]	79 9
SW6010	Beryllium	1 02	1 02	Yes	- -	- -	na	0 94	0 63	0 42
SW6010	Cadmium	0 556	0 556	Yes	[(0 96 F)]	[(0.88 F)]	0 42	- -	na	na
SW6010	Calcium	167788	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	10 1 F	9 5 F	na	17 5	na	17 2
SW6010	Cobalt	11 05	610	Yes	2 7 F	2 7 F	na	6 5 F	na	na
SW6010	Copper	17 37	130	Yes	6 9 F	15 7 J	na	8 7	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	[(62 F)]	[(67.9 F)]	na	8 F	na	na
SW7421	Lead	30 97	30 97	Yes	na	na	na	na	[(68.5)]	17 1 F
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	- -	- -	na	- -	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	6 7 F	7 6 F	na	12 2 F	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	[(5 5 F)]	[(6.3 F)]	na	[(13 5 F)]	na	na
SW6010	Silver	0 213	51	Yes	- -	- -	na	- -	na	na
SW7761	Silver	0 213	51	Yes	na	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	[(19 1 F)]	[(17.2 F)]	na	[(21 6 F)]	na	na
SW6010	Vanadium	46 3	72	Yes	18 6 J	17 4 J	na	32 5 J	na	na
SW6010	Zinc	38 8	3100	Yes	32 3 J	34 7 J	na	25 1 J	(40.6)	36 1
SW9010	Cyanide	0 5	20	Yes	- -	- -	na	- -	na	na
SW9030	Sulfide	25	N/A	Yes	- -	- -	na	- -	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	- -	- -	na	- -	na	na
SW8260	*m*- & *p*-Xylene (sum of	0 005	1000	Yes	- -	- -	na	- -	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	- -	- -	na	- -	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	na	- -	na	na
SW8270	Naphthalene	0 33	200	Yes	0 043 F	- -	na	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	na	- -	na	na
SW8260	Toluene	0 005	100	Yes	- -	- -	na	- -	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	na	- -	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	0 036 F	- -	na	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	(0.62 J)	(0.36 J)	na	- -	- -	- -
SW8270	Acenaphthylene	0 33	610	Yes	- -	- -	na	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	(1.1 J)	(0 74 J)	na	- -	- -	- -
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	[(5)]	[(4 1)]	na	- -	[(0 37)]	- -
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	[(5 5)]	[(5)]	na	- -	[(0 46)]	- -
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	na	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(8 2 J)]	[(5.9 J)]	na	0 049 F	[(0 68)]	0 14 F
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	(4 1)	(3 3)	na	- -	0 32 F	- -
SW8310	Benzo[*g h i*]perylene	0 05	310	Yes	na	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	[(2.7 J)]	[(0.6 J)]	na	- -	0 27 F	- -
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	na	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	na	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	[(6 3)]	[(5.1)]	na	- -	(0.46)	- -
SW8310	Chrysene	0 1	3 9	Yes	na	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	[(0.76)]	[(0.6)]	na	- -	- -	- -
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	0 23 F	0 096 F	na	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	na	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	(13)	(9 6)	na	- -	(0.4)	0 16 F
SW8310	Fluoranthene	0 14	410	Yes	na	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	(0.41 J)	0 22 F	na	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	[(4.3)]	[(3.6)]	na	- -	[(0.48)]	0 3 F
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	(9 5 J)	(5 4 J)	na	- -	0 11 F	- -
SW8310	Phenanthrene	0 42	310	Yes	na	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	(14 J)	(8.4 J)	na	- -	(0.51)	- -
SW8310	Pyrene	0 18	310	Yes	na	na	na	na	na	na

Notes

RRS-1 = *Risk Reduction Standard 1*
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = *Estimated value below reporting limit and above the* MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA822 00 ft 1999-10-08	BHGLTA829 00 ft 1999-10-07	BHGLTA829 00 ft 2000-06-15	BHGLTA830 00 ft 1999-10-07	BHGLTA831 00 ft 1999-10-08	BHGLTA831 Dup 00 ft 1999-10-08
SW6010	Aluminum	22035	22035	No	na	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	- -	- -	na	na	- -	- -
SW6010	Arsenic	5 85	5 85	Yes	3 4 F	na	na	na	3 9 F	4 F
SW6010	Barium	233	233	Yes	44 7 J	[(3340)]	na	[(1160)]	74 J	70 J
SW6010	Beryllium	1 02	1 02	Yes	0 33	na	na	na	0 75	0 78
SW6010	Cadmium	0 556	0 556	Yes	- -	na	na	[(0.83)]	0 07 F	- -
SW6010	Calcium	167788	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	9	[(111)]	9 6 F	[(31.7)]	14 9	19 7
SW6010	Cobalt	11 05	610	Yes	3 4 F	na	na	na	4 8 F	4 7 F
SW6010	Copper	17 37	130	Yes	5 8 F	na	na	na	8 9 F	9 4 F
SW6010	Iron	17717	N/A	No	na	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	na	na	na	na
SW7421	Lead	30 97	30 97	Yes	14	[(1050)]	na	[(732)]	23 8	22 5
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	- -	na	na	na	- -	- -
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	6 3 F	na	na	na	9 5	9 9 F
SW6010	Potassium	2895	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	na	na	na	na	na	na
SW6010	Silver	0 213	51	Yes	na	na	na	na	na	na
SW7761	Silver	0 213	51	Yes	- -	na	na	na	(0 27)	(0 27)
SW6010	Sodium	37300	N/A	No	na	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	na	na	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	16 1 F	na	na	na	27 3 F	28 4 F
SW6010	Zinc	38 8	3100	Yes	17 9 F	na	na	na	(40)	(41 6)
SW9010	Cyanide	0 5	20	Yes	0 49 F	na	na	na	- -	- -
SW9030	Sulfide	25	N/A	Yes	- -	na	na	na	24 7 F	- -
SW8260	2-Hexanone	0 005	N/A	Yes	- -	na	na	na	- -	- -
SW8260	*m*- & *p*-Xylene (sum of	0 005	1000	Yes	- -	na	na	na	- -	- -
SW8260	Methyl isobutyl ketone	0 005	820	Yes	- -	na	na	na	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	(0.007)	na	na	na	0 002 J	(0.003 J)
SW8270	Naphthalene	0 33	200	Yes	- -	na	na	na	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	na	na	na	- -	- -
SW8260	Toluene	0 005	100	Yes	0 003 F	na	na	na	0 004 F	0 005 F
SW8260	Trichloroethene	0 005	0 5	Yes	- -	na	na	na	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	na	na	na	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	na	na	na	- -	- -
SW8270	Acenaphthylene	0 33	610	Yes	- -	na	na	na	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	na	na	na	- -	- -
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	na	na	na	- -	- -
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	0 12 F	na	na	na	0 1 F	- -
SW8310	Benzo[*a*]pyrene	0 015	0.02	Yes	na	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	0 18 F	na	na	na	0 14 F	- -
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	0 14 F	na	na	na	- -	- -
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	na	na	na	- -	- -
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	na	na	na	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	na	na	na	- -	0 21 F
SW8270	Chrysene	0 33	3 9	Yes	0 11 F	na	na	na	- -	- -
SW8310	Chrysene	0 1	3 9	Yes	na	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	na	na	na	- -	- -
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	- -	na	na	na	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	na	na	na	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	na	na	na	0 12 F	- -
SW8310	Fluoranthene	0 14	410	Yes	na	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	- -	na	na	na	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	0 3 F	na	na	na	0 3 F	0 2 F
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	- -	na	na	na	- -	- -
SW8310	Phenanthrene	0 42	310	Yes	na	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	- -	na	na	na	- -	- -
SW8310	Pyrene	0 18	310	Yes	na	na	na	na	na	na

Notes

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Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA831 00 ft 2000-03-09	BHGLTA832 00 ft 2000-03-08	BHGLTA833 00 ft 2000-03-08	BHGLTA834 00 ft 2000-03-08	BHGLTA835 00 ft 2000-03-09	BHGLTA835 Dup 00 ft 2000-03-09
SW6010	Aluminum	22035	22035	No	na	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	na	na	na	na	na	na
SW6010	Arsenic	5 85	5 85	Yes	na	na	na	na	na	na
SW6010	Barium	233	233	Yes	na	68 4	90 1	[(383)]	na	na
SW6010	Beryllium	1 02	1 02	Yes	na	na	na	na	na	na
SW6010	Cadmium	0 556	0 556	Yes	na	0 13 F	na	na	0 39 F	0 39 F
SW6010	Calcium	167788	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	17 3	na	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	na	na	na	na
SW6010	Copper	17 37	130	Yes	na	na	na	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	na	na	na	na
SW7421	Lead	30 97	30 97	Yes	na	20 2	17 1 F	21 2	[(83.7)]	[(80 1)]
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	na	na	na	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	na	na	na	na	na	na
SW6010	Silver	0 213	51	Yes	na	na	na	na	na	na
SW7761	Silver	0 213	51	Yes	na	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	na	na	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	na	na	na	na
SW6010	Zinc	38 8	3100	Yes	na	na	na	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of	0 005	1000	Yes	na	na	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	na	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na	na	na
SW8270	Acenaphthylene	0 33	610	Yes	na	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	na	0 0037 F	0 0031 F	0 0023 F	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	(0 021)	(0 0096 F)	(0 022)	(0 022 F)	(0 035 F)
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	na	[(0 028)]	0 011 F	[(0 024)]	[(0 032 F)]	[(0 05 F)]
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	(0.021)	0 0098 F	(0.026)	[(0.044 F)]	[(0.082)]
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	0 017 F	0 0054 F	0 023 F	0 026 F	0 042 F
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na	na	na
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	0 011 F	0 0053 F	(0.014)	(0 021 F)	(0.041 F)
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	na	na	na	na
SW8310	Chrysene	0 1	3 9	Yes	na	0 026 F	0 012 F	0 026 F	0 031 F	0 047 F
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	[(0.15)]	[(0 026)]	[(0 021 F)]	[(0.037 F)]	[(0 052 F)]
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na	na	na
SW8310	Fluoranthene	0 14	410	Yes	na	0 066 F	0 031 F	0 049 F	0 076 F	0 11 F
SW8270	Fluorene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	0 017 F	0 0076 F	0 011 F	(0 032 F)	[(0 047 F)]
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na	na	na
SW8310	Phenanthrene	0 42	310	Yes	na	0 021 F	0 012 F	0 013 F	- -	0 032 F
SW8270	Pyrene	0 33	310	Yes	na	na	na	na	na	na
SW8310	Pyrene	0 18	310	Yes	na	0 064 F	0 033 F	0 032 F	0 12 F	0 14 F

Notes

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Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA835 00 ft 2000-06-14	BHGLTA836 00 ft 2000-03-09	BHGLTA837 00 ft 2000-03-09	BHGLTA837 Dup 00 ft 2000-03-09	BHGLTA838 00 ft 2000-03-13	BHGLTA840 00 ft 2000-03-13
SW6010	Aluminum	22035	22035	No	na	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	na	na	na	na	na	na
SW6010	Arsenic	5 85	5 85	Yes	na	na	na	na	na	na
SW6010	Barium	233	233	Yes	na	na	na	na	na	na
SW6010	Beryllium	1 02	1 02	Yes	na	na	na	na	na	na
SW6010	Cadmium	0 556	0 556	Yes	na	na	0 43	0 48	na	na
SW6010	Calcium	167788	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	na	na	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	na	na	na	na
SW6010	Copper	17 37	130	Yes	na	na	na	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	na	na	na	na
SW7421	Lead	30 97	30 97	Yes	[(54.6 J)]	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	na	0 11	na	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	na	na	na	na	na	na
SW6010	Silver	0 213	51	Yes	na	na	na	na	na	na
SW7761	Silver	0 213	51	Yes	na	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	na	na	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	na	na	na	na
SW6010	Zinc	38 8	3100	Yes	na	na	na	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of	0 005	1000	Yes	na	na	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na	na	na	- -	0 2 F
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	na	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na	- -	(2 5)
SW8270	Acenaphthylene	0 33	610	Yes	na	na	na	na	- -	- -
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na	- -	(5.4)
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na	[(3 6)]	[(40 J)]
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na	[(4 9 J)]	[(45 J)]
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	na	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na	[(5.1 J)]	[(51 J)]
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na	(2 8 J)	(37 J)
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na	[(4 J)]	[(31 J)]
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	na	na	[(4.1 J)]	[(46 J)]
SW8310	Chrysene	0 1	3 9	Yes	na	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	na	na	[(0.7)]	[(4 6 J)]
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na	(5.4 J)	(81 J)
SW8310	Fluoranthene	0 14	410	Yes	na	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	na	na	na	na	- -	(1.5)
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na	[(4 J)]	[(45 J)]
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na	(1.3 J)	(43 J)
SW8310	Phenanthrene	0 42	310	Yes	na	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	na	na	(6 2 J)	(110 J)
SW8310	Pyrene	0 18	310	Yes	na	na	na	na	na	na

Notes

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA841 00 ft 2000-03-13	BHGLTA842 00 ft 2000-03-09	BHGLTA844 00 ft 2000-06-14	BHGLTA845 00 ft 2000-06-14	BHGLTA846 00 ft 2000-06-14	BHGLTA847 00 ft 2000-06-14
SW6010	Aluminum	22035	22035	No	na	na	na	na	na	na
SW6010	Antimony	0 56	0 6	Yes	na	na	na	na	na	na
SW6010	Arsenic	5 85	5 85	Yes	na	na	na	na	na	na
SW6010	Barium	233	233	Yes	na	59 8	na	na	na	131
SW6010	Beryllium	1 02	1 02	Yes	na	na	na	na	na	na
SW6010	Cadmium	0 556	0 556	Yes	na	0 13 F	na	na	na	na
SW6010	Calcium	167788	N/A	No	na	na	na	na	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	na	11 1	na	na	na	na
SW6010	Cobalt	11 05	610	Yes	na	na	na	na	na	na
SW6010	Copper	17 37	130	Yes	na	7 1 F	na	na	na	na
SW6010	Iron	17717	N/A	No	na	na	na	na	na	na
SW6010	Lead	30 97	30 97	Yes	na	na	na	na	na	na
SW7421	Lead	30 97	30 97	Yes	na	25 7	4 8 F	2 5 F	3 3 F	na
SW6010	Magnesium	3003	N/A	No	na	na	na	na	na	na
SW6010	Manganese	849	1400	No	na	na	na	na	na	na
SW7471	Mercury	0 14	0 2	Yes	na	na	na	na	na	na
SW6010	Molybdenum	1 46	51	No	na	na	na	na	na	na
SW6010	Nickel	14 6	200	Yes	na	na	na	na	na	na
SW6010	Potassium	2895	N/A	No	na	na	na	na	na	na
SW6010	Selenium	0 907	5	Yes	na	na	na	na	na	na
SW6010	Silver	0 213	51	Yes	na	na	na	na	na	na
SW7761	Silver	0 213	51	Yes	na	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	na	na	na	na	na
SW6010	Thallium	2 43	2 43	Yes	na	na	na	na	na	na
SW6010	Vanadium	46 3	72	Yes	na	na	na	na	na	na
SW6010	Zinc	38 8	3100	Yes	na	31 6	na	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na	na
SW8260	*m*- & *p*-Xylene (sum of	0 005	1000	Yes	na	na	na	na	na	na
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na	na	na
SW8270	Naphthalene	0 33	200	Yes	na	na	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	na	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na	na	na
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na	na	na
SW8270	Acenaphthylene	0 33	610	Yes	na	na	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na	na	na
SW8310	Anthracene	0 44	3100	Yes	- -	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	- -	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	0 01 F	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	0 01 F	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na	na	na
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	- -	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na	na	na
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	0 0053 F	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	na	na	na	na
SW8310	Chrysene	0 1	3 9	Yes	0 0064 F	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	- -	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	na	na	na	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na	na	na
SW8310	Fluoranthene	0 14	410	Yes	0 019 F	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	na	na	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na	na	na
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	- -	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na	na	na
SW8310	Phenanthrene	0 42	310	Yes	0 0046 F	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	na	na	na	na
SW8310	Pyrene	0 18	310	Yes	0 016 F	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA848 00 ft 2000-06-14	THGLTA022 00 ft 1997-08-28	THGLTA022 Dup 00 ft 1997-08-28	THGLTA023 00 ft 1997-08-28	THGLTA024 00 ft 1997-09-10	THGLTA025 00 ft 1997-09-10
SW6010	Aluminum	22035	22035	No	na	3110	2720	3070	6680	2510
SW6010	Antimony	0 56	0 6	Yes	na	[(0 96 J)]	[(1 J)]	[(2 J)]	0 26 F	[(1.2 J)]
SW6010	Arsenic	5 85	5 85	Yes	na	2 8 J	3 J	2 2 F	2 9 J	1 5 J
SW6010	Barium	233	233	Yes	101	[(510 J)]	[(1630 J)]	[(3620)]	73 J	[(3900 J)]
SW6010	Beryllium	1 02	1 02	Yes	na	0 27 F	0 39 F	0 47	0 41 J	0 2 F
SW6010	Cadmium	0 556	0 556	Yes	na	[(0 65 F)]	[(0.89 F)]	[(5 4)]	0 28 F	[(0.81 F)]
SW6010	Calcium	167788	N/A	No	na	167000	(211000)	127000	160000	(174000)
SW6010	Chromium (total)	25 86	25 86	Yes	na	[(28.1 J)]	[(42 5 J)]	[(63.5)]	4 F	[(56.4 F)]
SW6010	Cobalt	11 05	610	Yes	na	2 4 F	3 3 F	4 2 F	2 9 F	4 7 F
SW6010	Copper	17 37	130	Yes	na	13 2 J	(21.3 J)	(47.6 J)	5 1 F	12 J
SW6010	Iron	17717	N/A	No	na	6060	6190	4530	6860	4520
SW6010	Lead	30 97	30 97	Yes	na	[(325 J)]	[(430 J)]	[(519 J)]	20 J	[(387 J)]
SW7421	Lead	30 97	30 97	Yes	na	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	na	1650 J	2110 J	1430 J	1640 J	1110 J
SW6010	Manganese	849	1400	No	na	192 J	231 J	166 J	215 J	148 J
SW7471	Mercury	0 14	0 2	Yes	na	0 022 F	0 024 F	[(0 43)]	0 016 F	0 047 F
SW6010	Molybdenum	1 46	51	No	na	0 8 F	1 F	1 3 F	0 32 F	0 77 F
SW6010	Nickel	14 6	200	Yes	na	5 5 F	5 4 F	5 4 F	6 3 F	4 8 F
SW6010	Potassium	2895	N/A	No	na	661 J	705 F	565 J	817 J	562 J
SW6010	Selenium	0 907	5	Yes	na	- -	- -	- -	- -	- -
SW6010	Silver	0 213	51	Yes	na	- -	- -	- -	- -	- -
SW7761	Silver	0 213	51	Yes	na	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	na	112 J	149 J	130	91 J	90 9 J
SW6010	Thallium	2 43	2 43	Yes	na	- -	- -	- -	- -	- -
SW6010	Vanadium	46 3	72	Yes	na	11 1	12 3	10 4	16 5 J	9 J
SW6010	Zinc	38 8	3100	Yes	na	(84 4 J)	(109 J)	(419 J)	23 5 J	(64.4 J)
SW9010	Cyanide	0 5	20	Yes	na	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	na	na	na
SW8260	*m* - & *p* -Xylene (sum of	0 005	1000	Yes	na	- -	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 005	820	Yes	na	na	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	- -	- -	- -	- -	- -
SW8270	Naphthalene	0 33	200	Yes	na	0 13 F	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	- -	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	na	0 0014 F	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	na	- -	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	na	- -	- -	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	na	0 26 F	- -	- -	- -	- -
SW8270	Acenaphthylene	0 33	610	Yes	na	- -	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	na	(0 54 F)	0 12 F	0 098 F	(1.2 F)	- -
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	[(2.7)]	[(0 71 F)]	[(0 85)]	[(5 1)]	[(2 8)]
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	[(2.8)]	[(1)]	[(1 4)]	[(5 2)]	[(3 1)]
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	na	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	[(4 3)]	[(1.6)]	[(2.5)]	[(6 8)]	[(3 3)]
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	(1.6)	(0.67 F)	(0 95)	(3.7)	(1 5)
SW8310	Benzo[*g,h,i*]perylene	0 05	310	Yes	na	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na	na	na
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	na	0 064 F	0 23 F	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	[(0.81)]	- -	0 27 F	- -	(0 52 F)
SW8270	Chrysene	0 33	3 9	Yes	na	(3 1)	(1)	(1.2)	[(5.6)]	[(4.1)]
SW8310	Chrysene	0 1	3 9	Yes	na	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	[(0.42 F)]	0 17 F	0 22 F	[(1 3 F)]	[(0.62 F)]
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na	na
SW8270	Dibenzofuran	0 33	41	Yes	na	0 14 F	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	- -	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	na	(5.2)	(1 5)	(1.5)	(12)	(5 5)
SW8310	Fluoranthene	0 14	410	Yes	na	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	na	0 24 F	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	[(1.7)]	[(0 74 F)]	[(0.99)]	[(3.2)]	[(1.6)]
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	(3.1)	(0.56 F)	(0.52 F)	(6 9)	(2 2)
SW8310	Phenanthrene	0 42	310	Yes	na	na	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	(4.2)	(1 3)	(1.4)	(16)	(9)
SW8310	Pyrene	0 18	310	Yes	na	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.18
Surface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA026 00 ft 1997-09-11	THGLTA027 00 ft 1997-09-11	THGLTA028 00 ft 1997-09-11	WHGLTA801 00 ft 1999-10-28	WHGLTA803 00 ft 1999-10-28
SW6010	Aluminum	22035	22035	No	9380	6420	1210	na	na
SW6010	Antimony	0 56	0 6	Yes	0 25 F	0 17 F	0 14 F	na	na
SW6010	Arsenic	5 85	5 85	Yes	3 5 J	2 9 J	2 4 J	na	na
SW6010	Barium	233	233	Yes	104 J	59 6 J	15 4 J	na	na
SW6010	Beryllium	1 02	1 02	Yes	0 61 J	0 48 J	0 14 F	na	na
SW6010	Cadmium	0 556	0 556	Yes	0 19 F	**[(0.64 F)]**	0 18 F	na	na
SW6010	Calcium	167788	N/A	No	121000	114000	162000	na	na
SW6010	Chromium (total)	25 86	25 86	Yes	6 5 F	9 1 F	- -	na	na
SW6010	Cobalt	11 05	610	Yes	4 5 F	3 F	1 F	na	na
SW6010	Copper	17 37	130	Yes	5 9 F	8 J	2 8 F	na	na
SW6010	Iron	17717	N/A	No	8910	6990	4340	na	na
SW6010	Lead	30 97	30 97	Yes	12 5 J	**[(68.8 J)]**	2 5 F	na	na
SW7421	Lead	30 97	30 97	Yes	na	na	na	na	na
SW6010	Magnesium	3003	N/A	No	1960 J	1450 J	1210 J	na	na
SW6010	Manganese	849	1400	No	299 J	200 J	141 J	na	na
SW7471	Mercury	0 14	0 2	Yes	0 0069 F	0 036 F	0 017 F	na	na
SW6010	Molybdenum	1 46	51	No	0 2 F	0 29 F	0 52 F	na	na
SW6010	Nickel	14 6	200	Yes	9 7 F	6 5 F	2 7 F	na	na
SW6010	Potassium	2895	N/A	No	1710 J	1460 J	283 F	na	na
SW6010	Selenium	0 907	5	Yes	- -	- -	- -	na	na
SW6010	Silver	0 213	51	Yes	- -	- -	- -	na	na
SW7761	Silver	0 213	51	Yes	na	na	na	na	na
SW6010	Sodium	37300	N/A	No	61 3 J	88 2 J	192 J	na	na
SW6010	Thallium	2 43	2 43	Yes	- -	- -	- -	na	na
SW6010	Vanadium	46 3	72	Yes	20 6 J	18 7 J	7 4 F	na	na
SW6010	Zinc	38 8	3100	Yes	24 2 J	**(40 6 J)**	- -	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na	na
SW8260	2-Hexanone	0 005	N/A	Yes	na	na	na	- -	- -
SW8260	*m* - & *p* -Xylene (sum of	0 005	1000	Yes	- -	- -	- -	- -	- -
SW8260	*Methyl isobutyl ketone*	0 005	820	Yes	na	na	na	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	**(0 003)**	**(0 003)**
SW8270	Naphthalene	0 33	200	Yes	- -	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	0 0012 F	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 33	410	Yes	- -	- -	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -	- -
SW8270	Acenaphthylene	0 33	610	Yes	- -	- -	- -	- -	- -
SW8270	*Anthracene*	0 33	3100	Yes	- -	**(5.3 F)**	- -	- -	- -
SW8310	Anthracene	0 44	3100	Yes	na	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	0 23 F	- -	- -	0 23 F	- -
SW8310	Benzo[*a*]anthracene	0 009	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	0 25 F	**[(13 F)]**	- -	0 21 F	- -
SW8310	Benzo[*a*]pyrene	0 015	0 02	Yes	na	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	0 31 F	**[(15)]**	- -	0 31 F	- -
SW8310	Benzo[*b*]fluoranthene	0 012	0 039	Yes	na	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	0 15 F	**(6.2 F)**	- -	0 2 F	- -
SW8310	*Benzo[g,h,i]perylene*	0 05	310	Yes	na	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	0 13 F	- -
SW8310	Benzo[*k*]fluoranthene	0 011	0 39	Yes	na	na	na	na	na
SW8270	Benzyl butyl phthalate	0 33	2000	Yes	- -	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	**[(7.5 F)]**	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	0 24 F	**[(17)]**	- -	0 27 F	- -
SW8310	Chrysene	0 1	3 9	Yes	na	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	**[(2 8 F)]**	- -	0 23 F	- -
SW8310	Dibenzo[*a,h*]anthracene	0 02	0 02	Yes	na	na	na	na	na
SW8270	*Dibenzofuran*	0 33	41	Yes	- -	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	**(0.36 F)**	**(34)**	- -	**(0.42)**	- -
SW8310	Fluoranthene	0 14	410	Yes	na	na	na	na	na
SW8270	Fluorene	0 33	410	Yes	- -	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -	**[(6.1 F)]**	- -	**[(0 38)]**	- -
SW8310	Indeno[1,2,3-*c,d*]pyrene	0 03	0 039	Yes	na	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	- -	**(18)**	- -	0 16 F	- -
SW8310	Phenanthrene	0 42	310	Yes	na	na	na	na	na
SW8270	*Pyrene*	0 33	310	Yes	**(0.45 F)**	**(41)**	- -	**(0.36)**	- -
SW8310	Pyrene	0 18	310	Yes	na	na	na	na	na

Notes

RRS-1 = Risk Reduction Standard 1
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N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

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Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA812 05 ft 1998-06-02	BHGLTA812 10 ft 1998-06-02	BHGLTA812 15 ft 1998-06-02	BHGLTA812 20 ft 1998-06-02
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6 58	6.58	Yes	- -	**[(14.3 F)]**	**[(9.8 F)]**	- -
SW6010	Barium	128 1	200	Yes	**(131)**	76 5	101	53 3
SW6010	Beryllium	1 13	1 13	Yes	- -	0 61	0 9	0 63 F
SW6010	Cadmium	0 59	0 59	Yes	- -	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	**[(22.8)]**	13.2	**[(21)]**	14 5 F
SW6010	Cobalt	6 19	610	Yes	3 1 F	4 5 F	5 3 F	2 F
SW6010	Copper	13 72	130	Yes	6 2 F	6 1 F	6 7 F	3.3 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	**[(73.2 F)]**	10 3 F	7 1 F	9 2 F
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	7 9 F	8 2 F	11 5 F	5 4 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	**[(5.4 F)]**	**[(7.3 F)]**	**[(9.4 F)]**	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1 5	Yes	**[(14.1 F)]**	**[(20 F)]**	**[(25.9 F)]**	- -
SW6010	Vanadium	37 4	72	Yes	17 9 J	25 8 J	33 8 J	17 2 F
SW6010	Zinc	31.3	3100	Yes	**(38.1 J)**	23 6 J	30 J	20 7 J
SW9010	Cyanide	0 5	20	Yes	- -	- -	- -	- -
SW9030	Sulfide	25	N/A	Yes	**(35.8 S)**	**(36.3 S)**	**(39.8 S)**	- -
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -	- -	**(0.008)**	- -
SW8260	Acetone	0 005	1000	Yes	**(0.052)**	- -	- -	- -
SW8260	Benzene	0.002	0 5	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	- -	- -	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0.005	0.5	Yes	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	**(0.052)**	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0.33	Yes	- -	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	- -	- -	- -	- -
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 035 F	0 052 F	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	- -	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	0 077 F	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Pyrene	0 33	310	Yes	0 074 F	- -	- -	- -

Notes
RRS-1 = Risk Reduction Standard 1
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na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)].
All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA813 05 ft 1998-05-12	BHGLTA813 10 ft 1998-05-12	BHGLTA813 15 ft 1998-06-01	BHGLTA813 20 ft 1998-06-01
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6.58	6 58	Yes	- -	[(8.8 F)]	[(14.7 F)]	- -
SW6010	Barium	128.1	200	Yes	54.2	40 9	116	30.9
SW6010	Beryllium	1.13	1 13	Yes	- -	0 33 F	1 1	- -
SW6010	Cadmium	0 59	0 59	Yes	- -	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	12 6 F	7 1 F	[(25.3)]	10.4 F
SW6010	Cobalt	6 19	610	Yes	3.4 F	2.4 F	5.8 F	3.2 F
SW6010	Copper	13.72	130	Yes	5 3 F	3 5 F	11 7	5 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	- -	5.1 F	6.9 F	- -
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	(0.12)
SW6010	Molybdenum	1.93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	6 5 F	3 9 F	14 1	6 6 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0.313	5	Yes	- -	- -	[(13.6 F)]	- -
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1.5	Yes	- -	- -	[(30.3 F)]	- -
SW6010	Vanadium	37 4	72	Yes	23 5 F	13 F	(42.7 J)	29 1 F
SW6010	Zinc	31 3	3100	Yes	21.1	11 8	(39.5 J)	15 9 J
SW9010	Cyanide	0 5	20	Yes	- -	- -	- -	- -
SW9030	Sulfide	25	N/A	Yes	- -	- -	- -	- -
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	(0.015)	(0.012)	(0.066)	- -
SW8260	Benzene	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	0 003 F	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	- -	- -	(0.01)	- -
SW8260	Methylene chloride	0 002	0.5	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0.33	0.33	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0 33	Yes	- -	0 04 F	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	- -	- -	- -	- -
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0.075 F	- -	[(3.3)]	0 2 F
SW8270	Chrysene	0 33	3 9	Yes	- -	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	0 17 F	0 04 F	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	0 045 F	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	Yes	- -	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Pyrene	0 33	310	Yes	- -	0 04 F	- -	- -

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA814 05 ft 1998-05-18	BHGLTA814 10 ft 1998-05-18	BHGLTA815 05 ft 1998-05-12	BHGLTA815 10 ft 1998-06-02
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	**[(9.4 F)]**	- -	2.9 F	5 1 F
SW6010	Barium	128 1	200	Yes	71.2	35 6	99 5	26 9
SW6010	Beryllium	1 13	1 13	Yes	0 65	- -	- -	- -
SW6010	Cadmium	0.59	0.59	Yes	- -	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16 31	Yes	13 2	10 6 F	5.4 F	7 3
SW6010	Cobalt	6.19	610	Yes	3 8 F	1 7 F	1 8 F	2 5 F
SW6010	Copper	13 72	130	Yes	4 6 F	3 5 F	3 5 F	3 4 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12.66	12.66	Yes	3 5 F	- -	5 4 F	2 9 F
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1.93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	7 6 F	3 3 F	3 F	5 1 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	- -	- -	- -	**[(6.1 F)]**
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1.5	Yes	- -	- -	- -	**[(9.8 F)]**
SW6010	Vanadium	37.4	72	Yes	27 J	25 7 F	8 J	12 2 J
SW6010	Zinc	31 3	3100	Yes	17 8 J	15 J	11 1	11 4 J
SW9010	Cyanide	0 5	20	Yes	- -	- -	- -	- -
SW9030	Sulfide	25	N/A	Yes	- -	- -	- -	- -
SW8260	1,2-Dichloroethene, *cis-*	0.005	7	Yes	- -	0.004 F	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	**(0.013 J)**	- -
SW8260	Benzene	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0.005	6100	Yes	- -	- -	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	0 004 F	**(0.012)**	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0.33	Yes	- -	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	0 14 F
SW8270	Chrysene	0 33	3.9	Yes	- -	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	- -	- -	0 09 F	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Pyrene	0 33	310	Yes	- -	- -	- -	- -

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses)
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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA815 15 ft 1998-06-02	BHGLTA815 20 ft 1998-06-02	BHGLTA816 05 ft 1998-06-02	BHGLTA816 10 ft 1998-06-02
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0.712	0 712	Yes	- -	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	[(7.5 F)]	- -	- -	[(18.9 F)]
SW6010	Barium	128 1	200	Yes	57 5	62 3	62.4	(136)
SW6010	Beryllium	1 13	1.13	Yes	0 59	- -	- -	[(1.2)]
SW6010	Cadmium	0.59	0 59	Yes	- -	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16 31	Yes	12	6 3 F	10 F	[(26.4)]
SW6010	Cobalt	6.19	610	Yes	3 6 F	1 8 F	3 5 F	5 6 F
SW6010	Copper	13 72	130	Yes	6 6	4 7 F	4 9 F	8.9
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12.66	Yes	7 5 F	- -	[(13.3 F)]	4 6 F
SW7421	Lead	12 96	12.66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0.2	Yes	- -	- -	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	7 2 F	6 9 F	7 3 F	13 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	[(9.9 F)]	- -	- -	[(18.7 F)]
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	[(17.5 F)]	[(36.3 F)]	- -	[(30.5 F)]
SW6010	Vanadium	37.4	72	Yes	23 3 J	18.2 F	18.8 F	(45.3 J)
SW6010	Zinc	31.3	3100	Yes	20 3 J	11 7 J	23 3 J	(35.3 J)
SW9010	Cyanide	0 5	20	Yes	- -	- -	- -	- -
SW9030	Sulfide	25	N/A	Yes	- -	- -	- -	- -
SW8260	1,2-Dichloroethene, *cis*-	0 005	7	Yes	- -	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	- -	- -	- -
SW8260	Benzene	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	- -	- -	- -	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	(0.007)
SW8260	Toluene	0.005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0.5	Yes	- -	- -	- -	- -
SW8270	Acenaphthene	0.33	610	Yes	- -	- -	0 036 F	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	0 08 F	- -
SW8270	Benzo[*a*]anthracene	0 33	0.33	Yes	0 15 F	- -	[(0.39)]	- -
SW8270	Benzo[*a*]pyrene	0.33	0 33	Yes	[(0.49)]	- -	[(0.52 J)]	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	[(0.72)]	- -	[(0.71)]	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	(0.4)	- -	(0.39)	- -
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	0 27 F	- -	0.32 F	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	0 21 F	- -	0 076 F	- -
SW8270	Chrysene	0 33	3.9	Yes	0.2 F	- -	(0.46 J)	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	0 065 F	- -	(0.71)	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	Yes	[(0.45)]	- -	[(0.34 F)]	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	(0.46)	- -
SW8270	Pyrene	0.33	310	Yes	0.063 F	- -	(0.87)	- -

Notes:
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J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses).
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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA816 Dup 10 ft 1998-06-02	BHGLTA816 10 ft 2000-06-14	BHGLTA816 15 ft 1998-06-02	BHGLTA818 05 ft 1998-05-19
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0.712	Yes	- -	na	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	[(23.6 F)]	na	- -	[(8.2 F)]
SW6010	Barium	128 1	200	Yes	(142)	na	85 9	63
SW6010	Beryllium	1 13	1 13	Yes	[(1.2)]	0 7	- -	0 57
SW6010	Cadmium	0 59	0.59	Yes	- -	na	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16.31	Yes	[(25.3)]	na	11 8 F	11 6
SW6010	Cobalt	6.19	610	Yes	(6.3 F)	na	3 5 F	3 4 F
SW6010	Copper	13.72	130	Yes	8 2	na	5.3 F	4 8 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12.66	12 66	Yes	4 7 F	na	9.2 F	4 6 F
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	na	- -	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19.76	200	Yes	13 5 F	na	10.3 F	6 8 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	[(14.4 F)]	na	- -	(2.7 F)
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	[(34.2 F)]	na	- -	[(13.4 F)]
SW6010	Vanadium	37 4	72	Yes	(43.9 J)	na	30 2 F	21 J
SW6010	Zinc	31.3	3100	Yes	(35.8 J)	na	19 9 J	17 5 J
SW9010	Cyanide	0.5	20	Yes	- -	na	- -	- -
SW9030	Sulfide	25	N/A	Yes	- -	na	- -	- -
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -	na	- -	- -
SW8260	Acetone	0 005	1000	Yes	- -	na	(0.042)	(0.006)
SW8260	Benzene	0.002	0 5	Yes	- -	na	- -	- -
SW8260	Ethylbenzene	0.003	70	Yes	- -	na	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	- -	na	- -	- -
SW8260	Methylene chloride	0.002	0 5	Yes	- -	na	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	na	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	na	- -	- -
SW8260	Trichloroethene	0.005	0 5	Yes	- -	na	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	na	- -	- -
SW8270	Anthracene	0.33	3100	Yes	- -	na	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0.33	Yes	- -	na	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	na	- -	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0 33	Yes	- -	na	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	na	- -	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	na	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	na	- -	- -
SW8270	Chrysene	0.33	3 9	Yes	- -	na	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	- -	na	- -	- -
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	- -	na	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	na	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -	na	- -	- -
SW8270	Phenanthrene	0.33	310	Yes	- -	na	- -	- -
SW8270	Pyrene	0.33	310	Yes	- -	na	- -	- -

Notes:

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
Values above RRS-2 are **bold** and are enclosed in [(parentheses and brackets)]
All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA818 10 ft 1998-06-03	BHGLTA818 15 ft 1998-06-03	BHGLTA819 05 ft 1999-10-07	BHGLTA820 15 ft 1999-10-07
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0.712	0 712	Yes	- -	- -	na	na
SW6010	Arsenic	6.58	6.58	Yes	- -	- -	na	na
SW6010	Barium	128 1	200	Yes	68 4	43	na	na
SW6010	Beryllium	1.13	1.13	Yes	1.1 F	- -	na	na
SW6010	Cadmium	0.59	0.59	Yes	- -	- -	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16.31	Yes	[(23.2 F)]	7 5 F	na	na
SW6010	Cobalt	6 19	610	Yes	4 5 F	3 5 F	na	na
SW6010	Copper	13 72	130	Yes	5 5 F	4.7 F	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	12 F	8 9 F	na	na
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0.2	Yes	- -	- -	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	13 6 F	6 6 F	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	[(19.4 F)]	- -	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1.5	Yes	[(29.8 F)]	- -	na	na
SW6010	Vanadium	37 4	72	Yes	(41.4 J)	20.7 F	na	na
SW6010	Zinc	31 3	3100	Yes	25 9 J	14 4 J	na	na
SW9010	Cyanide	0 5	20	Yes	- -	- -	na	na
SW9030	Sulfide	25	N/A	Yes	- -	- -	na	na
SW8260	1,2-Dichloroethene, *cis*-	0 005	7	Yes	- -	- -	na	na
SW8260	Acetone	0.005	1000	Yes	(0.14)	(0.03)	na	na
SW8260	Benzene	0 002	0 5	Yes	- -	- -	na	na
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	na	na
SW8260	Methyl ethyl ketone	0.005	6100	Yes	(0.021)	- -	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	na	na
SW8260	Tetrachloroethene	0.005	0.5	Yes	- -	- -	na	na
SW8260	Toluene	0.005	100	Yes	- -	- -	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	na	na
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0.33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0.33	Yes	- -	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	0 2 F	- -
SW8270	Chrysene	0.33	3 9	Yes	- -	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Pyrene	0 33	310	Yes	- -	- -	- -	- -

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
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Values above RRS-1 are **bold** and are enclosed in (parentheses)
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All concentrations are in mg/kg.

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA821 15 ft 1999-10-07	BHGLTA822 05 ft 1999-10-08	BHGLTA822 10 ft 1999-10-08	BHGLTA822 15 ft 1999-10-08
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0.712	Yes	na	- -	- -	- -
SW6010	Arsenic	6 58	6 58	Yes	na	2 6 F	3 5 F	3 8 F
SW6010	Barium	128 1	200	Yes	na	42 8 J	39 8 F	69 1 J
SW6010	Beryllium	1.13	1.13	Yes	na	0 37	0.36	0.4
SW6010	Cadmium	0 59	0 59	Yes	na	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16.31	Yes	na	9 4 F	11.1	12 4
SW6010	Cobalt	6 19	610	Yes	na	2 7 F	3 8 F	4 2 F
SW6010	Copper	13 72	130	Yes	na	4 6 F	4 7 F	6 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12.66	Yes	na	7 4 F	8 F	7 F
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	- -	- -	- -
SW6010	Molybdenum	1.93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	6 1 F	7 3 F	8 9 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	17 8 F	18.2 F	23 7 F
SW6010	Zinc	31 3	3100	Yes	na	13 5 F	14 7 F	17 F
SW9010	Cyanide	0.5	20	Yes	na	0 4 F	- -	- -
SW9030	Sulfide	25	N/A	Yes	na	(73.9)	(33.6)	15 4 F
SW8260	1,2-Dichloroethene, *cis*-	0 005	7	Yes	na	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	na	- -	(0.035)	(0.047)
SW8260	Benzene	0.002	0 5	Yes	na	0 001 F	0 001 F	- -
SW8260	Ethylbenzene	0 003	70	Yes	na	- -	- -	- -
SW8260	Methyl ethyl ketone	0.005	6100	Yes	na	- -	- -	- -
SW8260	Methylene chloride	0 002	0.5	Yes	na	- -	(0.003)	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	- -	- -	- -
SW8260	Toluene	0.005	100	Yes	na	(0.024)	(0.013)	(0.007)
SW8260	Trichloroethene	0.005	0 5	Yes	na	- -	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	- -	- -	- -	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	- -
SW8270	Chrysene	0 33	3.9	Yes	- -	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	- -	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	- -	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Pyrene	0.33	310	Yes	- -	- -	- -	- -

Notes:

RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are **bold** and are enclosed in (parentheses).
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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA822 20 ft 1999-10-08	BHGLTA829 15 ft 2000-03-13	BHGLTA829 20 ft 2000-03-13	BHGLTA831 05 ft 1999-10-08
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	- -	na	na	- -
SW6010	Arsenic	6 58	6 58	Yes	6 5	na	na	4 4 F
SW6010	Barium	128.1	200	Yes	57.8 J	na	na	97.8 J
SW6010	Beryllium	1 13	1 13	Yes	0 61	na	na	0.71
SW6010	Cadmium	0.59	0.59	Yes	- -	na	na	- -
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	14.3	na	na	13 7
SW6010	Cobalt	6 19	610	Yes	4 2 F	na	na	4.1 F
SW6010	Copper	13 72	130	Yes	5.7 F	na	na	6 8 F
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	9.8	na	na	8 8 F
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351.7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	na	na	- -
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	9.5 F	na	na	9 5 F
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	32 8	na	na	27 5 F
SW6010	Zinc	31 3	3100	Yes	18 3 F	na	na	22 1 F
SW9010	Cyanide	0.5	20	Yes	- -	na	na	- -
SW9030	Sulfide	25	N/A	Yes	9 8 F	na	na	- -
SW8260	1,2-Dichloroethene, *cis-*	0.005	7	Yes	0 003 F	na	na	- -
SW8260	Acetone	0 005	1000	Yes	**(0.029)**	na	na	- -
SW8260	Benzene	0 002	0 5	Yes	0 001 F	na	na	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	na	na	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	- -	na	na	- -
SW8260	Methylene chloride	0 002	0 5	Yes	- -	na	na	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	na	na	- -
SW8260	Toluene	0 005	100	Yes	**(0.027)**	na	na	**(0.01)**
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	0 003 F	- -
SW8270	Acenaphthene	0 33	610	Yes	- -	na	na	- -
SW8270	Anthracene	0 33	3100	Yes	- -	na	na	- -
SW8270	Benzo[*a*]anthracene	0.33	0 33	Yes	- -	na	na	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	na	na	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -	na	na	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	na	na	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -	na	na	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0 6	Yes	- -	na	na	- -
SW8270	Chrysene	0.33	3 9	Yes	- -	na	na	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	na	na	- -
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	- -	na	na	- -
SW8270	Fluoranthene	0 33	410	Yes	- -	na	na	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	Yes	- -	na	na	- -
SW8270	Phenanthrene	0 33	310	Yes	- -	na	na	- -
SW8270	Pyrene	0.33	310	Yes	- -	na	na	- -

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
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Values above RRS-1 are **bold** and are enclosed in (parentheses)
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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA831 10 ft 1999-10-08	BHGLTA831 15 ft 1999-10-08	BHGLTA831 20 ft 1999-10-08	BHGLTA832 05 ft 2000-03-13
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0.712	Yes	- -	- -	- -	na
SW6010	Arsenic	6 58	6 58	Yes	5.4	3 6 F	1.3 F	na
SW6010	Barium	128.1	200	Yes	37 4 F	111 J	93 5 J	na
SW6010	Beryllium	1 13	1 13	Yes	0 38	0 89	0 71	na
SW6010	Cadmium	0 59	0 59	Yes	- -	- -	- -	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16 31	Yes	9 8 F	**[(21.7)]**	**[(17.1)]**	na
SW6010	Cobalt	6.19	610	Yes	2 5 F	4 6 F	2.5 F	na
SW6010	Copper	13.72	130	Yes	5 F	8 F	7 1 F	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12.66	12 66	Yes	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	5 9 F	9 5 F	10 1	**[(17.5)]**
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351.7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	- -	- -	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	7 1 F	11 F	8.1 F	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1.5	Yes	na	na	na	na
SW6010	Vanadium	37.4	72	Yes	24 F	**(38.3)**	31 4	na
SW6010	Zinc	31 3	3100	Yes	16 F	**(32.4 F)**	**(33.8)**	na
SW9010	Cyanide	0 5	20	Yes	- -	- -	- -	na
SW9030	Sulfide	25	N/A	Yes	- -	23 F	**(45.2)**	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -	- -	- -	na
SW8260	Acetone	0 005	1000	Yes	- -	**(0.084)**	**(0.037)**	na
SW8260	Benzene	0 002	0 5	Yes	0.001 F	- -	- -	na
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	- -	na
SW8260	Methyl ethyl ketone	0.005	6100	Yes	- -	**(0.008)**	- -	na
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	na
SW8260	Toluene	0.005	100	Yes	**(0.023)**	**(0.009)**	0 003 F	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	- -	- -	na
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	na
SW8270	Anthracene	0 33	3100	Yes	- -	- -	- -	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -	- -	- -	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	- -	- -	- -	na
SW8270	Benzo[*b*]fluoranthene	0.33	0.33	Yes	- -	- -	- -	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	na
SW8270	Benzo[*k*]fluoranthene	0 33	0.39	Yes	- -	- -	- -	na
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0.6	Yes	- -	- -	- -	na
SW8270	Chrysene	0 33	3 9	Yes	- -	- -	- -	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -	- -	- -	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	- -	na
SW8270	Fluoranthene	0 33	410	Yes	- -	- -	- -	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	Yes	- -	- -	- -	na
SW8270	Phenanthrene	0 33	310	Yes	- -	- -	- -	na
SW8270	Pyrene	0 33	310	Yes	- -	- -	- -	na

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

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J = Estimated value above reporting limit
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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA832 10 ft 2000-03-13	BHGLTA832 10 ft 2000-06-14	BHGLTA832 15 ft 2000-03-13	BHGLTA832 20 ft 2000-03-08
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6.58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1.13	1.13	Yes	[(1.2)]	[(1.3)]	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16.31	Yes	na	na	13.3	6 8 F
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0.035	0.2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	(42.2)	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis*-	0 005	7	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	(0.19)	na
SW8260	Benzene	0 002	0 5	Yes	na	na	na	na
SW8260	Ethylbenzene	0 003	70	Yes	na	na	na	na
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	(0.045)	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Toluene	0 005	100	Yes	- -	na	- -	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na
SW8270	Anthracene	0.33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na
SW8270	Chrysene	0.33	3.9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	na	na	na	na
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na
SW8270	Pyrene	0.33	310	Yes	na	na	na	na

Notes.
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected

F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses).
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)].
All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA833 05 ft 2000-03-13	BHGLTA833 10 ft 2000-03-13	BHGLTA833 15 ft 2000-03-13	BHGLTA833 20 ft 2000-03-13
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0.712	0 712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na
SW6010	Barium	128.1	200	Yes	na	na	na	na
SW6010	Beryllium	1.13	1.13	Yes	na	na	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16.31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12.66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1.93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0.313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37.4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	na	na	na	na
SW8260	Acetone	0.005	1000	Yes	na	- -	- -	(0.011)
SW8260	Benzene	0 002	0 5	Yes	na	na	na	na
SW8260	Ethylbenzene	0.003	70	Yes	na	na	na	na
SW8260	Methyl ethyl ketone	0.005	6100	Yes	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	- -	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Toluene	0.005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na
SW8270	Anthracene	0.33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0.33	0.33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0 6	Yes	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	na	na	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	na	na

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
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- - = Not detected

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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA834 05 ft 2000-03-13	BHGLTA834 10 ft 2000-03-13	BHGLTA834 15 ft 2000-03-13	BHGLTA834 20 ft 2000-03-13
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0.712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na
SW6010	Barium	128.1	200	Yes	na	na	na	na
SW6010	Beryllium	1 13	1.13	Yes	na	na	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0.2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1.5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	- -	- -	- -
SW8260	Benzene	0 002	0 5	Yes	na	na	na	na
SW8260	Ethylbenzene	0.003	70	Yes	na	na	na	na
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na
SW8260	Methylene chloride	0 002	0.5	Yes	na	- -	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Toluene	0.005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0.005	0 5	Yes	na	na	na	na
SW8270	Acenaphthene	0.33	610	Yes	na	na	na	na
SW8270	Anthracene	0.33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0.33	0.33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0.33	0 33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0.33	0.33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0.6	Yes	na	na	na	na
SW8270	Chrysene	0.33	3 9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	na	na	na	na
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	na	na	na	na
SW8270	Fluoranthene	0.33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Phenanthrene	0.33	310	Yes	na	na	na	na
SW8270	Pyrene	0.33	310	Yes	na	na	na	na

Notes:
RRS-1 = Risk Reduction Standard 1
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- - = Not detected

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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA835 05 ft 2000-06-14	BHGLTA839 03 ft 2000-03-08	BHGLTA842 10 ft 2000-03-09	BHGLTA843 10 ft 2000-03-09
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0 712	Yes	na	na	na	na
SW6010	Arsenic	6.58	6 58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1.13	1.13	Yes	na	na	na	na
SW6010	Cadmium	0 59	0.59	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16.31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12.96	12 66	Yes	5 6 J	na	na	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0.2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1.5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na
SW6010	Zinc	31.3	3100	Yes	na	na	na	na
SW9010	Cyanide	0.5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0.005	7	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Benzene	0 002	0 5	Yes	na	na	na	na
SW8260	Ethylbenzene	0.003	70	Yes	na	na	na	na
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0.5	Yes	na	na	na	na
SW8260	Toluene	0.005	100	Yes	na	na	na	na
SW8260	Trichloroethene	0 005	0 5	Yes	na	na	- -	- -
SW8270	Acenaphthene	0 33	610	Yes	na	- -	na	na
SW8270	Anthracene	0.33	3100	Yes	na	- -	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	- -	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	- -	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0.33	Yes	na	- -	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	- -	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0 39	Yes	na	- -	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0.6	Yes	na	na	na	na
SW8270	Chrysene	0 33	3 9	Yes	na	- -	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	- -	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	- -	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	- -	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	- -	na	na
SW8270	Pyrene	0 33	310	Yes	na	- -	na	na

Notes
RRS-1 = Risk Reduction Standard 1
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Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA844 05 ft 2000-06-14	BHGLTA845 05 ft 2000-06-14	BHGLTA846 05 ft 2000-06-14	BHGLTA846 Dup 05 ft 2000-06-14
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0.712	0.712	Yes	na	na	na	na
SW6010	Arsenic	6 58	6 58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1 13	1 13	Yes	na	na	na	na
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16 31	16 31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13.72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12.66	12.66	Yes	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	4 F	2.3 F	6 9 F	7 9 F
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0 035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1 5	Yes	na	na	na	na
SW6010	Vanadium	37.4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na
SW9010	Cyanide	0.5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Benzene	0 002	0 5	Yes	na	na	na	na
SW8260	Ethylbenzene	0 003	70	Yes	na	na	na	na
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	na	na
SW8260	Trichloroethene	0.005	0 5	Yes	na	na	na	na
SW8270	Acenaphthene	0 33	610	Yes	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0.33	0 33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na
SW8270	Chrysene	0.33	3.9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	Yes	na	na	na	na
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	na	na	na
SW8270	Fluoranthene	0.33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	na	na	na	na
SW8270	Phenanthrene	0.33	310	Yes	na	na	na	na
SW8270	Pyrene	0.33	310	Yes	na	na	na	na

Notes:
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
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- - = Not detected

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All concentrations are in mg/kg

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA849 05 ft 2000-06-14	BHGLTA849 10 ft 2000-06-14	BHGLTA850 05 ft 2000-06-14	BHGLTA850 10 ft 2000-06-14
SW6010	Aluminum	20260	20260	No	na	na	na	na
SW6010	Antimony	0 712	0.712	Yes	na	na	na	na
SW6010	Arsenic	6.58	6 58	Yes	na	na	na	na
SW6010	Barium	128 1	200	Yes	na	na	na	na
SW6010	Beryllium	1.13	1 13	Yes	na	1	na	0.78
SW6010	Cadmium	0 59	0 59	Yes	na	na	na	na
SW6010	Calcium	272000	N/A	No	na	na	na	na
SW6010	Chromium (total)	16.31	16 31	Yes	na	na	na	na
SW6010	Cobalt	6 19	610	Yes	na	na	na	na
SW6010	Copper	13 72	130	Yes	na	na	na	na
SW6010	Iron	17469	N/A	No	na	na	na	na
SW6010	Lead	12 66	12 66	Yes	na	na	na	na
SW7421	Lead	12 96	12 66	Yes	**[(13.5 J)]**	na	**[(16.6 F)]**	na
SW6010	Magnesium	2420	N/A	No	na	na	na	na
SW6010	Manganese	351 7	1400	No	na	na	na	na
SW7471	Mercury	0.035	0 2	Yes	na	na	na	na
SW6010	Molybdenum	1 93	51	No	na	na	na	na
SW6010	Nickel	19 76	200	Yes	na	na	na	na
SW6010	Potassium	1717	N/A	No	na	na	na	na
SW6010	Selenium	0 313	5	Yes	na	na	na	na
SW6010	Sodium	53200	N/A	No	na	na	na	na
SW6010	Thallium	1 5	1.5	Yes	na	na	na	na
SW6010	Vanadium	37 4	72	Yes	na	na	na	na
SW6010	Zinc	31 3	3100	Yes	na	na	na	na
SW9010	Cyanide	0 5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0.005	7	Yes	na	na	na	na
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Benzene	0 002	0 5	Yes	na	na	na	na
SW8260	Ethylbenzene	0 003	70	Yes	na	na	na	na
SW8260	Methyl ethyl ketone	0.005	6100	Yes	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	na	na	na
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	na	na	na
SW8260	Toluene	0 005	100	Yes	na	na	na	na
SW8260	Trichloroethene	0.005	0.5	Yes	na	na	na	na
SW8270	Acenaphthene	0.33	610	Yes	na	na	na	na
SW8270	Anthracene	0 33	3100	Yes	na	na	na	na
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*a*]pyrene	0.33	0.33	Yes	na	na	na	na
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	na	na	na
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	na	na	na
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	na	na	na
SW8270	Chrysene	0.33	3.9	Yes	na	na	na	na
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	na	na	na	na
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	na	na	na	na
SW8270	Fluoranthene	0 33	410	Yes	na	na	na	na
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0.33	Yes	na	na	na	na
SW8270	Phenanthrene	0 33	310	Yes	na	na	na	na
SW8270	Pyrene	0 33	310	Yes	na	na	na	na

Notes
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All concentrations are in mg/kg.

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	BHGLTA850 Dup 10 ft 2000-06-14	THGLTA021 10 ft 1997-08-27	THGLTA022 11 ft 1997-08-28	THGLTA023 10 ft 1997-08-28
SW6010	Aluminum	20260	20260	No	na	7470	9820	8830
SW6010	Antimony	0 712	0 712	Yes	na	0 44 F	0 46 F	0 37 F
SW6010	Arsenic	6 58	6 58	Yes	na	4 3 J	4 6 J	2 7 J
SW6010	Barium	128.1	200	Yes	na	56 4	80 9	36.7
SW6010	Beryllium	1 13	1.13	Yes	1 1	0 72	0 89	0 66
SW6010	Cadmium	0 59	0 59	Yes	na	- -	- -	- -
SW6010	Calcium	272000	N/A	No	na	42200	7520	84300
SW6010	Chromium (total)	16 31	16 31	Yes	na	9 8	13 3	10 3
SW6010	Cobalt	6 19	610	Yes	na	**(6.4 F)**	**(6.8 F)**	3 8 F
SW6010	Copper	13 72	130	Yes	na	5 3 F	9.4 J	6 7 F
SW6010	Iron	17469	N/A	No	na	10200	10300	6970
SW6010	Lead	12 66	12 66	Yes	na	8 5 J	11 J	10.7 J
SW7421	Lead	12 96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	na	1070 J	1880 J	1610 J
SW6010	Manganese	351 7	1400	No	na	225 J	**(519 J)**	166 J
SW7471	Mercury	0.035	0 2	Yes	na	- -	0 0092 F	- -
SW6010	Molybdenum	1 93	51	No	na	0 66 F	0 48 F	0 29 F
SW6010	Nickel	19 76	200	Yes	na	8 8 F	17.1 F	8 F
SW6010	Potassium	1717	N/A	No	na	987 J	**(1950 J)**	1390 J
SW6010	Selenium	0 313	5	Yes	na	**(0.59 F)**	- -	- -
SW6010	Sodium	53200	N/A	No	na	39 2 F	26 9 F	142
SW6010	Thallium	1 5	1 5	Yes	na	- -	- -	- -
SW6010	Vanadium	37.4	72	Yes	na	25 1	33 2	22 7
SW6010	Zinc	31.3	3100	Yes	na	13 4 J	23.1 J	19 1 J
SW9010	Cyanide	0.5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, cis-	0 005	7	Yes	na	- -	- -	- -
SW8260	Acetone	0 005	1000	Yes	na	na	na	na
SW8260	Benzene	0.002	0 5	Yes	na	- -	- -	- -
SW8260	Ethylbenzene	0.003	70	Yes	na	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	na	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	na	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	na	- -	- -	- -
SW8260	Trichloroethene	0.005	0 5	Yes	na	- -	**(0.0059 F)**	- -
SW8270	Acenaphthene	0 33	610	Yes	na	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	na	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	na	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0.33	0.33	Yes	na	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	na	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	na	- -	0 036 F	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	na	- -	- -	- -
SW8270	Chrysene	0.33	3 9	Yes	na	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0.33	0 33	Yes	na	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	na	- -	- -	- -
SW8270	Fluoranthene	0.33	410	Yes	na	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0.33	0 33	Yes	na	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	na	- -	- -	- -
SW8270	Pyrene	0 33	310	Yes	na	- -	- -	- -

Notes.
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Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA024 15 ft 1997-09-10	THGLTA025 10 5 ft 1997-09-10	THGLTA026 04 5 ft 1997-09-11	THGLTA027 03 ft 1997-09-11
SW6010	Aluminum	20260	20260	No	8010	11500	1150	1180 J
SW6010	Antimony	0 712	0 712	Yes	0 18 F	0 29 F	0 16 F	- -
SW6010	Arsenic	6 58	6 58	Yes	4 J	[(7.9 J)]	2 7 J	2 1 J
SW6010	Barium	128.1	200	Yes	(145 J)	120 J	15 4 J	12.4 J
SW6010	Beryllium	1 13	1 13	Yes	0 56 J	0 72 J	0 16 F	0 15 F
SW6010	Cadmium	0 59	0 59	Yes	0 18 F	0.19 F	0 12 F	0 12 F
SW6010	Calcium	272000	N/A	No	96300	116000	268000	224000
SW6010	Chromium (total)	16 31	16 31	Yes	[(17.3 F)]	10.7 F	- -	[(18 F)]
SW6010	Cobalt	6 19	610	Yes	4.4 F	4 1 F	0 76 F	0 87 F
SW6010	Copper	13 72	130	Yes	5 7 F	6 9 F	1 7 F	1 6 F
SW6010	Iron	17469	N/A	No	9270	10900	3470	3570 J
SW6010	Lead	12 66	12.66	Yes	9 9 J	12.1 J	2 9 F	[(136 J)]
SW7421	Lead	12.96	12 66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	1500 J	1740 J	1380 J	1350 J
SW6010	Manganese	351.7	1400	No	311 J	140 J	163 J	152 J
SW7471	Mercury	0 035	0 2	Yes	0 023 F	0 0078 F	0 015 F	0 016 F
SW6010	Molybdenum	1 93	51	No	0 3 F	0 29 F	0 66 F	0.57 F
SW6010	Nickel	19.76	200	Yes	8 4 F	9 8 F	2 3 F	2.1 F
SW6010	Potassium	1717	N/A	No	1400 J	(1820 J)	212 F	218 F
SW6010	Selenium	0 313	5	Yes	- -	- -	- -	(2 F)
SW6010	Sodium	53200	N/A	No	78 J	205 J	330 J	241 J
SW6010	Thallium	1.5	1 5	Yes	- -	- -	- -	- -
SW6010	Vanadium	37.4	72	Yes	21.2 J	25.5 J	6.5 F	7.8 F
SW6010	Zinc	31 3	3100	Yes	(39.5 J)	28 4 J	- -	(80.4 J)
SW9010	Cyanide	0 5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -	- -	- -	- -
SW8260	Acetone	0.005	1000	Yes	na	na	na	na
SW8260	Benzene	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 003	70	Yes	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	na	na
SW8260	Methylene chloride	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0.005	0 5	Yes	- -	- -	- -	- -
SW8270	Acenaphthene	0.33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0 33	3100	Yes	- -	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0.33	0 33	Yes	0 2 F	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	0.21 F	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0.33	0.33	Yes	0 25 F	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -	- -	- -	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0.39	Yes	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	0.33	0.6	Yes	- -	- -	- -	- -
SW8270	Chrysene	0 33	3 9	Yes	0.23 F	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0.33	Yes	- -	- -	- -	- -
SW8270	Di-n-butyl phthalate	0.33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	(0.6 F)	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0.33	Yes	- -	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	0 32 F	- -	- -	- -
SW8270	Pyrene	0 33	310	Yes	(0.58 F)	- -	- -	- -

Notes

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All concentrations are in mg/kg.

Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	THGLTA027 Dup 03 ft 1997-09-11	THGLTA028 09 ft 1997-09-11	WHGLTA801 05 ft 1999-10-28	WHGLTA801 10 ft 1999-10-28
SW6010	Aluminum	20260	20260	No	530 J	3010	na	na
SW6010	Antimony	0 712	0.712	Yes	- -	0 16 F	na	na
SW6010	Arsenic	6.58	6 58	Yes	1 9 J	3 9 J	na	na
SW6010	Barium	128 1	200	Yes	10 5 J	27 6 J	na	na
SW6010	Beryllium	1 13	1 13	Yes	0 11 F	0 3 F	na	na
SW6010	Cadmium	0 59	0 59	Yes	0 1 F	0 21 F	na	na
SW6010	Calcium	272000	N/A	No	209000	**(323000)**	na	na
SW6010	Chromium (total)	16.31	16 31	Yes	- -	- -	na	na
SW6010	Cobalt	6 19	610	Yes	0 82 F	2 1 F	na	na
SW6010	Copper	13 72	130	Yes	1 3 F	2 9 F	na	na
SW6010	Iron	17469	N/A	No	2570 J	5320	na	na
SW6010	Lead	12 66	12 66	Yes	3 8 F	4 7 F	na	na
SW7421	Lead	12.96	12.66	Yes	na	na	na	na
SW6010	Magnesium	2420	N/A	No	1230 J	2190 J	na	na
SW6010	Manganese	351 7	1400	No	152 J	114 J	na	na
SW7471	Mercury	0 035	0 2	Yes	- -	0 014 F	na	na
SW6010	Molybdenum	1 93	51	No	0 59 F	0.33 F	na	na
SW6010	Nickel	19 76	200	Yes	1 7 F	4 3 F	na	na
SW6010	Potassium	1717	N/A	No	107 F	514 F	na	na
SW6010	Selenium	0 313	5	Yes	- -	- -	na	na
SW6010	Sodium	53200	N/A	No	268 J	354 J	na	na
SW6010	Thallium	1 5	1.5	Yes	- -	- -	na	na
SW6010	Vanadium	37 4	72	Yes	5.8 F	17 8 J	na	na
SW6010	Zinc	31 3	3100	Yes	- -	- -	na	na
SW9010	Cyanide	0.5	20	Yes	na	na	na	na
SW9030	Sulfide	25	N/A	Yes	na	na	na	na
SW8260	1,2-Dichloroethene, *cis-*	0.005	7	Yes	- -	0 0013 F	- -	0 003 F
SW8260	Acetone	0 005	1000	Yes	na	na	- -	- -
SW8260	Benzene	0 002	0 5	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0.003	70	Yes	- -	- -	- -	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	na	na	- -	- -
SW8260	Methylene chloride	0.002	0 5	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -	- -	- -	- -
SW8260	Toluene	0 005	100	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 005	0 5	Yes	- -	0 0049 F	**(0.016 J)**	0 004 F
SW8270	Acenaphthene	0 33	610	Yes	- -	- -	- -	- -
SW8270	Anthracene	0.33	3100	Yes	**(5 F)**	- -	- -	- -
SW8270	Benzo[*a*]anthracene	0.33	0 33	Yes	**[(26 J)]**	- -	- -	- -
SW8270	Benzo[*a*]pyrene	0 33	0 33	Yes	**[(23 J)]**	- -	- -	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	**[(22 J)]**	- -	- -	- -
SW8270	Benzo[*g,h,i*]perylene	0.33	310	Yes	**(8.9 F)**	- -	- -	- -
SW8270	Benzo[*k*]fluoranthene	0.33	0.39	Yes	na	na	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -	- -	- -	- -
SW8270	Chrysene	0 33	3.9	Yes	**[(25 J)]**	- -	- -	- -
SW8270	Dibenzo[*a,h*]anthracene	0.33	0.33	Yes	**[(4.1 F)]**	- -	- -	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -	- -	- -	- -
SW8270	Fluoranthene	0 33	410	Yes	**(48 J)**	- -	- -	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	**[(10 F)]**	- -	- -	- -
SW8270	Phenanthrene	0 33	310	Yes	**(16 J)**	- -	- -	- -
SW8270	Pyrene	0.33	310	Yes	**(60 J)**	- -	- -	- -

Notes:

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Table 5.19
Subsurface Soil Detections
SWMU 25/Landfill 8
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	WHGLTA803 .05 ft 1999-10-28
SW6010	Aluminum	20260	20260	No	na
SW6010	Antimony	0 712	0 712	Yes	na
SW6010	Arsenic	6.58	6 58	Yes	na
SW6010	Barium	128 1	200	Yes	na
SW6010	Beryllium	1.13	1 13	Yes	na
SW6010	Cadmium	0 59	0 59	Yes	na
SW6010	Calcium	272000	N/A	No	na
SW6010	Chromium (total)	16 31	16 31	Yes	na
SW6010	Cobalt	6.19	610	Yes	na
SW6010	Copper	13.72	130	Yes	na
SW6010	Iron	17469	N/A	No	na
SW6010	Lead	12 66	12.66	Yes	na
SW7421	Lead	12 96	12 66	Yes	na
SW6010	Magnesium	2420	N/A	No	na
SW6010	Manganese	351.7	1400	No	na
SW7471	Mercury	0 035	0 2	Yes	na
SW6010	Molybdenum	1 93	51	No	na
SW6010	Nickel	19 76	200	Yes	na
SW6010	Potassium	1717	N/A	No	na
SW6010	Selenium	0.313	5	Yes	na
SW6010	Sodium	53200	N/A	No	na
SW6010	Thallium	1 5	1 5	Yes	na
SW6010	Vanadium	37 4	72	Yes	na
SW6010	Zinc	31 3	3100	Yes	na
SW9010	Cyanide	0 5	20	Yes	na
SW9030	Sulfide	25	N/A	Yes	na
SW8260	1,2-Dichloroethene, *cis-*	0 005	7	Yes	- -
SW8260	Acetone	0 005	1000	Yes	- -
SW8260	Benzene	0 002	0 5	Yes	- -
SW8260	Ethylbenzene	0.003	70	Yes	- -
SW8260	Methyl ethyl ketone	0 005	6100	Yes	- -
SW8260	Methylene chloride	0 002	0.5	Yes	- -
SW8260	Tetrachloroethene	0 005	0 5	Yes	- -
SW8260	Toluene	0 005	100	Yes	- -
SW8260	Trichloroethene	0.005	0.5	Yes	- -
SW8270	Acenaphthene	0 33	610	Yes	- -
SW8270	Anthracene	0.33	3100	Yes	- -
SW8270	Benzo[*a*]anthracene	0 33	0 33	Yes	- -
SW8270	Benzo[*a*]pyrene	0 33	0.33	Yes	- -
SW8270	Benzo[*b*]fluoranthene	0 33	0 33	Yes	- -
SW8270	Benzo[*g,h,i*]perylene	0 33	310	Yes	- -
SW8270	Benzo[*k*]fluoranthene	0 33	0 39	Yes	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 33	0 6	Yes	- -
SW8270	Chrysene	0.33	3 9	Yes	- -
SW8270	Dibenzo[*a,h*]anthracene	0 33	0 33	Yes	- -
SW8270	Di-n-butyl phthalate	0 33	1000	Yes	- -
SW8270	Fluoranthene	0 33	410	Yes	- -
SW8270	Indeno[1,2,3-*c,d*]pyrene	0 33	0 33	Yes	- -
SW8270	Phenanthrene	0 33	310	Yes	- -
SW8270	Pyrene	0.33	310	Yes	- -

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Table 5.20
Confirmation/SPLP Results
SWMU 25/Landfill 8
NAS Fort Worth, JRB, Texas

Boring	Depth	Method	Analyte	GWP-Ind MSC mg/kg	Bkgd mg/kg	Previous Result mg/kg	Result mg/kg	SPLP Result mg/L	GW-Ind MSC mg/L	Inside Dig Area
BHGLTA829-01	Surface	SW6010	Antimony	0 6	0 56	1 0J	0 21UJ	0 0026UJ	0 006	yes
BHGLTA830-01	Surface	SW6010	Antimony	0 6	0 56	2 0J	0 18U	0 0026U	0 006	yes
BHGLTA815-01	Surface	SW6010	Barium	200	233	23100	1140	0 419E	2	yes
BHGLTA829-01	Surface	SW6010	Barium	200	233	1630J	3340	0 728	2	yes
BHGLTA830-01	Surface	SW6010	Barium	200	233	3620	1160	0 455U	2	yes
BHGLTA815-01	Surface	SW6010	Beryllium	0 4	1 02	14 4	0 28	0 0004F	0 004	yes
BHGLTA816-03	10'	SW6010	Beryllium	0 4	1 13	1 2	0 7	0 0007	0 004	no
BHGLTA832-03	10'	SW6010	Beryllium	0 4	1.13	1 2	1 3	0 0006	0 004	no
BHGLTA816-01	Surface	SW6010	Cadmium	0 5	0 556	0 99F	0 57	0 05U	0 005	no
BHGLTA817-01	Surface	SW6010	Cadmium	0 5	0 556	0 96F	0 42	NA	0 005	yes
BHGLTA830-01	Surface	SW6010	Cadmium	0 5	0 556	5 4	0 83	0 0003U	0 005	yes
BHGLTA837-01	Surface	SW6010	Cadmium	0 5	0 556	0 96F	0 43	0 05 U	0 005	yes
BHGLTA815-01	Surface	SW6010	Chromium	10	25 86	94 4	9 6	0 0082	0 1	yes
BHGLTA829-01	Surface	SW6010	Chromium	10	25 86	42 5J	111	0 1F	0 1	yes
BHGLTA830-01	Surface	SW6010	Chromium	10	25 86	63 5	31 7	0 0236U	0 1	yes
BHGLTA829-01	Surface	SW6010	Lead	1.5	30 97	430	(1050)	0 182	0 015	yes
BHGLTA830-01	Surface	SW6010	Lead	1 5	30 97	519	732	0 0708	0 015	yes
BHGLTA835-01	Surface	SW6010	Lead	1 5	30 97	83 7	54 6	0 002 U	0 015	no
BHGLTA835-01	Surface	SW6010	Lead	1 5	30 97	83 7			0 015	no
BHGLTA816-01	Surface	SW6010	Lead	1 5	30 97	89 4	69 2	0 0029	0 015	yes
BHGLTA836-01	Surface	SW6010	Mercury	0 2	0 14	0 43	0 11	0 1 U	0 002	yes
BHGLTA816-03	10'	SW6010	Selenium	5	0 313	18 7 F	0 99 U	0 007 U	0 05	
BHGLTA838-01	Surface	SW8270C/SW8310	Benzo[*a*]anthracene	0 039	0 33	13J	3 6	0 00014 U	0 00039	yes
BHGLTA838-01	Surface	SW8270C/SW8310	Benzo[*a*]pyrene	0 02	0 33	12J	4 9	0 00024 U	0 0002	yes
BHGLTA838-01	Surface	SW8270C/SW8310	Benzo[*b*]fluoranthene	0 039	0 33	17J	5 1	0 00019 U	0 00039	yes
BHGLTA838-01	Surface	SW8270C/SW8310	Benzo[*k*]fluoranthene	0 39	0 33	7.7J	4	0 00018 U	0 0039	yes
BHGLTA838-01	Surface	SW8270C/SW8310	Chrysene	3 9	0 33	13J	4 1	0 0016 U	0 039	yes
BHGLTA838-01	Surface	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0 02	0 33	0 5J	0 7	0 00031 U	0 0002	yes
BHGLTA838-01	Surface	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0 039	0 33	10J	4	0 00045 U	0 00039	yes
BHGLTA839-00	3'	SW8270C/SW8310	Benzo[*a*]anthracene	0 039	0 33	26F	0 4 U	0 00014 U	0 00039	yes
BHGLTA839-00	3'	SW8270C/SW8310	Benzo[*a*]pyrene	0 02	0 33	23J	0 4 U	0 00025 U	0 0002	yes
BHGLTA839-00	3'	SW8270C/SW8310	Benzo[*b*]fluoranthene	0 039	0 33	22J	0 4 U	0 0002 U	0 00039	yes
BHGLTA839-00	3'	SW8270C/SW8310	Chrysene	3 9	0 33	25J	0 4 U	0 0016 U	0 039	yes
BHGLTA839-00	3'	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0 02	0 33	4 1F	0 4 U	0 00033 U	0 0002	yes
BHGLTA839-00	3'	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0 039	0 33	10F	0 4 U	0 00047 U	0 00039	yes

Table 5.20
Confirmation/SPLP Results
SWMU 25/Landfill 8
NAS Fort Worth, JRB, Texas

Boring	Depth	Method	Analyte	GWP-Ind. MSC mg/kg	Bkgd mg/kg	Previous Result mg/kg	Result mg/kg	SPLP Result mg/L	GW-Ind MSC mg/L	Inside Dig Area
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*a*]anthracene	0 039	0 33	5 1	40	0 00015 U	0 00039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*a*]pyrene	0 02	0 33	5 2	45	0 00017 F	0 0002	no
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*b*]fluoranthene	0 039	0 33	6 8	51	0 00027	0 00039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*k*]fluoranthene	0 39	0 33	< RRS 1	31	0 00011 F	0 0039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Chrysene	3 9	0 33	5 6	46	0 00023 F	0 039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0 02	0.33	1 3F	4 6	0 00034 U	0 0002	no
BHGLTA840-01	Surface	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0 039	0 33	3 2	45	0 00028 F	0 00039	no

Note Gray shading indicates Standard 3 concentrations
Parenthesis indicate concentration failed SPLP.
na - Not Analyzed

Table 5.21
Site-Specific MSCs
SWMU 25/Landfill 8
NAS Fort Worth, JRB, Texas

Boring	Depth	Method	Analyte	GWP-Ind MSC mg/kg	Bkgd mg/kg	Previous Result mg/kg	Result Site-specific MSC mg/kg	SPLP Result mg/L	GW-Ind MSC mg/L	Inside Dig Area
BHGLTA829-01	Surface	SW6010	Barium	200	233	1630 J	3340	0.728	2	yes
BHGLTA832-03	10'	SW6010	Beryllium	0.4	1.13	1.2	1.3	0.0006	0.004	no
BHGLTA830-01	Surface	SW6010	Cadmium	0.5	0 556	5.4	0.83	0.0003 U	0 005	yes
BHGLTA829-01	Surface	SW6010	Chromium	10	25 86	42.5 J	111	0 1 F	0.1	yes
BHGLTA816-01	Surface	SW6010	Lead	1 5	30 97	89.4	69.2	0 0029	0.015	no
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*a*]anthracene	0.039	0.33	5.1	40	0.00015 U	0.00039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*a*]pyrene	0.02	0 33	5.2	45	0.00017 F	0.0002	no
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*b*]fluoranthene	0.039	0.33	6.8	51	0.00027	0 00039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Benzo[*k*]fluoranthene	0.39	0.33	< RRS 1	31	0.00011 F	0.0039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Chrysene	3.9	0.33	5.6	46	0.00023 F	0.039	no
BHGLTA840-01	Surface	SW8270C/SW8310	Dibenzo[*a,h*]anthracene	0.02	0.33	1.3F	4.6	0.00034 U	0.0002	no
BHGLTA840-01	Surface	SW8270C/SW8310	Indeno[1,2,3-*c,d*]pyrene	0.039	0.33	3.2	45	0 00028 F	0.00039	no

Note Gray shading indicates Standard 3 concentrations

na - Not Analyzed

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Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	FT08-11A 1997-09-09	FT08-11A 2000-01-10	FT09-12E 2000-01-11	FT09-12E 2000-01-11 Dup	LF04-04 1997-09-08
SW6010	Aluminum	1 332	100	No	0.15 F	na	na	na	- -
SW7041	Antimony	0 002	0.006	Yes	na	- -	**(0.0036 F)**	- -	na
SW6010	Arsenic	0 0049	0 05	Yes	- -	- -	- -	- -	0 003 F
SW6010	Barium	0.587	2	Yes	0 15	0 146 F	0 107 F	0 107 F	0 095
SW6010	Calcium	2438	N/A	No	159	na	na	na	166
SW6010	Chromium (total)	0 006	0 1	Yes	- -	na	na	na	- -
SW7191	Chromium (total)	0 006	0 1	Yes	na	- -	- -	- -	na
SW6010	Cobalt	0 0089	6 1	Yes	- -	- -	- -	- -	- -
SW6010	Copper	0 0028	1 3	Yes	**(0.0042 F)**	- -	- -	- -	- -
SW6010	Iron	0 224	N/A	No	0 085	na	na	na	- -
SW6010	Lead	0 0016	0 015	Yes	- -	na	na	na	- -
SW6010	Magnesium	37 8	N/A	No	8 3	na	na	na	8 4
SW6010	Manganese	0 175	14	No	0.046	na	na	na	0 0025 F
SW6010	Nickel	0 0204	2	Yes	- -	- -	- -	- -	- -
SW6010	Potassium	15 03	N/A	No	2 8 F	na	na	na	2 2 F
SW7740	Selenium	0.0077	0.05	Yes	na	- -	- -	0 0019 F	na
SW6010	Sodium	167	N/A	No	20 4	na	na	na	28 5
SW6010	Vanadium	0 012	0.72	Yes	- -	- -	- -	- -	- -
SW6010	Zinc	0 118	31	Yes	0 013 F	- -	- -	- -	- -
SW8260	1,1-Dichloroethane	0 0004	10	Yes	- -	- -	- -	- -	- -
SW8260	1,1-Dichloroethene	0 0005	0 007	Yes	- -	- -	- -	- -	- -
SW8260	1,2-Dichloroethene, cis-	0.0005	0 07	Yes	**(0.014)**	**(0.008)**	- -	- -	**[(0.12)]**
SW8260	1,2-Dichloroethene, trans-	0 0005	0 1	Yes	**(0.0018)**	**(0.001)**	- -	- -	- -
SW8260	1,2-Dichloropropane	0 0004	0 005	Yes	- -	- -	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0 0003	0 075	Yes	- -	na	na	na	- -
SW8270	1,4-Dichlorobenzene	0 01	0 075	Yes	- -	- -	- -	- -	- -
SW8260	Benzene	0.0004	0 005	Yes	- -	- -	- -	- -	- -
SW8260	Chlorobenzene	0.0004	0 1	Yes	- -	- -	- -	- -	- -
SW8260	Chloroform	0 0003	0 1	Yes	- -	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0.0005	20	Yes	- -	- -	**(0.003)**	**(0.003)**	- -
SW8260	Ethylbenzene	0 0005	0 7	Yes	- -	- -	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0 0005	10	Yes	- -	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 002	8.2	Yes	na	- -	- -	- -	na
SW8260	Methylene chloride	0 0003	0 005	Yes	- -	- -	- -	- -	- -
SW8270	Naphthalene	0.01	2	Yes	- -	- -	- -	- -	- -
SW8260	Tetrachloroethene	0.0005	0 005	Yes	- -	- -	- -	- -	- -
SW8260	Toluene	0 0005	1	Yes	- -	- -	- -	- -	- -
SW8260	Trichloroethene	0 0005	0.005	Yes	**[(0.0071)]**	**(0.005)**	**(0.001)**	**(0.001)**	**[(0.36)]**
SW8260	Vinyl acetate	0.002	100	Yes	na	- -	- -	- -	na
SW8260	Vinyl chloride	0.0005	0 002	Yes	0 00029 F	- -	- -	- -	- -
SW8270	2-Methylnaphthalene	0 01	4 1	Yes	- -	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 01	0.01	Yes	- -	- -	- -	- -	- -

Notes
RRS-1 = Risk Reduction Standard 1
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F = Estimated value below reporting limit and above the MDL
J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
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Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	LF04-04 1997-09-08 Dup	LF04-04 2000-01-13	LF04-4B 1997-09-08	LF04-4D 1999-10-14	LF04-4D 1999-10-14 Dup
SW6010	Aluminum	1 332	100	No	- -	na	- -	na	na
SW7041	Antimony	0 002	0 006	Yes	na	- -	na	na	na
SW6010	Arsenic	0 0049	0 05	Yes	- -	- -	- -	- -	- -
SW6010	Barium	0.587	2	Yes	0.096	0 0783 F	0 096	0 204	0 2
SW6010	Calcium	2438	N/A	No	168	na	113	na	na
SW6010	Chromium (total)	0 006	0 1	Yes	- -	na	- -	na	na
SW7191	Chromium (total)	0.006	0 1	Yes	na	- -	na	0 0014 F	- -
SW6010	Cobalt	0 0089	6 1	Yes	- -	- -	- -	- -	- -
SW6010	Copper	0 0028	1.3	Yes	- -	- -	- -	- -	- -
SW6010	Iron	0 224	N/A	No	- -	na	- -	na	na
SW6010	Lead	0 0016	0.015	Yes	- -	na	- -	na	na
SW6010	Magnesium	37 8	N/A	No	8.5	na	5 5	na	na
SW6010	Manganese	0.175	14	No	0 0023 F	na	0 0035 F	na	na
SW6010	Nickel	0 0204	2	Yes	- -	- -	- -	- -	- -
SW6010	Potassium	15 03	N/A	No	1.9 F	na	1 4 F	na	na
SW7740	Selenium	0.0077	0 05	Yes	na	- -	na	- -	- -
SW6010	Sodium	167	N/A	No	28 3	na	34 7	na	na
SW6010	Vanadium	0 012	0.72	Yes	- -	- -	- -	0 0014 F	- -
SW6010	Zinc	0 118	31	Yes	- -	- -	0 017 F	- -	- -
SW8260	1,1-Dichloroethane	0 0004	10	Yes	- -	**(0.0005)**	- -	**(0.0005)**	**(0.0005)**
SW8260	1,1-Dichloroethene	0 0005	0 007	Yes	- -	**(0.002)**	- -	**(0.003)**	**(0.003)**
SW8260	1,2-Dichloroethene, cis-	0 0005	0 07	Yes	**[(0.12)]**	**[(0.34 J)]**	- -	**[(0.42)]**	**[(0.42)]**
SW8260	1,2-Dichloroethene, trans-	0 0005	0 1	Yes	- -	**(0.016)**	- -	**(0.014 J)**	**(0.014 J)**
SW8260	1,2-Dichloropropane	0 0004	0 005	Yes	- -	- -	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0 0003	0 075	Yes	- -	na	- -	na	na
SW8270	1,4-Dichlorobenzene	0 01	0 075	Yes	- -	- -	- -	- -	- -
SW8260	Benzene	0 0004	0 005	Yes	- -	- -	- -	- -	- -
SW8260	Chlorobenzene	0 0004	0 1	Yes	- -	- -	- -	**(0.0007)**	**(0.0007)**
SW8260	Chloroform	0 0003	0.1	Yes	- -	0 0003	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 0005	20	Yes	- -	- -	- -	- -	- -
SW8260	Ethylbenzene	0 0005	0.7	Yes	- -	- -	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0.0005	10	Yes	- -	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 002	8 2	Yes	na	- -	na	- -	- -
SW8260	Methylene chloride	0 0003	0 005	Yes	- -	- -	- -	- -	- -
SW8270	Naphthalene	0 01	2	Yes	- -	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 0005	0 005	Yes	- -	- -	- -	- -	- -
SW8260	Toluene	0 0005	1	Yes	- -	- -	- -	- -	- -
SW8260	Trichloroethene	0 0005	0 005	Yes	**[(0.39)]**	**[(1.8)]**	- -	**[(1.6)]**	**[(1.7)]**
SW8260	Vinyl acetate	0 002	100	Yes	na	- -	na	- -	- -
SW8260	Vinyl chloride	0 0005	0 002	Yes	- -	**(0.001)**	- -	**[(0.004)]**	- -
SW8270	2-Methylnaphthalene	0 01	4 1	Yes	- -	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 01	0 01	Yes	- -	- -	- -	- -	**[(0.029 J)]**

Notes
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Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	LF04-4D 2000-01-13	LF05-02 2000-01-07	LF05-19 2000-01-12	LF05-5B 2000-01-12	LF05-5C 1999-10-14
SW6010	Aluminum	1 332	100	No	na	na	na	na	na
SW7041	Antimony	0.002	0 006	Yes	- -	na	- -	- -	na
SW6010	Arsenic	0.0049	0 05	Yes	- -	(0.0331 F)	- -	- -	- -
SW6010	Barium	0 587	2	Yes	0 198 F	0 272	0 111 F	na	0.14 F
SW6010	Calcium	2438	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	0 006	0 1	Yes	na	na	na	na	na
SW7191	Chromium (total)	0.006	0.1	Yes	- -	- -	- -	- -	- -
SW6010	Cobalt	0.0089	6 1	Yes	- -	0 0034 J	- -	- -	- -
SW6010	Copper	0.0028	1 3	Yes	- -	- -	- -	- -	- -
SW6010	Iron	0 224	N/A	No	na	na	na	na	na
SW6010	Lead	0 0016	0 015	Yes	na	na	na	na	na
SW6010	Magnesium	37.8	N/A	No	na	na	na	na	na
SW6010	Manganese	0 175	14	No	na	na	na	na	na
SW6010	Nickel	0 0204	2	Yes	- -	- -	- -	- -	- -
SW6010	Potassium	15 03	N/A	No	na	na	na	na	na
SW7740	Selenium	0 0077	0.05	Yes	- -	- -	- -	- -	- -
SW6010	Sodium	167	N/A	No	na	na	na	na	na
SW6010	Vanadium	0.012	0.72	Yes	- -	- -	- -	- -	- -
SW6010	Zinc	0 118	31	Yes	- -	- -	- -	- -	- -
SW8260	1,1-Dichloroethane	0 0004	10	Yes	- -	- -	(0.001)	- -	- -
SW8260	1,1-Dichloroethene	0 0005	0 007	Yes	(0.002)	(0.003)	0 0005	(0.002)	(0.002)
SW8260	1,2-Dichloroethene, cis-	0 0005	0 07	Yes	[(0.25)]	[(0.6)]	[(0.096 J)]	[(0.43 J)]	[(0.42)]
SW8260	1,2-Dichloroethene, trans-	0 0005	0.1	Yes	(0.008)	(0.046)	(0.003)	(0.003)	(0.029 J)
SW8260	1,2-Dichloropropane	0.0004	0 005	Yes	- -	- -	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0.0003	0 075	Yes	na	na	na	na	na
SW8270	1,4-Dichlorobenzene	0 01	0 075	Yes	- -	- -	- -	- -	- -
SW8260	Benzene	0 0004	0.005	Yes	- -	- -	- -	- -	- -
SW8260	Chlorobenzene	0 0004	0 1	Yes	(0.001)	- -	- -	- -	(0.0005)
SW8260	Chloroform	0 0003	0.1	Yes	- -	- -	- -	- -	(0.0004)
SW8260	Dichlorodifluoromethane	0 0005	20	Yes	- -	- -	- -	- -	- -
SW8260	Ethylbenzene	0 0005	0.7	Yes	- -	- -	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0 0005	10	Yes	- -	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 002	8 2	Yes	- -	- -	- -	- -	- -
SW8260	Methylene chloride	0 0003	0 005	Yes	- -	- -	- -	- -	- -
SW8270	Naphthalene	0 01	2	Yes	- -	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 0005	0.005	Yes	- -	- -	- -	- -	(0.002)
SW8260	Toluene	0.0005	1	Yes	- -	- -	- -	- -	- -
SW8260	Trichloroethene	0 0005	0 005	Yes	[(0.92)]	[(0.38)]	[(0.33)]	- -	[(2.2)]
SW8260	Vinyl acetate	0 002	100	Yes	- -	- -	- -	- -	- -
SW8260	Vinyl chloride	0 0005	0 002	Yes	[(0.003)]	[(0.021)]	- -	[(0.1)]	[(0.018)]
SW8270	2-Methylnaphthalene	0 01	4.1	Yes	- -	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.01	0 01	Yes	- -	- -	- -	- -	- -

Notes
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Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	LF05-5C 2000-01-11	LF05-5C 2000-01-11 Dup	WHGLTA002 1997-09-10	WHGLTA002 2000-01-12
SW6010	Aluminum	1 332	100	No	na	na	0 082 F	na
SW7041	Antimony	0 002	0 006	Yes	- -	- -	na	- -
SW6010	Arsenic	0 0049	0 05	Yes	- -	- -	- -	- -
SW6010	Barium	0 587	2	Yes	0 126 F	0 126 F	0 096	0 108 F
SW6010	Calcium	2438	N/A	No	na	na	130	na
SW6010	Chromium (total)	0 006	0 1	Yes	na	na	- -	na
SW7191	Chromium (total)	0 006	0 1	Yes	- -	- -	na	- -
SW6010	Cobalt	0 0089	6.1	Yes	- -	- -	- -	- -
SW6010	Copper	0 0028	1 3	Yes	- -	- -	**(0.0041 F)**	- -
SW6010	Iron	0 224	N/A	No	na	na	0 059 F	na
SW6010	Lead	0 0016	0 015	Yes	na	na	- -	na
SW6010	Magnesium	37 8	N/A	No	na	na	4 4	na
SW6010	Manganese	0 175	14	No	na	na	0.07	na
SW6010	Nickel	0 0204	2	Yes	- -	- -	- -	- -
SW6010	Potassium	15 03	N/A	No	na	na	1 2 F	na
SW7740	Selenium	0 0077	0 05	Yes	- -	- -	na	- -
SW6010	Sodium	167	N/A	No	na	na	17 2	na
SW6010	Vanadium	0 012	0 72	Yes	- -	- -	- -	- -
SW6010	Zinc	0 118	31	Yes	- -	- -	- -	- -
SW8260	1,1-Dichloroethane	0 0004	10	Yes	- -	0 0004	- -	- -
SW8260	1,1-Dichloroethene	0 0005	0.007	Yes	**(0.002 J)**	**(0.002)**	- -	- -
SW8260	1,2-Dichloroethene, cis-	0 0005	0 07	Yes	**[(0.32)]**	**[(0.32)]**	**(0.0017)**	**(0.001)**
SW8260	1,2-Dichloroethene, trans-	0 0005	0 1	Yes	**(0.031 J)**	**(0.03)**	- -	- -
SW8260	1,2-Dichloropropane	0 0004	0 005	Yes	- -	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0 0003	0 075	Yes	na	na	- -	na
SW8270	1,4-Dichlorobenzene	0.01	0 075	Yes	- -	- -	- -	- -
SW8260	Benzene	0 0004	0 005	Yes	- -	- -	- -	- -
SW8260	Chlorobenzene	0 0004	0.1	Yes	**(0.0009 J)**	**(0.001)**	- -	- -
SW8260	Chloroform	0.0003	0 1	Yes	**(0.0004 J)**	0 0003	- -	- -
SW8260	Dichlorodifluoromethane	0 0005	20	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 0005	0 7	Yes	- -	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0.0005	10	Yes	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 002	8 2	Yes	- -	- -	na	- -
SW8260	Methylene chloride	0 0003	0 005	Yes	- -	- -	- -	- -
SW8270	Naphthalene	0 01	2	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0.0005	0 005	Yes	- -	- -	- -	- -
SW8260	Toluene	0 0005	1	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 0005	0 005	Yes	**[(2)]**	**[(2 J)]**	**(0.0019)**	**(0.002)**
SW8260	Vinyl acetate	0 002	100	Yes	- -	- -	na	- -
SW8260	Vinyl chloride	0 0005	0 002	Yes	**[(0.016 J)]**	**[(0.016)]**	- -	- -
SW8270	2-Methylnaphthalene	0 01	4 1	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.01	0 01	Yes	- -	- -	- -	- -

Notes

RRS-1 = Risk Reduction Standard 1

RRS-2 = Risk Reduction Standard 2

na = Not analysed

N/A = Not applicable, no value

- - = Not detected

F = Estimated value below reporting limit and above the MDL

J = Estimated value above reporting limit

Values above RRS-1 are bold and are enclosed in (parentheses)

Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]

Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	WHGLTA003 1997-09-05	WHGLTA004 1997-09-09	WHGLTA004 2000-01-10	WHGLTA703 2000-01-06
SW6010	Aluminum	1 332	100	No	**(6.8 J)**	0 11 F	na	na
SW7041	Antimony	0.002	0 006	Yes	na	na	- -	na
SW6010	Arsenic	0.0049	0 05	Yes	- -	- -	- -	**(0.0097 J)**
SW6010	Barium	0 587	2	Yes	0 17	0 13	0 124 F	0 281
SW6010	Calcium	2438	N/A	No	204	137	na	na
SW6010	Chromium (total)	0 006	0 1	Yes	**(0.012 F)**	- -	na	na
SW7191	Chromium (total)	0 006	0.1	Yes	na	na	**(0.0137)**	- -
SW6010	Cobalt	0 0089	6.1	Yes	0 0038 F	- -	- -	0 0062 J
SW6010	Copper	0 0028	1 3	Yes	**(0.0073 F)**	- -	- -	- -
SW6010	Iron	0 224	N/A	No	7 2	0 055 F	na	na
SW6010	Lead	0 0016	0 015	Yes	- -	**(0.0018 F)**	na	na
SW6010	Magnesium	37.8	N/A	No	10 8	5 3	na	na
SW6010	Manganese	0 175	14	No	0.15	0.0027 F	na	na
SW6010	Nickel	0 0204	2	Yes	0 017 F	- -	- -	0.0043 J
SW6010	Potassium	15 03	N/A	No	3 9 F	5 2	na	na
SW7740	Selenium	0 0077	0 05	Yes	na	na	- -	- -
SW6010	Sodium	167	N/A	No	29	14 6	na	na
SW6010	Vanadium	0 012	0 72	Yes	**(0.015 F)**	- -	- -	- -
SW6010	Zinc	0 118	31	Yes	0 03	- -	- -	- -
SW8260	1,1-Dichloroethane	0.0004	10	Yes	- -	- -	**(0.0005)**	- -
SW8260	1,1-Dichloroethene	0 0005	0 007	Yes	- -	- -	**(0.002)**	**(0.002)**
SW8260	1,2-Dichloroethene, cis-	0 0005	0 07	Yes	**[(0.16)]**	**[(0.099 F)]**	**[(0.1)]**	**[(0.24)]**
SW8260	1,2-Dichloroethene, trans-	0 0005	0 1	Yes	- -	- -	**(0.006)**	**(0.014)**
SW8260	1,2-Dichloropropane	0.0004	0 005	Yes	- -	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0 0003	0 075	Yes	- -	- -	na	na
SW8270	1,4-Dichlorobenzene	0 01	0 075	Yes	- -	- -	- -	- -
SW8260	Benzene	0 0004	0 005	Yes	- -	- -	- -	- -
SW8260	Chlorobenzene	0 0004	0 1	Yes	- -	- -	- -	0.0004
SW8260	Chloroform	0 0003	0 1	Yes	- -	- -	0 0003	- -
SW8260	Dichlorodifluoromethane	0 0005	20	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 0005	0 7	Yes	- -	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0 0005	10	Yes	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 002	8 2	Yes	na	na	- -	- -
SW8260	Methylene chloride	0 0003	0.005	Yes	- -	- -	- -	- -
SW8270	Naphthalene	0 01	2	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0.0005	0 005	Yes	- -	- -	- -	- -
SW8260	Toluene	0 0005	1	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 0005	0.005	Yes	**[(0.45)]**	**[(0.94)]**	**[(0.94)]**	**[(1.6)]**
SW8260	Vinyl acetate	0.002	100	Yes	na	na	- -	**(0.022)**
SW8260	Vinyl chloride	0 0005	0 002	Yes	- -	- -	- -	**[(0.007)]**
SW8270	2-Methylnaphthalene	0 01	4 1	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.01	0.01	Yes	- -	- -	- -	- -

Notes
RRS-1 = Risk Reduction Standard 1
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J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]

Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	WHGLTA801 1999-11-02	WHGLTA801 2000-01-10	WHGLTA803 1999-11-03	WHGLTA803 2000-01-10
SW6010	Aluminum	1 332	100	No	na	na	na	na
SW7041	Antimony	0 002	0.006	Yes	na	- -	na	- -
SW6010	Arsenic	0 0049	0.05	Yes	- -	- -	- -	- -
SW6010	Barium	0.587	2	Yes	0 123 F	0 122 F	0 195 F	0 234
SW6010	Calcium	2438	N/A	No	na	na	na	na
SW6010	Chromium (total)	0 006	0 1	Yes	na	na	na	na
SW7191	Chromium (total)	0.006	0.1	Yes	- -	- -	- -	- -
SW6010	Cobalt	0 0089	6.1	Yes	- -	- -	- -	- -
SW6010	Copper	0.0028	1.3	Yes	- -	- -	- -	- -
SW6010	Iron	0 224	N/A	No	na	na	na	na
SW6010	Lead	0 0016	0 015	Yes	na	na	na	na
SW6010	Magnesium	37 8	N/A	No	na	na	na	na
SW6010	Manganese	0 175	14	No	na	na	na	na
SW6010	Nickel	0 0204	2	Yes	- -	- -	0 0026 F	- -
SW6010	Potassium	15 03	N/A	No	na	na	na	na
SW7740	Selenium	0 0077	0.05	Yes	- -	- -	- -	- -
SW6010	Sodium	167	N/A	No	na	na	na	na
SW6010	Vanadium	0 012	0 72	Yes	- -	- -	- -	- -
SW6010	Zinc	0 118	31	Yes	- -	- -	- -	- -
SW8260	1,1-Dichloroethane	0 0004	10	Yes	- -	- -	- -	- -
SW8260	1,1-Dichloroethene	0.0005	0.007	Yes	**(0.002)**	**(0.002)**	- -	- -
SW8260	1,2-Dichloroethene, cis-	0 0005	0 07	Yes	**[(0.41)]**	**[(0.27)]**	- -	**(0.0006)**
SW8260	1,2-Dichloroethene, trans-	0 0005	0 1	Yes	**(0.06)**	**(0.037)**	- -	- -
SW8260	1,2-Dichloropropane	0 0004	0.005	Yes	- -	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0.0003	0 075	Yes	na	na	na	na
SW8270	1,4-Dichlorobenzene	0 01	0 075	Yes	- -	- -	- -	- -
SW8260	Benzene	0 0004	0 005	Yes	- -	- -	- -	- -
SW8260	Chlorobenzene	0 0004	0 1	Yes	- -	- -	- -	- -
SW8260	Chloroform	0.0003	0 1	Yes	- -	- -	- -	- -
SW8260	Dichlorodifluoromethane	0 0005	20	Yes	- -	- -	- -	- -
SW8260	Ethylbenzene	0 0005	0 7	Yes	- -	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0.0005	10	Yes	- -	- -	- -	- -
SW8260	Methyl isobutyl ketone	0.002	8 2	Yes	- -	- -	- -	- -
SW8260	Methylene chloride	0 0003	0 005	Yes	- -	- -	- -	- -
SW8270	Naphthalene	0 01	2	Yes	- -	- -	- -	- -
SW8260	Tetrachloroethene	0 0005	0 005	Yes	- -	- -	- -	- -
SW8260	Toluene	0 0005	1	Yes	- -	- -	- -	- -
SW8260	Trichloroethene	0 0005	0 005	Yes	**[(0.76)]**	**[(0.83)]**	- -	**(0.0009)**
SW8260	Vinyl acetate	0.002	100	Yes	- -	- -	- -	- -
SW8260	Vinyl chloride	0 0005	0.002	Yes	**(0.001)**	**(0.0008)**	- -	- -
SW8270	2-Methylnaphthalene	0.01	4 1	Yes	- -	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.01	0 01	Yes	- -	- -	- -	- -

Notes
RRS-1 = Risk Reduction Standard 1
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J = Estimated value above reporting limit
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Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	WITCTA057 2000-04-26	WITCTA058 2000-04-26	WITCTA059 2000-04-26	WITCTA060 2000-04-26	WP07-10A 2000-01-11
SW6010	Aluminum	1 332	100	No	na	na	na	na	na
SW7041	Antimony	0 002	0 006	Yes	na	na	na	na	- -
SW6010	Arsenic	0 0049	0 05	Yes	na	na	na	na	- -
SW6010	Barium	0.587	2	Yes	na	na	na	na	0 102 F
SW6010	Calcium	2438	N/A	No	na	na	na	na	na
SW6010	Chromium (total)	0 006	0 1	Yes	na	na	na	na	na
SW7191	Chromium (total)	0 006	0 1	Yes	na	na	na	na	- -
SW6010	Cobalt	0.0089	6 1	Yes	na	na	na	na	- -
SW6010	Copper	0 0028	1.3	Yes	na	na	na	na	- -
SW6010	Iron	0 224	N/A	No	na	na	na	na	na
SW6010	Lead	0 0016	0 015	Yes	na	na	na	na	na
SW6010	Magnesium	37 8	N/A	No	na	na	na	na	na
SW6010	Manganese	0 175	14	No	na	na	na	na	na
SW6010	Nickel	0 0204	2	Yes	na	na	na	na	- -
SW6010	Potassium	15 03	N/A	No	na	na	na	na	na
SW7740	Selenium	0 0077	0.05	Yes	na	na	na	na	- -
SW6010	Sodium	167	N/A	No	na	na	na	na	na
SW6010	Vanadium	0 012	0 72	Yes	na	na	na	na	- -
SW6010	Zinc	0 118	31	Yes	na	na	na	na	- -
SW8260	1,1-Dichloroethane	0 0004	10	Yes	- -	(0.0007)	- -	(0.0006)	(0.0006)
SW8260	1,1-Dichloroethene	0 0005	0 007	Yes	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
SW8260	1,2-Dichloroethene, cis-	0 0005	0.07	Yes	[(0.52 J)]	[(0.22 J)]	[(0.42 J)]	[(0.42 J)]	[(0.35)]
SW8260	1,2-Dichloroethene, trans-	0 0005	0 1	Yes	(0.052 J)	(0.051 J)	(0.042 J)	(0.036)	(0.045 J)
SW8260	1,2-Dichloropropane	0 0004	0 005	Yes	- -	- -	- -	- -	- -
SW8260	1,4-Dichlorobenzene	0 0003	0 075	Yes	(0.001)	(0.0009)	(0.0004)	(0.0005)	na
SW8270	1,4-Dichlorobenzene	0 01	0 075	Yes	na	na	na	na	- -
SW8260	Benzene	0 0004	0 005	Yes	0 0003 F	- -	- -	0.0004	- -
SW8260	Chlorobenzene	0 0004	0 1	Yes	- -	- -	- -	- -	- -
SW8260	Chloroform	0 0003	0 1	Yes	(0.0005)	(0.0006)	(0.0005)	(0.0005)	(0.0004)
SW8260	Dichlorodifluoromethane	0 0005	20	Yes	- -	- -	- -	- -	- -
SW8260	Ethylbenzene	0 0005	0.7	Yes	- -	- -	- -	0 0005	- -
SW8260	m- & p-Xylene (sum of isomers)	0 0005	10	Yes	- -	- -	- -	(0.0006)	- -
SW8260	Methyl isobutyl ketone	0.002	8.2	Yes	na	na	na	na	- -
SW8260	Methylene chloride	0 0003	0 005	Yes	- -	- -	- -	(0.0007)	- -
SW8270	Naphthalene	0.01	2	Yes	na	na	na	na	- -
SW8260	Tetrachloroethene	0 0005	0 005	Yes	(0.0006)	(0.001)	0 0005 F	0 0004 F	0 0005
SW8260	Toluene	0.0005	1	Yes	- -	- -	- -	(0.0009)	- -
SW8260	Trichloroethene	0 0005	0.005	Yes	[(2.7 J)]	[(2.2 J)]	[(2.3 J)]	[(2.3 J)]	[(2.2 J)]
SW8260	Vinyl acetate	0 002	100	Yes	- -	- -	- -	- -	- -
SW8260	Vinyl chloride	0.0005	0.002	Yes	- -	- -	- -	- -	[(0.01)]
SW8270	2-Methylnaphthalene	0 01	4 1	Yes	na	na	na	na	- -
SW8270	bis(2-Ethylhexyl)phthalate	0.01	0 01	Yes	na	na	na	na	- -

Notes
RRS-1 = Risk Reduction Standard 1
RRS-2 = Risk Reduction Standard 2
na = Not analysed
N/A = Not applicable, no value
- - = Not detected
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J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]

Table 5.22
Alluvial Terrace Groundwater Detections
(1997 to 2000)
NAS Fort Worth JRB, Texas

Method	Analyte	RRS-1	RRS-2	App IX	WP07-10B 1999-10-14	WP07-10B 2000-01-12	WP07-10C 2000-01-12
SW6010	Aluminum	1 332	100	No	na	na	na
SW7041	Antimony	0 002	0 006	Yes	na	- -	- -
SW6010	Arsenic	0 0049	0 05	Yes	- -	- -	**(0.0148 F)**
SW6010	Barium	0 587	2	Yes	0 0976 F	0 101 F	0 152 F
SW6010	Calcium	2438	N/A	No	na	na	na
SW6010	Chromium (total)	0 006	0 1	Yes	na	na	na
SW7191	Chromium (total)	0 006	0 1	Yes	- -	- -	- -
SW6010	Cobalt	0 0089	6 1	Yes	- -	- -	- -
SW6010	Copper	0 0028	1 3	Yes	- -	- -	- -
SW6010	Iron	0 224	N/A	No	na	na	na
SW6010	Lead	0 0016	0 015	Yes	na	na	na
SW6010	Magnesium	37 8	N/A	No	na	na	na
SW6010	Manganese	0 175	14	No	na	na	na
SW6010	Nickel	0.0204	2	Yes	- -	- -	- -
SW6010	Potassium	15 03	N/A	No	na	na	na
SW7740	Selenium	0 0077	0.05	Yes	- -	- -	- -
SW6010	Sodium	167	N/A	No	na	na	na
SW6010	Vanadium	0 012	0 72	Yes	0 00096 F	- -	- -
SW6010	Zinc	0.118	31	Yes	- -	- -	- -
SW8260	1,1-Dichloroethane	0 0004	10	Yes	- -	**(0.0005)**	- -
SW8260	1,1-Dichloroethene	0 0005	0 007	Yes	**(0.002)**	**(0.002)**	**(0.006)**
SW8260	1,2-Dichloroethene, cis-	0 0005	0 07	Yes	**[(0.35)]**	**[(0.29)]**	**[(0.23)]**
SW8260	1,2-Dichloroethene, trans-	0.0005	0.1	Yes	**(0.044 J)**	**(0.035)**	**(0.04)**
SW8260	1,2-Dichloropropane	0 0004	0 005	Yes	**(0.0009)**	- -	- -
SW8260	1,4-Dichlorobenzene	0 0003	0 075	Yes	na	na	na
SW8270	1,4-Dichlorobenzene	0 01	0 075	Yes	- -	- -	0 004 F
SW8260	Benzene	0 0004	0 005	Yes	0 0002 F	- -	**(0.0006)**
SW8260	Chlorobenzene	0 0004	0 1	Yes	0 0003 F	0 0004	**(0.001)**
SW8260	Chloroform	0.0003	0.1	Yes	**(0.0005)**	**(0.0004)**	- -
SW8260	Dichlorodifluoromethane	0 0005	20	Yes	- -	- -	- -
SW8260	Ethylbenzene	0 0005	0 7	Yes	- -	- -	- -
SW8260	m- & p-Xylene (sum of isomers)	0 0005	10	Yes	- -	- -	- -
SW8260	Methyl isobutyl ketone	0 002	8.2	Yes	0 0005 F	- -	- -
SW8260	Methylene chloride	0 0003	0 005	Yes	0 0003 F	- -	- -
SW8270	Naphthalene	0 01	2	Yes	- -	- -	- -
SW8260	Tetrachloroethene	0 0005	0 005	Yes	**(0.005)**	**(0.004)**	- -
SW8260	Toluene	0 0005	1	Yes	- -	- -	- -
SW8260	Trichloroethene	0 0005	0 005	Yes	**[(2.6)]**	**[(2.4)]**	**[(1.5)]**
SW8260	Vinyl acetate	0 002	100	Yes	- -	- -	- -
SW8260	Vinyl chloride	0 0005	0 002	Yes	**[(0.014)]**	**[(0.01)]**	**[(0.018)]**
SW8270	2-Methylnaphthalene	0 01	4 1	Yes	- -	- -	- -
SW8270	bis(2-Ethylhexyl)phthalate	0 01	0 01	Yes	**[(0.02)]**	- -	- -

Notes
RRS-1 = Risk Reduction Standard 1
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J = Estimated value above reporting limit
Values above RRS-1 are bold and are enclosed in (parentheses)
Values above RRS-2 are bold and are enclosed in [(parentheses and brackets)]

FIGURES

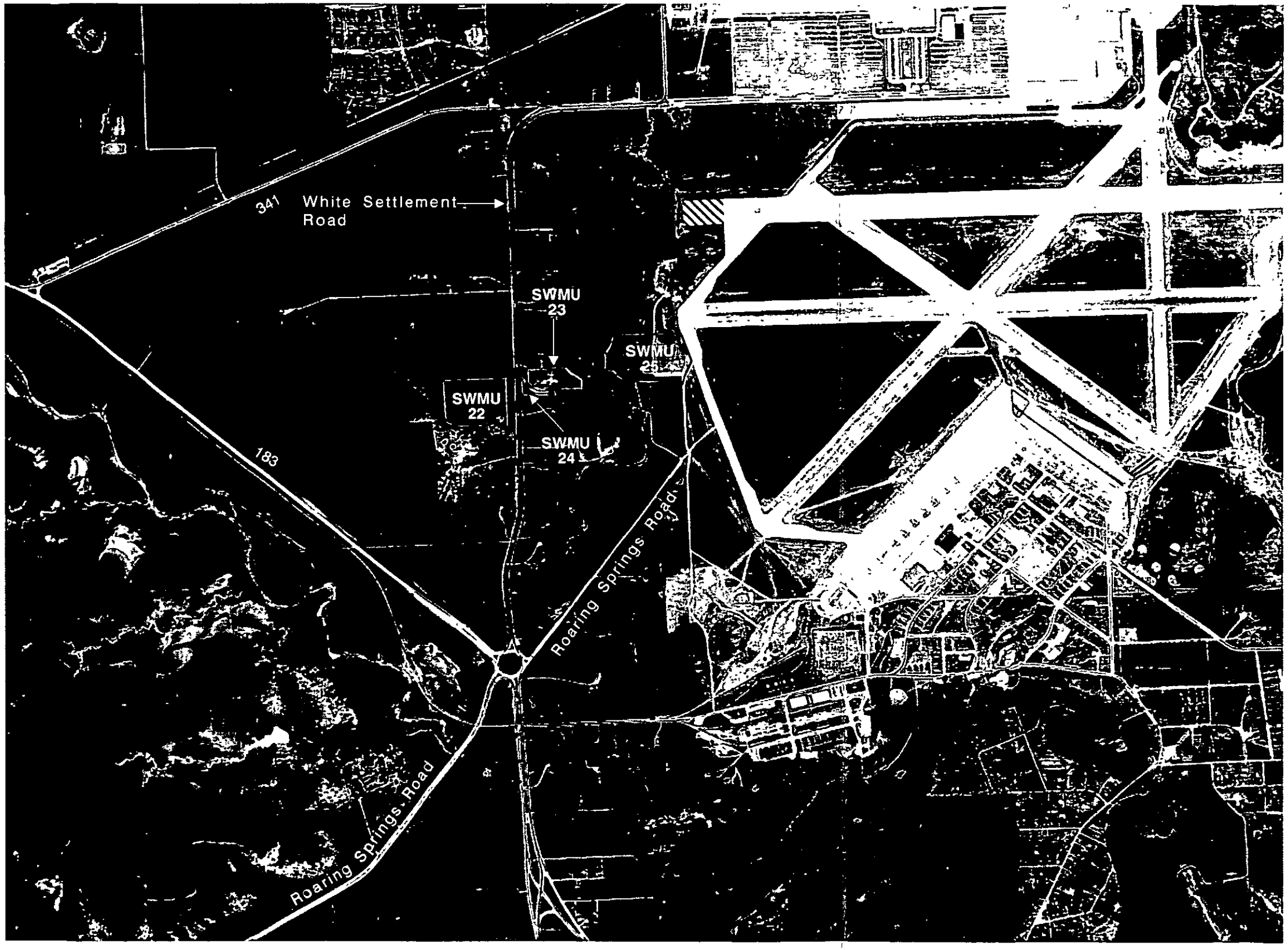

Figure 5.1

Aerial Photograph Depicting Primary Roadways, 1946 NAS Fort Worth JRB

U.S. Air Force Center for Environmental Excellence

Legend

Approximate SWMU Location

Note: Aerial photograph represented on this figure is dated September 1946.

N

Filename X \AFC001\024C\Report
\Final RFI SWMUs 22, 23, 24, and 25\roadways cdr
Project AFC001-024C
Created by cfarmer 09/06/00
Revised 09/12/00 cf

HYDRO GeoLogic INC

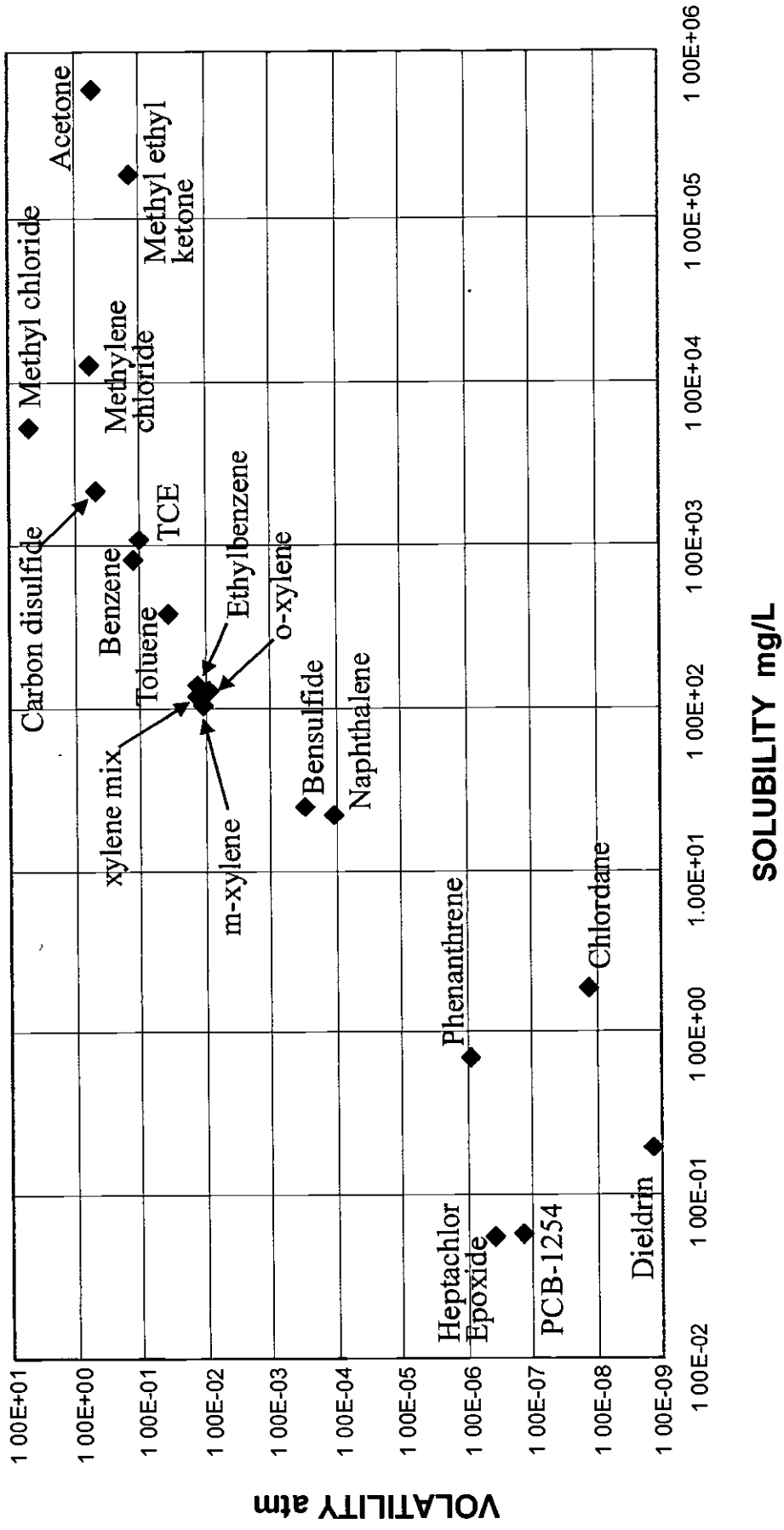

Figure 5.2
Solubility vs. Volatility for Selected Compounds

HYDRO GeoLogic INC

Filename X \024c\report\final_RFI_SWMUs 22, 23, 24, and 25\graph cdr
Project AFC001-024C
Created by cfarmer 08/31/00
Revised 09/12/00 ASP
Source

HydroGeoLogic, Inc —Final RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 5.3
Aerial Photograph of SWMU 22 Soil Boring, Test Pit, and Monitoring Well Locations

U.S. Air Force Center for Environmental Excellence

Legend

- - - - NAS Fort Worth JRB (Carswell Field)

Landfill 4/SWMU 22 Boundary

BHGLTA202 — Test Pit Location

BHGLTA211 — Borehole Location

GMI-22-07M — Monitoring Well Location

Note Aerial photograph represented on this figure is dated December 1958

N

90 0 90 180

SCALE IN FEET

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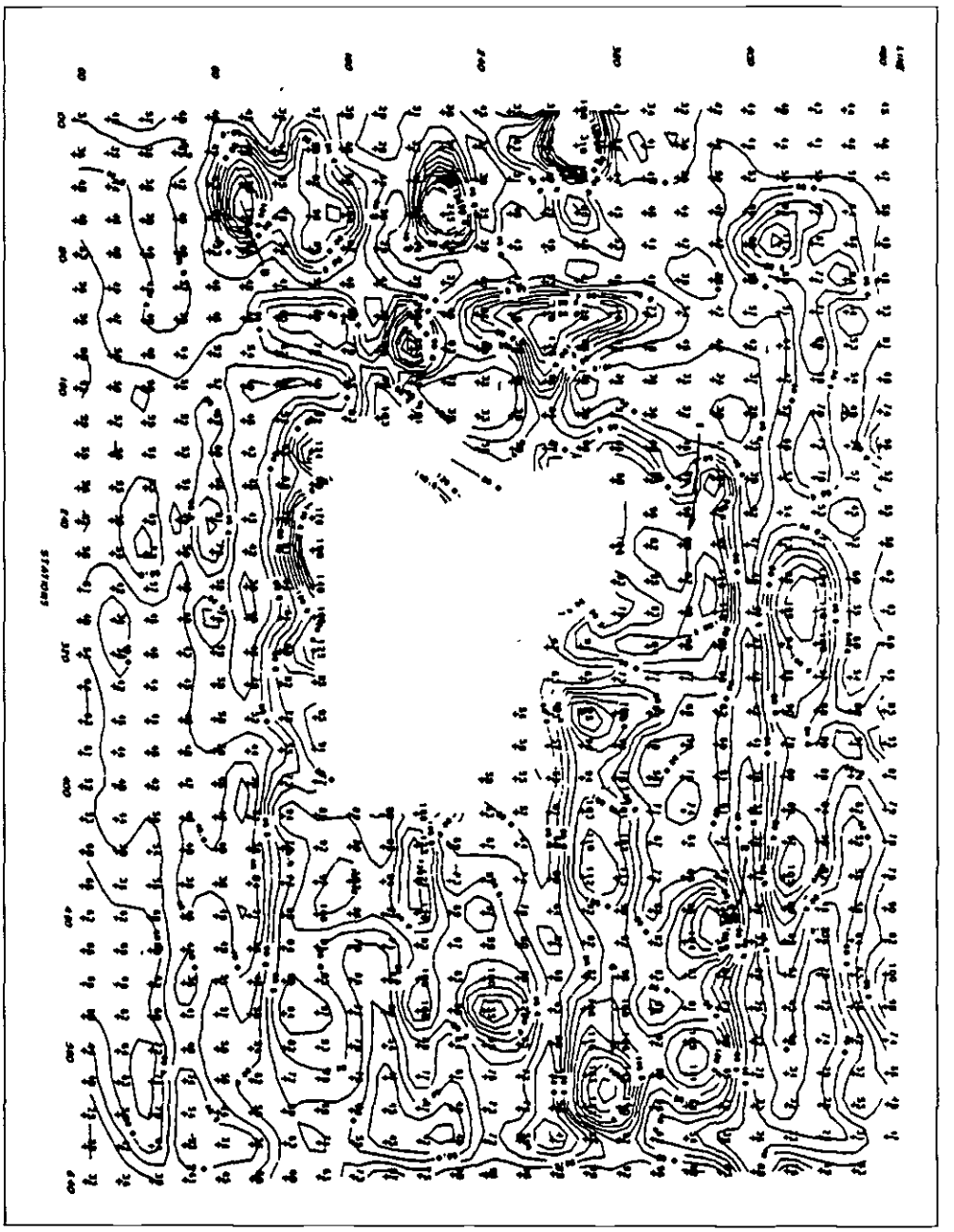
Project AFC001-024C
Created 08/15/00 jbelcher
Revised 04/16/01 asp
Map Source HydroGeoLogic, Inc — GIS Database

HYDRO GeoLogic INC.



N

40 0 40 80

SCALE IN FEET

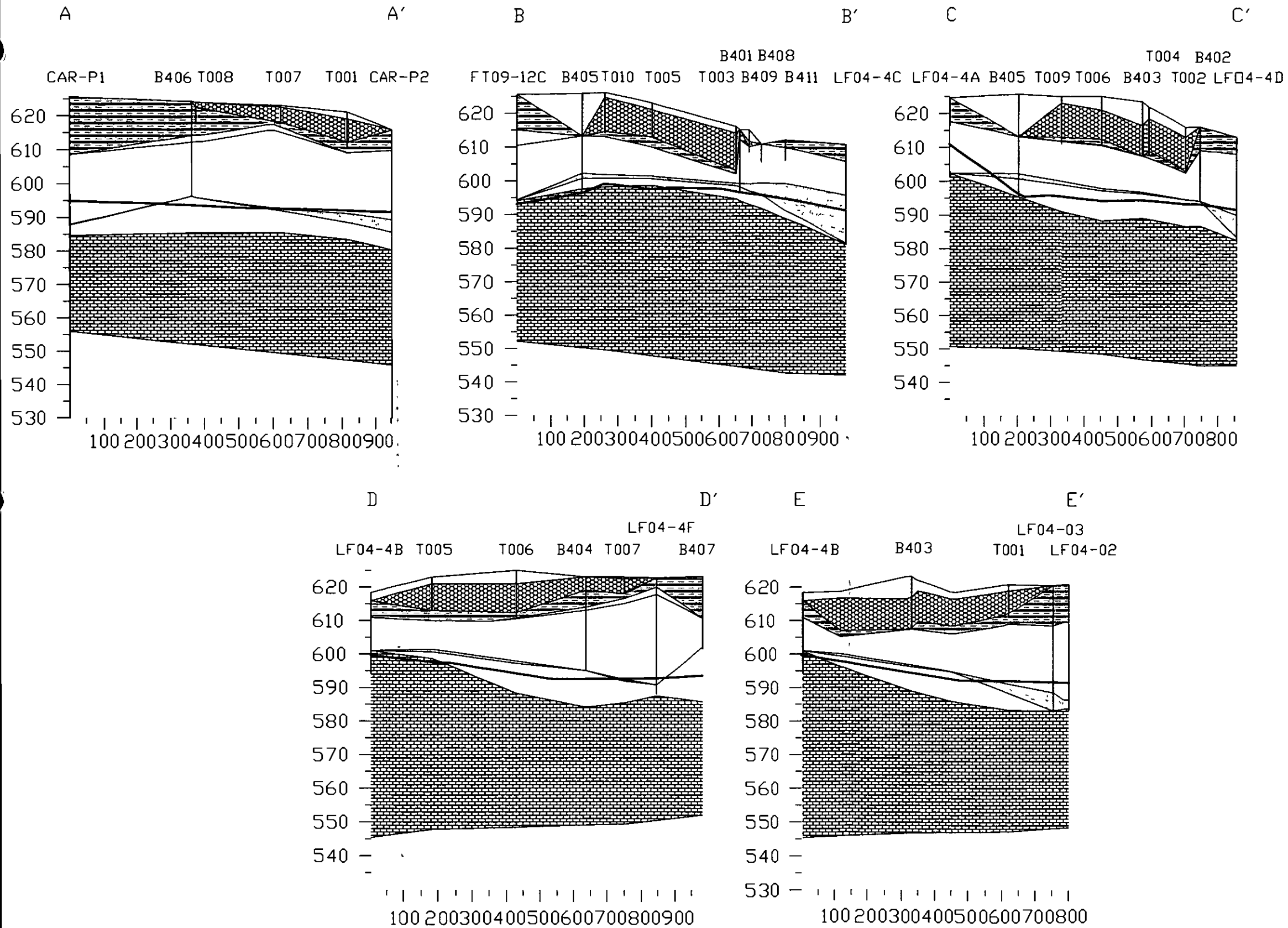
Filename X \AFC001\024C\report \final rfi_swmus 22,23, 24, and 25\EM_profiles2 cdr
Project AFC001-024C
Created by cfarmer 08/14/99
Revised 09/12/00 ASP
Source Radian Corporation, 1986

HYDRO GeoLogic INC

Figure 5.4
Electromagnetic Profile Data (EM31)
SWMU 22/Landfill 4
(Radian, 1986)

Figure 5.5
SWMU 22/Landfill 4
Geologic Cross Sections

U.S. Air Force Center for Environmental Excellence

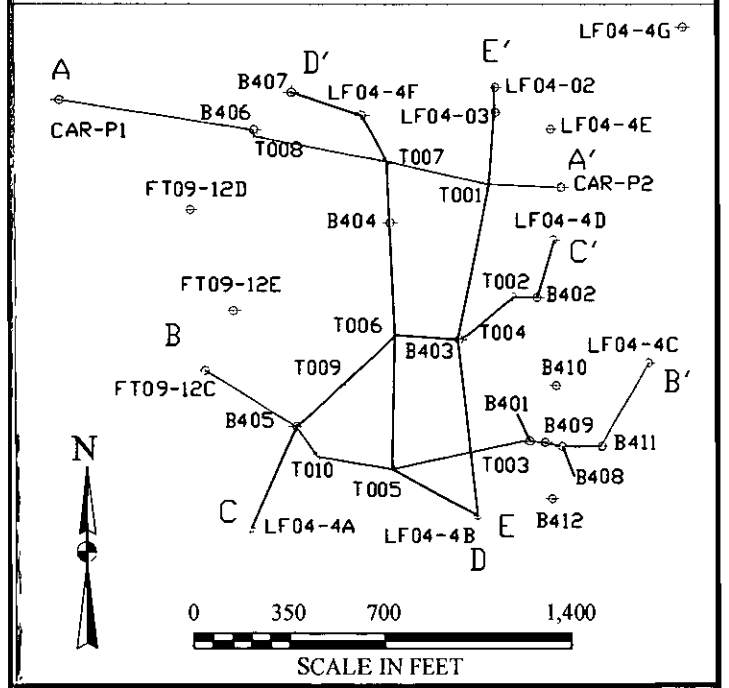


Legend

- Soilfill
- Landfill
- Silty Clay
- Silt
- Sand
- Gravel with Sand
- Sand
- Goodland/Walnut (Bedrock)
- Paluxy (Bedrock)
- B407 = BHGLTA407
- T004 = THGLTA004
- Monitoring Well

Vertical Exaggeration = 10 X

Groundwater Elevation July 2000



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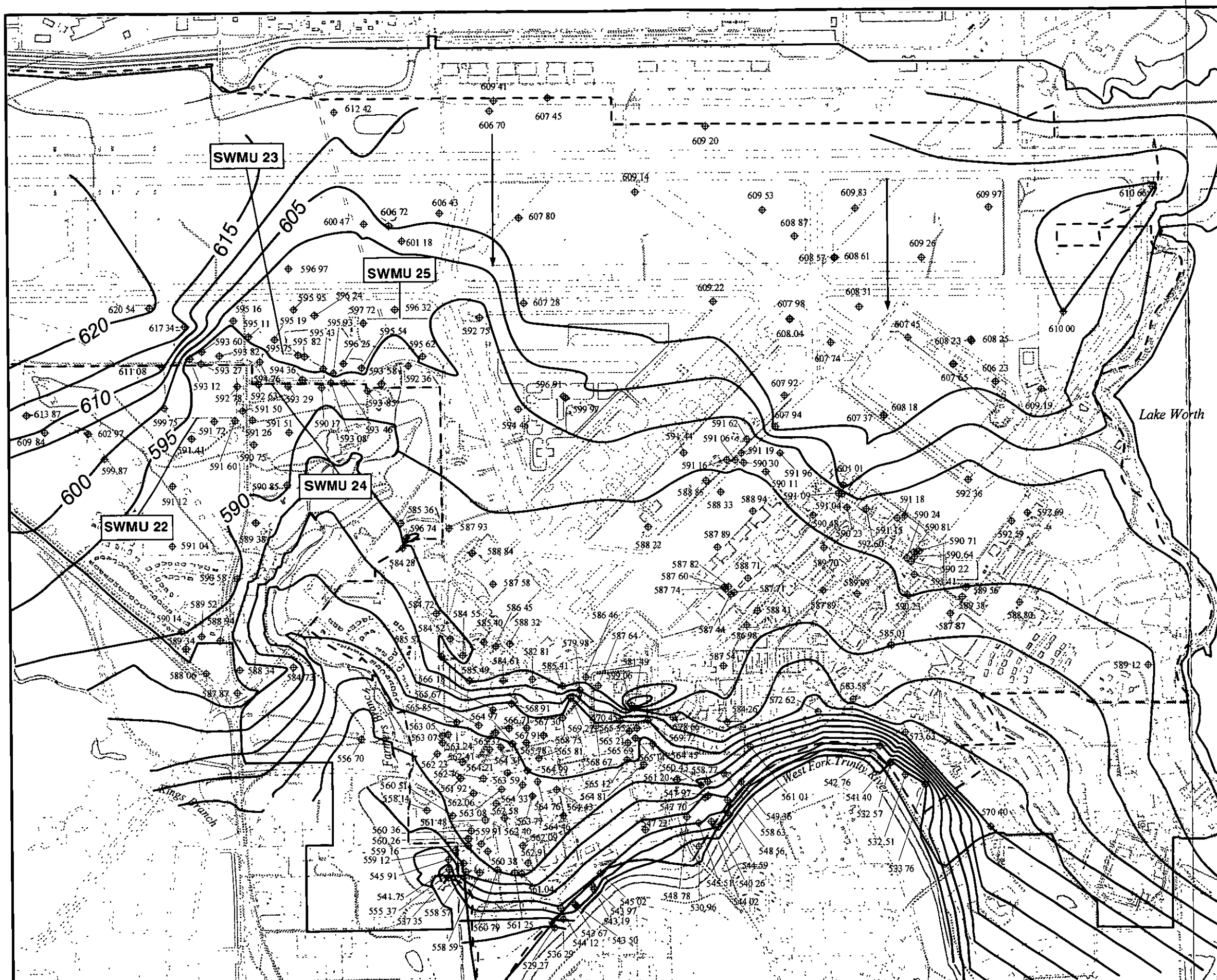
Project AFC001-024C
Revised 09-07-00 ASP

HYDRO GeoLogic INC.



HydroGeoLogic, Inc —From RFI SWMUs 22, 23, 24 and 25
NAS Fort Worth JRB, Texas

Figure 5.6

Groundwater Elevations and Flow Direction July 2000

U.S. Air Force Center For Environmental Excellence

Legend

- - - - NAS Fort Worth JRB (Carswell Field)

——— Former Carswell Air Force Base

-600- Groundwater Elevation Contour (Feet Above Mean Sea Level)

——→ Generalized Groundwater Flow

⌖ Monitoring Well

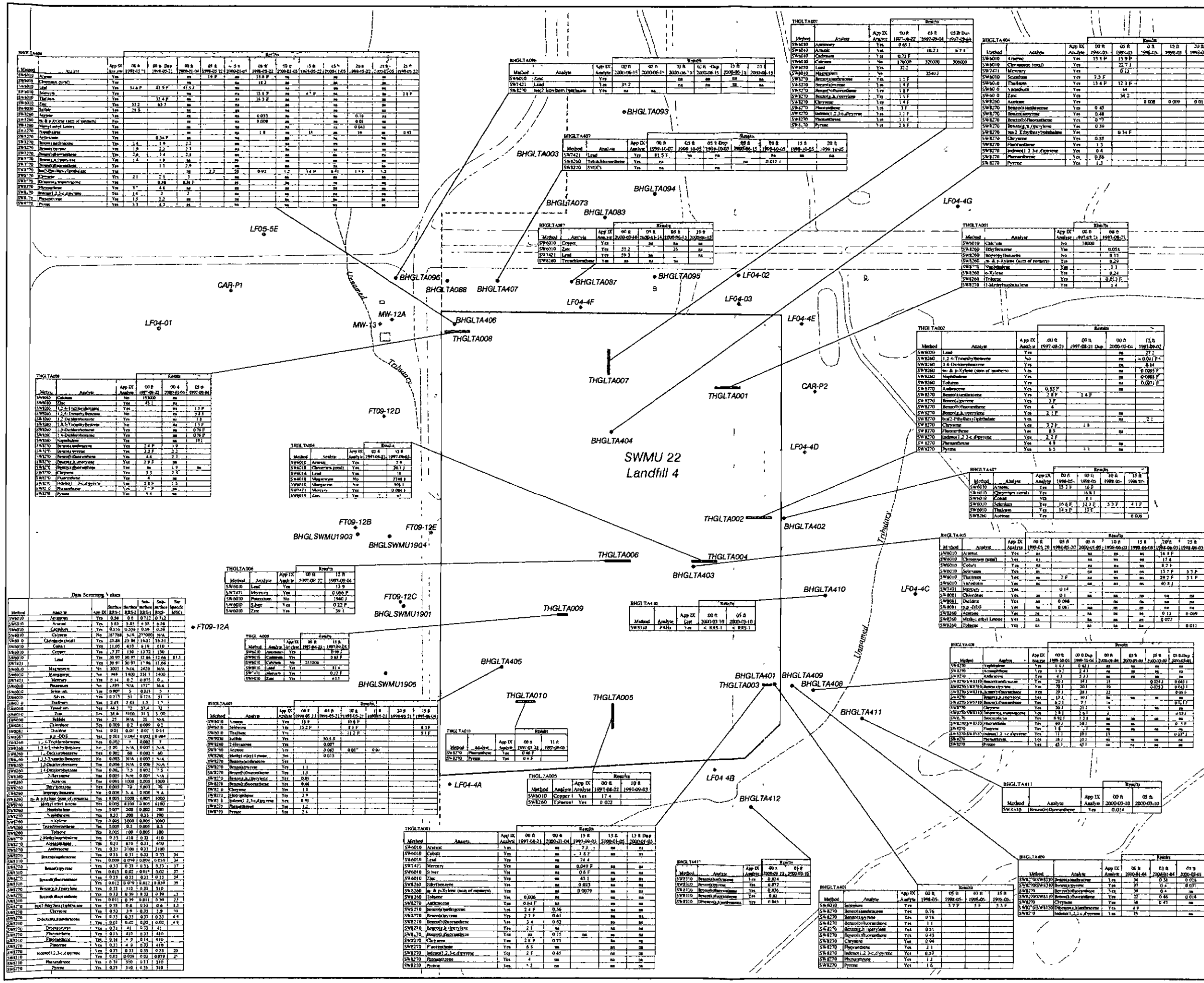
N

0 500 1000 2000

SCALE IN FEET

Filename X:\AFC001\024c Report
Final RFI SWMUs 22, 23, 24 and 25\water_lvl_elev_0700 apr
Project AFC001-024C
Created 01/22 00 jbelcher
Revised 04/16 01 ASP
Map Source HydroGeoLogic, Inc GIS Database

HYDRO GeoLogic INC



HydroGeoLogic,Inc
RFI SWMUs 22, 23, 24, 25
NAS Fort Worth JRB, Texas

Figure 5.7

SWMU 22/Landfill 4 Analytical Results in Soil

U S Air Force Center
For Environmental Excellence

Legend

- NAS Fort Worth JRB Boundary
- Former Carswell Air Force Base Boundary
- SWMU 22/Landfill 4
- Monitoring Well
- Soil Boring
- Test Pit

All results in mg/kg

Color Codes

- Analyte detected above RRS 2
- Analyte detected above RRS-2 Sample interval removed in IRA
- Analyte detected above RRS 2 but below site-specific MSC
- Analyte detected above RRS 2 but conservatively eliminated as a COPC
- Initial analyte detection above RRS-2 but not confirmed during subsequent sampling
- Analyte not detected or detected below RRS 1
- < RRS-1 Analytical state not detected or detected below RRS 1

Notes
App IX Appendix IX analytical suite
COPC - Contaminant of Potential Concern
Date yyyy-mm-dd
IRA Interim Remedial Action
MSC Medium Specific Concentration GWP-Ind
N/A Not Applicable
ns Not Analyzed
nr Not Sampled
RRS-1 Risk Reduction Standard 1
RRS 2 Risk Reduction Standard 2

BHGLTA401 BHGLTA406 — Full Appendix IX suite of analytes.
THGLTA001 THGLTA010 — RCRA Metals, VOCs, SVOCs

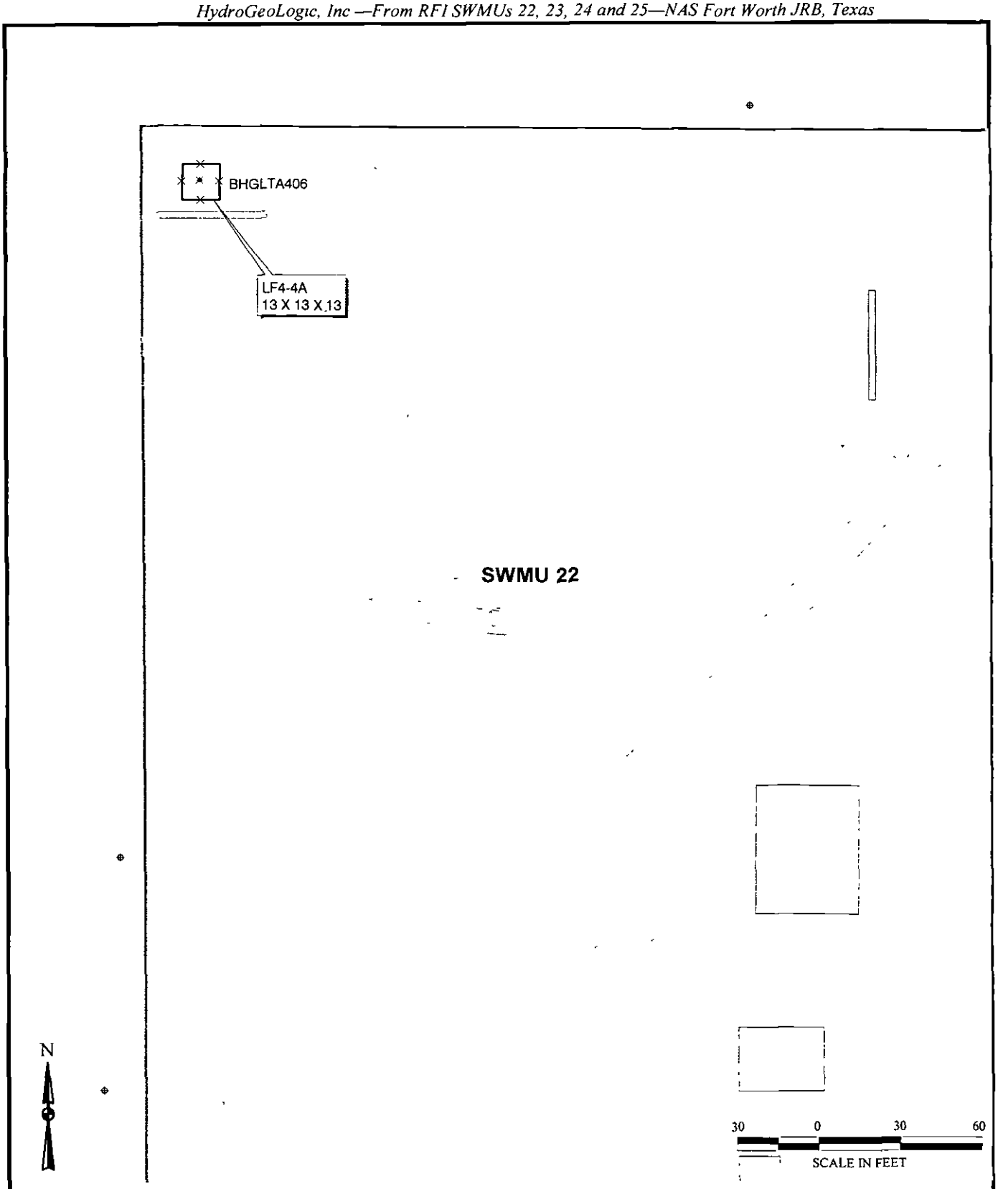
All buildings and roads within the perimeter of Landfill 4 have been removed as of Summer 2000

N

75 0 75 150
SCALE IN FEET

HYDRO GeoLogic INC.

Filename X:\Afc001 024c Report Final RFI SWMUs 22, 23, 24 and 25\ swmu22_analytical.apr
Project AFC.001-024C
Created 08/29/00 jbelcher
Revised 09/12/00 jb
Source HydroGeoLogic Inc--GIS Database



Filename X AFC 001 024C Report
Final RFI SWMUs 22, 23, 24, and 25 excavation_areas apr
Project AFC001-024C
Created 06 08 00 TKH
Revised 05 29 01 ASP
Source HydroGeoLogic Inc--GIS Database

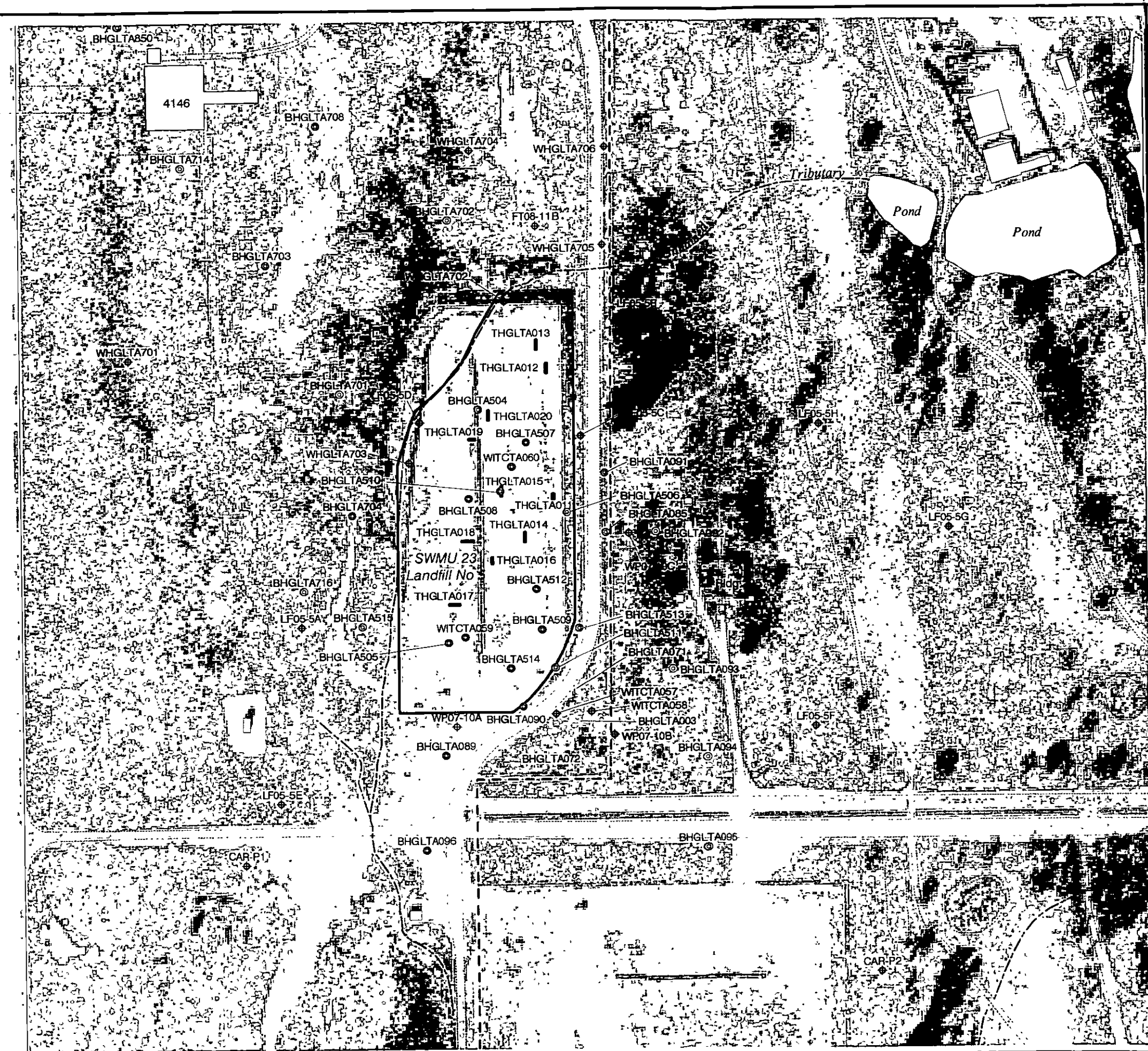
HYDRO GeoLogic

Legend

Area of Study (SWMU 22)

Building
SWMU
Trench
Excavation Areas
Monitoring Well
Confirmation Sampling Location
Borehole

Figure 5.8
Excavation Confirmation Sampling Locations
SWMU 22/Landfill 4



HydroGeoLogic, Inc —From RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 5.9
SWMU 23/Landfill 5
Soil Boring, Test Pit, and Monitoring Well Locations

U.S. Air Force Center for Environmental Excellence

Legend

- NAS Fort Worth JRB (Carswell Field)
- Landfill 5/SWMU 23 Boundary
- BHGLTA202 — Test Pit Location
- BHGLTA211 — Borehole Location
- GMI-22-07M — Monitoring Well Location

Note: Aerial photograph represented on this figure is dated March 1975

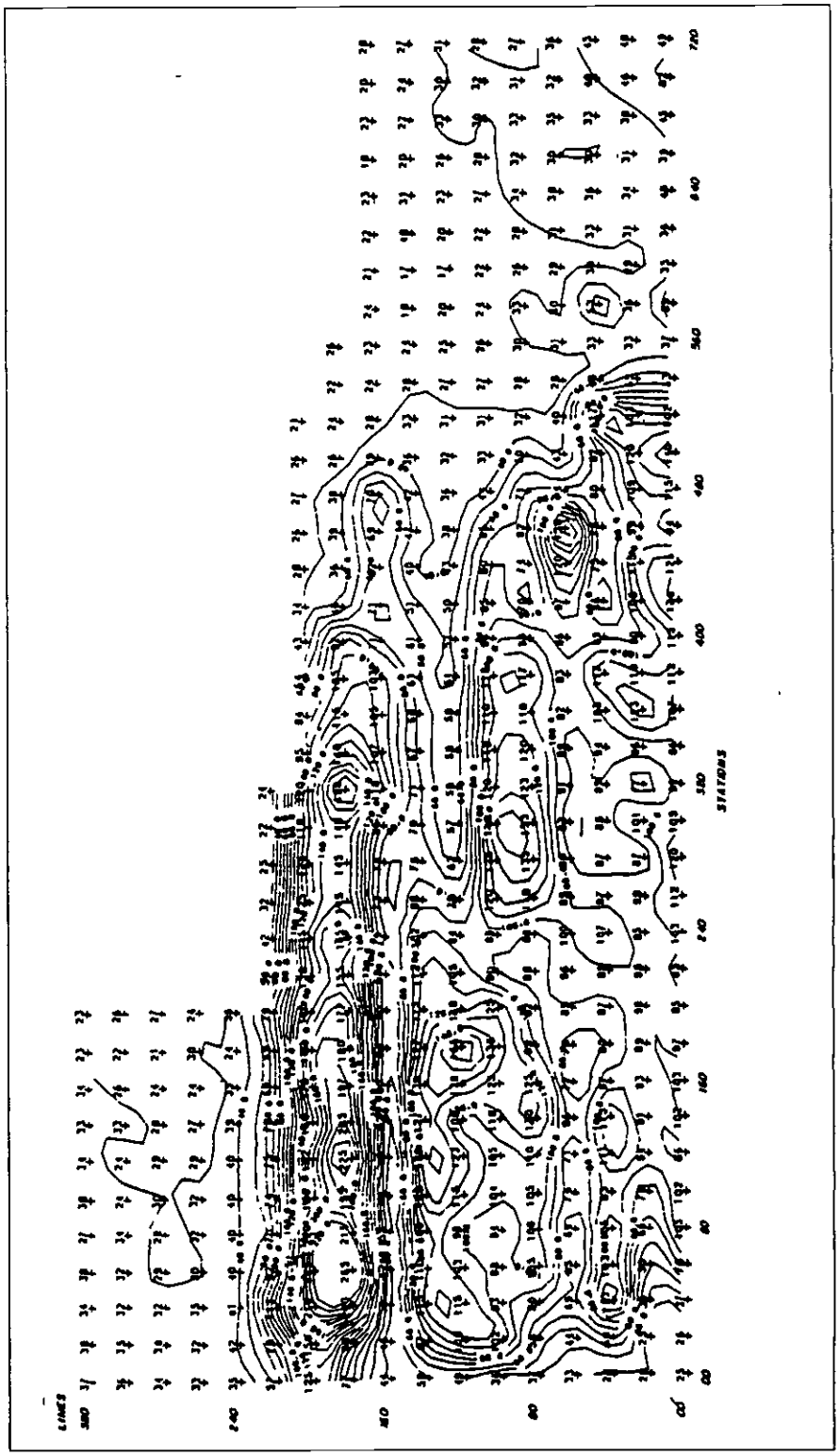
N

90 0 90 180

SCALE IN FEET

Filename X \Afc001\024c\Report\SWMUs 22, 23, 24, and 25\ swmu23_lf5 aerial apr
Project AFC001-024C
Created 08/16/00 jbelcher
Revised 05/29/01 asp
Map Source HydroGeoLogic, Inc— GIS Database

HYDRO GeoLogic INC



N

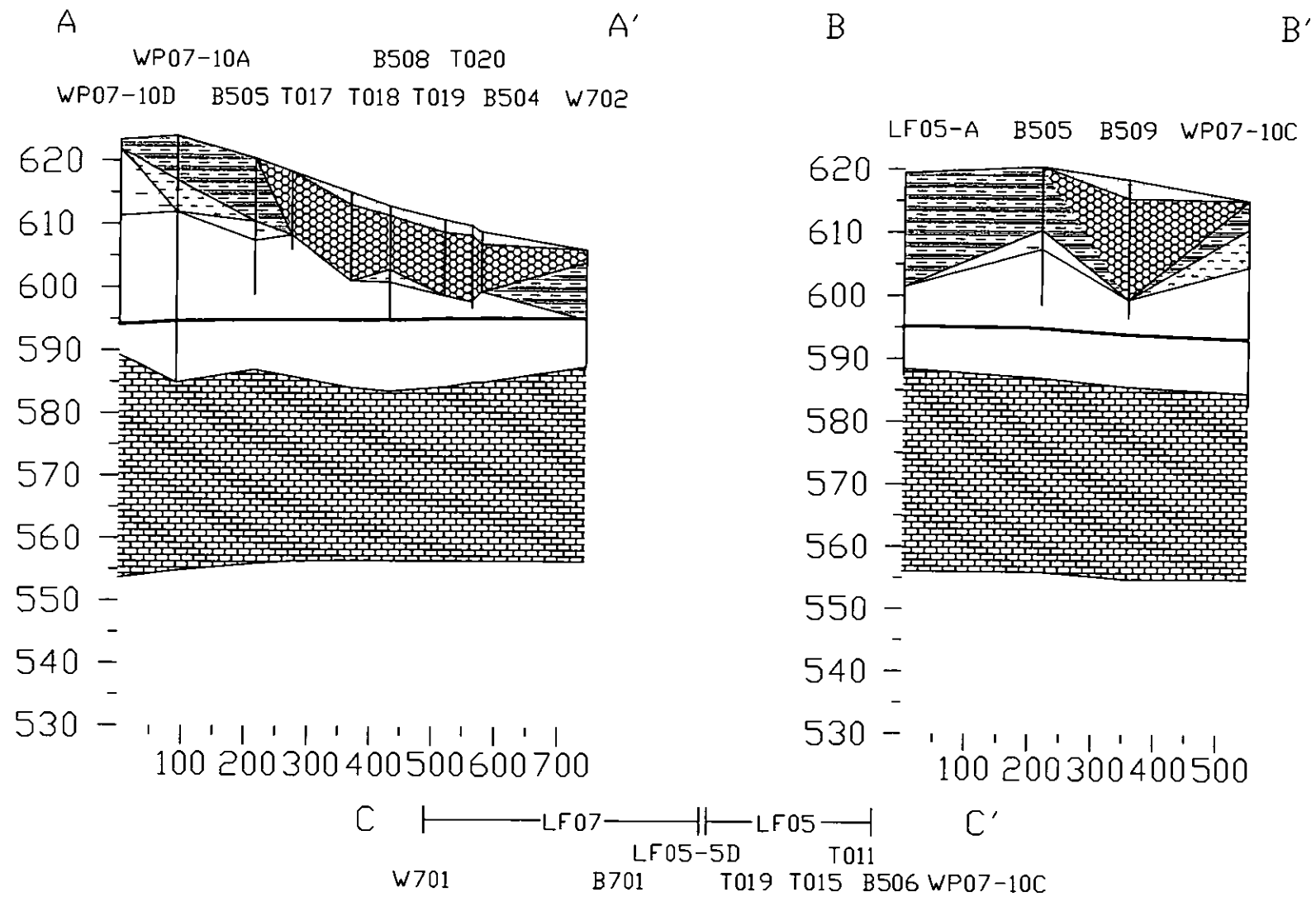
40 0 40 80

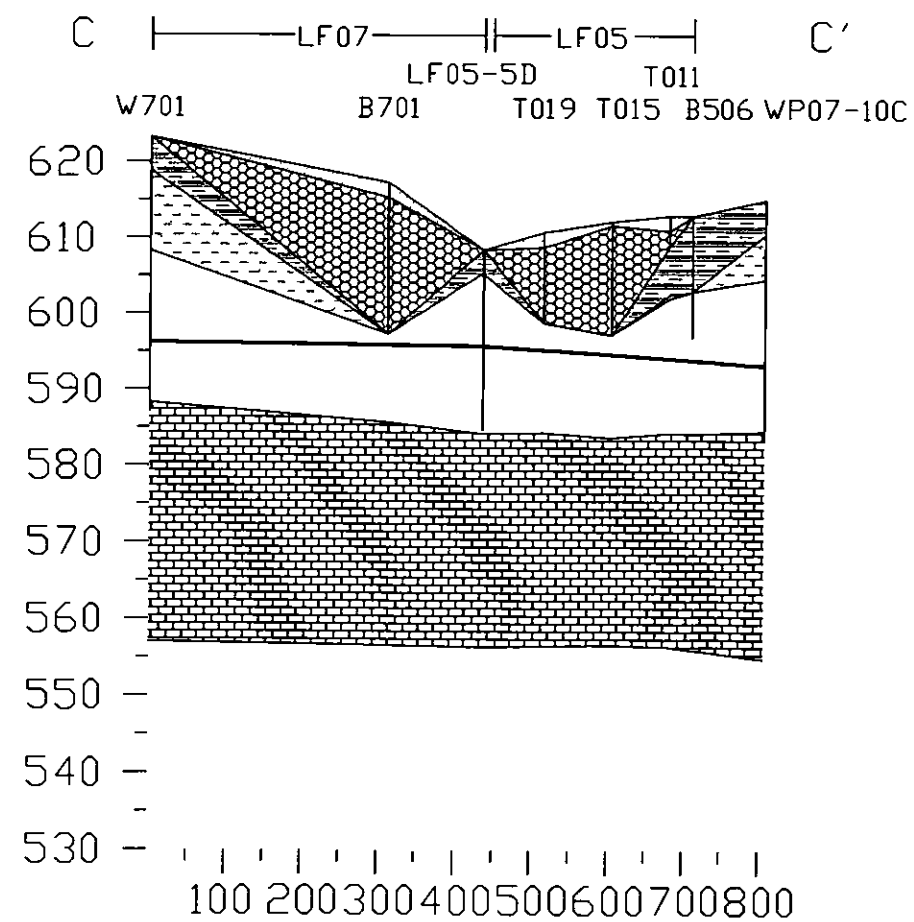
SCALE IN FEET

Filename X \AFC001\024C\report \final rfi_swmus 22,23, 24, and 25\EM_profiles2 cdr
Project AFC001-024C
Created by cfarmer 08/14/99
Revised 09/12/00 ASP
Source Radian Corporation, 1986

HYDRO GeoLogic INC

Figure 5.10
Electromagnetic Profile Data (EM31)
SWMU 23/Landfill 5
(Radian, 1986)





HydroGeoLogic, Inc — RFI SWMUs 22, 23, 24 and 25
SWMUs 22,23,24 and 25

Figure 5.11
SWMU 23/Landfill 5
Geologic Cross Sections

U.S. Air Force Center for Environmental Excellence

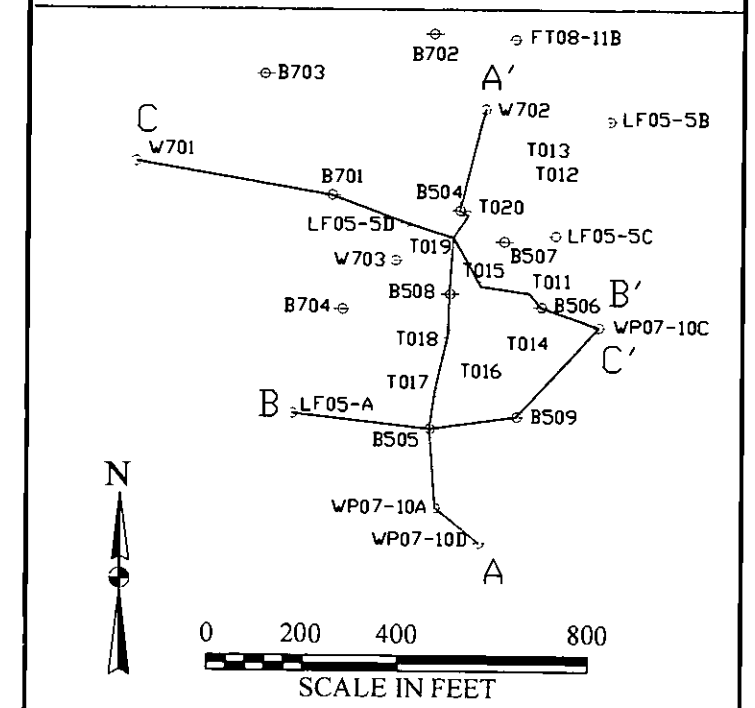
Legend

- Soilfill
- Landfill
- Clay
- Gravelly Clay
- Silt
- Sand
- Goodland/Walnut (Bedrock)
- Paluxy (Bedrock)

Vertical Exaggeration = 10 X

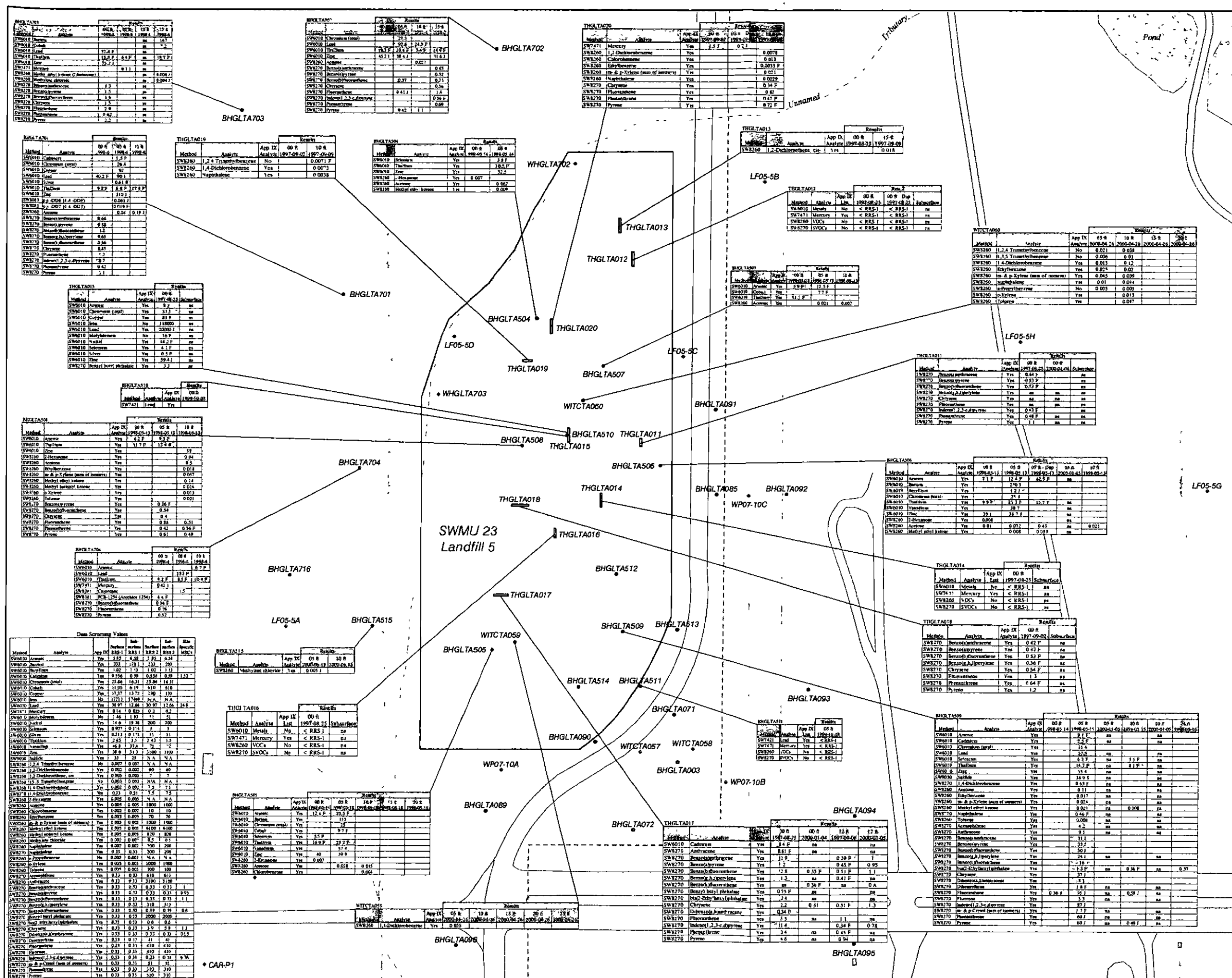
Groundwater Elevation July 2000

B812 = BHGLTA812
T024 = THGLTA024
W004 = WHGLTA004



Filename X \AFC001\024c\Report\SWMUs 22,23,24,and25\ LF05-DO2_XSECT dwg
Project AFC001-024C
Revised 09-07-00 ASP

HYDRO GeoLogic INC



HydroGeoLogic Inc
RFI SWMUs 22, 23 24, 25
NAS Fort Worth JRB, Texas

Figure 5.12

SWMU 23/Landfill 5 Analytical Results in Soil

U.S Air Force Center
For Environmental Excellence

Legend

- NAS Fort Worth JRB Boundary
- SWMU 23/Landfill 5
- Monitoring Well
- Soil Boring
- Test Pit

All results in mg/kg

Color Codes
- Analyte detected above RRS-2
- Analyte detected above RRS-2. Sample interval removed in IRA
- Analyte detected above RRS-2 but below site-specific MSC
- Analyte detected above RRS-2 but analytically eliminated as a COPC
- Initial analyte detection above RRS-2 but not confirmed during subsequent sampling.
- Analyte not detected or detected below RRS-1
- <RRS-1 Analytical sample not detected or detected below RRS-1

Notes
App IX Appendix IX analytical suite
COPC Constituent of Potential Concern
Date yyyy-mm-dd
IRA Interim Remedial Action
MSC Medium Specific Concentration GWP-Ind
N/A Not Applicable
ns Not Analyzed
ns Not Sampled
RRS-1 Risk Reduction Standard 1
RRS-2 Risk Reduction Standard 2
* Site-specific MSCs for cadmium and lead were derived from SPLP analysis of excavation confirmation samples at B309 These results are not presented on this map

BHGLTA504 BHGLTA509 — Full Appendix IX Suite
THGLTA011 THGLTA020 — RCRA Metals, VOCs, SVOCs

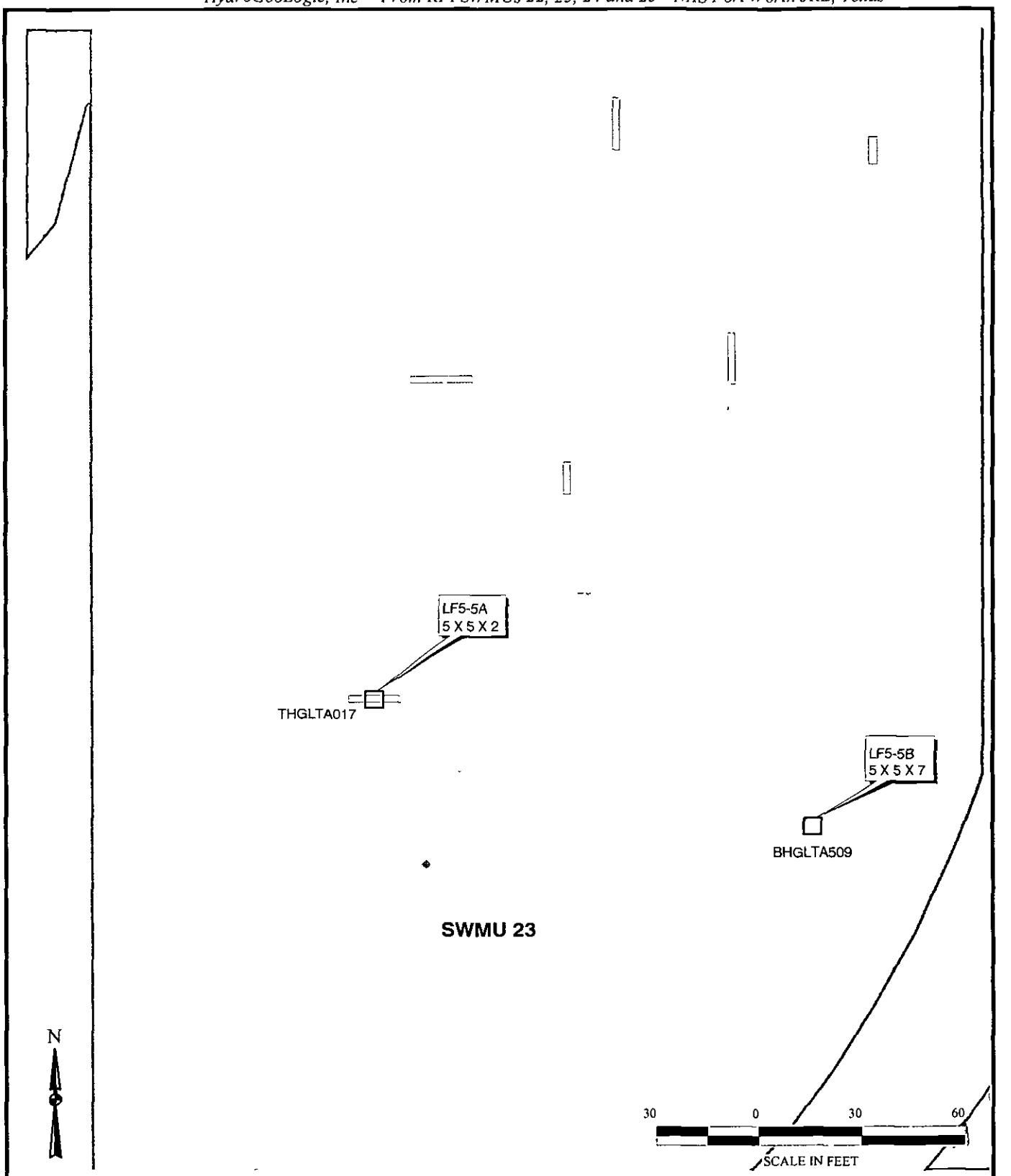
N

50 0 50 100
SCALE IN FEET

HYDRO GeoLogic INC

Filename X:\Afc001\024c\Report\Final RFI SWMUs 22 23 24, and 25\swmu23_analytical.apr
Project AFC001-024C
Created 08/25/00 jbelcher
Revised 05/30/01 asp
Source HydroGeoLogic, Inc—GIS Database

675 340



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Project AFC 001-024C
Created 06 08 00 TKH
Revised 05/29 01 ASP
Source HydroGeoLogic, Inc - GIS Database

HYDRO GeoLogic

Legend

Area of Study (SWMU 23)

SWMU

Excavation Areas

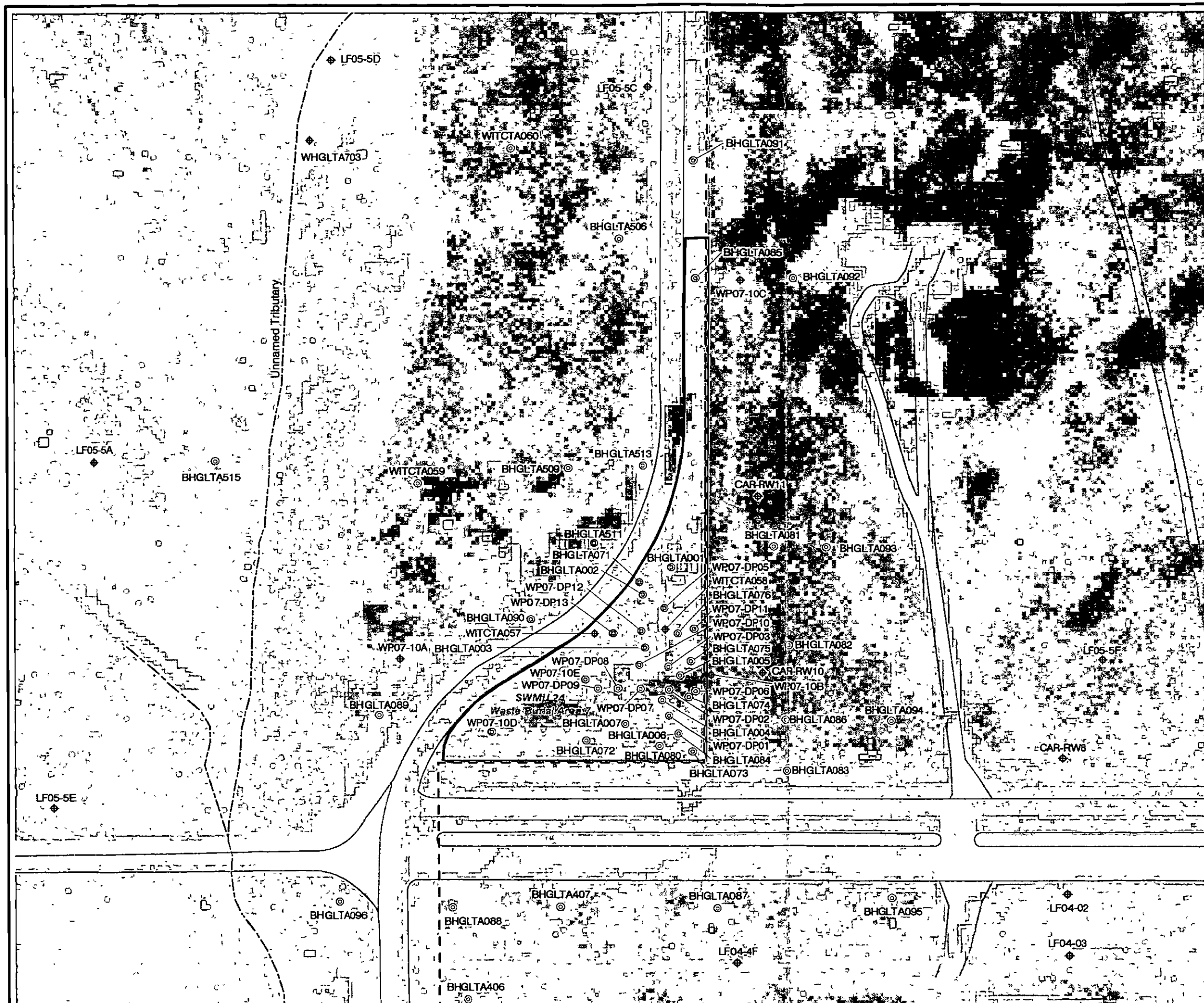
Trench

Monitoring Well

Borehole

Confirmation Sampling Location

Figure 5.13
Excavation Confirmation Sampling Locations
SWMU 23/Landfill 5



HydroGeoLogic, Inc —From RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 5.14
SWMU 24/Waste Burial Area 7
Soil Boring and Monitoring
Well Locations

U.S. Air Force Center for Environmental Excellence

Legend

- Monitoring Well
- Soil Borings
- Solid Waste Management Unit (SWMU)
- Building / Structure

Note: Aerial photograph represented on this figure is dated December 1958.

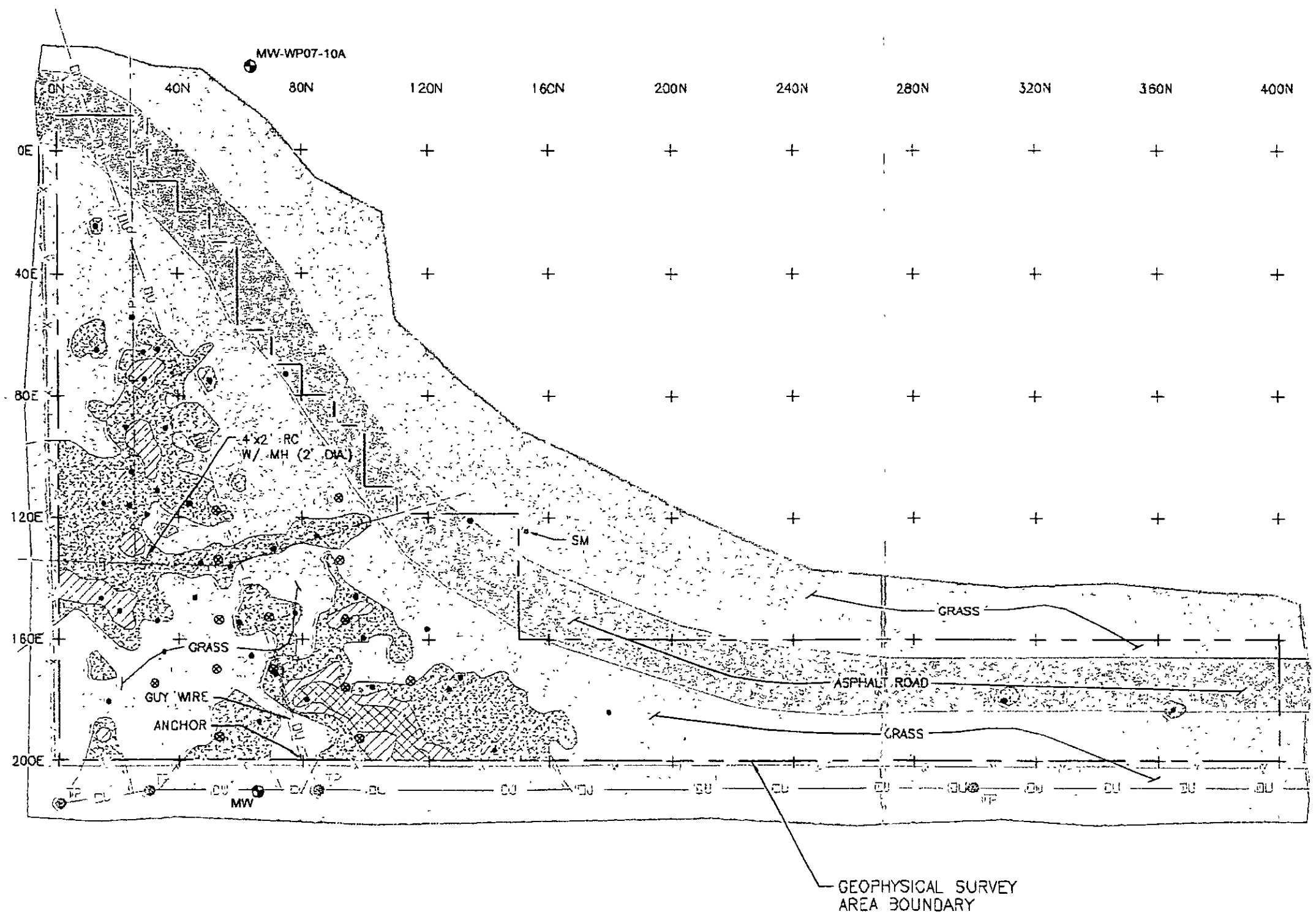
N

50 0 50 100

SCALE IN FEET

Filename X \Afc001\024c\Report\Final RFI SWMUs 22,23, 24, and 25\ swmu24_wp7 aerial apr
Project AFC001-0201
Created 02/25/00 jbelcher
Revised 05/30/01 asp
Source HGL ArcView GIS Database

HYDRO GeoLogic INC



HydroGeoLogic, Inc—RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 5.15
SWMU 24/Waste Burial Area 7 Site Map with Geophysical Interpretation

U.S. Air Force Center for Environmental Excellence

Legend

- Buried Metal Object
- Low Concentration of Buried Metal
- Moderate Concentration of Buried Metal
- High Concentration of Buried Metal
- Telephone Pole
- Direct Push Sample Point
- Monitoring Well
- —x— Fence
- —OU— Overhead Utilities
- —P— Buried Pipeline or Utility
- MW Monitoring Well
- RC Reinforced Concrete
- SM Surface Metal

Note: Locations of features outside survey area are approximate.

N

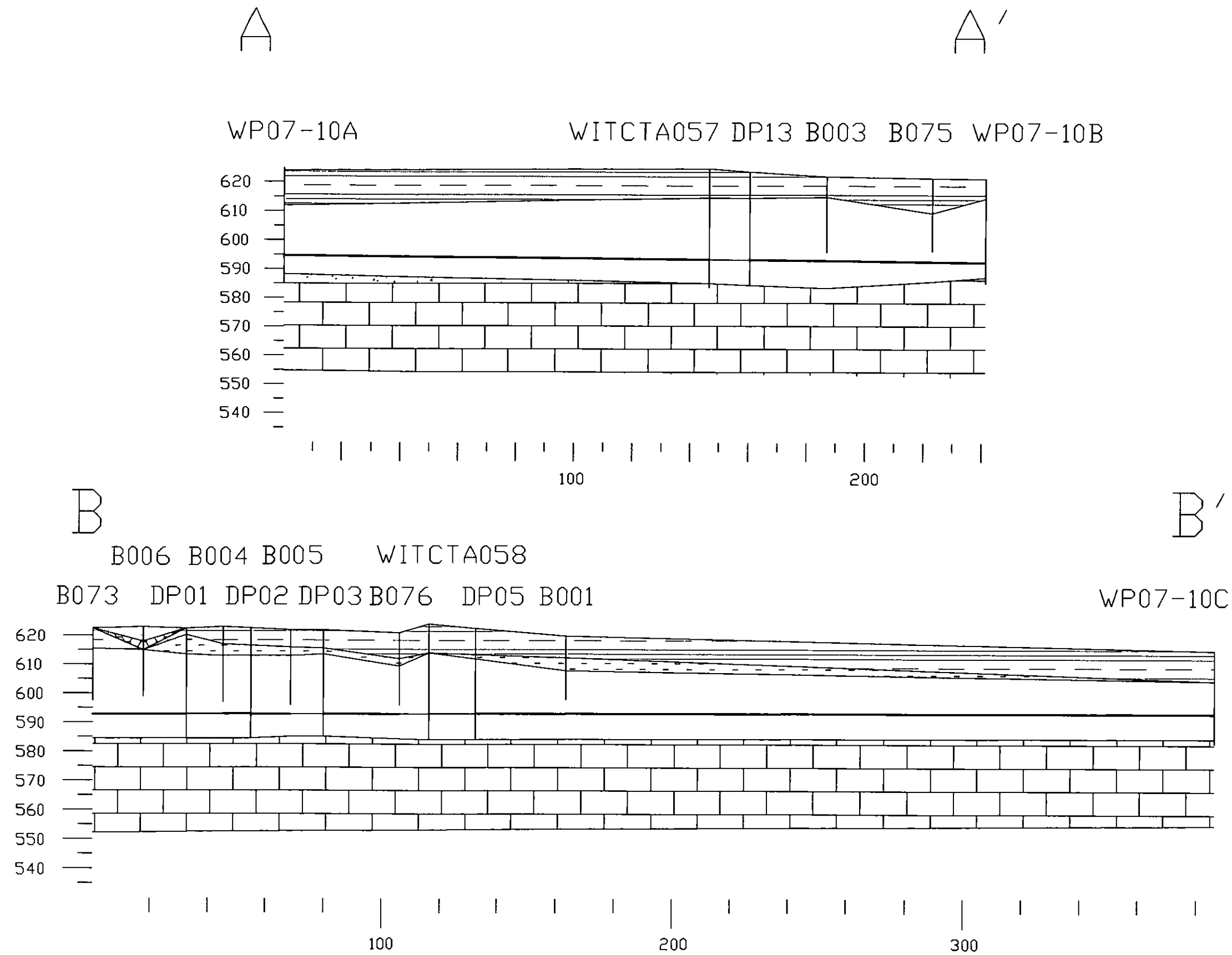
20 0 20 40 60
SCALE IN FEET

Filename X \AFC001\024C\Report
\Final Report SWMUs 22, 23, 24 and 25\WP7_sitemap cdr
Project AFC001-024C
Created by cfarmer 08/21/00
Revised 09/13/00 ap
Source IT Corporation 04/25/00

HYDRO GeoLogic INC

Figure 5.16
SWMU24/Waste Burial Area 7
Geologic Cross Sections

U.S. Air Force Center for Environmental Excellence



Legend

- Soilfill
- Landfill
- Clay
- Silt
- Sand
- Gravel with Sand
- Goodland/Walnut (Bedrock)
- Paluxy (Bedrock)

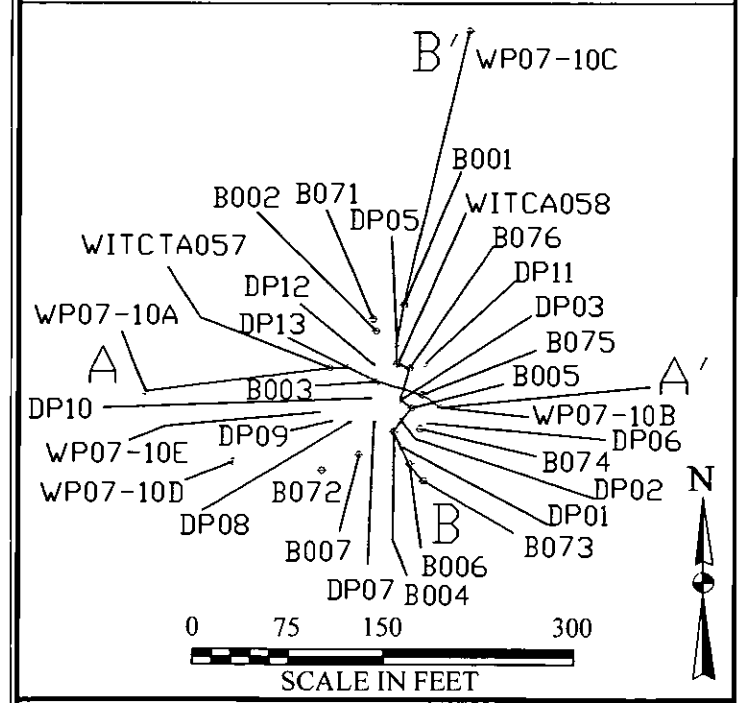
No Vertical Exaggeration

Groundwater Elevation July 2000

• B007 = BHGLTA007

• Monitoring Well

. Direct Push Location



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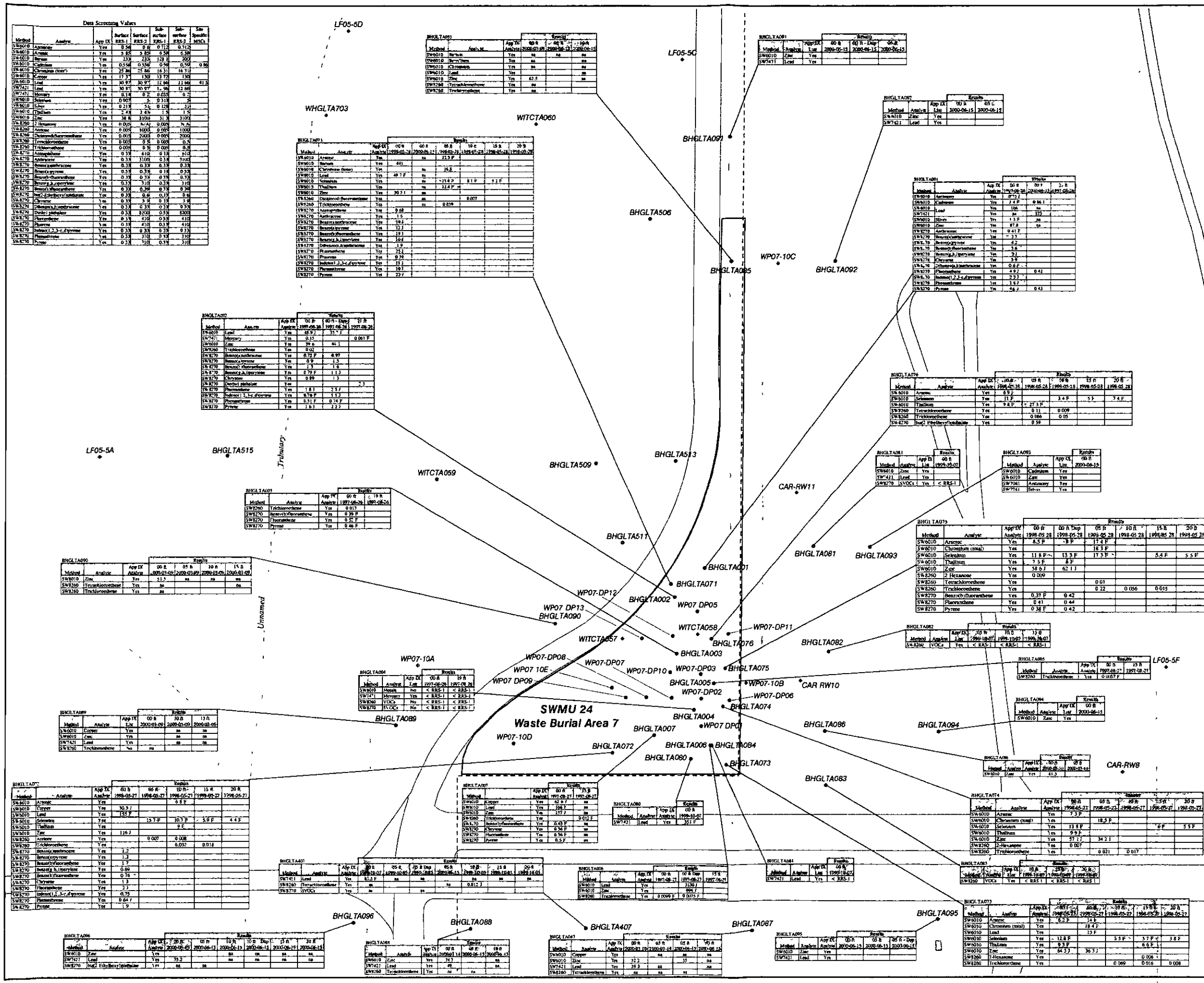
Revised 09-12-00 ASP

HYDRO GeoLogic INC



Data Screening Values

Method	Analyte	App IX	Surface RRS-1	Surface RRS-2	Subsurface RRS-1	Subsurface RRS-2	Site Specific MSCs
SW6010	Antimony	Yes	0.54	0.8	0.712	0.712	
SW6010	Arsenic	Yes	3.85	5.89	0.58	0.58	
SW6010	Barium	Yes	233	233	128	200	
SW6010	Cadmium	Yes	0.556	0.556	0.99	0.99	0.86
SW6010	Chromium (total)	Yes	25.86	25.86	16.31	16.31	
SW6010	Copper	Yes	13.37	130	13.72	130	
SW6010	Lead	Yes	30.97	30.97	12.66	12.66	41.5
SW7421	Lead	Yes	30.97	30.97	1.99	12.66	
SW7471	Mercury	Yes	0.14	0.2	0.035	0.2	
SW6010	Selenium	Yes	0.907	.5	0.318	.5	
SW6010	Silver	Yes	0.218	.5	0.128	.218	
SW6010	Thallium	Yes	2.43	2.43	1.5	1.5	
SW6010	Zinc	Yes	38.8	3100	31.3	3100	
SW8260	2-Hexanone	Yes	0.005	N/A	0.005	N/A	
SW8260	Acetone	Yes	0.005	1000	0.005	1000	
SW8260	Dichloromethane/methylene	Yes	0.005	2000	0.005	2000	
SW8260	Tetrachloroethene	Yes	0.005	0.5	0.005	0.5	
SW8260	Trichloroethene	Yes	0.005	0.5	0.005	0.5	
SW8270	Acenaphthene	Yes	0.33	610	0.33	610	
SW8270	Anthracene	Yes	0.33	3100	0.33	3100	
SW8270	Benzo(a)anthracene	Yes	0.33	0.33	0.33	0.33	
SW8270	Benzo(a)pyrene	Yes	0.33	0.33	0.33	0.33	
SW8270	Benzo(b)fluoranthene	Yes	0.33	0.33	0.33	0.33	
SW8270	Benzo(g,h,i)perylene	Yes	0.33	310	0.33	310	
SW8270	Benzo(k)fluoranthene	Yes	0.33	0.39	0.33	0.39	
SW8270	bis(2-Ethylhexyl)phthalate	Yes	0.33	0.4	0.33	0.4	
SW8270	Chrysene	Yes	0.33	3.9	0.33	3.9	
SW8270	Dibenzo(a,h)anthracene	Yes	0.33	0.33	0.33	0.33	
SW8270	Dioctyl phthalate	Yes	0.33	8200	0.33	8200	
SW8270	Fluoranthene	Yes	0.33	410	0.33	410	
SW8270	Fluorene	Yes	0.33	410	0.33	410	
SW8270	Indeno(1,2,3-c,d)pyrene	Yes	0.33	0.33	0.33	0.33	
SW8270	Phenanthrene	Yes	0.33	310	0.33	310	
SW8270	Pyrene	Yes	0.33	310	0.33	310	

BHGLTA093

Method	Analyte	App IX Analyte	00 ft 2000-05-15	00 ft Dup 2000-06-15	05 ft 2000-06-15
SW6010	Barium	Yes	na	na	na
SW6010	Beryllium	Yes	na		na
SW6010	Chromium	Yes	na		na
SW6010	Lead	Yes			na
SW6010	Zinc	Yes	63.5		na
SW8260	Tetrachloroethene	Yes	na		
SW8260	Trichloroethene	Yes	na		

BHGLTA091

Method	Analyte	App IX List	00 ft 2000-05-15	00 ft Dup 2000-06-15	05 ft 2000-06-15
SW6010	Zinc	Yes			
SW7421	Lead	Yes			

BHGLTA092

Method	Analyte	App IX List	00 ft 2000-06-15	05 ft 2000-06-15
SW6010	Zinc	Yes		
SW7421	Lead	Yes		

BHGLTA073

Method	Analyte	App IX Analyte	00 ft 1998-05-28	00 ft Dup 1998-05-28	05 ft 1998-05-28	10 ft 1998-05-28	15 ft 1998-05-28	20 ft 1998-05-28
SW6010	Arsenic	Yes	8.5 F	9 F	17.4 F			
SW6010	Chromium (total)	Yes			16.3 F			
SW6010	Selenium	Yes	11.8 F	13.3 F	17.3 F		5.4 F	5.5 F
SW6010	Thallium	Yes	7.5 F	8 F				
SW6010	Zinc	Yes	58.6 J	62.1 J				
SW8260	2-Hexanone	Yes	0.009					
SW8260	Tetrachloroethene	Yes			0.01			
SW8260	Trichloroethene	Yes			0.22	0.056	0.015	
SW8270	Benzo(b)fluoranthene	Yes	0.37 F	0.42				
SW8270	Fluoranthene	Yes	0.41	0.44				
SW8270	Pyrene	Yes	0.38 F	0.42				

BHGLTA001

Method	Analyte	App IX Analyte	00 ft 1997-08-26	00 ft 2000-06-15	2 ft 1997-08-26
SW6010	Antimony	Yes	0.75 J		
SW6010	Cadmium	Yes	7.4 F	0.86 J	
SW6010	Lead	Yes	166	na	
SW7421		Yes	na	275	
SW6010	Silver	Yes	1.3 F	na	
SW6010	Zinc	Yes	87.8	na	
SW8270	Acenaphthene	Yes	0.41 F		
SW8270	Benzo(a)anthracene	Yes	3.3		
SW8270	Benzo(a)pyrene	Yes	4.2		
SW8270	Benzo(b)fluoranthene	Yes	5.6		
SW8270	Benzo(g,h,i)perylene	Yes	2.1		
SW8270	Chrysene	Yes	5.9		
SW8270	Dibenzo(a,h)anthracene	Yes	0.62 J		
SW8270	Fluoranthene	Yes	4.9 J	0.42	
SW8270	Indeno(1,2,3-c,d)pyrene	Yes	2.2 J		
SW8270	Phenanthrene	Yes	3.6 J		
SW8270	Pyrene	Yes	4.6 J	0.43	

BHGLTA076

Method	Analyte	App IX Analyte	00 ft 1998-05-28	05 ft 1998-05-28	10 ft 1998-05-28	15 ft 1998-05-28	20 ft 1998-05-28
SW6010	Arsenic	Yes	6.9 J				
SW6010	Selenium	Yes	11 F		3.4 F	5.3	3.4 F
SW6010	Thallium	Yes	9.8 F	< 27.3 F			
SW8260	Tetrachloroethene	Yes		0.11	0.009		
SW8260	Trichloroethene	Yes		0.086	0.05		
SW8270	bis(2-Ethylhexyl)phthalate	Yes		0.59			

BHGLTA081

Method	Analyte	App IX List	00 ft 1998-05-07
SW6010	Zinc	Yes	
SW7421	Lead	Yes	
SW8270	SVOCs	Yes	< RRS-1

BHGLTA093

Method	Analyte	App IX List	00 ft 2000-06-15
SW6010	Cadmium	Yes	
SW6010	Zinc	Yes	
SW7041	Antimony	Yes	
SW7761	Selen	Yes	

BHGLTA082

Method	Analyte	App IX List	05 ft 1996-10-07	10 ft 1996-10-07	15 ft 1996-10-07
SW8260	VOCs	Yes	< RRS-1	< RRS-1	< RRS-1

BHGLTA095

Method	Analyte	App IX Analyte	00 ft 2000-06-15	00 ft Dup 2000-06-15	05 ft 2000-06-15
SW6010	Zinc	Yes			
SW7421	Lead	Yes			

BHGLTA095

Method	Analyte	App IX Analyte	00 ft 2000-06-15	05 ft 2000-06-15
SW6010	Zinc	Yes		
SW7421	Lead	Yes		

BHGLTA005

Method	Analyte	App IX List	25 ft 1997-08-27	25 ft 1997-08-27
SW8260	Trichloroethene	Yes	0.0167 F	

BHGLTA094

Method	Analyte	App IX List	00 ft 2000-06-15
SW6010	Zinc	Yes	

BHGLTA086

Method	Analyte	App IX Analyte	00 ft 2000-05-30	05 ft 2000-05-30
SW6010	Zinc	Yes	41.3	

BHGLTA074

Method	Analyte	App IX Analyte	00 ft 1998-05-27	05 ft 1998-05-27	10 ft 1998-05-27	15 ft 1998-05-27	20 ft 1998-05-27
SW6010	Arsenic	Yes		7.3 F			
SW6010	Chromium (total)	Yes			18.5 F		
SW6010	Selenium	Yes	13.8 F			6 F	5.5 F
SW6010	Thallium	Yes	9.9 F				
SW6010	Zinc	Yes	57.1 J	34.2 J			
SW8260	2-Hexanone	Yes	0.007				
SW8260	Trichloroethene	Yes		0.021	0.017		

BHGLTA083

Method	Analyte	App IX Analyte	00 ft 1996-10-07	05 ft 1996-10-07	10 ft 1996-10-07	15 ft 1996-10-07	20 ft 1996-10-07
SW8260	VOCs	Yes	< RRS-1	< RRS-1	< RRS-1		

BHGLTA073

Method	Analyte	App IX Analyte	00 ft 1998-05-28	05 ft 1998-05-28	10 ft 1998-05-28	15 ft 1998-05-28	20 ft 1998-05-28
SW6010	Arsenic	Yes	6.2 F	14 F			
SW6010	Chromium (total)	Yes		18.4 F			
SW6010	Lead	Yes		13 F			
SW6010	Selenium	Yes	12.8 F		5.5 F	5.7 F	3.8 F
SW6010	Thallium	Yes	9.3 F			6.6 F	
SW6010	Zinc	Yes	84.3 J	36.3 J			
SW8260	2-Hexanone	Yes				0.008	
SW8260	Trichloroethene	Yes			0.069	0.016	0.008

BHGLTA080

Method	Analyte	App IX Analyte	00 ft 1999-10-07
SW7421	Lead	Yes	33.8 J

BHGLTA084

Method	Analyte	App IX Analyte	00 ft 1999-10-07
SW7421	Lead	Yes	< RRS-1

BHGLTA407

Method	Analyte	App IX Analyte	00 ft 1998-10-07	05 ft 1999-10-07	05 ft Dup 1999-10-07	05 ft 2000-06-15	10 ft 1999-10-07	15 ft 1999-10-07	20 ft 1999-10-07
SW7421	Lead	Yes	81.5 F	na	na		na	na	na
SW8260	Tetrachloroethene	Yes				na	0.012 J		
SW8270	SVOCs	Yes	na		na				

BHGLTA096

Method	Analyte	App IX Analyte	00 ft 2000-06-15	05 ft 2000-06-15	10 ft 2000-06-15	10 ft Dup 2000-06-15	15 ft 2000-06-15	20 ft 2000-06-15
SW6010	Zinc	Yes			na	na	na	na
SW7421	Lead	Yes	35.2	na	na	na	na	na
SW8270	bis(2-Ethylhexyl)phthalate	Yes	na	na				

BHGLTA088

Method	Analyte	App IX Analyte	00 ft 2000-06-15	05 ft 2000-06-15	05 ft Dup 2000-06-15	10 ft 2000-06-15
SW6010	Zinc	Yes	34.3			na
SW7421	Lead	Yes	na			
SW8260	Tetrachloroethene	Yes	na	na	na	

BHGLTA407

Method	Analyte	App IX Analyte	00 ft 2000-05-15	00 ft Dup 2000-05-15	05 ft 2000-06-15	10 ft 2000-06-15
SW6010	Copper	Yes	na	na	na	na
SW6010	Zinc	Yes	32.2		35	na
SW7421	Lead	Yes	39.3	na		na
SW8260	Tetrachloroethene	Yes	na		na	

BHGLTA095

Method	Analyte	App IX Analyte	00 ft 2000-06-15	05 ft 2000-06-15	05 ft Dup 2000-06-15
SW6010	Zinc	Yes			
SW7421	Lead	Yes			

HydroGeoLogic Inc
RFI SWMUs 22, 23 24, 25
NAS Fort Worth JRB, Texas

Figure 5.17

SWMU 24/Waste Burial Area 7 Analytical Results in Soil

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Legend

- NAS Fort Worth JRB Boundary
- SWMU 24/Waste Burial Area 7
- Monitoring Well
- Soil Boring
- Test Pit

All results in mg/kg

Color Codes

- Analyte detected above RRS-2
- Analyte detected above RRS-2. Sample interval removed in IRA.
- Analyte detected above RRS-2 but below site-specific MSC
- Analyte detected above RRS 2 but statistically determined as a COPC
- Initial analyte detection above RRS 2 but not confirmed during subsequent sampling
- Analyte not detected or detected below RRS-1
- < RRS-1 — Analytical suite not detected or detected below RRS-1

Notes

App IX Appendix IX analytical suite
COPC - Contaminant of Potential Concern
Date yyyy-mm-dd
IRA Interim Remedial Action
MSC - Medium Specific Concentration GWP Ind
N/A Not Applicable
na Not Analyzed
nn - Not Sampled
RRS-1 Risk Reduction Standard 1
RRS-2 Risk Reduction Standard 2

Borings B001 B007 — samples analyzed for RCRA metals VOCs and SVOCs.
Borings B071 B076 — samples analyzed for Appendix IX
Borings B080 B096 — samples analyzed for specific analytes or analytical suites
Borings WP07 DP01 WP07-DP14 — bedrock depth borings with VOC screening at surface of water table

N

40 0 40 80

SCALE IN FEET

HYDRO GeoLogic INC.

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Revised 05/29 01 asp
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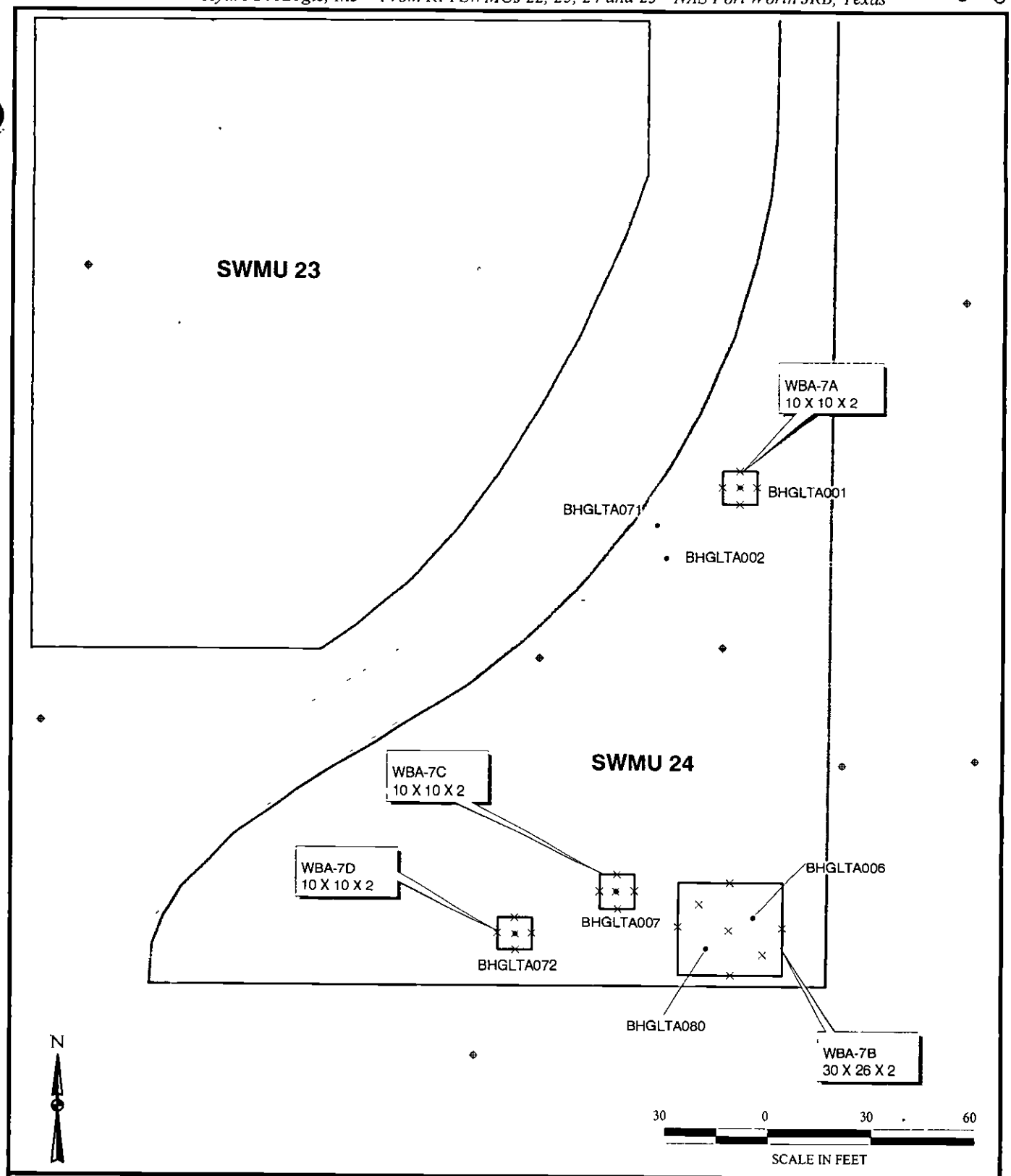

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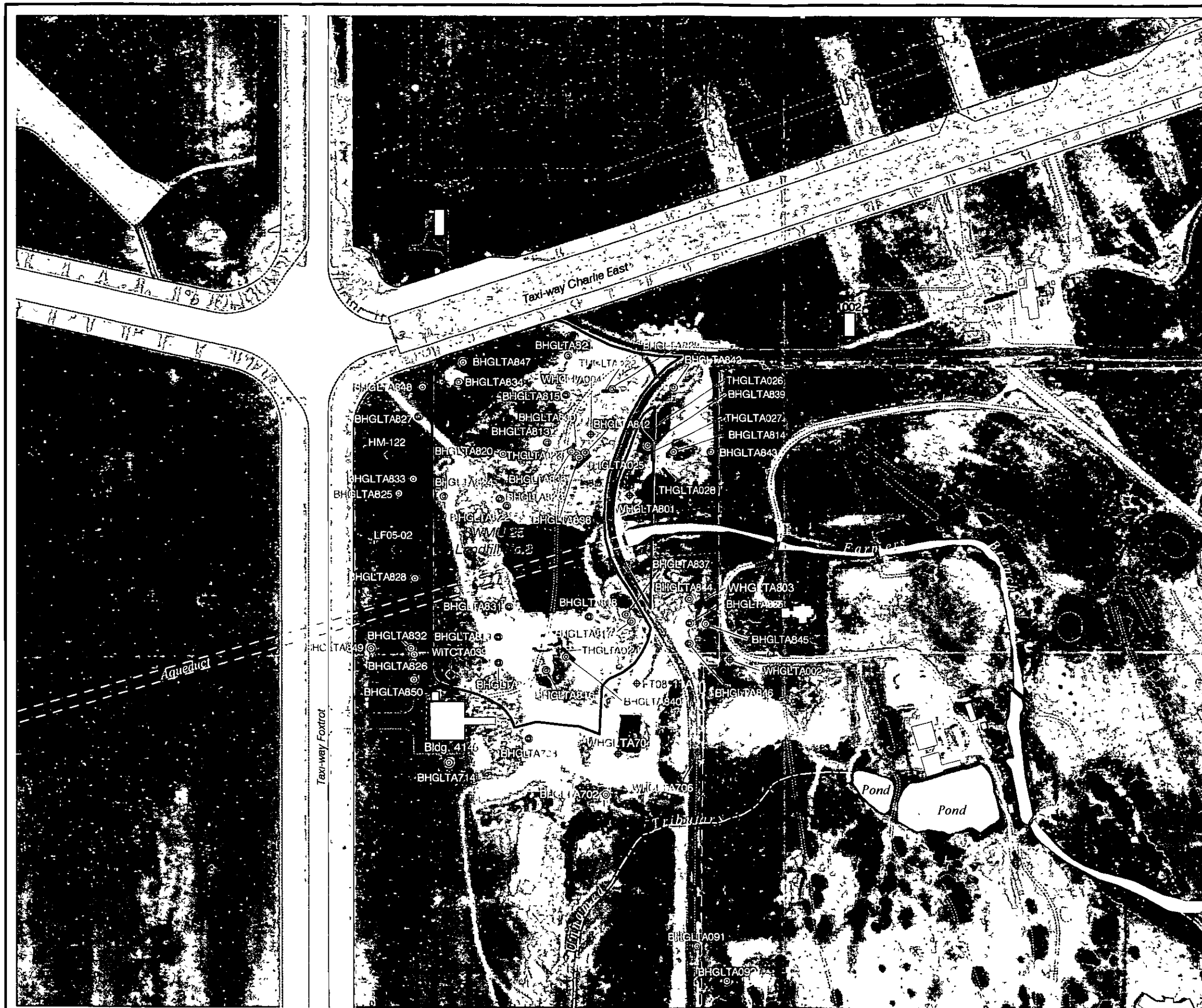
Project AFC 001-024C
Created 06 08 00 TKH
Revised 05 29 01 ASP
Source HydroGeoLogic, Inc – GIS Database

HYDRO GeoLogic

Legend

- Area of Study (SWMU 24)
- SWMU
- Excavation Areas
- Confirmation Sampling Location
- Borehole
- Monitoring Well

Figure 5.18
Excavation Confirmation Sampling Locations
SWMU 24/Waste Burial Area 7



HydroGeoLogic, Inc —From RFI SWMUs 22, 23, 24, and 25
NAS Fort Worth JRB, Texas

Figure 5.19
SWMU 25/Landfill 8
Soil Boring, Test Pit, and Monitoring Well Locations

U.S. Air Force Center for Environmental Excellence

Legend

- NAS Fort Worth JRB (Carswell Field)
- Landfill Boundaries
- Test Pit Location
- Borehole Location
- Monitoring Well

Note: Aerial photograph represented on this figure is dated August 1962

N

200 0 200 400
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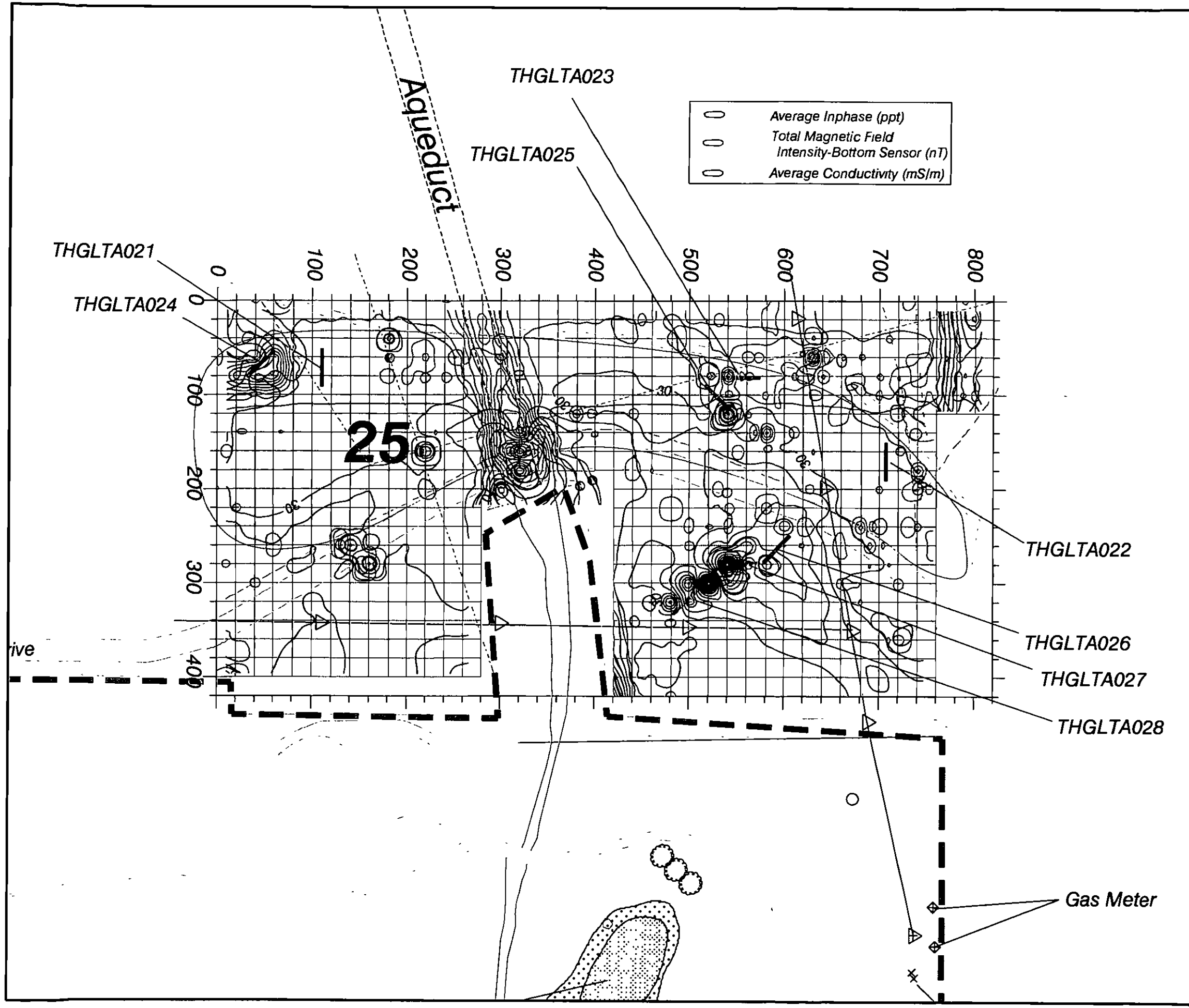
GIS Database

HYDRO GeoLogic INC



HydroGeoLogic, Inc —RFI SWMUs 22, 23, 24 and 25
NAS Fort Worth JRB, Texas

Figure 5.20
Composite Geophysical Results
SWMU 25/Landfill 8

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Legend

- Approximate NAS Ft. Worth JRB Site Boundary
- 25 Solid Waste Management Unit
- 20 foot grid spacing
- THGLTA023 Test Pit
- Road
- Overhead Utility
- Sanitary Sewer
- Gas Line
- Communication Line
- Water Line
- Underground Utility
- Manhole Cover
- Sprinkler Head
- Tree

N

0 50 100 200

SCALE IN FEET

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Revised 09-13-00 ap
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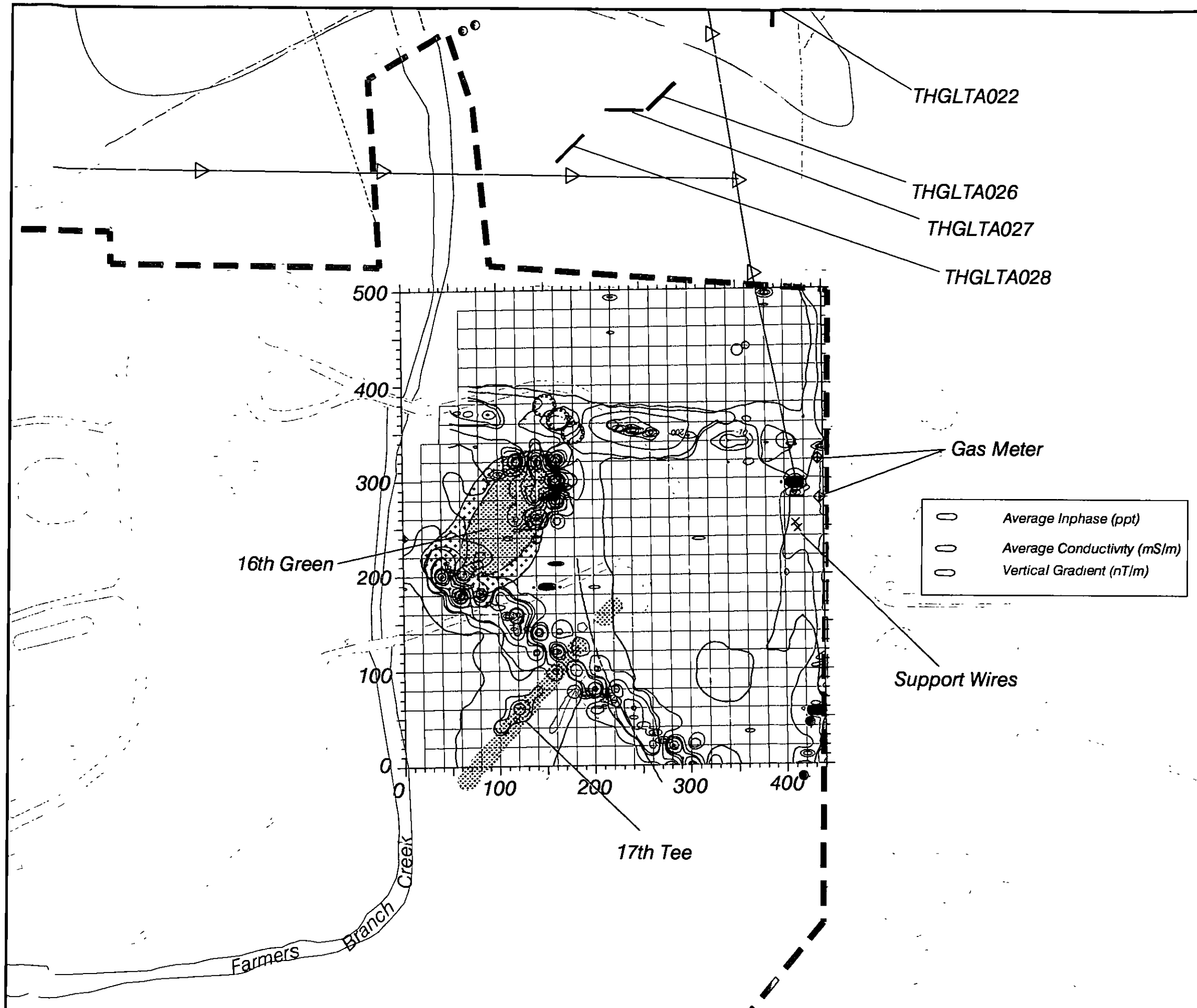

HydroGeoLogic, Inc —RFI SWMUs 22, 23, 24 and 25
NAS Fort Worth JRB, Texas

Figure 5.21
Composite Geophysical Results
Carswell Golf Course

U.S. Air Force Center for
Environmental Excellence

Legend

- Approximate NAS Ft. Worth JRB Site Boundary
- 25 — Solid Waste Management Unit
- 20 foot grid spacing
- THGLTA023 — Test Pit
- Road
- Overhead Utility
- Sanitary Sewer
- Gas Line
- Communication Line
- Water Line
- Underground Utility
- Manhole Cover
- Sprinkler Head
- Tree

N

0 50 100 200
SCALE IN FEET

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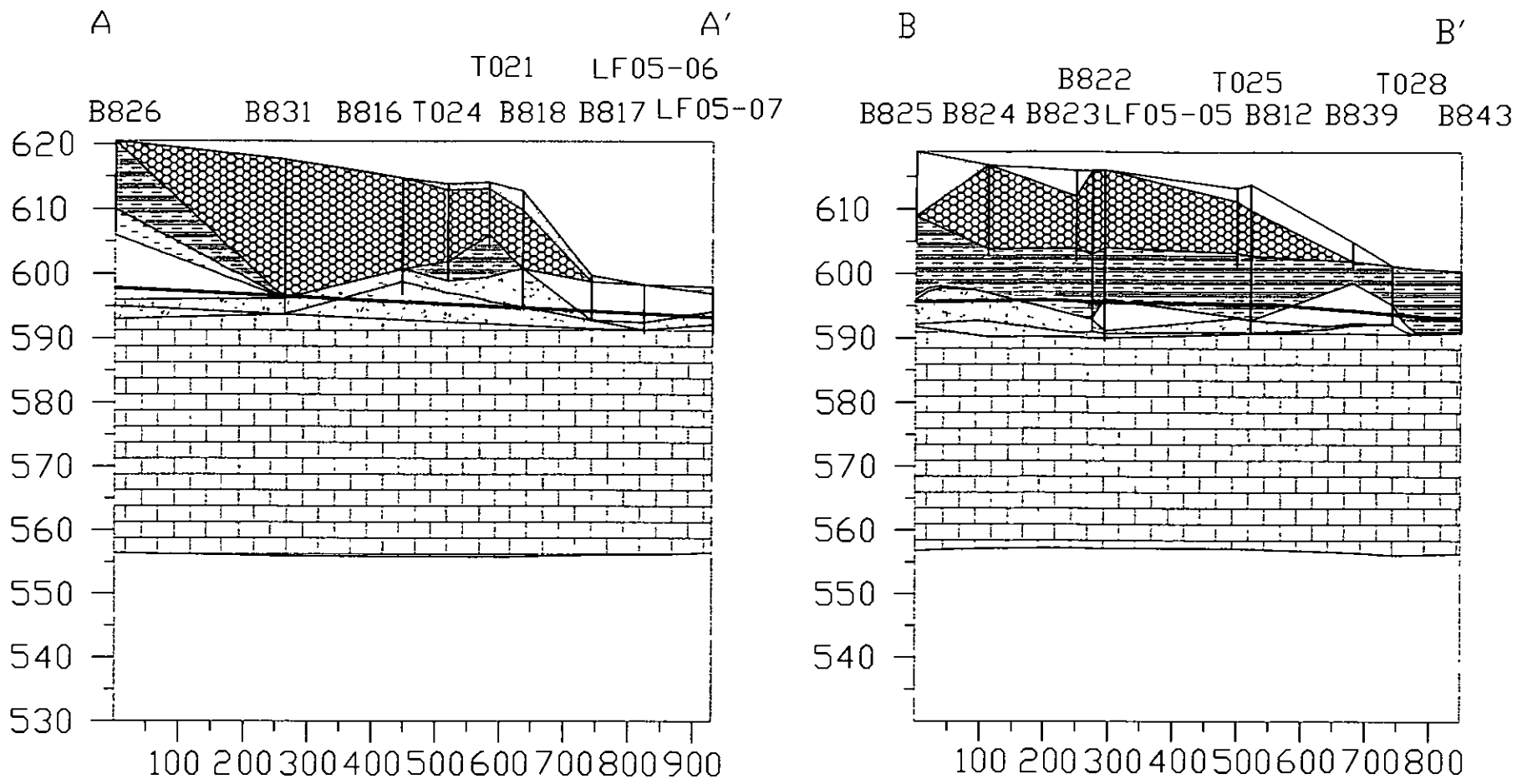
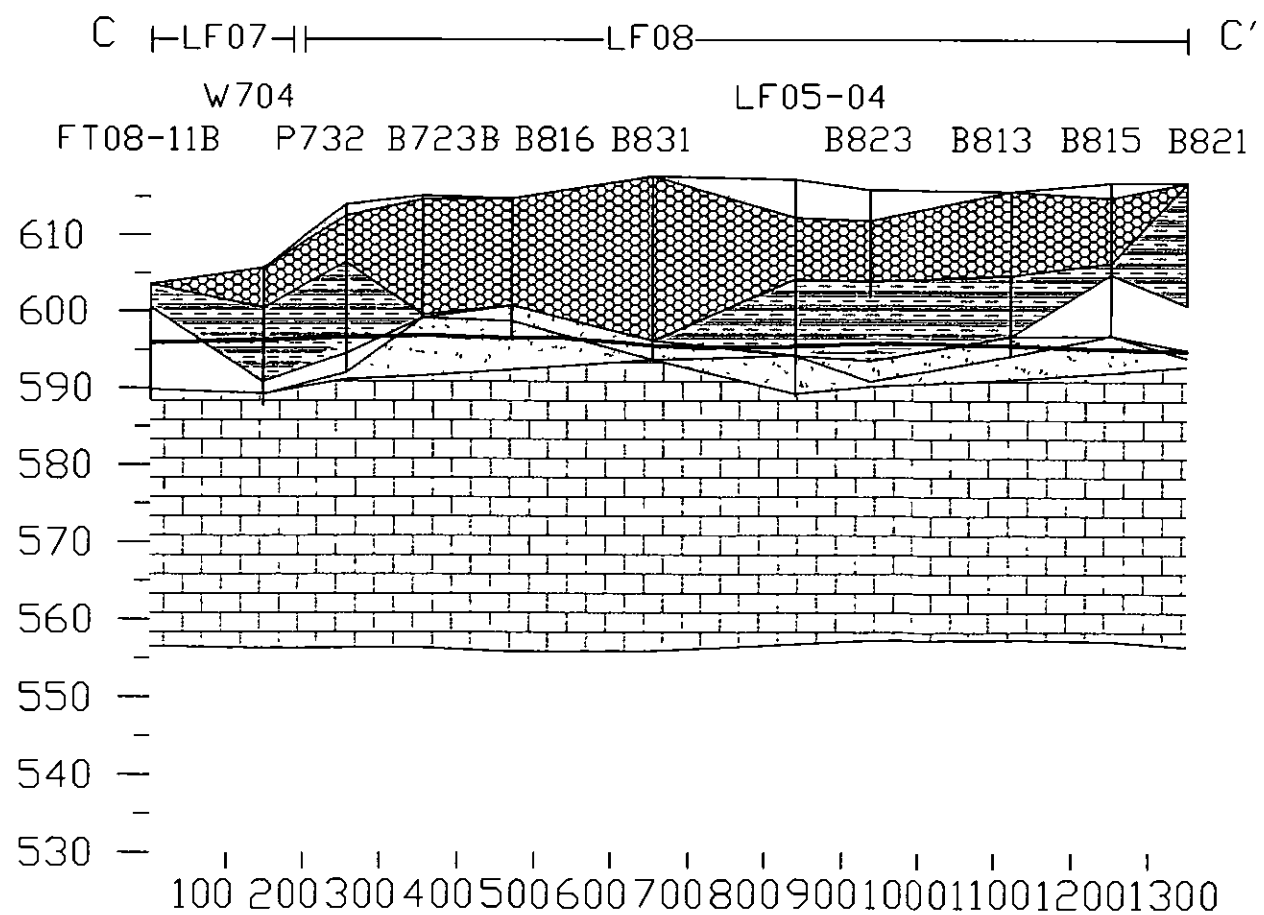
Revised 09-13-00 ap

HYDRO GeoLogic INC





HydroGeoLogic, Inc — RFI SWMUs 22, 23, 24 and 25
NAS Fort Worth JRB, Texas

Figure 5.22
SWMU 25/Landfill 8
Geologic Cross Sections

U.S. Air Force Center for Environmental Excellence

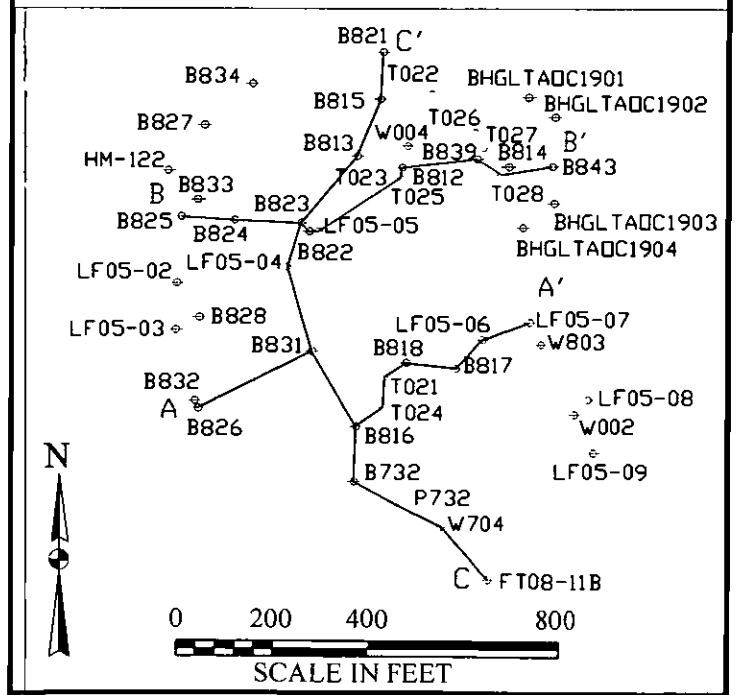
Legend

- Soilfill
- Landfill
- Clay
- Silt
- Sand with Clay and Gravel
- Clayey Gravel
- Sand and Gravel
- Goodland/Walnut (Bedrock)
- Paluxy (Bedrock)

Vertical Exaggeration = 10 X

Groundwater Elevation July 2000

B812 = BHGLTA812
T024 = THGLTA024
W004 = WHGLTA004
P732 = PHGLTA732



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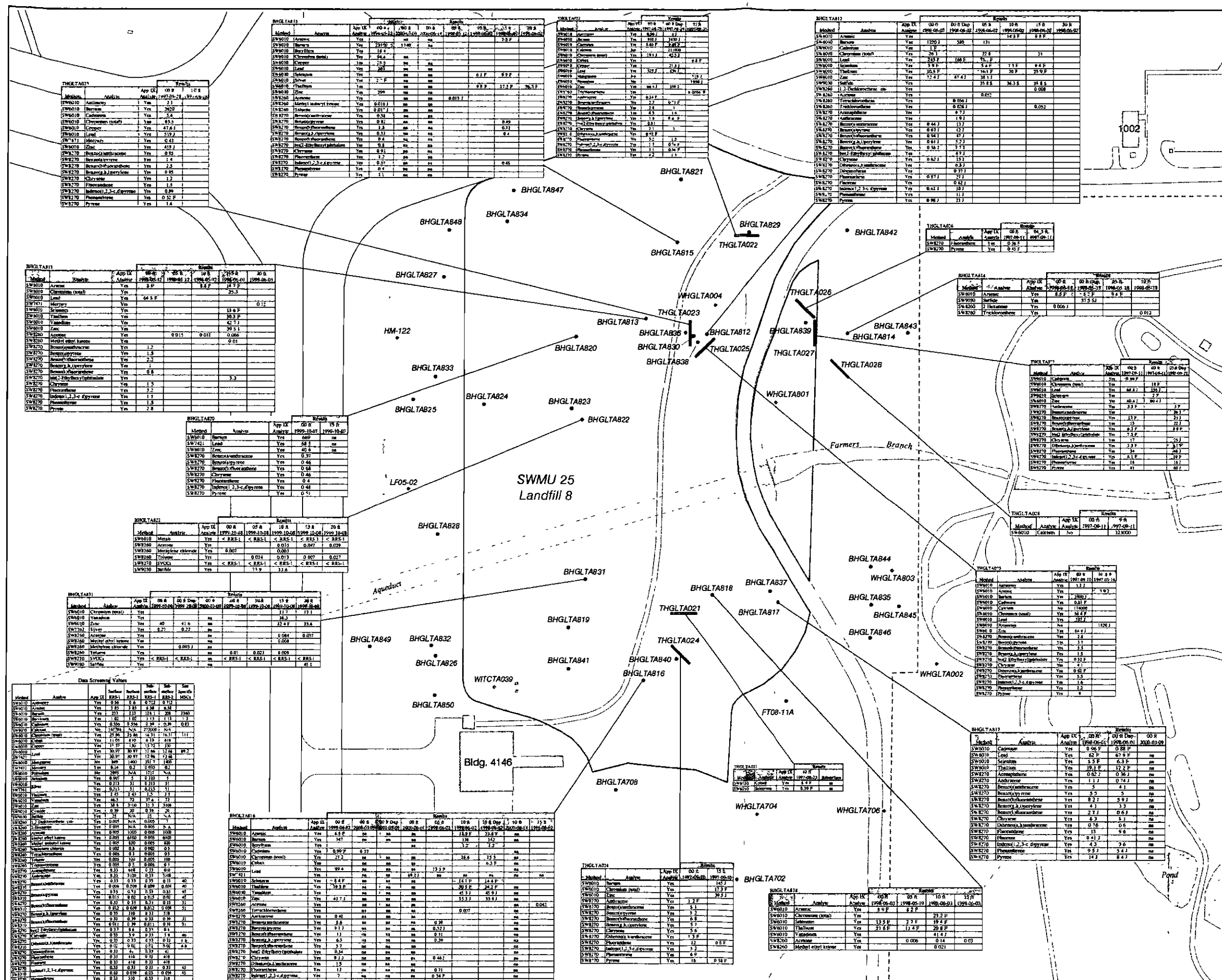

HydroGeoLogic,Inc
RFI SWMUs 22, 23 24, 25
NAS Fort Worth JRB, Texas

Figure 5.23

SWMU 25/Landfill 8 Analytical Results in Soil Characterization Sampling

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For Environmental Excellence

Legend

- NAS Fort Worth JRB Boundary
- SWMU 24/Waste Burial Area 7
- Monitoring Well
- Soil Boring
- Test Pit

All results in mg/kg

Color Codes
- Analyte detected above RRS-2
- Analyte detected above RRS-2 Sample interval removed in IRA
- Analyte detected above RRS-2 but below site-specific MSC.
- Analyte detected above RRS 2 but statistically eliminated as a COPC
- Initial analyte detection above RRS-2 but not confirmed during subsequent sampling.
- Analyte not detected or detected below RRS 1
- < RRS-1 Analytical state not detected or detected below RRS 1

Notes.
App IX Appendix IX analytical state
COPC Contaminant of Potential Concern
Date yyyy-mm-dd
IRA Interim Remedial Action
MSC Medium Specific Concentration GWP Ind
N.A Not Applicable
na Not Analyzed
ns Not Sampled
RRS-1 Risk Reduction Standard 1
RRS-2 Risk Reduction Standard 2

All borings with results tables on this figure were analyzed for the full suite of Appendix IX. compounds.
All samples from test pits were analyzed for Metals (RCRA list), VOCs, and SVOCs only

N

75 0 75 150
SCALE IN FEET

HYDRO GeoLogic INC

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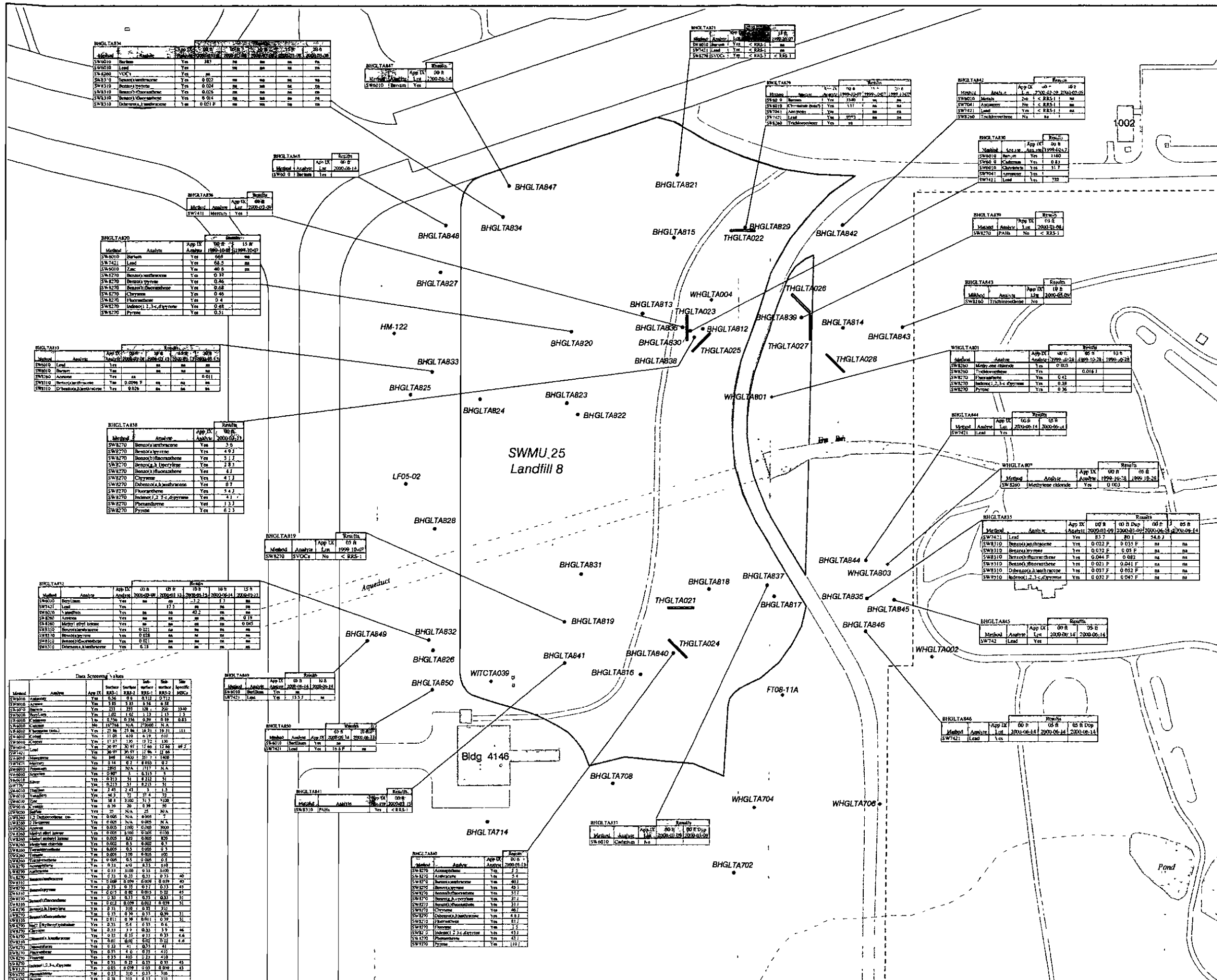

HydroGeoLogic, Inc
RFI SWMUs 22, 23, 24, 25
NAS Fort Worth JRB, Texas

Figure 5.24

SWMU 25/Landfill 8 Analytical Results in Soil Confirmation/Delineation

U.S. Air Force Center
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Legend

- NAS Fort Worth JRB Boundary
- SWMU 24/Waste Burial Area 7
- Monitoring Well
- Soil Boring
- Test Pit

All results in mg/kg

Color Codes

- Analyte detected above RRS-2
- Analyte detected above RRS-2. Sample interval removed in IRA
- Analyte detected above RRS-2, but below site-specific MSC
- Analyte detected above RRS-2, but statistically eliminated as a COPC
- Initial analyte detections above RRS-2 but not confirmed during subsequent sampling.
- Analyte not detected or detected below RRS 1
- <RRS-1 Analytical result not detected or detected below RRS 1

Notes

App ID. Appendix D, analytical suite
COPC Contaminant of Potential Concern
Date - yyyy-mm-dd
IRA Interim Remedial Action
MSC Medium Specific Concentration GWP-ind
N/A Not Applicable
na Not Analyzed
ns - Not Sampled
RRS-1 Risk Reduction Standard 1
RRS-2 Risk Reduction Standard 2

All borings with results tables on this figure were analyzed for specific analytes or analytical suites.

N

75 0 75 150

SCALE IN FEET

HYDRO GeoLogic INC

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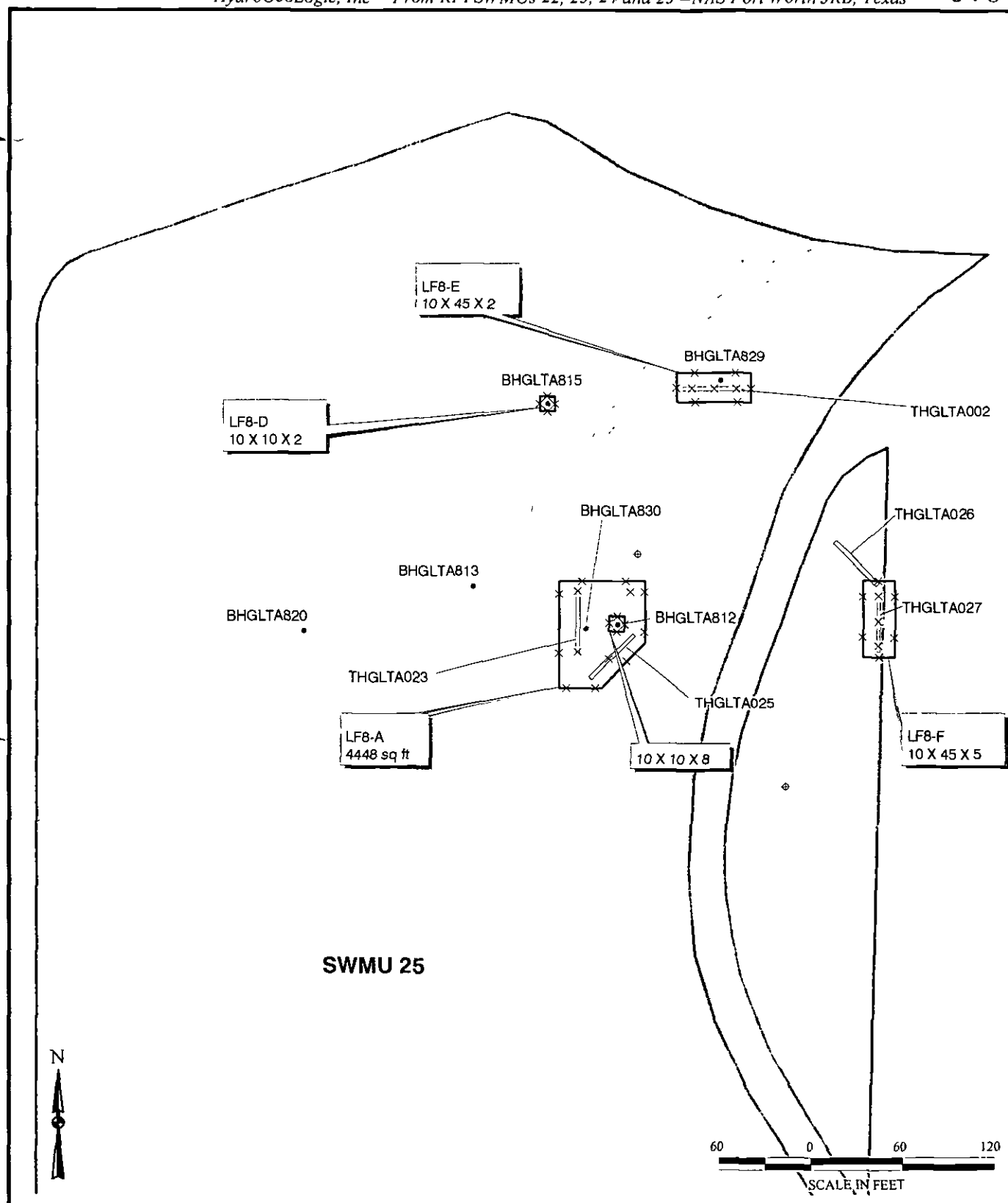
Created *08/29/00 jbelcher*
Revised *09/11/00 jb*
Source *HydroGeoLogic, Inc.—GIS Database*



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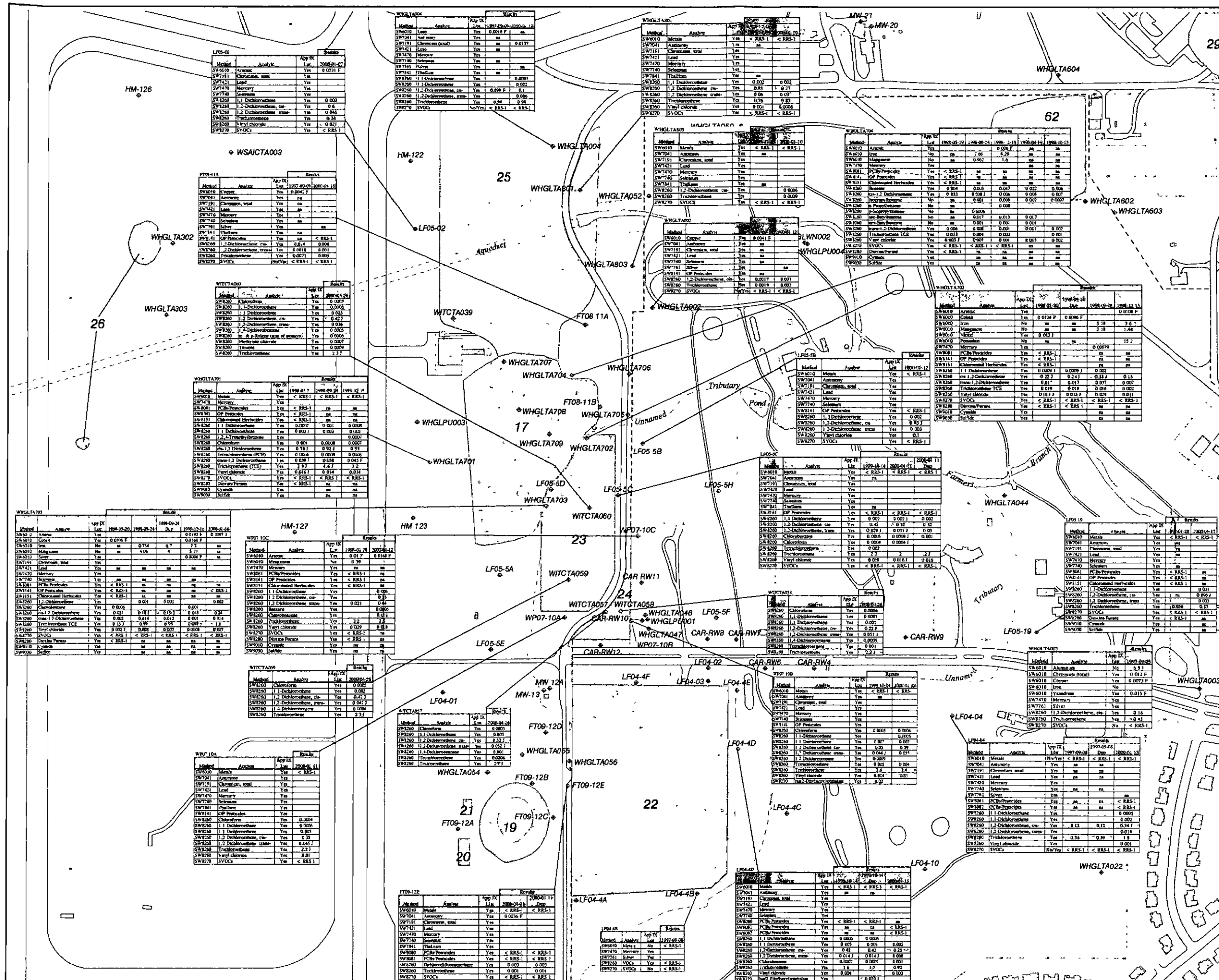
Project AFC001-024C
Created 06 08 00 TKH
Revised 05 29 01 ASP
Source HydroGeologic, Inc - GIS Database

HYDRO GeoLogic

Legend

Area of Study (SWMU 25)
SWMU
Excavation Areas
Trench
Borehole
Monitoring Well
Confirmation Sampling Location

Figure 5.25
Excavation Confirmation Sampling Locations
SWMU 25/Landfill 8



HydroGeoLogic, Inc — RFI SWMUs 22, 23, 24 and 25
NAS Fort Worth JRB, Texas

Figure 5.26

Alluvial Terrace Groundwater Sampling Results (1997-2000)

U.S. Air Force Center
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Legend

- NAS Fort Worth JRB Boundary
- Former Carswell Air Force Base Boundary
- Solid Waste Management Unit (SWMU)
- Building / Structure
- Monitoring Well
- Appendix IX Well
- Temporary Well (Abandoned July 2000)

NOTES

J = Estimated
F = Detection between the SQL and MDL
S = Screening level data
NA = Not Analyzed
N/A = Not Applicable

All data reported are => RRS1

Yellow shaded values in analytical tables indicate values => RRS2

All data reported in mg/kg

No shading indicates analyte not detected or detected below RRS-1

Not Yes - analytical results in 1997 were for RCRA metals VOCs (AFCEE List)
SVOCs (AFCEE List) only. Subsequent data analyzed for Appendix IX list

Method	Analyte	App IX List	RRS-1	RRS-2
SW6010	Aluminum	No	1 332	100
SW7041	Antimony	Yes	0 002	0 006
SW6010	Arsenic	Yes	0 0049	0 02
SW8260	Chloroform	Yes	0 0005	0 1
SW6010	Chromium (total)	Yes	0 006	0 1
SW7191	Chromium (total)	Yes	0 006	0 1
SW6010	Cobalt	Yes	0 0085	6 1
SW6010	Copper	Yes	0 0028	1 3
SW6010	Iron	No	0.224	N A
SW6010	Lead	Yes	0 0018	0 015
SW6010	Nickel	Yes	0 0054	2
SW6010	Vanadium	Yes	0 012	0 72
SW8260	1 1 Dichloroethane	Yes	0 0004	10
SW8260	1 1 Dichloroethene	Yes	0 0005	0 007
SW8260	1,2 Dichloroethane (cis-	Yes	0 0005	0 07
SW8260	1,2 Dichloroethane (trans-	Yes	0 0005	0 1
SW 8260	1 4 Dichlorobenzene	Yes	0 0003	0 075
SW8260	1 2 Dichloropropane	Yes	0 0004	0 005
SW8260	Benzene	Yes	0 0004	0 005
SW8260	Chlorobenzene	Yes	0 0004	0 1
SW8260	Dichloromethane/methylene chloride	Yes	0 0005	20
SW8260	m- & p-Xylene (sum of isomers)	Yes	0 0005	10
SW8260	Methylene chloride	Yes	0 0003	0 005
SW8260	Tetrachloroethene	Yes	0 0004	0 005
SW8260	Toluene	Yes	0 0005	1
SW8260	Trichloroethene	Yes	0 0005	0 005
SW8260	Vinyl acetate	Yes	0 005	100
SW8260	Vinyl chloride	Yes	0 0005	0 005
SW8270	bis(2 Ethylhexyl)phthalate	Yes	0 01	0.01

Filename Y:\Afc001\024C\Report\Final SWMUs 22 23, 24 25\groundwater.apr
Project AFC001-024C
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Revised 05/30 00 asp
Source HydroGeoLogic Inc GIS Database

TAB

SECTION 6.0

6.0 CONCLUSIONS

SWMUs 22, 23, 24, and 25 have been investigated in accordance with Chapter 335, Subchapter S of the TNRCC RRSs and the NAS Fort Worth JRB Hazardous Waste Permit, HW-50289; Standard 2 and 3 contaminants have been delineated, and Standard 3 contaminated soils have been removed from the sites. All remaining COPCs at each of these units are Standard 2 and closure of soil under Standard 2 of the TNRCC RRS program is recommended for each for the four SWMUs. It is important to note that groundwater contamination in the landfill area of NAS Fort Worth JRB, which includes SWMUs 22, 23, 24, and 25, is being addressed and remediated under a separate environmental restoration project. A more detailed discussion of conclusions for each unit is presented below.

6.1 SWMU 22 CONCLUSIONS

SWMU 22 was a landfill used by the USAF during much of the history of Carswell AFB. The period of official operation of this SWMU was 1956 to 1975. In accordance with the NAS Fort Worth JRB hazardous waste permit, soil samples were collected in 5-foot intervals from the ground surface to the water table and analyzed for the full suite of Appendix IX compounds. Results from these soil samples indicated no detections of chlorinated herbicides, OP pesticides, dioxins, furans, or cyanide at SWMU 22. However, Standard 2 and Standard 3 concentrations of metals, mercury, VOCs, SVOCs, and OC pesticides were detected during the initial broad spectrum analytical phase of the RFI. Consistent with the RRSs and the guidance provided in the TNRCC Consistency Memorandum, these detections were subsequently either not confirmed; statistically eliminated; found to be anthropogenic or natural variations of background; shown to be laboratory artifacts; shown to be false positives due to matrix interference; determined to be not significant based on low frequency of detection, confirmed as Standard 2 and delineated; confirmed as Standard 3, delineated, and passed SPLP with a new site-specific MSC; or confirmed as Standard 3, delineated, failed SPLP, and excavated during IRA activities.

B2EHP was the only compound at SWMU 22 to fail SPLP. An IRA was initiated to remove the Standard 3 contaminated soil through excavation and disposal (Figure 5.8, excavation LF4-4A). The IRA was verified as complete when all confirmation samples were detected below the site-specific MSC of 1.3 mg/kg. The results of confirmation sampling are presented in Appendix M. As the remaining concentrations of B2EHP at SWMU 22 have passed SPLP and B2EHP has not been consistently detected in groundwater, it is believed that B2EHP does not present a potential risk to human health or the environment at SWMU 22.

Pursuant with Chapter 335, Subchapter S, and Sections 335.555 through 335.560 of the TNRCC RRS, this RFI demonstrates that attainment of RRS-2 (Closure/Remediation to health-based standards and criteria) has been achieved and closure of SWMU 22 soils is recommended. A letter stating that closure and remediation of SWMU 22 was carried out in accordance with Section 335.555, signed by the AFBCA representative, is provided along with a metes and bounds description of SWMU 22 (Appendix N).

In conclusion, it is believed based on the results of the RFI that SWMU 22 does not present a threat to human health or the environment as all compounds detected at the site are currently below

site-specific MSCs; all compounds are delineated to Standard 1; and a landfill cap has been constructed to prevent physical access to medical wastes identified in the landfill. Consequently, closure under Standard 2 of the TNRCC Risk Reduction Rules is recommended for SWMU 22.

6.2 SWMU 23 CONCLUSIONS

SWMU 23 was a landfill used by the USAF during much of the history of Carswell AFB. The period of official operation of this SWMU was 1963 to 1975. In accordance with the NAS Fort Worth JRB hazardous waste permit, soil samples were collected in 5-foot intervals from the ground surface to the water table and analyzed for the full suite of Appendix IX compounds. Results from these soil samples indicated no detections of chlorinated herbicides, OP pesticides, dioxins, furans, or cyanide at SWMU 23. However, Standard 2 and Standard 3 concentrations of metals, mercury, VOCs, and SVOCs were detected during the initial broad spectrum analytical phase of the RFI. Consistent with the RRSs and the guidance provided in the TNRCC Consistency Memorandum, these detections were subsequently either not confirmed; statistically eliminated; found to be anthropogenic or natural variations of background; shown to be laboratory artifacts; shown to be false positives due to matrix interference; determined to be not significant based on low frequency of detection, confirmed as Standard 2 and delineated; confirmed as Standard 3, delineated, and passed SPLP with a new site-specific MSC; or confirmed as Standard 3, delineated, failed SPLP, and excavated during IRA activities.

Cadmium, lead, and B2EHP were the only compounds at SWMU 23 with concentrations over site-specific MSCs. An IRA was initiated to remove the Standard 3 contaminated soil through excavation and disposal (Figure 5.13, excavations LF5-5A and LF5-5B). The IRA was verified as complete when all confirmation samples were detected below the site-specific MSC of 1.2 mg/kg. The results of confirmation sampling are presented in Appendix M. As the remaining concentrations of these compounds at SWMU 23 have passed SPLP and these compounds have not been detected in downgradient groundwater, it is believed that cadmium, lead, and B2EHP do not present a potential risk to human health or the environment at SWMU 23.

Pursuant with Chapter 335, Subchapter S, and Sections 335.555 through 335.560 of the TNRCC RRS, this RFI demonstrates that attainment of RRS-2 (Closure/Remediation to health-based standards and criteria) has been achieved and closure of SWMU 23 soils is recommended. A letter stating that closure and remediation of SWMU 23 was carried out in accordance with Section 335.555, signed by the AFBCA representative, is provided along with a metes and bounds description of SWMU 23 (Appendix N).

In conclusion, it is believed based on the results of the RFI that SWMU 23 does not present a threat to human health or the environment as all compounds detected at the site are currently below site-specific MSCs; all compounds are delineated to Standard 1; and a landfill cap has been constructed to prevent physical access to medical wastes identified in the landfill. Consequently, closure under Standard 2 of the TNRCC Risk Reduction Rules is recommended for SWMU 23.

6.3 SWMU 24 CONCLUSIONS

SWMU 24 was a waste burial area used by the USAF for a decade in the history of Carswell AFB. The period of official operation of this SWMU was the 1960s. In accordance with the NAS Fort Worth JRB hazardous waste permit, soil samples were collected in 5-foot intervals from the ground surface to the water table and analyzed for the full suite of Appendix IX compounds. Results from these soil samples indicated no detections of chlorinated herbicides, OP pesticides, dioxins, furans, or cyanide at SWMU 24. However, Standard 2 and Standard 3 concentrations of metals, mercury, VOCs, and SVOCs were detected during the initial broad spectrum analytical phase of the RFI. Consistent with the RRSs and the guidance provided in the TNRCC Consistency Memorandum, these detections were subsequently either not confirmed; statistically eliminated; found to be anthropogenic or natural variations of background; shown to be laboratory artifacts; shown to be false positives due to matrix interference; determined to be not significant based on low frequency of detection, confirmed as Standard 2 and delineated; confirmed as Standard 3, delineated, and passed SPLP with a new site-specific MSC; or confirmed as Standard 3, delineated, failed SPLP, and excavated during IRA activities.

Lead was the only compound at SWMU 24 with concentrations over site-specific MSCs. An IRA was initiated to remove the Standard 3 contaminated soil through excavation and disposal (Figure 5.18, excavations WBA-7A, WBA-7B, WBA-7C, and WBA-7D). The IRA was verified as complete when all confirmation samples were detected below the site-specific MSC of 1.2 mg/kg. The results of confirmation sampling are presented in Appendix M. As the remaining concentrations of lead at SWMU 24 are below site-specific MSCs and lead has not been detected in downgradient groundwater, it is believed that lead does not present a potential risk to human health or the environment at SWMU 24.

Pursuant with Chapter 335, Subchapter S, and Sections 335.555 through 335.560 of the TNRCC RRS, this RFI demonstrates that attainment of RRS-2 (Closure/Remediation to health-based standards and criteria) has been achieved and closure of SWMU 24 soils is recommended. A letter stating that closure and remediation of SWMU 24 was carried out in accordance with Section 335.555, signed by the AFBCA representative, is provided along with a metes and bounds description of SWMU 24 (Appendix N).

In conclusion, it is believed based on the results of the RFI that SWMU 24 does not present a threat to human health or the environment as all compounds detected at the site are currently below site-specific MSCs and all compounds are delineated to Standard 1. Consequently, closure under Standard 2 of the TNRCC Risk Reduction Rules is recommended for SWMU 24.

6.4 SWMU 25 CONCLUSIONS

SWMU 25 was a landfill used by the USAF during much of the history of Carswell AFB. The period of official operation of this SWMU was the 1960s. In accordance with the NAS Fort Worth JRB hazardous waste permit, soil samples were collected in 5-foot intervals from the ground surface to the groundwater and analyzed for the full suite of Appendix IX compounds. Results from these soil samples indicated no detections of chlorinated herbicides, OP pesticides, dioxins, furans, at SWMU 25. However, Standard 2 and Standard 3 concentrations of metals,

mercury, VOCs, and SVOCs were detected during the initial broad spectrum analytical phase of the RFI. Cyanide was detected at Standard 1 concentrations at SWMU 25. Consistent with the RRSs and the guidance provided in the TNRCC Consistency Memorandum, these detections were subsequently either not confirmed; statistically eliminated; found to be anthropogenic or natural variations of background; shown to be laboratory artifacts; shown to be false positives due to matrix interference; determined to be not significant based on low frequency of detection, confirmed as Standard 2 and delineated; confirmed as Standard 3, delineated, and passed SPLP with a new site-specific MSC; or confirmed as Standard 3, delineated, failed SPLP, and excavated during IRA activities.

Barium, cadmium, lead, and B2EHP were the only compounds at SWMU 25 with concentrations over site-specific MSCs. An IRA was initiated to remove the Standard 3 contaminated soil through excavation and disposal (Figure 5.25, excavations LF8-A, LF8-D, LF8-E and LF8-F). The IRA was verified as complete when all confirmation samples were detected below the site-specific MSC of 1.2 mg/kg. The results of confirmation sampling are presented in Appendix M. As the remaining concentrations of these compounds at SWMU 25 have passed SPLP, and these compounds have not been detected in downgradient groundwater, it is believed that barium, cadmium, lead, and B2EHP do not present a potential risk to human health or the environment at SWMU 25.

Pursuant with Chapter 335, Subchapter S, and Sections 335.555 through 335.560 of the TNRCC RRS, this RFI demonstrates that attainment of RRS-2 (Closure/Remediation to health-based standards and criteria) has been achieved and closure of SWMU 25 soils is recommended. A letter stating that closure and remediation of SWMU 25 was carried out in accordance with Section 335.555, signed by the AFBCA representative, is provided along with a metes and bounds description of SWMU 25 (Appendix N).

In conclusion, it is believed based on the results of the RFI that SWMU 25 does not present a threat to human health or the environment as all compounds detected at the site are currently below site-specific MSCs and all compounds are delineated to Standard 1. Consequently, closure under Standard 2 of the TNRCC Risk Reduction Rules is recommended for SWMU 25.

TAB

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7.0 REFERENCES

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