Final

Former Lockbourne Air Force Base Landfill Remedial Investigation Report FUDS Site: G05 OH0007

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Executive Summary

The US Army Corps of Engineers (USACE), Louisville District contracted CH2M HILL to document the remedial investigation (RI) and other prior investigation activities conducted at the former Lockbourne Air Force Base (AFB) landfill near Columbus, Ohio. The former Lockbourne AFB is located east of Interstate 71 in Franklin and Pickaway counties, just east of the Village of Lockbourne, Ohio (Figure 1-1). Environmental response actions at this site conform to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, 42 United States Code 9601 et seq., the National Oil and Hazardous Substance Pollution Contingency Plan, commonly called the National Contingency Plan (NCP), and Army Regulation 200-1, as applicable.

This RI report summarizes previous investigative activities conducted at the former Lockbourne AFB landfill and presents an interpretation and evaluation of available data. A discussion of the nature and extent of impact (i.e., types, concentrations, and distribution of constituents detected in different media sampled), their migration pathways, and environmental fate and transport mechanisms for constituents of waste materials identified on the property are presented herein. The RI documents the potential human health and environmental risk associated with current site conditions and evaluates potential future exposure. This report contains discussions and conclusions that supersede those in prior RI reports, particularly regarding risk assessment.

Environmental impacts were found during previous investigations (2003, 1998, 1997, and 1995 sampling events) in surface and subsurface soil, surface water, sediment, and groundwater. The primary constituents at the site are semivolatile organic compounds (SVOCs), dioxins, arsenic, and lead. No volatile organic compounds (VOCs) in any of the samples collected exceeded their respective regional screening levels (RSLs). Exceedances in SVOCs were seen in all media. Dioxins were detected above their RSLs in surface soil and groundwater. Arsenic and lead were detected in the majority of the well locations, including background wells.

The primary fate and transport mechanisms for the constituents of interest were identified based on a review of the nature and extent of the analytical data relative to the environmental setting, physical and chemical properties of the site-related constituents of interest, and comparison to screening levels. Based on this review, it was determined that there is one primary migration pathway, which is runoff of impacted soil because of precipitation and subsequent transport to downgradient drainage ditches.

The entire site was divided into two areas of concern (AOCs) based on whether wastes were detected during a recent site investigation that required installation of test pits. AOC 1 includes areas where waste is present, and AOC 2 is an area where no waste was found. The human health risk assessment (HHRA) was performed for each AOC to evaluate potential current and future risks associated with exposure to surface soil, subsurface soil, sediment, surface water, and groundwater at the former Lockbourne AFB landfill based on potential but unlikely conservative receptor populations and exposure scenarios. Under current land-

use conditions, maintenance worker exposures to surface soil, offsite industrial worker exposures to particulate emissions from surface soil, and trespasser/visitor exposures to surface soil, sediment, and surface water were evaluated. Under future conditions, facility worker exposures to surface soil and indoor air (applicable for AOC 2 only), construction worker exposures to subsurface soil, sediment, surface water, and groundwater, and offsite resident exposure to groundwater were evaluated. Maintenance worker, offsite industrial worker, and trespasser/visitor exposures were assumed the same under future land-use conditions as those under current land-use conditions.

The exposure scenarios that do exceed risk targets are identified in the following table along with the risk drivers. AOC 1 includes areas where waste is present. AOC 2 is an area where no waste was found during investigation activities.

Exposure Scenarios that Exceed Risk Targets

Exposure Area	Exposure Medium	Human Receptors	Risk Drivers
AOC 1	Surface soil	Current/future maintenance, trespasser/visitor	PAHs, PCBs
AOC 1	Total soil	Future construction worker	PAHS, PCBs, lead
AOC 1	UWBZ Groundwater	Future construction worker and offsite residents	PAHs, phthalates, dioxins, metals (aluminum, arsenic, cadmium, cobalt, copper, iron, manganese, thallium, vanadium, and lead), VOCs (methylene chloride)
AOC 1	IDA Groundwater	Future offsite residents	PAHs, phthalates, dioxins, metals (iron and manganese)
AOC 2	UWBZ Groundwater	Future construction worker	PAHs, dioxins
Off-Landfill	IDA Groundwater	Future offsite residents	PAHs, dioxins

AOC = Area of Concern
cPAH = carcinogenic polynuclear aromatic hydrocarbons
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
VOC = volatile organic compound

For the groundwater exposure scenarios that exceed target risk goals (i.e., future construction workers and offsite residents), risks are driven primarily by PAHs and dioxins, and to a lesser extent by metals, VOCs, and SVOCs. These exposure scenarios include future construction workers and offsite residents. Lead concentrations in AOC 1 upper water-bearing zone (UWBZ) groundwater would exceed the criterion for blood lead level (BLL) in future children exposed to offsite groundwater.

The ecological risk assessment (ERA) was performed to evaluate the actual or potential ecological effects from exposures at AOC 1 and AOC 2. This multi-pathway analysis was

based on reasonable, protective assumptions about the potential for ecological receptors (lower-trophic [i.e., benthic invertebrates /soil invertebrates] and upper-trophic [i.e., birds, mammals, and fish] receptors) to be exposed to and be adversely affected by exposure to COPCs.

The upper-trophic receptors were selected as surrogate species representing estimated exposure and, subsequently, risk to other species within comparable feeding guilds. Key wildlife receptors include the deer mouse, American robin, mourning dove, short-tailed shrew, red-tailed hawk, red fox, mallard, marsh wren, muskrat, belted kingfisher, and mink.

The results of the ERA are summarized below, including the exposure area, medium, and chemicals of potential concern (COPCs), which are those chemicals that exceed the ecological hazard quotients (HQs) of 1 and where the lines of evidence (i.e., habitat, frequency of exceedances, background contributions) support the ecological quotient exceedances.

Summary of Ecological Risks

Exposure Area	Exposure Medium	Receptors	Chemicals of Potential Concern
AOC 1	Surface soil (0–4 feet)	Terrestrial Mammals	Thallium, PAHs, PCBs, Dioxins/Furans
		Terrestrial Birds	Lead, PCBs
		Lower-Trophic Receptors	Aluminum, chromium, lead, mercury, selenium, thallium, zinc, DDT, PCBs, PAHs, Dixons/Furans
AOC 2	Surface soil (0–4 feet)	Terrestrial Mammals	NR
		Lower-Trophic Receptors	NR
East Ditch	Surface water	Lower-Trophic Receptors	NR
		Upper-Trophic Receptors	NR
	Sediment	Lower-Trophic Receptors	PAHs
		Upper-Trophic Receptors	NR
West Ditch	Surface water	Lower-Trophic Receptors	Dioxins/Furans
	Sediment	Lower-Trophic Receptors	Arsenic, DDD, DDE, DDT, PCBs, PAHs, Dioxins/Furans

Note: NR = negligible risk as determined in the ERA

Based on the results of the ERA, potential ecological risks were identified with respect to lower-trophic and upper-trophic terrestrial receptors within AOC 1 and AOC 2, and lower-trophic receptors within the West Ditch and East Ditch. No further evaluation was recommended for AOC 1 or the East or West Ditch because the presumptive remedy identified for AOC 1 will address the ecological risk identified above. Additionally, based on the results of the refinements to the COPCs identified within AOC 2, it is unlikely that lower or upper-trophic receptors are at risk and as a result, no further evaluation is warranted. Furthermore, possible future redevelopment of AOC 2 for commercial and/or industrial use will also limit habitat present onsite.

Based on the results, potential risk is present at AOC 1 that warrants remedial action. A presumptive remedy involving containment is considered applicable and will be evaluated

in a focused feasibility study. This approach for a presumptive remedy and a focused feasibility study has been discussed as a viable next step between the Ohio Environmental Protection Agency (Ohio EPA) and United States Army Corps of Engineers (USACE). In addition to a soil cover at AOC 1, future land use will be restricted to industrial/ commercial use along with potable groundwater use restriction in the form of environmental covenants for AOC 1 and AOC 2.

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
µg/dL	micrograms per deciliter
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
AF	adherence factor
AFB	Air Force Base
ALM	adult lead methodology
ANG	Air National Guard
AOC	area of concern
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
BAF	bioaccumulation factor
BCF	bioconcentration factor
BERA	baseline ecological risk assessment
bgs	below ground surface
BLL	blood lead level
$CaCO_3$	calcium carbonate
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
cm/sec	centimeters per second
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
cPAH	carcinogenic polynuclear aromatic hydrocarbon
CRAA	Columbus Regional Airport Authority
CSF	cancer slope factor
CSM	conceptual site model
C_{source}	vapor concentration at the source of contamination
DCE	dichloroethene

DDD	dichlorodiphenyl dichloroethane
DDE	dichlorodiphenyl dichloroethylene
DDT	dichlorodiphenyl trichloroethane
DoD	United States Department of Defense
DPT	direct push technology
E&E	Ecology and Environment, Inc.
Eco-SSL	ecological soil screening level
EEG	Ellis Environmental Group, LC
ELCR	excess lifetime carcinogenic risk
EM	electromagnetic
EPC	exposure point concentration
EqP	equilibrium partitioning
ERA	ecological risk assessment
ER-L	effect range low value
ES	Engineering Science
ESL	ecological screening level
EWH	exceptional warmwater habitat
f_{oc}	soil organic carbon weight fraction
FOD	frequency of detect
ft/day	feet per day
ft/ft	foot per foot
ft/min	feet per minute
FUDS	Formerly Used Defense Sites
g/cm^3	grams per cubic centimeter
GI	gastrointestinal
GSD	geometric standard deviation
H	Henry's law constant
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	hazard index
HMW	high molecular weight
HQ	hazard quotient
HU	heavily used area

IDA	intermediate depth aquifer
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
IT	IT Corporation
IUR	inhalation unit risk
J&E	Johnson and Ettinger
K	hydraulic conductivity
K_d	soil water distribution coefficient
K_{oc}	organic partition coefficient
K_{ow}s	octanol-water partition coefficient
L/kg	liters per kilogram
LAW	LAW Environmental Services, Inc.
LEL	lowest effect level
LMW	low molecular weight
LOAEL	lowest adverse effect level
MATC	maximum allowable toxic concentration
MCL	maximum contaminant level
MET	minimal effect threshold
MF	modifying factor
mg	milligram
mg/day	milligrams per day
mg/kg	milligrams per kilogram
MMOA	mutagenic mode of action
MSW	municipal solid waste
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NFRAP	No Further Remedial Action Planned
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NR	negligible risk
NTU	nephelometric turbidity units

NWI	National Wetlands Inventory
OAC	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
OMZM	outside mixing zone maximum
ONHP	Ohio Natural Heritage Program
OSWER	Office of Solid Waste and Emergency Response
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEC	probable effect concentration
PESI	Parsons Engineering Science, Inc.
PID	photoionization detector
PMC	Program Management Company
ppm	parts per million
PPRTV	Provisional Peer Reviewed Toxicity Value
PRG	preliminary remediation goal
QA/QC	quality assurance/quality control
QHEI	Qualitative Habitat Evaluation Index
RAGS	*Risk Assessment Guidance for Superfund*
RANGB	Rickenbacker Air National Guard Base
RBP	Rapid Bioassessment Protocol
RCRA	Resource Conservation and Recovery Act
Rf	retardation factors
RfC	reference concentration
RfD	reference dose
RI	remedial investigation
RME	reasonable maximum exposure
RSL	regional screening level
RTV	reference toxicity value
S	water solubility
SARA	Superfund Amendments and Reauthorization Act
SERA	screening ecological risk assessment
SI	site investigation

SQAL	sediment quality advisory level
SQG	sediment quality guideline
SRV	sediment reference value
STL	Severn Trent Laboratory
STSC	Superfund Health Risk Technical Support Center
SVOC	semivolatile organic compound
TAL	target analyte list
TCDD	tetrachlorodibenzo-p-dioxin
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TEC	threshold effect concentration
TEF	toxic equivalency factor
TEL	threshold effect level
TEQ	toxic equivalent
TRV	toxicity reference value
UCL	upper confidence limit
UF	uncertainty factor
UMU	unused to moderately used area
URF	unit risk factor
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTL	upper tolerance limit
UWBZ	upper water-bearing zone
UXO	unexploded ordnance
VOC	volatile organic compound
WHO	World Health Organization

SECTION 1

Introduction

The US Army Corps of Engineers (USACE), Louisville District contracted CH2M HILL to document the remedial investigation (RI) and other prior investigation activities conducted at the former Lockbourne Air Force Base (AFB) landfill near Columbus, Ohio (Figure 1-1), under Contract No. W912QR-04-D-0020, Delivery Order No. 0029. The former Lockbourne AFB landfill is part of a Formerly Used Defense Site (FUDS) and is designated as G05 OH0007. Environmental response actions at FUDS conform to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, 42 United States Code 9601 et seq., the National Oil and Hazardous Substance Pollution Contingency Plan, commonly called the National Contingency Plan (NCP), and Army Regulation 200-1, as applicable.

1.1 Objectives

The data collection, data analysis, and report preparation for RI has been conducted in accordance with the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (Interim Final)* (U.S. Environmental Protection Agency [USEPA] 1988). This report summarizes previous investigative activities conducted at the former Lockbourne AFB landfill and presents an interpretation and evaluation of data. In 2008, CH2M HILL conducted a site investigation (SI) that included geophysical measurements, installing test pits, measuring methane at select locations, and evaluating the absence or presence of groundwater seeps at the site. The results of that investigation are presented in detail in the SI report (CH2M HILL 2009) and considered during data evaluation.

The sections that follow discuss the nature and extent of impact (i.e., types, concentrations, and distribution of constituents detected in different media sampled), their migration pathways, and transport mechanisms for soil and groundwater at the site. In addition, potential human health and environmental risks associated with current site conditions and potential future exposure are evaluated.

The RI assumed that a presumptive remedy involving containment would be implemented in the future. The scope of the RI included evaluating surface and subsurface soil, groundwater, surface water, sediment, and seeps within the site boundaries. The data were evaluated to determine if isolated areas of impact exist that are harmful to surface receptors and aquatic biota.

1.2 Site Description and Background

1.2.1 Facility Description

The former Lockbourne AFB is located east of Interstate 71 in Franklin and Pickaway counties, just east of the Village of Lockbourne, Ohio (Figure 1-1). The former AFB covers

approximately 4,371 acres, and the site is now occupied by the Columbus Regional Airport Authority (CRAA), the 121st Air Refueling Wing of the Ohio Air National Guard (ANG), the Ohio Army National Guard, Lane Aviation, various retail and service businesses, and a Naval Reserve Center. The former Lockbourne AFB landfill is located within an area of approximately 146 undeveloped acres west of the developed portion of the former Lockbourne AFB.

A site features map is provided as Figure 1-2. The site is bordered by Vause Road to the north, Tank Truck Road to the southeast, and CSX Railroad tracks to the southwest. A high-tension power line crosses the northwest side of the site approximately parallel to Tank Truck Road. An inactive power line corridor runs east to west from Tank Truck Road through the site, ending shortly after crossing the main site access road. Rural residential areas are on the north and south of the site. East of the site is Rickenbacker ANG Base (RANGB), while west of the site is the Village of Lockbourne, Ohio. CRAA maintains control of entry to the site.

1.2.2 Site History

Historical activities at the former Lockbourne AFB site date back to 1942 and include aircraft fueling, preparation, supplying, arming, and air-delivered ordnance removal and handling. Historical documentation reviewed concerning the former Lockbourne AFB landfill indicates that from 1951 to 1979, 51 of the 146 acres, historically referred to as the "heavily used area (HU)," were used for burning and burying wastes from the base. The remaining acres, historically referred to as the "unused to moderately used area (UMU)," were used for surface disposal of various wastes, primarily construction and demolition debris. The terms "heavily used" and "unused to moderately used" are historical terms that have been carried forward only for consistency.

The former Lockbourne AFB landfill received municipal solid waste (MSW), construction and demolition debris, and lime sludge from the base. MSW is believed to have been generated from base housing and other buildings on base. Construction and demolition debris is believed to have been generated during base renovations. Pavement debris is visible at the surface at some locations of the former Lockbourne AFB landfill. Lime sludge generated by the base water treatment plant also is present. Information obtained during the Phase I SI records search (LAW Environmental Services, Inc. [LAW] 1995a) suggests that the former Lockbourne AFB landfill may have received pesticides and herbicides, ammunition, airplane parts, toxic and hazardous materials, household-type garbage, and construction debris. The wastes were reportedly disposed in trenches and on the ground surface. No further historical information relating to the actual types of solid waste in the former Lockbourne AFB landfill is available.

Aerial photographs from 1950, 1957, 1960, 1964, 1971, 1980, 1996, and 2003 (Appendix A); geophysical survey data; soil gas survey data; and surface and subsurface soil data (as summarized later in this report) provide information indicative of the extent and characteristics of disposal. Based on these historical data and site inspection, the former Lockbourne AFB landfill apparently contains construction and demolition debris, industrial waste from AFB processes, and household wastes. In March 1978, the Ohio Environmental Protection Agency (Ohio EPA) inspected the former Lockbourne AFB landfill and recommended restricting use to construction debris disposal only. The inspection report

also indicated the presence of approximately 200 feet of permeable sand and gravel deposits beneath the former Lockbourne AFB landfill and noted the presence of the Village of Lockbourne water supply wells less than 0.25 mile to the west (LAW 1995a). The Village of Lockbourne supply well, identified by the Ohio Department of Natural Resources (ODNR) as No. 413418, is located between Commerce, Decker, and Landis streets, and is no longer being used.

1.2.3 Previous Investigations

A reverse chronological list of investigations conducted at the site is presented below and discussed in detail in Section 2.

Period	Entity Conducting the Investigations	Nature of Investigation	Activities Completed
September and October 2008	CH2M HILL	Additional SI	CH2M HILL conducted additional SI work, including the following: – Installation of test pits – Geophysical survey work involving electromagnetic (EM) induction – Sampling for landfill gas
July and August 2003	Ellis Environmental Group, LC (EEG)	RI	EEG conducted the RI, which included the following: – Installation of two upper water-bearing zone (UWBZ) groundwater monitoring wells and collection of one subsurface soil sample from each of two groundwater monitoring wells installed – Installation of one temporary groundwater monitoring well – Collection of 24 surface soil samples, three collocated surface water and sediment samples, one additional sediment sample, one seep sample, and six geotechnical samples from outside the former Lockbourne AFB landfill – Groundwater sampling from 17 groundwater monitoring wells
1997 and 1998	Program Management Company (PMC)	Phase II SI	Phase II investigation during 1997 included the following: – Installation and sampling of three UWBZ and four intermediate depth aquifer (IDA) groundwater monitoring wells – Installation of three piezometers – Subsurface soil sampling at four locations, which were sampled during the Phase I SI – Collection of five collocated surface water and sediment samples, three additional sediment samples, and three seep samples Phase II investigation during 1998 included : – Collection of samples from six groundwater monitoring wells (three UWBZ and three IDA) – Collection of seven surface soil locations

Period	Entity Conducting the Investigations	Nature of Investigation	Activities Completed
1995	Parsons Engineering Science, Inc. (PESI) and LAW	Installation Restoration Program (IRP) SI	• PESI investigated five IRP sites, adjacent to and upgradient from the former Lockbourne AFB landfill, and presented the findings in a separate report (PESI 1995) • LAW (1995a) investigated an additional IRP site
1995	IT Corporation (IT)	Environmental Baseline Survey Investigation	IT conducted a clay layer investigation to determine if the gray clay/silt zone between the UWBZ and IDA at the RANGB is laterally continuous across the former AFB.
1994 and 1995	LAW	Phase I SI	LAW conducted a two-stage Phase I SI Stage 1, conducted in October and November 1994, included the following: – Passive soil gas survey – Geophysical survey – Unexploded ordnance survey Stage 2, conducted in May and June 1995, included the following: – Installation and sampling of three UWBZ groundwater monitoring wells and four IDA groundwater monitoring wells – Collection of hand-augured soil samples from the upper 3 feet of soil at 12 locations – Collection of three collocated surface water and sediment samples from the ditch along the western border of the former Lockbourne AFB landfill – Collection of two seep samples from the eastern bank of the drainage ditch
July 1986	Ecology and Environment, Inc. (E&E)	Site Screening Investigation	USEPA field investigation contractor, E&E, conducted a site screening investigation at the former Lockbourne AFB landfill (E&E 1986), including: – Soil and sediment sampling along the southwestern and northern sides of the former Lockbourne AFB landfill – Groundwater sampling from the Village of Lockbourne residential water supplies

1.3 Report Organization

The report is organized as follows:

- Section 2 presents a summary of site investigation activities.
- Section 3 presents the physical characteristics of the site.
- Section 4 summarizes the analytical results and describes the nature of impact at the site.
- Section 5 discusses the fate and transport of site-specific constituents of interest.
- Section 6 discusses the human health risk assessment (HHRA) for the site.
- Section 7 discusses the ecological risk assessment (ERA) for the site.
- Section 8 presents a summary of the findings and conclusions of the RI.
- Section 9 presents a list of references for this report.

SECTION 2

Study Area Investigation

The present report summarizes the information obtained from previous investigations. A chronological list of the investigation activities is presented in Section 1.2.3. The Phase I and II SIs were followed by the RI activities completed in 2003. The Phase I SI was completed to determine if chemical contaminants are present at the site, their migration potential, and the necessity for additional investigation. Based on the findings of Phase I SI, a Phase II SI was completed to collect additional data. The RI was completed to define the nature and extent of wastes at the landfill and characterize risk. CH2M HILL completed an additional SI in 2008 to further determine the limits of waste disposal and to collect landfill gas samples and seep samples, if available.

This section presents a summary of investigation activities conducted at the site. The most recent SIs are presented first. A summary of all samples collected during the RI and Phase I and II SIs are presented in Tables 2-1a through 2-1e for soil, surface water, sediment, seep, and groundwater, respectively.

2.1 Additional SI Completed in 2008 by CH2M HILL

The intent of the additional SI completed by CH2M HILL during 2008 was to supplement prior data and support completion of the RI process. The SI field activities and procedures were in accordance with the procedures outlined in the *Former Lockbourne AFB Landfill Site Investigation Work Plan* (CH2M HILL 2008) and were approved by USACE and Ohio EPA. The SI report (CH2M HILL 2009) includes the results of the following additional investigation:

- Installation of test pits for better characterization of the limits of wastes at the site and evaluation of the relationship of these findings to previously observed electromagnetic (EM) anomalies
- Geophysical survey work, involving EM in select areas to assist in mapping waste disposal extents
- Collection of landfill gas samples to determine if the former Lockbourne AFB landfill is generating methane gas

Seeps from around the former Lockbourne AFB landfill also were to be investigated; however, multiple attempts over 6 months were made to locate the seeps, but they could not be found. Representatives of CH2M HILL, Ohio EPA, and USACE agreed that the seeps did not exist as persistent features and were excluded from the scope of the SI report. Since the seeps were not present, and the data gathered from previous investigation could not be replicated, and assessment of risk was not conducted using the historical seep data. Presence of seeps was identified by previous consultants, but could not be found nor confirmed by CH2M HILL. An explanation as to what happened to the seeps is speculation, but it may be attributed to changes in the migration of groundwater flow to the surface.

Based on previous investigations and observations made during the SI, CH2M HILL redefined the entire site into two areas of concern (AOCs): AOC 1 and AOC 2 (Figure 1-2). AOC 1 includes areas where waste was present, and includes previously identified HUs and UMUs. AOC 2 is an area where no wastes were identified during the test pitting activities.

2.2 RI Completed in 2003 by EEG

In 2003, EEG completed RI activities at the site in accordance with the project plans approved by USACE and Ohio EPA. Data collected by EEG was presented to Ohio EPA in draft format, but the document was not finalized.

The primary objectives of the field activities completed by EEG during the RI were as follows:

- Collect additional data necessary to determine the nature and extent of impacts at the former Lockbourne AFB landfill
- Identify potential impacts to the drainage ditch located at the site and characterize potential offsite transport of constituents of interest

2.2.1 RI Phase I Field Operations

RI field operations by EEG began on December 3, 2002. In an effort to determine the extent of impact at the former Lockbourne AFB landfill, exploratory trenching near the transmitter property was conducted to determine the horizontal interface of the native material and the former Lockbourne AFB landfill. The trenching report, including photographs and a map, is included as Appendix B1. The draft report was submitted to USEPA, Ohio EPA, and CRAA for review.

Trenching activities were conducted on the east, south, and west corners of the transmitter building property. Visual inspection of the trenches revealed only native material with no evidence of landfill debris. The north corner fell on the access road to the transmitter building, and all parties agreed that no burial of debris was likely to have occurred in the area. At that point, Ohio EPA, USACE, RANGB, and Rickenbacker Port Authority representatives agreed that trenching for transmitter property delineation had been completed and was documented in an Ohio EPA letter dated November 10, 2005.

2.2.2 RI Phase 2 Field Operations

Between July 18 and August 15, 2003, EEG completed the RI Phase 2 activities, and the investigation included collecting and analyzing samples of surface and subsurface soil, surface water, sediment, seep water, and groundwater. Tables 2-1a through 2-1e list the samples collected during the RI.

Field Efforts

The following tasks were performed as part of the RI:

- Installed two groundwater monitoring wells to a depth of 16 feet below ground surface (bgs) and one temporary monitoring well

- Collected 17 groundwater samples (from 15 previously installed monitoring wells and two newly installed wells)
- Collected 24 surface soil samples
- Collected eight subsurface soil samples as follows:
  - Two subsurface soil samples (one sample from each of the two newly installed monitoring wells)
  - Six subsurface soil samples from outside of the former Lockbourne AFB landfill (three samples each from the northern and southern areas of investigation) for geotechnical analysis
- Collected three surface water samples
- Collected four sediment samples
- Collected one seep sample

The analyses conducted on the collected samples are indicated below.

Sample Type	Technique	Analysis
Surface soil	Grab = VOCs only Composite = All remaining fractions	VOCs, SVOCs, TAL metals, pesticides, PCBs, dioxins, explosives
Subsurface soil associated with monitoring well installations	Grab = VOCs only Composite = All remaining fractions	VOCs, SVOCs, TAL metals, pesticides, PCBs, explosives
Subsurface soil outside landfill	Direct push technology (DPT) acetate sleeves	Atterberg limits (ASTM D4318-00), moisture content (ASTM D4959), organic content, bulk density, pH, and sieve analysis for grain size and particle distribution (ASTM D422-63)
Surface water	Grab	All samples - SVOCs, TAL metals, pesticides, and PCBs Only EEGLKB-SW/SD01 – Dioxins and explosives in addition to the above
Sediment	Grab = VOCs only Composite = All remaining fractions	All samples – VOCs, SVOCs, TAL metals, pesticides, and PCBs Only EEGLKB-SW/SD01 – Dioxins and explosives in addition to the above Only EEGLKB-SD04 – Explosives in addition to the above
Seep	Grab	VOCs, SVOCs, TAL metals, pesticides, PCBs, dioxins, explosives
Groundwater	Low flow sampling	All wells - VOCs, SVOCs, TAL metals, pesticides, PCBs LCKMW-4, 15, and 16 – Dioxins and explosives in addition to the above LCKMW-7 and 13 – Dioxins in addition to the above

Sample Type	Technique	Analysis
IDW (water)	Grab	Total analytes
IDW (soil)	Grab	Full TCLP

IDW – investigation-derived waste
SVOC – semivolatile organic compound
TCLP – toxicity characteristic leaching procedure
PCB – polychlorinated biphenyl
TAL – target analyte list
VOC – volatile organic compound

The following appendices include pertinent information related to RI activities:

- B2 - Analytical results
- B3 - Sampling protocols followed during RI
  - B3-1 – Data Validation Report by EEG
  - B3-2 – Investigation-derived waste manifests and laboratory analysis
- B4 – Chain-of-custody forms
- B5 - Photographs related to installation of two new monitoring wells
- B6 – Field forms
- B7 – Boring logs and well construction logs
- B8 - Field change request forms
- B9 - Geotechnical results

Installation of Two Monitoring Wells and One Temporary Well

Two shallow monitoring wells were installed during the RI. Monitoring well LCKMW-15 is located in the northwest section of the site, while LCKMW-16 is located in the southeast section. Both wells are installed outside and downgradient of the former Lockbourne AFB landfill (Figure 2-1). The locations were selected as areas most likely to be representative of the upper water-bearing zone (UWBZ) in the former Lockbourne AFB landfill. The two shallow monitoring wells were installed using hollow-stem auger drilling methods, and each boring was advanced to a depth of 16 feet bgs.

An attempt was also made to install one temporary well, LCKTW-1 (Figure 2-1), during the installation of the other site monitoring wells. The total depth of LCKTW-1 was 7.86 feet bgs before refusal. Water was encountered at 6.76 feet bgs. The initial attempt to sample this well was unsuccessful, as approximately 12 ounces of brown viscous mud were recovered before the well went dry. After consultation with USACE, no further attempts were made to reinstall and sample the temporary well, and the boring was abandoned. Completed field change request forms are included in Appendix B8.

Surface and Subsurface Soil Sampling

Surface soil sampling locations were based upon previous soil gas data, stressed vegetation, and obvious burn areas. Subsurface soil sampling locations immediately outside the former Lockbourne AFB landfill were based on volatile organic compound (VOC) screening and absence of landfill debris in DPT acetate liners. Belasco Drilling Services, Inc. of Columbus, Ohio, was contracted for DPT borings and monitoring well installations. Figures 2-2 and 2-3 show the surface and subsurface soil sample locations.

Geotechnical analyses were performed to determine the engineering properties of soil beneath the site. The RI included six geotechnical samples collected from two DPT borings

outside the former Lockbourne AFB landfill (EEGLKB-DPT-02S and EEGLKB-DPT-03N). Both DPT borings terminated in clayey sand at 16 feet bgs.

Samples were collected from both DPT borings at 2- to 4-foot bgs interval. The 2- to 4-foot bgs interval from EEGLKB-DPT-02S was classified as sandy lean clay, while the 2- to 4-foot bgs interval from EEGLKB-DPT-03N was classified as a fat clay with sand. A geotechnical sample was collected from EEGLKB-DPT-02S at 5- to 7-foot bgs interval and one from EEGLKB-DPT-03N at 6- to 8-foot bgs interval. Both of these samples were classified as sandy lean clay to lean clay with sand. Geotechnical samples were collected in both borings from the 10- to 12-foot bgs horizon; both were classified as clayey sand units. These classifications are consistent with silty clay with interbedded sand lenses of the unconsolidated surficial deposit that is laterally continuous under the former Lockbourne AFB landfill area. Soil classifications of the samples collected in association with monitoring well installations and DPT borings were consistent.

The six geotechnical samples were submitted to Midwest Testing Laboratories in Fargo, North Dakota, for analysis. Samples were submitted in sealed (capped and taped) acetate liners. The following geotechnical analyses were performed on the six samples:

- Grain-size distribution in accordance with American Society for Testing and Materials (ASTM) D422-63
- Atterberg limits in accordance with ASTM D4318-00; this analysis determined the liquid limit, plastic limit, and plasticity index of the soil
- Bulk density, moisture content, soil pH, organic content, and percent solids

Results of the geotechnical soil analyses are provided in Appendix B9.

Although samples were collected for geotechnical analyses, no samples were collected for laboratory chemical analysis during subsurface soil sampling outside the former Lockbourne AFB landfill. Sample collection for chemical analyses was performed during the subsurface soil sampling associated with monitoring well installation only.

The subsurface soil samples associated with monitoring well installations were obtained using the split-spoon sampling technique employed with the hollow-stem auger drilling method. The borings were advanced until groundwater was encountered. Samples from LCKMW-15 were collected from the 4- to 6-foot bgs interval because of high photoionization detector (PID) readings. Samples from LCKMW-16 were collected immediately above the water table (8 to 10 foot bgs interval). Soil samples were field classified in accordance with the Unified Soil Classification System and recorded on a monitoring well boring log (Appendix B7).

Surface Water and Sediment Sampling

EEG collected three surface water and four sediment samples from the drainage ditch at locations between a reinforced concrete structure and where the ditch enters the junction box under the intersection of Vause Road and Canal Road (Figure 2-4). The justifications for the sample locations were as follows:

- EEGLKB-SW01 and EEGLKB-SD01 were selected to characterize surface water and sediment at the ditch outfall from the former Lockbourne AFB landfill.
- EEGLKB-SW03 and EEGLKB-SD03 were selected to characterize surface water and sediment at the downstream end of the concrete structure.
- EEGLKB-SW02 and EEGLKB-SD02 were selected approximately midway between the other two sample locations to best characterize sediment and surface water along the ditch.
- Sediment sample EEGLKB-SD04 was collected offsite adjacent to Canal Road, north of the former Lockbourne AFB landfill drainage ditch.

Surface water and sediment samples were collected during non-storm conditions, and from mid-stream and at mid-depth. Field measurements of pH, specific conductance, temperature, and turbidity were collected at each sampling location and recorded on a surface water sampling form (Appendix B6). The collocated sediment samples were collected after surface water was sampled to eliminate the potential for inclusion of resuspended sediment in water samples. Sediment samples were collected using a stainless steel trowel. The VOC fraction was placed directly in the sample container. For all other analyses, sediment was placed into a stainless steel bowl, homogenized using the sampling trowel, and then transferred into the appropriate sampling containers. A sediment sampling form (Appendix B6) was completed for each sample collected.

Seep Sampling

The length of the ditch and banks on the southeast and southwest boundaries of the former Lockbourne AFB landfill were inspected for seeps on August 7, 2003. One active seep was located approximately 1,050 feet northwest of the reinforced concrete structure (Figure 2-5). No other seeps were located. A field change request form regarding seep sample collection is included in Appendix B8, as originally up to five samples were proposed.

The single seep sample was collected by grab method using the laboratory-supplied sample containers. Field measurements of pH, conductivity, temperature, and turbidity were collected and recorded on the seep sampling field data form (Appendix B6). Samples were placed immediately in a pre-chilled cooler and shipped to Severn Trent Laboratory (STL) in Chicago.

Groundwater Sampling

Groundwater samples were collected from the two new monitoring wells and from previously installed monitoring wells during initial (August 2003) and subsequent quarterly sampling events. The new monitoring wells and existing monitoring wells are listed below (Figure 2-1).

Existing Wells	New Wells
LCKMW-1, LCKMW-2, LCKMW-3, LCKMW-4, LCKMW-5, LCKMW-6, LCKMW-7, LCKMW-8, LCKMW-9, LCKMW-10, LCKMW-11, LCKMW-12A, LCKMW-13, LCKMW-14, RB25MW-7	LCKMW-15, LCKMW-16

LCKMW-7 is located west of the drainage ditch, on the east side of the Village of Lockbourne. There are seven well pairs at the site, with one monitoring well screening in the UWBZ and the other screening in the IDA. These well pairs are:

- LCKMW-1 (IDA) and LCKMW-2 (UWBZ)
- LCKMW-3 (IDA) and RB25-MW7 (UWBZ)
- LCKMW-4 (UWBZ) and LCKMW-14 (IDA)
- LCKMW-5 (IDA) and LCKMW-6 (UWBZ)
- LCKMW-8 (IDA) and LCKMW-9 (UWBZ)
- LCKMW-10 (IDA) and LCKMW-11 (UWBZ)
- LCKMW-12A (IDA) and LCKMW-13 (UWBZ)

Wells LCKMW-1, LCKMW-2, LCKMW-8, and LCKMW-9 are located upgradient; all other wells are located on the western half of the site.

Groundwater level measurements were collected from site wells, and potentiometric surface maps of the UWBZ and IDA were created using water level measurements. The water level measurement log forms are included in Appendix B6.

2.2.3 Surveying

An Ohio-licensed surveyor identified the horizontal coordinates of the ground surface at each soil, seep, surface water, and sediment sampling point, and the natural ground surface and the top of the casing elevations of each groundwater monitoring well (including the temporary well). The horizontal coordinates were surveyed to an accuracy of ±1 foot within the Ohio State Plane Coordinate System using the North American Datum of 1983. The elevations were surveyed to within ±0.01-foot referenced to the National Geodetic Vertical Datum survey of 1929. The surveyed coordinates of RI sampling locations are listed in Table 2-2. EEG used hand-held global positioning system units to locate the DPT sampling locations and locations of other field observations as needed.

2.3 Phase II SI Completed in 1997 and 1998 by PMC

PMC conducted a Phase II SI during 1997 and 1998. Tables 2-1a through 2-1e list the samples collected during the Phase II SI. The overall objective of the Phase II SI was to determine the presence or absence of impacts that may have resulted from U.S. Department of Defense (DoD)-related activities. Specific objectives of the Phase II SI were as follows:

- Implement a groundwater investigation plan to address specific data gaps from the Phase I SI
- Identify site-specific background levels of constituents in groundwater
- Determine if migration of constituents of interest from the former Lockbourne AFB landfill is occurring
- Perform a risk screening analysis
- Determine if the former Lockbourne AFB landfill qualifies as a site eligible for a presumptive remedy
- Make appropriate recommendations regarding additional investigation

1997 Field Efforts

The following tasks were performed as part of the Phase II SI:

- Seven monitoring wells (three UWBZ wells and four IDA wells) were strategically installed to supplement existing well locations and provide UWBZ and IDA groundwater quality information at upgradient and downgradient locations, relative to the former Lockbourne AFB landfill location (Figure 2-1):
  - Three UWBZ wells (LCKMW-9, LCKMW-11, and LCKMW-13) were installed to depths of 13.63, 15.52, and 26.57 feet bgs, respectively.
  - Four IDA wells (LCKMW-8, LCKMW-10, LCKMW-12A, and LCKMW-14) were installed to depths of 71.33, 86.85, 74.91, and 91.10 feet bgs, respectively.
- Three piezometers (LCKPZ-1, LCKPZ-2, and LCKPZ-3) were installed along the southwestern bank of the creek to evaluate groundwater flow conditions to the creek (Figure 2-1).
- Surface and subsurface soil samples were collected from four locations (LCKSO-1, LCKSO-6, LCKSO-7, and LCKSO-8) (Figures 2-2 and 2-3) that were previously sampled during the Phase I SI and analyzed for select constituents (dioxins and metals) to augment the data collected during the Phase I SI. These four locations were selected for resampling, as the Phase I SI samples collected from these locations contained the highest concentrations of constituents of interest. Additional surface and subsurface soil samples were analyzed for target compound list (TCL) VOCs, TCL semivolatile organic compounds (SVOCs), target analyte list (TAL) metals, polychlorinated biphenyls (PCBs), pesticides, dioxins, explosives, total and amenable cyanide, sulfate, and nitrate.

- Five collocated surface water and sediment samples were collected from the drainage ditch bordering the former Lockbourne AFB landfill (Figure 2-4). Collocated surface water and sediment samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals (total and dissolved), pesticides and PCBs, explosives, total and amenable cyanide, sulfate, and nitrate.
- Three seeps were sampled to evaluate the potential migration of chemicals of potential concern (COPCs) from the former Lockbourne AFB landfill (Figure 2-5). Seep samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals (total and dissolved), PCBs and pesticides, explosives, total and amenable cyanide, sulfate, and nitrate.
- The seven new wells and nine existing wells were surveyed and sampled. Groundwater samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals (total and dissolved), PCBs and pesticides, dioxins, explosives, and total and amenable cyanide.

1998 Field Efforts

Based on the results of the 1997 Phase II SI field efforts, additional site characterization efforts were conducted in 1998 (PMC 2000) to:

- Determine off-landfill concentrations of dioxins in soil
- Establish the nature and concentration of dioxins in groundwater at select locations
- Investigate potential sources of dioxins detected in environmental media

The results were used to determine potential human health risks posed by dioxins detected in soil and groundwater.

The 1998 field efforts consisted of the following tasks:

- Seven surface soil samples were collected to establish offsite soil dioxin levels and assess potential point source contributions of dioxins from upgradient sources.
- Three sediment samples (LCKSD-10, LCKSD-11, and LCKSD-12) (Figure 2-4) were collected from drainage features upgradient of the former Lockbourne AFB landfill but downgradient of potential dioxin sources, such as a former coal-burning heating plant and areas where burning occurred.
- Six groundwater monitoring wells (LCKMW-7, LCKMW-10, LCKMW-11, LCKMW-12A, LCKMW-13, and 14-MW1) (Figure 2-1) were sampled to determine total and dissolved dioxin concentrations in groundwater.

2.4 Phase I SI Completed in 1994 and 1995 by LAW

LAW (1995a) conducted a two-stage Phase I SI at the former Lockbourne AFB landfill during 1994 and 1995. Tables 2-1a through 2-1e list the samples collected.

1994 Field Efforts

The initial part of the Phase I SI consisted of a geophysical survey, passive soil gas survey, and unexploded ordnance (UXO) survey conducted at the former Lockbourne AFB landfill during October and November 1994 (LAW 1995a). The results of these surveys were the

basis for determining subsequent sampling locations. The results of the geophysical survey indicated that the greatest density of geophysical anomalies was located primarily within a 51-acre area believed to have been used for burning and disposal of wastes from the former AFB. A conductive plume search was performed in two areas along the presumed downgradient boundary of the former Lockbourne AFB landfill, but none was noted. Additionally, landfilling activity beyond the presumed downgradient boundary was not noted (LAW 1995a).

The most prevalent compounds detected during the soil gas survey were benzene, toluene, ethylbenzene, xylenes, and total petroleum hydrocarbons (LAW 1995a). The results of the soil gas survey were interpreted as indicative of a release of petroleum products near the northern border of the transmitter station, and other sporadically distributed localized surface or subsurface releases of common petroleum products and solvents. Most of the detected soil gas concentrations corresponded with geophysical anomalies. Analyses for other landfill gases, such as methane, were not performed during the Phase I SI soil gas survey.

During the UXO survey, nonhazardous UXO-related materials, classified as training materials, were encountered in two locations in the eastern half of the site. One object, a primer ribbon from an air-to-surface missile, was found in the low-lying grass area in the north-central section of the former Lockbourne AFB landfill (LAW 1995a).

1995 Field Efforts

Stage 2 of the Phase I SI was performed during May and June 1995. This effort consisted of the following activities:

- Installing and sampling three shallow UWBZ monitoring wells (LCKMW-2, LCKMW-4, and LCKMW-6) and four IDA monitoring wells (LCKMW-1, LCKMW-3, LCKMW-5, and LCKMW-7) (Figure 2-1)
- Collecting hand-augered soil samples from the upper 3 feet of soil at 12 locations (Figures 2-2 and 2-3)
- Collecting three collocated surface water and sediment samples from the drainage ditch along the western boundary of the former Lockbourne AFB landfill (Figure 2-4)
- Collecting two seep samples from the eastern bank of the west drainage ditch (Figure 2-5)

Sample Analysis

- Groundwater samples collected from seven wells were tested for VOCs, SVOCs, PCBs, pesticides, 11 inorganics (arsenic, barium, cadmium, chromium, iron, lead, manganese, mercury, sodium, selenium, and zinc), explosives, nitrate, and sulfate (LAW 1995b).
- Soil samples were tested for VOCs, SVOCs, PCBs, pesticides, nine inorganics (arsenic, barium, cadmium, chromium, lead, mercury, silver, selenium, and zinc), and explosives (LAW 1995b).

- Surface water samples were analyzed for VOCs, SVOCs, PCBs, pesticides, nine inorganics (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and zinc), explosives, nitrate, and sulfate (LAW 1995b).
- Sediment samples were analyzed for VOCs, SVOCs, PCBs, pesticides, eight inorganics (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), and explosives (LAW 1995b).
- Seep samples were analyzed for VOCs, SVOCs, PCBs, pesticides, nine inorganics (arsenic, barium, cadmium, chromium, lead, mercury, silver, selenium and zinc), explosives, nitrate, and sulfate (LAW 1995b).

2.5 Background Concentrations

The background data were evaluated to distinguish between chemical concentrations that may be related to past or current activities at the site and those that appear representative of naturally occurring conditions or that may be attributable to non-site-related anthropogenic activities (e.g., the historical, widespread, and routine application of pesticides). Background soil concentrations were obtained during the *Supplemental Phase II Environmental Baseline Survey Investigation* (IT 1995). In order to establish the soil background concentrations for the site, statistical calculations were performed to determine the number of detections in the data set for each analyte, the maximum concentration detected, the distribution of the background values (i.e., whether the distribution is normal or lognormal), and the 95th percentile. The representative background concentration was identified as the 95th percentile or the maximum detected value if the maximum detected value was less than the 95th percentile. The procedure of using the 95th percentile for soil background concentrations differs from the background calculation methodology recommended by Ohio EPA (Ohio EPA 2004a, 2004b). Ohio EPA recommends calculating the background concentration levels as the upper cutoff value of the data set defined as the upper quartile (i.e., 75th percentile) + 1.5 (interquartile range).

A comparison was performed between sediment and surface water concentrations to the upgradient concentrations from collocated surface water and sediment samples collected during Phase II from each branch of the ditch. Surface water sample LCKSW-1 and sediment sample LCKSD-1 were collected from the East Ditch and used as background comparison criteria for samples collected in the East Ditch. Surface water sample LCKSW-3 and sediment sample LCKSD-3 were collected from the West Ditch and used as background comparison criteria for samples collected in the West Ditch. Three additional sediment samples (LCKSD-10, LCKSD-11, and LCKSD-12) were collected from drainage areas upgradient of the former Lockbourne AFB landfill (Figure 2-4).

For groundwater, background samples were collected from five upgradient wells: LCKMW-1, LCKMW-2, LCKMW-8, LCKMW-9, and 14-MW1 (Figure 2-1). Four of these wells are located along the northern edge of the former Lockbourne AFB landfill. The fifth well is located adjacent to the northern end of the runway. These wells are upgradient of the former Lockbourne AFB landfill and are not considered to be impacted by activities at the former Lockbourne AFB landfill. Three of these wells were screened in the UWBZ, and two were completed in the IDA. Background concentrations from the IDA were used as

comparison criteria for samples collected from monitoring wells in the IDA. Groundwater background levels from the UWBZ were used as background comparison criteria for the sample collected from monitoring wells in the UWBZ and were used as background comparison criteria for seep data. Soil, surface water, and groundwater background concentrations are presented in Tables 2-3a through 2-3c.

The representative background concentrations for groundwater were not calculated using the upper quartile method recommended by Ohio EPA (2004b). Instead, background concentrations were calculated as upper tolerance limits (UTLs) using guidance recently released by USEPA (USEPA 2007a). The groundwater data for each constituent were evaluated with regard to sample size, distribution, and variability to determine an appropriate statistical method as described in USEPA guidance (USEPA 2007a) and applied in ProUCL software (Version 4.0). These were targeted to be 95/95 UTLs (which are 95 percent upper confidence limits of the 95th percentile of the background population), although the inability to assign an assumption of normality to some cases resulted in a nonparametric approach including the Kaplan Meier approach. The Kaplan Meier approach is a nonparametric alternative when non-detects are present that does not require proxy substitutions for non-detects, and tends to provide 95 percent upper confidence limits of a lower percentile. In summary, the representative background concentrations for groundwater were identified as the 95/95 UTLs or the maximum detected value if the maximum detected value was less than 95/95 UTL.

Uncertainties associated with the calculation of soil and groundwater background concentrations (e.g., selection of COPCs and hot spots) are discussed in Section 6.7.4. Evaluations of analytical results with respect to background concentrations are also detailed in Section 6.

2.6 Adjacent IRP Site Activities

IRP Sites 7, 9, 20, 25, 26, and 27 (Figure 1-2) were screened against a commercial/industrial reuse scenario, applicable during the time of sampling. These sites were identified because of the potential that releases associated with these sites contribute to background conditions for the former Lockbourne AFB landfill. Although monitoring wells associated with the adjacent IRP sites were not installed to directly monitor the former Lockbourne AFB landfill, two monitoring wells (RB25-MW7 and RB25-MW9) were sampled as part of the Phase I and Phase II SI sampling activities. The sample results from these wells are discussed in Section 4. A brief summary for each site and their closure status is provided below.

Site 7 – No. 2 Fuel Oil Tank

Site 7 is a No. 2 fuel oil aboveground storage tank (AST) located near the center of the former Lockbourne AFB landfill (Figure 1-2). A release of approximately 200 to 500 gallons of No. 2 fuel oil reportedly occurred at this site. The Air Force conducted investigations at the site, and subsequently a No Further Remedial Action Planned (NFRAP) Decision Document was signed for this site.

Site 9 – Salvage Yard

COPCs detected in soil samples collected from this site were polynuclear aromatic hydrocarbons (PAHs), priority pollutant metals, and pesticides (upper 3 feet of soil only). COPCs detected in groundwater at this site were dissolved metals (antimony, arsenic, lead, nickel, and thallium) and pesticides (aldrin, Endosulfan II, and heptachlor epoxide), which were found in only one well. The presumed sources of impact include a documented fire and release of pesticides and undocumented releases of previously stored materials. An NFRAP Decision Document was signed for this site. Findings for Site 9 were reported in the *Final Remedial Investigation Phase I Data Report* (Parsons Engineering Science, Inc. [PESI] 1995) and the *Final Phase II RI Report* (IT 1998).

Site 20 – South Coal Pile

COPCs detected in soil collected from this site were PAHs and priority pollutant metals. COPCs detected in groundwater at this site were dissolved metals (arsenic, copper, cadmium, chromium, zinc, and lead). Presumed sources of impact include runoff from the South Coal Pile and other coal-related activities. An NFRAP Decision Document was signed for this site. Findings for Site 20 were reported in the *Final Remedial Investigation Phase I Data Report* (PESI 1995) and the *Final Phase II RI Report* (IT 1998).

Site 25 – Drainage System, Southwest Quadrant

COPCs detected in soil collected from this site were VOCs, SVOCs, and metals (lead, mercury, and zinc, one sample each). COPCs detected in ditch sediment were VOCs, SVOCs, pesticides, and priority pollutant metals, particularly lead and mercury. COPCs detected in groundwater were toluene, dichloroethene (DCE), dissolved lead, thallium, and arsenic. COPCs detected in surface water were SVOCs, pesticides, and priority pollutant metals. Presumed sources of impact include runoff from coal piles, runoff from Site 9, ash fallout from the old coal-burning heating plant, releases from Sites 3 and 4 (old pump houses), and smaller releases from aircraft maintenance and parking areas, runoff from runways, and possibly the old landfill. A Decision Document was issued in September 2001 stating that no further action would be required at the Site 25 Drainage System. Findings for Site 25 were reported in the *Final Phase II RI Report* (IT 1998) and the *January 1996 Remedial Investigation Phase I Data Report, Addendum Sites 25 and 27* (PESI 1996).

Site 26 – Transformer Storage

No further action was recommended for this site, since no PCBs were detected in soil samples (LAW 1995a). An NFRAP Decision Document was signed for this site. Findings for Site 26 were reported in the *Final Remedial Investigation Phase I Data Report* (PESI 1995).

Site 27 – Drainage Ditch Near Landfill Gate

COPCs detected in soil samples collected from this site were VOCs, SVOCs, and zinc (one sample only). COPCs detected in ditch sediment were VOCs, SVOCs, pesticides, and metals (arsenic, cadmium, chromium, lead, selenium, and zinc). COPCs detected in groundwater were toluene and dissolved metals (arsenic, copper, thallium, and zinc). COPCs detected in surface water were acetone and priority pollutant metals. Presumed sources of impact include point and nonpoint source releases to the ditch system and an August 1982 release of an unidentified industrial solvent. A Decision Document was issued in September 2001

stating that no further action would be required. Findings for Site 25 were reported in the *January 1996 Remedial Investigation Phase I Data Report, Addendum Sites 25 and 27* (PESI 1996).

2.7 USEPA Site Screening Investigation

In July 1986, the USEPA field investigation contractor, Ecology and Environment, Inc. (E&E), conducted a site screening investigation of the former Lockbourne AFB landfill. The investigation consisted of soil and sediment sampling along the southwestern and northern sides of the former Lockbourne AFB landfill and groundwater sampling from the Village of Lockbourne residential water supplies. Analytical results indicated presence of organic and inorganic analytes above background levels in soil and sediment samples. Inorganic analytes were detected in groundwater samples, but they were at concentrations below background levels (E&E 1986).

SECTION 3

Physical Setting

This section presents a summary of the physical characteristics of the site, including physiography, soils, drainage, geology, hydrogeology, climate, and land use. The summary is based on previous investigation activities conducted at the site. The main landfill investigation area consists of approximately 146 acres of partially open areas surrounded by densely wooded and overgrown areas. A portion of the 146 acres was used for waste disposal. Grass and low weeds cover large areas of the former Lockbourne AFB landfill with tall, dense brush, trees, and visible construction and demolition debris in intervening areas. The ground surface is generally hummocky because of disturbance and uneven settling of the ground surface in the area of former waste disposal trenches.

3.1 Physiography

The former Lockbourne AFB is located in the Central Lowland Province, which is characterized by low relief and elevation, and is located in the western half of Ohio. The Central Lowland Province consists of the Lake Plain and Till Plains physiographic sections. The former Lockbourne AFB lies within the Till Plains section of the Central Lowland Province. The Till Plains are extensive areas with a flat to slightly undulating terrain, consisting of a mixture of clay, sand, gravel, and boulders deposited by glaciers of the Pleistocene Age.

3.2 Soils

The U.S. Department of Agriculture Soil Conservation Service has described the soils near the former Lockbourne AFB landfill to be of two series: the Crosby series and the Kokomo series (National Cooperative Soil Survey 1980). The Crosby series consists of deep, somewhat poorly drained, slowly permeable soils formed in high-lime glacial till on uplands; slope ranges from 0 to 6 percent. The Kokomo series consists of deep, very poorly drained, moderately slowly permeable soils formed in high-lime Wisconsin Age glacial till on uplands; slope ranges from 0 to 2 percent.

3.3 Drainage

The former Lockbourne AFB is located on the drainage divide between Big Walnut Creek and Walnut Creek, with the former Lockbourne AFB landfill site lying within the Big Walnut Creek basin. Surface drainage at the site is controlled through an extensive network of storm drains, which include corrugated metal, concrete drainage pipes, and open drainage ditches. Surface water is routed through an oil/water separator prior to release into the surrounding surface streams (Engineering Science [ES] 1992).

The greater Columbus area is situated in the center of the state and in the drainage area of the Ohio River. Two rivers, the Scioto and Olentangy, flow through and near the city. The

former Lockbourne AFB landfill is within the Scioto River watershed. Elevation is 833 feet at Columbus and 730 feet at the former Lockbourne AFB landfill.

3.4 Geology

As stated in the Phase II SI report (PMC 2000), the former Lockbourne AFB area is characterized by approximately 200 feet of Pleistocene glacial drift, which fills a pre-glacial bedrock valley. Shales of the Ohio and Olentangy formations and limestones of the Columbus and Delaware formations underlie the area. The shale and limestone bedrock are Devonian Age. The surficial tills are mainly associated with ground moraine. Alluvial deposits are found in association with Walnut and Big Walnut creeks. The soils near the former Lockbourne AFB consist of medium textured glacial till and glacial outwash, mainly derived from limestone and dolomite.

The geology of the former Lockbourne AFB landfill area has been based upon field logs prepared during the Phase II SI and previous investigations conducted by ES (1992), IT (1995), and LAW (1995a). The uppermost unconsolidated unit consists of about 80 feet of clayey, silty till with alternating sand and gravel deposits. This till is underlain by two sand and gravel deposits, which are approximately 50 to 100 feet deep and separated by a layer of clay and silt, which is up to 60 feet thick. Shale and limestone bedrock underlies the unconsolidated deposits.

Shallow wells screened in the uppermost, unconsolidated geologic unit reveal a shallow water table with flow directed west and southwest. Logs from private wells north of the former Lockbourne AFB landfill and an abandoned water supply well for the heating plant northeast of the former Lockbourne AFB landfill (Figure 1-2) indicate clay deposits from the ground surface to about 60 to 70 feet bgs. This is underlain by sand and gravel deposits to the completion depths of the wells (ranging from 62 to 100 feet bgs) (Figures 3-1, 3-2, and 3-3). Figure 3-1 presents a plan view of two cross-section locations constructed across the unconsolidated stratigraphy of the site, and Figures 3-2 and 3-3 presents the east-west and north-south cross-sections, respectively. The cross-sections and the plan view were obtained from the Phase II SI report (PMC 2000). The geology at the former Lockbourne AFB consists of clayey silty till alternating with relatively extensive sand and gravel deposits. Underlying the unconsolidated glacial deposits are Devonian shales (ES 1992).

3.4.1 Geotechnical Analyses Completed in 2003

Subsurface soil samples were collected during RI from the northern and southern investigation areas to evaluate the character of downgradient soil, ascertain that the borings were outside the former Lockbourne AFB landfill, and help locate two additional downgradient monitoring wells. No chemical analysis was associated with subsurface soil sampling outside the former Lockbourne AFB landfill.

Northern Area of Investigation

Of the three DPT borings completed, samples were collected only from boring EEGLKB-DPT-03N to evaluate the soil characteristics. Soil boring EEGLKB-DPT-03N was advanced to 12 feet bgs, with groundwater encountered at approximately 8 feet bgs. The boring log for EEGLKB-DPT-03N is in Appendix B7. PID readings ranged from 8.1 parts per million (ppm)

(surface to 2-foot bgs interval) to 68.3 ppm (4- to 6-foot bgs interval). No odor was detected in the samples. No evidence of landfill debris was encountered in the boring.

Geotechnical samples representing distinct lithologies were collected from 2- to 4-foot bgs, 6- to 8-foot bgs, and 10- to 12-foot bgs horizons. Geotechnical analysis, performed by Midwest Testing Laboratories in Fargo, North Dakota, determined the lithology and characteristics of boring EEGLKB-DPT-03N (Table 3-1 and Appendix B9).

The samples are believed to be representative of an uppermost silty clay unit and of sand lenses that are scattered across or interbedded in the clay, and are consistent with the boring logs. Monitoring well LCKMW-15 was installed approximately 6 feet west-southwest of boring EEGLKB-DPT-03N.

Southern Area of Investigation

The southern area of sampling outside the former Lockbourne AFB landfill was densely forested. Two DPT borings were completed in the southern area of investigation, and no evidence of landfill debris was found in the second boring. Geotechnical samples were collected from one boring from the 2- to 4-foot bgs, 5- to 7- foot bgs, and 10- to 12- foot bgs horizons. No odor or evidence of landfill debris was detected in the samples. Geotechnical analysis determined the lithology and characteristics of boring EEGLKB-DPT-02S (Table 3-1).

The samples are representative of an uppermost silty clay unit and of sand lenses that are scattered across or interbedded in the clay, and are consistent with the boring logs. LCKMW-16 was installed approximately 6 feet northeast of boring EEGLKB-DPT-02S.

3.4.2 Phase II SI Soil Boring Sample Results

Soil samples were collected for geotechnical analyses, including grain size, moisture content, and Atterberg limits. Soil classification results based on geotechnical data obtained from grain size and Atterberg limits are listed in Table 3-2. The results obtained indicate:

- Evidence of uppermost silty clay unit:
  - Uppermost sample from boring LCKSB-8, collected between 22 and 24 feet bgs, was classified as sandy silty clay, and the sample collected from the 58- to 63-foot bgs interval was classified as lean clay with sand.
  - Soil samples collected from the 8- to 10-foot depth interval of boring LCKSB-9 were classified as clayey sand with gravel.
  - Samples collected from boring LCKSB-13 between 6 and 6.5 feet bgs were classified as poorly graded sand with silt. Samples collected between 18 and 18.5 feet bgs in the same boring were classified as lean clay with sand.
  - Samples collected from LCKSB-14 between 5.5 and 29 feet bgs and between 63.5 and 64 feet bgs were classified as predominantly sand with varying amounts of silt and clay. Samples collected from the same boring between 43.5 and 44 feet bgs were classified as lean clay with sand.

- Nature of the soils in the IDA:
  - The IDA was evident in samples collected between 74.5 and 78 feet bgs from LCKSB-8.
  - The deepest sample collected from boring LCKSB-10 was taken at the 80- to 85-foot depth interval. This sample was classified as silty clayey sand.
  - The deepest sample collected from boring LCKSB-14 was taken from the 78.5- to 79-foot depth interval. This sample was classified as silty clayey sand with gravel.
- Evidence of interbedded sand lenses that exist throughout the unconsolidated silty clay:
  - Four of the samples collected from boring LCKSB-8 were classified as predominantly sand with varying amounts of silt and clay. Three of these samples were collected between 38 and 58 feet bgs.
  - Five samples collected from boring LCKSB-10 between 9 and 69.5 feet bgs were classified as predominantly sand with varying amounts of silt and clay.
  - Samples collected from boring LCKSB-12 between 7.5 and 70 feet bgs were classified as predominantly sand with varying amounts of silt and clay and occasional gravel.

3.5 Hydrogeology

The hydrogeologic setting of the former Lockbourne AFB landfill area is characterized by the presence of three water-bearing zones that are separated by relatively impermeable sediment. The three zones are the UWBZ, IDA, and the deep sand aquifer, which are described below.

UWBZ groundwater exists at depths ranging between 4 and 16 feet bgs in interbedded sand lenses of the upper silty clay unit. The upper silty clay unit is present from the ground surface to depths ranging from approximately 55 feet to more than 80 feet in the area of the former Lockbourne AFB landfill (Figures 3-2 and 3-3). Geotechnical analyses have characterized the grain size of the gray clay layer within this unit as silty lean clay that would typically have permeability of approximately $5x10^{-8}$ to $2.5x10^{-7}$ centimeters per second (cm/sec) (IT 1998). This gray clay layer appears to be laterally continuous throughout the former Lockbourne AFB landfill and RANGB where its thickness is more than 20 feet. The gray clay layer within the upper silty clay unit is believed to be an effective aquitard (a zone within the earth that restricts the flow of groundwater from one aquifer to another) between the shallow water-bearing zone and the lower water-bearing zones (IT 1998).

The IDA is present in the sand and gravel deposits at depths exceeding 50 feet bgs, where it is under confined conditions. The deep sand aquifer is separated from the IDA by a silt and clay layer that inhibits interconnection between the aquifers.

3.5.1 Monitoring Wells Installed at Landfill

Seven monitoring wells (LCKMW-1 through LCKMW-7) were installed at the former Lockbourne AFB landfill as part of the Phase I SI (LAW 1995a). The depths of the UWBZ

wells ranged between 19 and 23 feet bgs, while the depths of the IDA wells ranged between 56 and 80 feet bgs (Table 3-3).

To supplement previous well locations and provide additional UWBZ and IDA groundwater quality information, seven monitoring wells (LCKMW-8 through LCKMW-14) were installed during the Phase II SI. The depths of the UWBZ wells ranged between 13.5 and 26.5 feet bgs, while the depths of the IDA wells ranged between 71 and 91 feet bgs (Table 3-3).

Two additional UWBZ monitoring wells (LCKMW-15 and LCKMW-16), located immediately outside the former Lockbourne AFB landfill, were installed during the RI. Both wells were screened in shallow sand lenses within the uppermost silty clay (in the UWBZ) and were drilled to 16 feet bgs (Table 3-3). LCKMW-15 penetrated a saturated zone at 7 feet bgs, and LCKMW-16 penetrated a saturated zone at 10 feet bgs. These were installed in the sandy intervals occurring within the uppermost silty clay.

Thirteen monitoring wells were installed at areas adjacent to the former Lockbourne AFB landfill as part of IRP site characterization activities. These existing monitoring wells are less than 20 feet deep and have revealed the presence of a shallow, topographically controlled water table with a gradient and flow direction to the west-southwest and within silty clay till surficial deposits (ES 1992).

3.5.2 Groundwater Flow

Of the 17 wells monitored during the initial RI groundwater monitoring event, nine were completed in the UWBZ. Of these nine monitoring wells, five (LCKMW-2, LCKMW-9, LCKMW-11, LCKMW-15, and RB25-MW7) encountered water at less than 10 feet. The remaining four UWBZ wells encountered water at less than 22 feet. UWBZ potentiometric surface maps, using groundwater elevation data collected during the RI field operations and the subsequent three quarters of groundwater monitoring, confirm groundwater flow direction is generally to the west-southwest at the former Lockbourne AFB landfill (Figures 3-4 through 3-7). During each monitoring event, groundwater elevation data were collected from LCKTW-1 (August 2003 only), LCKMW-2, LCKMW-4, LCKMW-6, LCKMW-9, LCKMW-11, LCKMW-13, LCKMW-15, LCKMW-16, and RB25-MW7 (three subsequent quarters only).

Phase II SI groundwater elevation data were collected from eight UWBZ monitoring wells (LCKMW-2, LCKMW-4, LCKMW-6, LCKMW-9, LCKMW-11, LCKMW-13, RB25-MW-7, and RB25-MW-9). Three stream gauges installed in the west drainage ditch were used to determine surface water elevations. A Phase II SI potentiometric surface map of the UWBZ was prepared using groundwater elevation data from the shallow monitoring wells, the stream gauges, and the piezometers (Figure 3-8). Groundwater flow in the shallow unconsolidated deposits is toward the west and southwest at the former Lockbourne AFB landfill. The average hydraulic gradient of the shallow potentiometric surface was reported to be approximately 0.0075 foot per foot (ft/ft) (PMC 2000).

RI groundwater potentiometric surface maps, using groundwater elevation data from each quarterly sampling event, confirm IDA groundwater flow is to the west and–southwest (Figures 3-9 through 3-12). Groundwater elevation data were collected from LCKMW-1,

LCKMW-3, LCKMW-5, LCKMW-7, LCKMW-8, LCKMW-10, LCKMW-12A, and LCKMW-14 during each quarterly monitoring event.

Phase II SI groundwater elevation data were collected from eight IDA monitoring wells (LCKMW-1, LCKMW-3, LCKMW-5, LCKMW-7, LCKMW-8, LCKMW-10, LCKMW-12A, and LCKMW-14). A Phase II SI potentiometric surface map of the IDA was prepared using groundwater elevation data from the IDA monitoring wells (Figure 3-13). Similar to that seen in the UWBZ, groundwater flow in the IDA is toward the west and southwest at the former Lockbourne AFB landfill. The average hydraulic gradient of the potentiometric surface in IDA was reported to be approximately 0.004 ft/ft (PMC 2000).

Groundwater water level measurements indicate that the groundwater potentiometric surface in the IDA wells is approximately 20 to 30 feet bgs, while the depth to the sand and gravel deposits of the aquifer is greater than 50 feet bgs. This suggests the IDA is under confined conditions. Finally, upon comparing the potentiometric heads at the UWBZ and IDA monitoring wells, a downward gradient was identified.

3.5.3 Permeability Test Data

Upper Water-Bearing Zone

In situ permeability tests (slug tests) were conducted during the Phase I and Phase II SIs. During the Phase I SI, slug testing of wells screened in the shallow water bearing zone produced hydraulic conductivity (K) values that ranged from $9.7x10^{-5}$ to $9.7x10^{-4}$ feet per minute (ft/min) (LAW 1995a). These values indicate silty sand and were interpreted as representing sand lenses within the silty clay.

Slug tests were conducted on each Phase II SI-installed monitoring well, including both slug-in (falling head) and slug-out (rising head) tests. Slug test results from the Phase II SI wells showed that the shallow wells (total depth less than 25 feet bgs) had K values that ranged from $6.9x10^{-4}$ to $2x10^{-2}$ ft/min. These values are indicative of clayey or silty sands and are representative of sand stringers within the unconsolidated silty clay unit.

Intermediate Depth Aquifer

Phase I SI slug tests of the IDA determined a K value of approximately $9.7x10^{-4}$ ft/min (LAW 1995a). Slug tests from the intermediate wells installed during the Phase II SI had K values that ranged from approximately $3.5x10^{-4}$ to $1.3x10^{-2}$ ft/min. This value is consistent with the results from the Phase I SI and confirms the presence of silty sands within sand and gravel aquifer.

During the Phase II SI, vertical and horizontal falling head permeability testing was conducted in the laboratory on samples taken from the shallow water-bearing zone. Six undisturbed soil samples were collected using 3-inch-diameter Shelby tube samplers. These undisturbed samples were submitted to H.C. Nutting Company for vertical and horizontal permeability testing. The K values of LCKSB-8 samples collected between 4 and 14 feet bgs ranged from $6.1x10^{-8}$ to $2x10^{-6}$ ft/min for vertical permeability and from $5.9x10^{-8}$ $5.5x10^{-7}$ ft/min for horizontal permeability. These values are indicative of clay materials and represent the uppermost silty clay. The K values for sample LCKSB-12, collected between 16 and 18 feet bgs, were $3.2x10^{-6}$ ft/min for vertical permeability and $5.5x10^{-7}$ ft/min for

horizontal permeability. The K values for samples LCKSB-12 (4 to 5.9 feet bgs) and LCKSB-14 (8 to 9.5 feet bgs) ranged from $3.3x10^{-5}$ to $7.7x10^{-5}$ ft/min for vertical permeability. Horizontal permeability for LCKSB-12 (4 to 5.9 feet bgs) was $4.9x10^{-5}$ ft/min. These values are indicative of clayey, silty sands and represent the sand lenses within the uppermost silty clay.

3.5.4 Conceptual Hydrogeologic Model

The Phase II SI report (PMC 2000) compiled and interpreted hydrogeologic data to provide the following description of the former Lockbourne AFB landfill hydrogeologic model:

- The uppermost unconsolidated material consists of silty clay with sand lenses.
- Groundwater elevation data from the shallow monitoring wells indicate that a shallow water table exists within the silty clay ranging in depth from approximately 4 to 16 feet bgs, and is possibly under perched water conditions.
- Groundwater flow in the shallow saturated zone is generally toward the west-southwest with a horizontal gradient of approximately 0.0075 ft/ft.
- The K values derived from slug testing of the shallow wells range from approximately 1 to 28 feet per day (ft/day).
- The upper silty clay unit contains a gray clay layer that occurs at depths ranging from approximately 18 to 48 feet bgs; is laterally continuous, more than 20 feet thick, and dense; and has a low permeability. Thus, it is considered an effective aquitard separating the shallow water-bearing zone from the lower aquifers.
- Below the silty clay is a sand and gravel unit, which comprises the IDA.
- Groundwater elevation data demonstrate that the groundwater surface in the IDA wells is approximately 20 to 30 feet bgs, and the IDA exists under confined conditions.
- The groundwater flow in the IDA is also generally toward the west-southwest with a horizontal gradient of approximately 0.004 ft/ft.
- The K values derived from slug testing of the IDA wells range from approximately 0.5 to 18 ft/day.
- The K values derived from vertical and horizontal permeability testing of the intermediate wells range from 0.0001 to 0.1 ft/day.
- A clay unit is present at a depth of approximately 130 feet bgs, which separates the IDA from a lower (deep) sand and gravel aquifer (ES 1992).
- The bedrock beneath the site occurs at approximately 200 feet bgs.

3.6 Climate

The greater Columbus area is located in an area of dynamic weather. Cold air masses from central and northwest Canada frequently invade the region. Tropical Gulf masses often reach central Ohio during the summer but to a much lesser extent in the fall and winter.

Columbus-area rivers and creeks provide variations in the microclimate of the area, contributing to the formation of shallow ground fog at daybreak in the summer and fall. The following are the average monthly temperatures and precipitation amounts in Columbus, Ohio.

Month	Low	High	Precipitation
January	20.3°F	36.2°F	2.53 inches
February	23.5°F	40.5°F	2.20 inches
March	32.2°F	51.7°F	2.89 inches
April	41.2°F	62.9°F	3.25 inches
May	51.8°F	73.3°F	3.88 inches
June	60.7°F	81.6°F	4.07 inches
July	64.9°F	85.3°F	4.61 inches
August	63.2°F	83.8°F	3.72 inches
September	55.9°F	77.1°F	2.92 inches
October	44.0°F	65.4°F	2.31 inches
November	34.9°F	52.4°F	3.19 inches
December	25.9°F	41.0°F	2.93 inches

Source: http://www.rssweather.com/climate/Ohio/Columbus/#temp
°F – degrees Fahrenheit

ODNR has summarized estimates of groundwater recharge rates in different basins (Dumouchelle and Schiefer 2002). Statewide, these recharge rates range from 3 to 16 inches per year, with a median rate of 6 inches. Data for the Big Walnut Creek basin indicate that precipitation is approximately 37 inches per year, but groundwater recharge is 4 to 5 inches per year, based on relatively low-permeability soils in this area.

3.7 Land and Water Use

The Village of Lockbourne began receiving potable water from the City of Columbus municipal water system in 1993. In January 1999, the Agency for Toxic Substances and Disease Registry (ATSDR), recommended that residents of Lockbourne use municipal drinking water rather than their private wells, if completed in the UWBZ, as their source of drinking water.

In 1996, Ohio EPA collected and analyzed groundwater from five of seven private wells. These five private wells drew water from the UWBZ. Two of the seven wells drew water from the deeper IDA and were deemed unnecessary to sample. Water from the five tested wells met federal and state drinking water standards (Waters 1996).

Currently, the Village of Lockbourne receives water from the Franklin County Water Department, based on CH2M HILL's communication with the Water Department of Franklin County, Ohio, on April 8, 2009; the Village of Lockbourne on April 13, 2009; and

the Water Department of Columbus, Franklin County, Ohio, on April 27, 2009. The county's largest public water system is the City of Columbus. The city uses surface water from the Scioto River, Big Walnut Creek, Hoover Creek, and Alum Creek reservoirs for its supply, along with groundwater from the south well field area in southeast Franklin County. The Village of Lockbourne is no longer using the supply well (No. 413418) located between Commerce, Landis, and Decker streets, which is within 0.25 mile of the former Lockbourne AFB landfill.

SECTION 4

Nature and Extent

This section presents investigation data for media sampled during the Phase I and Phase II SIs and RI field activities, and interpretation of the results to delineate the vertical and horizontal nature and extent of impact. The investigations did not identify any deviations to the scope that affected quality, except those included in Appendix B8.

Data validation for data collected by EEG during the 2003 sampling event, except for the three quarters of groundwater data collected between November 2003 and May 2004, was conducted by STL in Chicago, Illinois, and West Sacramento, California, and certified by the USACE Missouri River Division laboratory validation program (Attachment 1 of Appendix B3). CH2M HILL validated the last three quarters of data, and the data validation report is included as Appendix E.

4.1 Additional SI Completed in 2008 by CH2M HILL

Observations and conclusions made during the SI included:

- Waste encountered during trenching included MSW, construction and demolition debris, lime sludge, and black material that was similar in appearance to coal ash.
- The EM survey data were consistent with results expected for trench-and-fill landfill techniques, and identified anomalies consistent with buried construction debris.
- Based on EM survey and test pits, it was estimated that approximately 40 acres, located at the north and northeast portion of the site, contain no waste material.
- Temporary landfill gas monitoring points were installed, and landfill gas measurements indicated that methane concentrations were below the action level of 1.25 percent (as listed in Ohio Administrative Code [OAC] 3745-27-12).

4.2 Surface Soil Sampling Results

Samples collected from the 0- to 1-foot bgs interval were designated as surface soil samples. Table 4-1 presents the concentrations of constituents detected in surface soil samples collected during the RI and SIs (Phases I and II). Sampling locations are shown on Figure 2-2.

4.2.1 Results Obtained from 2003 Investigation Activities

Twenty-four surface soil samples and five quality assurance/quality control (QA/QC) samples were collected from 0 to 1 foot bgs (Table 2-1a). Of the 24 samples, 20 were collected from AOC 1 and four were collected from AOC 2 (Figure 2-2). Table 4-2 lists surface soil samples collected, their locations, and the rationale for location selection. Rationale includes:

- Sample locations based on 2003 current conditions (e.g., stressed vegetation)

- Phase I SI geophysical and passive soil gas data
- Phase II SI sampling of four Phase I SI sample locations that exhibited no signs of stressed vegetation, burn areas, apparent debris, or other indications of landfill activity

Three VOCs (acetone, toluene, and trichlorofluoromethane) were detected in the samples analyzed during the RI. The maximum concentrations of the detected VOCs were low. Only acetone and trichlorofluoromethane were detected in more than 50 percent of the samples analyzed. A total of 24 SVOCs were detected in the samples analyzed during the RI, and 15 of these SVOCs were found in more than 50 percent of the samples. Based on this observation, SVOCs are more prevalent in the surface soil samples collected from the former Lockbourne AFB landfill. These SVOCs are acenaphthene; anthracene; benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(ghi)perylene; benzo(k)fluoranthene; chrysene; dibenz(ah)anthracene; dibenzofuran; fluoranthene; indeno(1,2,3-cd)pyrene; 2-methylnaphthalene; phenanthrene; and pyrene.

In the 24 surface soil samples collected, five pesticides (alpha-chlordane; gamma-chlordane; p,p′-dichlorodiphenyl dichloroethane [p,p′-DDD]; p,p′-dichlorodiphenyl dichloroethylene [p,p′-DDE]; and p,p′-dichlorodiphenyl trichloroethane [p,p′-DDT]) and four PCBs (PCB 1242, PCB 1248, PCB 1254, and PCB 1260) were detected. The occurrence of these compounds was not widespread, as they were detected in less than 30 percent of the surface soil samples collected.

Only two explosives were detected in the samples analyzed (1,3-5-trinitrobenzene and 2,4,6-trinitrotoluene). The detected concentrations were low. A total of 12 dioxin/furan congeners were detected in the surface soil samples. TCDD-TEQ is a calculated number used for risk assessment. The World Health Organization (WHO) dioxin toxic equivalency factors (TEFs) were used to calculate the 2,3,7,8-TCDD toxic equivalent (TCDD-TEQ) concentration for each sample where dioxins or furans were detected. The concentration of each dioxin congener is adjusted to a TEQ concentration of 2,3,7,8-TCDD using the TEF. The TEQ concentrations of all of the dioxin congeners are then added to determine the TCDD-TEQ concentration, which is used in the risk assessment, along with the 2,3,7,8-TCDD toxicity values to calculate risks associated with exposure to the dioxins. In the case of non-detects, one-half the reporting limit for the dioxin congener is multiplied by the TEF for that congener, and included in the calculation of the sample TCDD-TEQ concentration.

The occurrence of dioxins/furans was not widespread, as they were detected in less than 20 percent of the surface soil samples collected (Figure 4-1). The maximum number of occurrences was observed with two dioxins (heptachlorodibenzo-p-dioxin and octachlorodibenzo-p-dioxin), and these dioxins were detected in four samples each.

A total of 23 metals were detected in the surface soil samples analyzed during the RI. Out of these 23 metals, 13 were detected in all the samples analyzed (aluminum, barium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc).

4.2.2 Results Obtained from 1997 and 1998 Investigation Activities

Two VOCs (acetone and methylene chloride) were detected in the surface soil samples collected during the Phase II SI. Acetone was detected at two locations, while methylene chloride was detected in one sample only. Of the 15 SVOCs that were detected in the surface

soil samples collected during the Phase II SI, none of the SVOCs was detected in more than three samples. Pyrene was detected in three samples, while anthracene; benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(ghi)perylene; benzo(k)fluoranthene; chrysene; dibenz(ah)anthracene; fluoranthene; indeno(1,2,3-cd)pyrene; and phenanthrene were each detected in two samples.

Two pesticides (p,p'-DDD and p,p'-DDE) were detected above their reporting limits, but no PCBs were detected in any of the samples analyzed. Twenty-four dioxin/furan congeners were detected in the collected samples, and 18 of these were detected in more than 10 samples. No explosives were detected above their reporting limits. Finally, 19 metals were detected in the surface soil samples collected during the Phase II SI, with eight metals detected in more than 10 samples. These metals were aluminum, arsenic, barium, calcium, iron, lead, magnesium, and zinc.

4.2.3 Results Obtained from 1995 Investigation Activities

Four VOCs (acetone; trans 1,3-dichloropropane; methylene chloride; and toluene) were detected in the surface soil samples collected during the Phase I SI. Among these detected VOCs, methylene chloride was detected in 12 samples, and acetone was detected in six samples. Although 21 SVOCs were detected in the surface soil samples analyzed, 10 SVOCs were detected in more than 50 percent of the samples. These SVOCs showed exceedances: benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(ghi) perylene; benzo(k)fluoranthene; chrysene; fluoranthene; indeno(1,2,3-cd)pyrene; phenanthrene; and pyrene.

Although three pesticides (p,p'-DDD; p,p'-DDE; and p,p'-DDT) were detected above their reporting limits, no PCBs were detected in any of the samples collected during the Phase I SI. In addition, no explosives were detected above their reporting limits. Samples were not submitted for dioxin analysis. Finally, nine metals were detected in the surface soil samples analyzed. Five of them were detected in all the samples. These metals are arsenic, barium, chromium, lead, and zinc.

4.3 Subsurface Soil Sampling Results

Samples collected from depths greater than 1 foot bgs were designated as subsurface soil samples. Table 4-3 presents the concentrations of different constituents detected in subsurface soil samples collected during the Phase I and Phase II SIs and RI. Sampling locations are shown on Figure 2-3.

4.3.1 Results Obtained from 2003 Investigation Activities

Samples were collected from two locations during the RI, with one location being in the 4- to 6-foot bgs interval, while the other is in the 8- to 10-foot bgs interval. Two VOCs (acetone and trichlorofluoromethane) were detected in the subsurface soil samples collected. Eight SVOCs (benzo(a)pyrene; benzo(b)fluoranthene; benzo(ghi)perylene; benzo(k)fluoranthene; chrysene; fluoranthene; phenanthrene; and pyrene) were detected in only the sample collected from LCKMW-16, while no SVOCs were detected in the sample collected from LCKMW-15.

Three pesticides (p,p′-DDD; p,p′-DDE; and p,p′-DDT) were detected in the subsurface sample collected from LCKMW-16, although no PCBs were detected in any of the samples collected. Samples were not analyzed for dioxins. Finally, 20 metals were detected above their reporting limits at both the locations.

4.3.2 Results Obtained from 1997 and 1998 Sampling Events

Six VOCs (acetone; 1,2-dichloroethene; methyl ethyl ketone; methylene chloride; trichloroethene; and vinyl chloride) were detected above their respective reporting limits, with four VOCs being detected at one location each. Only methylene chloride was detected in four samples. The concentrations of the detected VOCs were low. Ten SVOCs were detected in the subsurface soil samples analyzed, and only fluoranthene was observed in more than one sample.

No pesticides/PCBs were detected above their reporting limits. Twenty-six dioxin/furan congeners were detected in the collected samples, with 16 of these dioxins/furans occurring in more than 50 percent of the samples (Figure 4-1). Hexachlorodibenzo-p-dioxins, heptachlorodibenzo-p-dioxins, and octachlorodibenzo-p-dioxin were detected in all the samples analyzed during the 1997 sampling event. Finally, 20 metals were detected in the subsurface soil samples collected, with 14 metals occurring in all the samples analyzed. These metals are aluminum, arsenic, barium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc.

4.3.3 Results Obtained from 1995 Sampling Event

Six VOCs (acetone; trans 1,3-dichloropropene; ethylbenzene; methylene chloride; toluene; and xylenes) were detected during the Phase I SI. Only methylene chloride was detected in all the sample locations collected. Acetone, the next most frequently detected constituent, was detected in 50 percent of the samples. The concentrations of detected VOCs were low. Although 23 SVOCs were detected in the subsurface soil samples analyzed, only eight SVOCs were detected in 50 percent or more of the samples analyzed. They are benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene.

Four pesticides (p,p′-DDD; p,p′-DDE; and p,p′-DDT) and one PCB (PCB 1254) were detected in the samples analyzed above their respective reporting limits. Subsurface soil samples were not analyzed for dioxins. Finally, among the eight metals detected, arsenic, barium, chromium, lead, and zinc were detected in all the samples analyzed.

4.4 Surface Water Sampling

Table 4-4 presents the concentrations of different constituents detected in surface water samples collected during the Phase I and Phase II SIs and RI sampling events. Sampling locations are shown on Figure 2-4.

4.4.1 Results Obtained from 2003 Sampling

Three surface water samples (EEGLKB-SW01, EEGLKB-SW02, and EEGLKB-SW03) were collected and were collocated with sediment samples (discussed in next section). Figure 2-4

depicts Phase I and Phase II SIs and RI surface water and sediment sample locations. Surface water samples were not analyzed for VOCs. Only two SVOCs (benzoic acid and bis[2-ethlyhexyl]phthalate) were detected at one location (EEGLKB-SW02). Only the sample collected from EEGLKB-SW01 was analyzed for dioxins, and no dioxins were detected at this location. Ten metals were detected in the surface water samples collected during RI, and nine out of these 10 metals were detected at three locations. These metals are aluminum, barium, calcium, copper, magnesium, manganese, potassium, sodium, and zinc.

4.4.2 Results Obtained from 1997 and 1998 Sampling Events

Surface water samples were collected from five locations during these sampling events. Two VOCs (carbon disulfide and 1,2-dichloroethene) were detected in one sample each. No SVOCs were detected in any of the samples collected. Ten dioxin/furan congeners were detected in the samples analyzed, with octachlorodibenzo-p-dioxin detected in all the samples analyzed. Twelve metals were detected in the surface water samples collected. The most frequently occurring metals were barium, calcium, iron, magnesium, manganese, and sodium as they were detected in each samples collected. Arsenic, barium, calcium, magnesium, manganese, potassium, sodium, thallium, and zinc also were detected in the dissolved state.

4.4.3 Results Obtained from 1995 Sampling Events

Samples were collected from three locations during the Phase I SI. Among the detected VOCs, methylene chloride was detected at three samples, while acetone was detected in one sample. Two SVOCs (diethyl phthalate and di-n-butyl phthalate) were detected in one sample only. Samples were not analyzed for dioxins. Surface water samples were analyzed for only five metals (arsenic, barium, lead, selenium, and zinc) and all five metals were detected in the samples collected. Barium, lead, and zinc were detected in all the samples analyzed.

4.4.4 Variability Observed Between Sampling Events

Most of the VOCs and SVOCs detected in surface water samples collected during the Phase I SI were not detected subsequently in Phase II SI or RI samples. Not all dioxins detected in Phase II SI samples were detected in samples collected during the RI. More metals also were detected in Phase II SI samples compared to RI samples. This variability in results obtained from different phases of investigations is probably attributable to the sampling techniques, such as retaining different amounts of suspended solids in the collected samples. In addition, it is known that Phase I SI surface water samples were collected during the day after a rain event, which could increase the suspended solids. The amount of rainfall could not be quantified. No rain event occurred during the week prior to collecting the Phase II SI surface water samples.

4.5 Sediment Sampling

Table 4-5 presents the concentrations of different constituents detected in sediment samples collected during the Phase I and Phase II SIs and RI. Sampling locations are shown on Figure 2-4.

4.5.1 Results Obtained from 2003 Sampling Event

Three sediment samples (EEGLKB-SD01, EEGLKB-SD02, and EEGLKB-SD03), which were collocated with surface water samples (EEGLKB-SW01, EEGLKB-SW02, and EEGLKB-SW03), were collected during the RI sampling event. In addition, a fourth sediment sample (EEGLKB-SD04) was collected from an offsite location, north of the Vause Road and Canal Road bridge.

Considering the samples collected from SD-01, SD-03, and SD-04, four VOCs (acetone, chloroethane, toluene, and trichlorofluoromethane) were detected at concentrations above reporting limits. Fourteen SVOCs were detected in the samples collected from SD-01, SD-03, and SD-04. More SVOCs were detected at SD-03 compared to SD-01 and SD-04.

A pronounced oil sheen and hydrocarbon odor were observed at SD-02. Besides acetone, 17 SVOCs were detected at SD-02.

Three pesticides (p-p′-DDD; p-p′-DDE; and p-p′-DDT) were detected in samples collected at SD-02, SD-03, and SD-04, while one PCB (PCB 1260) were detected at SD-01. Only the sample collected from SD-01 was analyzed for dioxins, and the following dioxins were detected above their respective reporting limits in that sample: heptachlorodibenzo-p-dioxins, octachlorodibenzo-p-dioxins, tetrachlorodibenzofurans, and tetrachlorodibenzo-p-dioxins.

Twenty-one metals were detected in the sediment samples analyzed during RI, and 19 of these metals were detected in all the samples analyzed.

4.5.2 Results Obtained from 1997 and 1998 Sampling Events

During the Phase II SI, background samples were collected along with sediment samples from the East and West ditches. Samples were collected from eight locations, with five from the 1997 sampling event (LCKSD-1 through LCKSD-5) and three from the 1998 sampling event (LCKSD-10 through LCKSD-12). Samples collected during the 1998 sampling event were analyzed for dioxins only. Three VOCs (acetone, carbon disulfide, and methyl ethyl ketone) were detected in background and ditch samples. Seven SVOCs (benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene) were detected in the samples collected. Among these, benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene occurred most frequently.

Although no PCBs were detected, two pesticides (p-p′-DDD and p-p′-DDT) were detected in the samples collected. Twenty-four dioxins were detected in both background samples and those collected from the East and West ditches. Among the most frequently occurring dioxins were heptachlorodibenzo-p-dioxins, hexachlorodibenzofurans, hexachlorodibenzo-p-dioxins, octachlorodibenzo-p-dioxins, and tetrachlorodibenzo-p-dioxins (TCDD).

As indicated in Section 2, background samples collected from LCKSD-1 (East Ditch) during the 1997 sampling event and the three samples (LCKSD-10, LCKSD-11, and LCKSD-12) collected during the 1998 sampling event were located upgradient of the former Lockbourne AFB landfill but downgradient of potential dioxin sources. Sample LCKSD-10 was collected along a ditch that ran by the former heating plant settling pond. This sample contained the highest dioxin concentration of the three samples collected in 1998. Sample LCKSD-11 was collected along a ditch that receives drainage from a former coal storage area. Dioxins were

detected in this sample at a higher concentration than in sample LCKSD-12, which was collected along a ditch downgradient of runways and an aircraft parking apron. Based on review of available data, it appears there are sources that may have contributed to surface water and sediment dioxin loading upgradient of the Lockbourne AFB Landfill. Finally, 16 metals were detected in the background samples and the ditch samples, and 13 of these metals were detected in all the samples analyzed.

4.5.3 Results Obtained from 1995 Sampling Event

Three VOCs (acetone, methylene chloride, and toluene) were detected in the sediment samples collected during Phase I SI above their respective reporting limits. Although 13 SVOCs were detected in the samples collected, only three SVOCs (bis(2-ethylhexyl phthalate, fluoranthene and pyrene) were detected in more than one sample. Although no PCBs were detected in the samples analyzed, two pesticides (p,p′-DDD and p,p′-DDT) were detected above their respective reporting limits. The sediment samples were analyzed for seven metals, and six metals were detected in the samples analyzed, with arsenic, barium, chromium, and lead being the most frequently occurring metals.

4.6 SI Seep Sampling

In previous investigations, seeps were identified and samples were collected for analysis; however, four attempts were made by CH2M HILL to locate these previously identified seeps during the two September 2008 events, the October 2008 event, and the February 2009 event. Representatives of CH2M HILL, Ohio EPA, and USACE agreed at an onsite meeting that the seeps do not exist and, thus, excluded them from the scope of the SI report. *Previous seep sampling and investigative efforts are presented herein for reference only.*

During the 2003 sampling event, one seep was located and sampled (EEGLKB-SP01), and was compared to two seep samples during the Phase I SI (LCK-SW4 and LCK-SW5) and three during the Phase II SI (LCKSP-1, LCKSP-2, and LCKSP-3). During the Phase I SI, the two seep samples were located in the West Ditch (Figure 2-5). The seeps were identified following a significant rain event the previous day. During the Phase II SI, LCKSP-3 was in the East Ditch downgradient of IRP Sites 9 (salvage yard), 26 (transformer storage), and 25 and 27. The other two were in the West Ditch (Figure 2-5). Samples were collected by making a small depression in the ditch bank below the seep and allowing the beaker to fill. All seep samples were collected from the AOC 1 area.

Table 4-6 presents the concentrations of different constituents detected in seep samples collected during the Phase I and Phase II SIs and RI. Sampling locations are shown on Figure 2-5.

4.7 Groundwater Sampling

Table 4-7 presents the concentrations of different constituents detected in groundwater samples collected during the Phase I and Phase II SIs and the RI. Sampling locations are shown on Figure 2-1. Monitoring wells RB25-MW7 and RB25-MW9 were installed in 1986 (ES 1992). Monitoring wells LCKMW-1 through LCKMW-7 were installed during the Phase I SI, and monitoring wells LCKMW-8 through LCKMW-14 were installed during the

Phase II SI. Monitoring wells LCKMW-15, LCKMW-16 and LCKTW-1 were installed during the RI.

4.7.1 RI Groundwater Sampling

In August 2003, groundwater samples were collected from two monitoring wells installed during the RI and from 15 existing monitoring wells. These monitoring wells were also sampled in November 2003, February 2004, and May 2004. Four VOCs (acetone, carbon disulfide, methylene chloride, and toluene) were detected during the RI groundwater sampling. Only acetone was detected in 13 samples, while the other three were detected in only one sample. Twelve SVOCs were detected in samples collected during the RI. Dibenz(ah)anthracene and indeno(1,2,3-cd)pyrene were most frequently detected, followed by benzo(a)pyrene and benzo(b)fluoranthene. No explosives were detected in RI groundwater samples. Twenty metals were detected in the groundwater samples collected during the RI. The most commonly occurring metals were aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc. Arsenic was detected primarily in the UWBZ, and generally near the reporting limit. However, the first quarterly sample collected (August 2003) from LCKMW-4 had an arsenic concentration of 73 micrograms per liter (µg/L). IDA arsenic concentrations from site wells were similar to concentrations in IDA background wells.

Five wells (LCKMW-4, LCKMW-7, LCKMW-13, LCKMW-15, and LCKMW-16) were selected for dioxin analysis for the August 2003 RI sampling events. Only LCKMW-7 was screened in the IDA. In RI samples, only TCDDs at LCKMW-15 and LCKMW-16 and octachlorodibenzo-p-dioxin at LCKMW-4 were detected.

4.7.2 Phase II SI Groundwater Sampling Results

During the 1997 field effort, groundwater samples were collected from 16 monitoring wells, 12 of which were located downgradient from the former Lockbourne AFB landfill. Two upgradient well pairs (LCKMW-1 and LCKMW-2, LCKMW-8 and LCKMW-9) were sampled to provide information on background groundwater constituent concentrations. Two individual wells and five UWBZ/IDA well pairs, located along the northern and southwestern site boundaries, were sampled to provide information on downgradient groundwater quality. The groundwater samples were analyzed for VOCs, SVOCs, PCBs/pesticides, dioxins, explosives, and metals (total and dissolved).

During the 1998 field effort, six groundwater monitoring wells were sampled, three screened in the UWBZ (14-MW1, LCKMW-11, and LCKMW-13) and three screened in the IDA (LCKMW-7, LCKMW-10, and LCKMW-12A). Monitoring well 14-MW1 is approximately 2 miles northeast of the northeast corner of the former Lockbourne AFB landfill. In order to determine the fraction containing dioxins, unfiltered and filtered groundwater samples were collected from each of the six above-mentioned wells and analyzed for total and dissolved dioxins, respectively.

Dioxins and furans were detected in groundwater more frequently in the Phase II SI samples compared with the RI samples. The dioxins and furans congeners detected in unfiltered samples were hexachlorodibenzofurans, octachlorodibenzo-p-dioxins, and tetrachlorodibenzo-p-dioxins at LCKMW 7, LOCKMW-10, LCKMW-11, and LCKMW-13.

The only dioxin that was detected in the filtered samples was octachlorodibenzo-p-dioxin, and it was detected in samples collected from LCKMW-12A and LCKMW-13.

Among VOCs, carbon disulfide and toluene were detected in five and one samples respectively. No SVOCs or pesticides/PCBs were detected in any of the wells sampled. Seventeen metals were detected in the groundwater samples, and nine of these metals (arsenic, barium, calcium, copper, iron, magnesium, manganese, potassium, and sodium) were detected in dissolved state in the samples.

4.7.3 Phase I SI Groundwater Sampling Results

Groundwater samples from the seven monitoring wells installed during the Phase I SI were analyzed for VOCs, SVOCs, pesticides/PCBs, metals; explosives, nitrate, and sulfate. Only one VOC (methylene chloride) was detected above its reporting limit. Five SVOCs (bis[2-ethylhexyl]phthalate, butylbenzyl phthalate, diethyl phthalate, di-n-octyl phthalate, and phenol) were detected in the groundwater samples. No pesticides or PCBs were detected. Dioxins were not analyzed during the Phase I SI.

Nine metals were detected in groundwater samples collected from seven monitoring wells, with arsenic, barium, iron, lead, manganese, and sodium being the most frequently detected ones. The Phase I SI report (LAW 1995a) documented final water purged from the development of monitoring wells LCKMW-2 and LCKMW-6 as being slightly turbid or brown and silty. This report also documented groundwater samples from wells LCKMW-2, LCKMW-3, LCKMW-4, LCKMW-5, and LCKMW-6 as appearing silty, very silty, and/or brown. Water purged from LCKMW-7 was noted as clear; however, the turbidity of the water sampled was 150 nephelometric turbidity units (NTU).

SECTION 5

Fate and Transport Evaluation

The fate and transport of chemicals detected in the environmental media (i.e., surface soil, subsurface soil, surface water, sediment, and groundwater) was qualitatively evaluated. This involved analyzing the comprehensive site characterization database of information with respect to the site physical and source characteristics. The purpose of understanding the trends of constituents of potential interest with respect to the migration potential of chemicals allows for determining whether:

- Residual chemicals in landfill surface soil can impact groundwater as a result of infiltration
- Landfill surface soil can impact downgradient surface water and the perimeter drainage ditch as a result of groundwater discharge from the UWBZ or from surface runoff
- Leaching from the waste materials is potentially a source that may lead to offsite migration of chemicals of interest by evaluating the surface water and groundwater data

This section provides an overview of the conceptual site model (CSM), including sources and factors at the site that influence migration pathways.

5.1 Sources

As indicated earlier in Section 2, CH2M HILL has redefined the site into two AOCs: AOC 1 and AOC 2. AOC 2 is the area where no waste was encountered during recent test pit activities, while AOC 1 is the area where landfill operations were concentrated.

Releases of constituents of potential interest from the site have occurred principally as a result of the former practices of burning and disposal of wastes from the base and surface disposal of various wastes, including pesticides and herbicides, ammunition, airplane parts, toxic and hazardous material, and household-type garbage (LAW 1995a). In addition, construction debris was disposed of in trenches and on the ground surface. These areas were not constructed with liners or low permeability covers, thus infiltration in this area is assumed similar to native soil.

No direct measurements of soil samples provide data on potential leaching from the subsurface materials; however, since the depth to groundwater ranges from approximately 4 to 16 feet bgs and landfill activities began over 50 years ago, groundwater data may be used to infer whether a significant source to groundwater can be identified from leaching.

5.2 Migration Pathways

A chemical migration pathway is a route by which a chemical travels following a release or spill from a source. This section highlights sources and migration pathways relevant for this site. The fate and transport of constituents at the site are determined by their physical,

chemical, and biological interactions with the environment. The mobility and persistence of the constituents at the site are two key characteristics in determining their probable behavior. Mobility is the potential for a constituent to migrate in environmental media, and persistence is a measure of how long a constituent will remain in the environment in its current form. The primary fate and transport mechanisms that control the mobility and persistence of the constituents are aqueous solubility, sorption, volatility, and degradation.

The potential chemical migration pathways from the source areas along with the receiving media are summarized below.

Release Source Analysis for Current Site Conditions		
Chemical Sources	**Release Mechanisms**	**Receiving Media**
Former landfill sources:		
Waste piles / Buried wastes	Discharges and spills during disposal, trenching, and burning	Surface and subsurface soil, and surface water
Current potential sources:		
Surface soil	Runoff Leaching	Surface water / Sediment Subsurface soil
Subsurface soil and waste	Leaching	Groundwater
UWBZ groundwater	Solute transport	Intermediate groundwater
IDA groundwater	Solute transport	Offsite intermediate groundwater

A migration pathway is complete if a chemical present in a source is detected in multiple media at concentrations that illustrate a trend (i.e., increasing or decreasing). If a trend does not exist or illustrate that a specific chemical process is taking place (i.e., degradation, dilution, etc.), then a separate source area or another reason for the presence of a chemical (i.e., laboratory cross contamination, anomaly, etc.) may be indicated.

A primary objective of assessing the potential fate and transport of surface contents of the former Lockbourne AFB landfill is to determine if constituents detected in surface soil have the potential of impacting the underlying groundwater zones or downgradient receptors via surface runoff, infiltration, or air dispersion of volatiles or dust.

Another potential migration pathway for the site-related constituents is potential release of site-related soil constituents to air via mechanical disturbance or wind. Three primary mechanisms of releases to air could be associated with the site: dust generation via mechanical disturbance or wind, volatilization of organic compounds, and landfill gas generation and migration. The release of site-related soil constituents to air via mechanical disturbance or wind was not considered a migration pathway of concern because of the heavy vegetative cover in most of the former Lockbourne AFB landfill, except for an area in the northwest part of the former Lockbourne AFB landfill that is devoid of vegetation. This is the area of the former lime-sludge dumping area. As indicated in Section 4.2, the VOC content in the samples of surface soil was low. Finally, as discussed in Section 4.1, landfill gas generation was minimal (less than 0.1 percent). Because of the above evidence, any

releases to air from the site are considered to be minimal. Therefore, this potential pathway is considered to be of lesser significance.

5.2.1 Surface Soil to Surface Water/Sediment

For the surface soil to surface water/sediment migration pathway, an analysis of the data was conducted to determine if chemicals present in surface soil also are present in drainage ditch sediment because of surface runoff and/or in drainage ditch surface water. The primary chemicals identified in the surface soil include SVOCs, pesticides, dioxins, and metals. Arsenic, barium, chromium, lead, and zinc are the five most detected metals. The key constituents in surface water are dioxins and metals, with barium, calcium, magnesium, manganese, and sodium being the five most detected. Upon comparison of the primary chemicals detected in surface soil and surface water, it appears that dioxins are common to both media. Although metals were detected in both media, the most frequently detected constituents in surface soil and surface water are different.

The key constituents in sediment are SVOCs, pesticides, dioxins, and metals. Aluminum, arsenic, calcium, chromium, and lead are the five most detected metals. Upon comparison of the key constituents detected in surface soil and sediment, SVOCs, pesticides, dioxins, arsenic, chromium, and lead are common to both surface soil and sediment. Based on the above comparison, the impact on surface water from surface soil is considered to be less significant compared to the impact on sediment.

5.2.2 Surface Soil to Subsurface Soil

In order to determine the surface soil to subsurface migration pathway, an analysis of the data was conducted to determine if chemicals present in surface soil also are present in subsurface soil because of leaching. The primary chemicals identified in surface soil include SVOCs, pesticides, dioxins, and metals (arsenic, barium, chromium, lead, and zinc). The key constituents in subsurface soil are SVOCs, dioxins, and metals, with arsenic, barium, chromium, lead, and zinc being the five most detected. Upon comparison of the key constituents detected in surface and subsurface soil, SVOCs, dioxins, arsenic, barium, chromium, lead, and zinc are common to the two media. Based on the above comparison, the impact on subsurface soil can be considered to be significant.

5.2.3 Subsurface Soil to Groundwater

This migration route was evaluated by reviewing analytical data to determine if landfill contents are affecting the UWBZ. The key constituents in subsurface soil are SVOCs, dioxins, and metals, with arsenic, barium, chromium, lead, and zinc being the five most detected. The key constituents in UWBZ groundwater are VOCs, SVOCs, dioxins, and metals, with barium, calcium, magnesium, manganese, and sodium being the five most detected. Upon comparison of the key constituents detected in subsurface soil, SVOCs, dioxins, and barium are common to the two media. Based on the above comparison, the impact on groundwater is considered to be moderate.

5.3 Physical-Chemical-Specific Discussions Related to Migration

The physical-chemical properties of the chemicals present at the site strongly influence their fate and transport processes. These properties dictate environmental partitioning and chemical mobility. Some of these properties also affect the chemical behavior of the compounds and their susceptibilities to degradation induced by physical and biological agents. Because there are many complex factors that control the partitioning of a constituent in the environment, the measured concentrations at the source areas can only represent site conditions at a discrete point in time. In addition, while the above historical release sources were identified, they may not have resulted in significant impact; thus, an understanding of the general fate and transport characteristics of the constituents present at the site is important when predicting future exposures, linking sources with currently impacted media, and identifying potentially complete pathways to site media.

A summary of the physical-chemical properties of the organic and inorganic constituents present at the site with respect to fate and transport are presented in Tables 5-1 and 5-2, respectively. Table 5-1 presents three most influential physical-chemical properties of the organic constituents detected at the site. These properties influence the fate and transport of organic chemicals in the environment. These are organic partition coefficient (K_{oc}), water solubility (S), and Henry's law constant (H). K_{oc} provides a measure of the extent of chemical partitioning between organic carbon and water at equilibrium. The higher the K_{oc} (measured in liters per kilogram [L/kg]), the more likely a chemical is to bind to soil than to remain in water. Henry's law constant provides a measure of the extent of chemical partitioning between air and water at equilibrium. The higher the constant, the more likely a chemical is to volatilize than to remain in the water.

Table 5-2 presents the physical chemical properties of the inorganic constituents. The properties presented are atomic weight, water solubility, soil water distribution coefficient (K_d), and boiling and melting points. The K_d value is a measure of how readily one species sorbs to a surface. The higher the K_d value is, the more readily the species is sorbed to the surface.

5.3.1 Organic Constituents

SVOCs

High molecular weight SVOCs were detected in soil at the site. Using benzo(a)pyrene as a representative constituent (detected in surface and subsurface soil, sediment, and groundwater), SVOCs at the site could be due to the former site use (burning and disposal of waste materials). As shown in Table 5-1, the high molecular weight SVOCs have high K_{oc}s, which indicates these compounds have a strong affinity to remain bound to soil. With the knowledge of K_{oc} values, one can calculate retardation factors (Rf), which is the ratio of velocity of water and velocity of the contaminant species. This is a bulk property that describes the overall migration of the chemical species with respect to the water and can be thought of as a chemical front moving somewhere behind the water front, but retarded by the various chemical interactions. If none of a particular species was retarded, then the Rf equals 1 and the contaminant travels along with the water at the groundwater flow rate.

When Rf is large, as for benzo(a)pyrene, the contaminant can take a long time to migrate offsite. Rf values are directly proportional the K_{oc} values. Since the SVOCs have high K_{oc} values, they also have high Rf values; therefore, migration of site SVOCs to groundwater, or through groundwater to surface water, is not considered a primary pathway of concern.

Because of the former site activities (burning and disposal of wastes), SVOCs (primarily PAHs) could have migrated from source areas to downgradient locations through overland runoff during precipitation events. Migration of site-related constituents has occurred as indicated by the presence of elevated SVOC levels in surface soil, and in sediment of the West and East ditches. Additional migration of SVOCs from surface soil to subsurface soil and groundwater could have occurred through infiltration.

Dioxins

Overall detections of dioxin concentrations in groundwater decreased for each successive sampling event. During the 1997 Phase II SI, dioxins were detected in all 19 samples. In the 1998 SI event, dioxins were detected in four of seven samples collected. In the 2003 RI event (first quarter sampling), dioxins were detected in three of six samples collected, and the concentrations of the detected dioxins were lower compared to that observed during the Phase II SI. The trend in lower dioxin concentrations between the 1997 Phase II SI versus the 1998 Phase II SI and 2003 RI may be in part because of the difference in sample collection techniques: bottom-emptying bailer sample collection during the 1997 sampling event versus low-flow sampling collection during the 1998 and 2003 sampling events.

Like SVOCs, dioxins have a strong affinity to bind to soil and are relatively insoluble in water. Higher concentrations were detected in selected samples in AOC 1. Dioxins do not migrate in the dissolved phase (Rf greater than 100,000) and do not form groundwater "plumes"; however, these were detected widely in unfiltered groundwater samples. The detected levels, if valid, would be associated with suspended soil particulates in the sample. Groundwater samples with detections, regardless of location, have similar low-level detections of dioxins; these detections were within and, at times, below the range of reporting limits for all samples evaluated. This type of distribution does not typically represent migration in groundwater.

Comparing the unfiltered dioxin concentrations detected in well pair LCKMW-10 (IDA well) and LCKMW-11 (UWBZ well), LCKMW-11 contained the highest concentrations of total dioxins among the wells sampled during the 1997 Phase II SI event. This observation was also made with 1998 Phase II SI groundwater dioxin data, though the dioxin concentration detected in LCKMW-11 in 1998 was nearly an order of magnitude lower than the concentration detected in the same well in 1997. Considering the small portion of the former Lockbourne AFB landfill that is upgradient of LCKMW-10 and LCKMW-11, it is considered unlikely that the former Lockbourne AFB landfill is contributing to groundwater dioxin concentrations at LCKMW-11 (PMC 2000). The dioxin data may represent temporal and spatial variability of groundwater concentrations, particularly at the exceptionally low concentrations. A similar pattern was observed at IDA well LCKMW-12A and UWBZ well LCKMW-13. The concentrations were three orders of magnitude lower than the levels detected in LCKMW-11, and four orders of magnitude lower than the 1997 levels detected in LCKMW-1 and LCKMW-2, which can be considered as upgradient wells. Thus, the

former Lockbourne AFB landfill does not appear to be contributing to groundwater dioxin concentrations in the area of well pair LCKMW-12A and LCKMW-13 (PMC 2000).

EEG collected five groundwater samples, four from onsite wells (LCKMW-13, LCKMW-15 and field duplicate, and LCKMW-16) and one from LCKMW-7, which is located in the Village of Lockbourne, for a total versus dissolved comparison of total dioxin concentrations. All five filtered samples were below detection for total dioxins, which reconfirms the dioxins are bound to soil particulates in the total samples. Based on these results, the infiltration of total dioxins from surface soil to the UWBZ is highly unlikely as these compounds do not readily solubilize in water and have a strong affinity to remain bound to soil.

The distribution of dioxins/furans suggests dioxins may be present in the East Ditch sediment as a result of upgradient sources, as illustrated by dioxin results being higher in upgradient samples (i.e., LCKSD-10, LCKSD-11, and LCKSD-12); however, dioxins in the West Ditch could be due to the former Lockbourne AFB landfill operations, since burning activities had occurred at AOC 1. As with SVOCs, a more detailed spatial analysis can be conducted as part of the focused feasibility study to determine the areal extent of elevated concentrations relative to the area of impact to sediment.

5.3.2 Metals

Metals are frequently detected since they are often associated with the natural conditions of the area (i.e., representative of the inorganics associated with the regional lithology). Thus, to determine whether the presence of metals in soil is related to the former Lockbourne AFB landfill or is representative of natural background conditions, it is important to compare site concentrations against background concentrations, as well as understand the regional soil characteristics and site redox conditions. The specific physical-chemical properties of the metals with respect to fate and transport depend on the existing environmental conditions and predominant species of each metal. For example, arsenic under reducing conditions exists primarily as As(III), which is more mobile, compared to As(V) found primarily under more oxidizing conditions. Redox processes, dissolution/precipitation, complexation, and adsorption affect the environmental fate and transport behavior of inorganic constituents, and the oxidation states of the metals can vary.

Arsenic has been detected consistently in all media and in background and site wells. Specifically, arsenic is detected as one of the most frequently detected in surface and subsurface soil and sediment but is also identified in groundwater. The presence of arsenic may be representative of background conditions and not because of waste disposal. In accordance with *Closure Plan Review Guidance For RCRA Facilities* developed by Ohio EPA's Division of Hazardous Waste Management (Ohio EPA 2008a), Ohio EPA acknowledges that the concentrations of total arsenic in background soil is often highly variable in Ohio, and this heterogeneity makes the designation of a generic standard difficult. Based on statistical analyses, any concentration of arsenic in a background soil above 13 milligrams per kilogram (mg/kg) (*Guidance for Developing Ecological Soil Screening Levels*, OSWER Directive 9285.7-55 [USEPA 2003]) may indicate that the sampling area has been affected by a specific source. However, based on the soil background study presented in the *Supplemental Phase II Environmental Baseline Survey Investigation* (IT 1995), which has been approved by Ohio EPA, the background concentration for arsenic in the soil related to the site is 22 mg/kg. The

maximum concentration detected in the collected surface soil samples was 21 mg/kg, and 12 samples had values greater than 13 mg/kg. The maximum concentration detected in the collected subsurface soil samples was 25.8 mg/kg, and seven samples had values greater than 13 mg/kg.

Thallium has been detected primarily in surface soil samples and sediment samples downgradient from the landfill. Thallium has also been detected in surface water samples. Major releases of thallium to the environment are from processes such as coal burning and smelting, in which thallium is a trace contaminant of the raw materials, rather than from facilities producing or using thallium compounds. Thallium is a nonvolatile heavy metal, and if released to the atmosphere by anthropogenic sources, may exist as an oxide (thallium oxide), hydroxide, sulfate, or as sulfide (http://www.atsdr.cdc.gov/toxprofiles/tp54.html). Thallium oxides are less soluble in water, and may be subject to only atmospheric dispersion and gravitational settling. Thallium tends to be sorbed to soils and sediments, and to bioconcentrate in aquatic plants, invertebrates, and fish. Due to this, migration of thallium to groundwater from soil is limited. This is also observed at the site, where thallium is primarily detected in surface soil and sediment but not in groundwater. Although thallium is detected in surface water, it can be due to surface runoff.

Lead is considered one of the most frequently detected constituents in surface and subsurface soil and sediment at the site. Lead also has been detected in surface water and groundwater. The background concentration of lead in soil for the site is 29 mg/kg (IT 1995). The maximum concentration of lead detected in surface soil was 150 mg/kg during the RI, 9,340 mg/kg during the Phase II SI, and 41 mg/kg during the Phase I SI. Concentrations of lead in subsurface soil samples also exceeded background concentration during the Phase I and Phase II SI, but not during the RI. The detection of lead in sediment samples and in other media (subsurface soil and groundwater) may be because of the high concentrations of lead detected in soil. Lead may have reached the surface drainages via overland runoff.

The amount of soluble lead in surface waters depends upon the pH of the water and the dissolved salt content. A significant fraction of lead carried by surface water bodies is expected to be in an undissolved form, which can consist of colloidal particles or larger undissolved particles of lead carbonate, lead oxide, lead hydroxide, or other lead compounds incorporated in other components of surface particulate matters from runoff. Lead may occur either as sorbed ions or surface coatings on sediment mineral particles, or it may be carried as a part of suspended living or nonliving organic matter in water. The fate of lead in soil is affected by the adsorption at mineral interfaces, the precipitation of sparingly soluble solid forms of the compound, and the formation of relatively stable organic-metal complexes or chelates with soil organic matter.

Finally, based on the K_d values of arsenic, lead, and thallium (Table 5-2), it appears that sorption of thallium and lead on soil will be appreciable with a K_d value of 1,500 and 900. Although the K_d value of arsenic is lower than lead, it is still expected that mobility of arsenic will be limited. The mobility of arsenic is further dictated by reducing and oxidizing conditions. It is not unusual to have reducing conditions in the landfill because of the presence of organic wastes. There is a good possibility that arsenic can be mobilized under these reducing conditions and, therefore, can raise the concentrations of arsenic in

groundwater. However, as groundwater flows downgradient, it might encounter more oxidizing conditions, which will lead to natural attenuation (via precipitation) of arsenic.

5.4 Summary of Significant Migration Routes

Based on a review of the nature and extent of the analytical data relative to the environmental setting, and physical and chemical properties of the site-related constituents, the primary fate and transport mechanisms are identified for the site. The presence of site-related chemicals throughout the former Lockbourne AFB landfill are principally the result of runoff of impacted soil and subsequent transport to downgradient drainage ditches.

The primary migration pathways are from surface soil to sediment via surface runoff and to subsurface soil via leaching. There is also evidence of migration of site constituents from surface soil to surface water via runoff, and from subsurface soil to groundwater via leaching.

A comparison of the constituents in groundwater (Table 4-7) and surface water (Table 4-4) suggests that discharge of shallow groundwater to surface water is not significant, as the dissolved phases of chemicals in groundwater were not observed in the dissolved phase surface water at concentrations above background landfill conditions.

SECTION 6

Human Health Risk Assessment

This section presents the results of the HHRA for soil, sediment, surface water, and groundwater at the former Lockbourne AFB landfill. The objective of this HHRA is to determine the magnitude and probability of actual or potential harm to public health, safety, and welfare posed by the threatened or actual release of hazardous substances at or from the site in the absence of additional remedial action. The results of this risk assessment will be used to determine if there is a potential current or future risk to human health that warrants remedial action at the site.

The HHRA has been prepared following USEPA guidance (including *Risk Assessment Guidance for Superfund* [RAGS] Part A, Part D, Part E, Part F; USEPA 1991, 2001, 2004a, 2009a), as well as Ohio EPA guidance (Ohio EPA 2004c). Table 6-1 lists the samples that were evaluated in the risk assessment. The supporting tables for this HHRA are presented in RAGS Part D format (USEPA 2001), in Appendix C. Additional supporting tables (e.g., ProUCL Version 4.0 output) are presented in Appendix D.

6.1 Conceptual Site Model

The CSM presents an overview of site conditions, potential contaminant migration pathways, and exposure pathways to potential receptors. The site description and history are provided in Section 1.2; and a discussion of land use is included in Section 3.7. Figure 6-1 presents the CSM for human exposure for the former Lockbourne AFB landfill associated with soil, sediment, surface water, and groundwater. Table 6-2 and Appendix C, Table 1 summarizes the potential exposure pathways and scenarios considered for the site.

Section 4 discusses multiple attempts made during the SI (CH2M HILL 2009) to locate seeps from the former Lockbourne AFB landfill, but no seeps were identified. Seep sampling locations from previous investigations are depicted on Figure 2-5. If seeps reoccur in the future, exposures would be limited because of the transient and localized nature of the seeps. Therefore, potential exposures to seeps are considered insignificant and were not evaluated in the risk assessment.

The former Lockbourne AFB landfill has been divided into AOC 1 and AOC 2 based on the distribution of waste material found within the former Lockbourne AFB landfill. AOC 1 includes areas where waste has been encountered; however, not all portions of AOC 1 contain waste materials, and it includes previously identified HU and UMU areas. AOC 2 is the area where no waste was encountered during the recent test pit activities. AOC 1 is approximately 106 acres and occupies the western half of the site. AOC 2 is approximately 40 acres and occupies the eastern half of the site. Plans for the site include redeveloping AOC 2, and that might include construction of an intermodal facility. Potential current receptors include maintenance workers who periodically check security and other site conditions, trespassers/visitors from the nearby residential area, and offsite industrial workers. The maintenance workers and trespassers/visitors may come in contact with

surface soil in AOC 1 and AOC 2. Exposure routes may include incidental ingestion of the surface soil, dermal contact with the surface soil, and inhalation of particulate and volatile emissions from the surface soil. Trespassers/visitors may also come in contact with sediment and surface water in the ditches at the east and west boundaries of the former Lockbourne AFB landfill. Exposure routes may include incidental ingestion and dermal contact. Offsite industrial workers may be exposed to airborne particulates in fugitive dust generated from surface soil in AOC 1 and AOC 2 via inhalation.

Potential future receptors include the current receptors (i.e., maintenance workers, trespassers/visitors, and offsite industrial workers), and future onsite facility workers, onsite construction workers, and offsite residents. The maintenance workers, trespassers/ visitors, and offsite industrial workers may be exposed to the same media under future land use conditions as those under current land use conditions. The future onsite facility workers may be present at AOC 2 if the site is developed for future industrial use and may come in contact with surface soil. Exposure routes may include incidental ingestion, dermal contact, and inhalation of particulate and volatile emissions. The future onsite facility worker also may be exposed to volatile constituents in indoor air through vapor intrusion of constituents from soil into indoor air and from groundwater into indoor air. The future construction workers are assumed to be exposed to total soil (i.e., surface and subsurface soil combined [0 to 10 feet]) if future industrial buildings or piping are constructed at AOC 2.

Although there are no plans for future development at AOC 1, as a conservative evaluation, it was assumed that construction workers could engage in soil disturbing activities at AOC 1. Exposure routes for the construction worker may include incidental ingestion, dermal contact, and inhalation of particulate and volatile emissions. Because of the shallow groundwater depth (i.e., less than 10 feet bgs), construction workers could be exposed to the groundwater through inhalation of volatiles and dermal contact in an excavation during construction activities. Construction workers were assumed to come in contact with sediment and surface water in the ditches at the east and west boundaries of the former Lockbourne AFB landfill. Exposure routes may include incidental ingestion and dermal contact.

Future residential exposures for the former Lockbourne AFB landfill area were not evaluated because it is not a reasonable foreseeable scenario. There are no plans for residential development; land use will remain industrial, and an environmental covenant will be used, as necessary, with remedy implementation to restrict use. An environmental covenant will be obtained for the former Lockbourne AFB landfill limiting land use to nonresidential activities. Use of groundwater from beneath AOC 1 or AOC 2 will not be permitted.

Groundwater at the former Lockbourne AFB landfill is not used for potable purposes. As discussed in Section 3.7, the Village of Lockbourne has been receiving potable water from the City of Columbus municipal water system since 1993. A call to the Franklin County Department of Water confirmed that the residences of the Village of Lockbourne have access to public water supplies (Franklin County 2009). Franklin County Department of Water also confirmed that residences along Vause Road, which borders the north side of the former Lockbourne AFB landfill, have access to public water supplies (Franklin County 2009). According to Village of Lockbourne officials, the Village of Lockbourne public supply well is no longer in use (Lockbourne 2009). However, it could not be determined whether all off-

base residents are using public water supplies or some off-base residents may still be obtaining drinking water from private wells. In January 1999, the ATSDR recommended that residents of Lockbourne use municipal drinking water rather than use their private wells, if completed in the UWBZ, as their source of drinking water. Because there is the potential that some off-base residents may still be using private wells, a potable use scenario was evaluated in this risk assessment. It was assumed that offsite residents use groundwater from both the shallow (UWBZ) and intermediate (IDA) aquifers downgradient of the former Lockbourne AFB landfill. The residents would be exposed through ingestion, and dermal contact and inhalation while showering. The future offsite resident also may be exposed to volatile constituents in indoor air from vapor intrusion of volatile constituents from groundwater into indoor air. No significant concentrations of VOCs were detected in groundwater.

Groundwater was divided into three potable use and vapor intrusion exposure units for the offsite resident evaluation: off-landfill IDA groundwater, AOC 1 UWBZ groundwater, and AOC 1 IDA groundwater. The off-landfill IDA groundwater exposure unit consists of groundwater data collected from monitoring well LCKMW-7. As seen on Figure 2-1, LCKMW-7 is located at the eastern edge of the Village of Lockbourne. Groundwater data from LCKMW-7 were conservatively assumed to be representative of groundwater concentrations in offsite private wells. The AOC 1 UWBZ groundwater exposure unit consists of groundwater data collected from monitoring wells installed within the boundary of AOC 1 and screened in the UWBZ. The AOC 1 IDA groundwater exposure unit consists of groundwater data collected from monitoring wells installed within the boundary of AOC 1 and screened in the IDA. As stated in Section 3.5, groundwater flow in the shallow saturated zone (i.e., UWBZ) and the IDA is generally toward the west and southwest. It was conservatively assumed that groundwater beneath AOC 1 was representative of future groundwater concentrations in offsite private wells. Data from groundwater wells installed in AOC 2 were not used to evaluate offsite residential exposures. These wells are used to characterize groundwater from the side of the former Lockbourne AFB landfill where waste has not been encountered.

A discussion of potential human receptors and exposure pathways is presented in Section 6.4.

6.2 Scope of Risk Assessment

The primary objective of the HHRA is to assess the health risks associated with exposure to the former Lockbourne AFB landfill for soil, sediment, surface water, and groundwater under current site conditions and potential future sites conditions. The risk assessment is comprised of the following components:

- **Identification of COPCs**—identification of the contaminants found onsite and selection of the COPCs. COPCs identified in this screening were the focus of the subsequent evaluation in the risk assessment.
- **Exposure Assessment**—Identification of the potential pathways of human exposure, characterization of the potentially exposed populations (e.g., maintenance workers,

industrial workers, construction workers, and trespassers), and estimation of the magnitude, frequency, and duration of exposures.

- **Toxicity Assessment**—Assessment of the potential adverse effects of the COPCs and compilation of the toxicity values used for developing numerical risk estimates.
- **Risk Characterization**—Integration of the results of the exposure assessment and toxicity assessment to develop numerical estimates of health risks.
- **Uncertainty Assessment**—Identification and discussion of sources of uncertainty associated with the data, methodology, and the values used in the risk assessment.

These components are described briefly in the following sections.

6.3 Identification of Chemicals of Potential Concern

The data evaluated in the HHRA consisted of soil, sediment, surface water, and groundwater samples collected during the Phase I and Phase II SIs, and RI. Sample analyses for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, and inorganics were used in the HHRA.

6.3.1 Data Summary and Evaluation

Detailed results of the sampling at the former Lockbourne AFB landfill were presented in Section 4. Although filtered and unfiltered surface water and groundwater samples were collected, only unfiltered samples were analyzed in the risk assessment.

Details on data quality for the samples collected during the SIs are provided in the Phase I SI report (LAW 1995a) and the Phase II SI report (PMC 2000). EEG validated the RI data collected through August 2003; the results were presented in the *Quality Control Summary Report* (EEG 2004). CH2M HILL validated three quarters of groundwater data collected during the RI by EEG (November 2003, February 2004, and May 2004; Appendix D). Data validation qualifiers for these three-quarters of data are shown on Appendix C, Tables 2.1 through 2.18; the laboratory qualifiers are shown on these tables for Phase I and Phase II data.

A review of the data identified the following criteria for data usability:

- Estimated values flagged with a J qualifier were treated as unqualified detected concentrations.
- Data qualified with an R (rejected) were not used in the risk assessment.
- For conservatism, blank (B)-qualified data were included in the evaluation.
- A-, a-, C-, CON-, D-, E-, I-, H-, L-, M-, N-, PR-, Q-, and *-qualified data were treated as unqualified detected concentrations. These qualifiers are defined in Appendix C, Tables 2-1 through 2-18.
- For duplicate samples, the maximum concentration between the two samples was used as the sample concentration.

Soil

As discussed in the CSM, the site was divided into two soil exposure units (i.e., AOC 1 and AOC 2) based on distribution of waste material found within the former Lockbourne AFB landfill. The site was further divided by applicable potential receptor groups. Human health risk evaluations were conducted for each exposure area presented in Table 1 of Appendix C and summarized below:

- AOC 1, Surface Soil – Surface soil samples (collected from 0 to 1 foot bgs) were used for the evaluation of current/future maintenance worker, trespasser/visitor, and offsite industrial worker scenarios. Thirty-seven surface soil samples were used in the HHRA; samples were collected in May 1995, July 1997, and July 2003. Soil samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the AOC 1 surface soil samples used in the HHRA.
- AOC 2, Surface Soil – Surface soil samples (collected from 0 to 1 foot bgs) were used for the evaluation of current/future maintenance worker, trespasser/visitor, and offsite industrial worker scenarios and the future onsite facility worker scenario. Ten surface soil samples were used in the HHRA; samples were collected in May 1995, July 1997, and July 2003. Soil samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the AOC 2 surface soil samples used in the HHRA.
- AOC 1, Total Soil – Surface soil samples (collected from 0 to 1 foot bgs) and subsurface soil samples (collected from 1 to 10 feet bgs) combined were used for the evaluation of the future construction worker scenario. Thirty-seven surface soil samples and 19 subsurface soil samples were used in the HHRA; samples were collected in May 1995, July 1997, July 2003, and August 2003. Soil samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the AOC 1 surface soil and subsurface soil samples used in the HHRA.
- AOC 2, Total Soil – Surface soil samples (collected from 0 to 1 foot bgs) and subsurface soil samples (collected from 1 to 10 feet bgs) combined were used for the evaluation of the future construction worker scenario and onsite future facility worker scenario (volatiles only). Ten surface soil samples and seven subsurface soil samples were used in the HHRA; samples were collected in May 1995, July 1997, and July 2003. Soil samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the AOC 2 surface soil and subsurface soil samples used in the HHRA.

Sediment and Surface Water

As discussed in the CSM, the site is bordered by a drainage ditch system located southeast and southwest of the site. The drainage ditch was divided into two exposure units – the drainage ditch to the southeast of the site, which is referred to as the East Ditch, and the drainage ditch to the southwest of the site, which is referred to as the West Ditch. Human health risk evaluations conducted for each exposure media presented in Table 1 of Appendix C are summarized below:

- East Ditch, Sediment – Sediment samples from the East Ditch were used for the evaluation of the current/future trespasser/visitor scenario and the future construction worker scenario. One sediment sample was used in the HHRA; the sample was collected in August 1997 and was analyzed for VOCs, SVOCs, explosives, metals, and pesticides/ PCBs. Table 6-1 identifies the East Ditch sediment sample used in the HHRA.
- East Ditch, Surface Water – Surface water samples from the East Ditch were used for the evaluation of the current/future trespasser/visitor scenario and the future construction worker scenario. One surface water sample was used in the HHRA; the sample was collected in August 1997 and was analyzed for VOCs, SVOCs, explosives, metals, and pesticides/PCBs. Table 6-1 identifies the East Ditch surface water sample used in the HHRA.
- West Ditch, Sediment – Sediment samples from the West Ditch were used for the evaluation of the current/future trespasser/visitor scenario and the future construction worker scenario. Eight sediment samples were used in the HHRA; samples were collected in May 1995, August 1997, and July 2003. Samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the West Ditch sediment samples used in the HHRA.
- West Ditch, Surface Water – Surface water samples from the West Ditch were used for the evaluation of the current/future trespasser/visitor scenario and the future construction worker scenario. Eight surface water samples were used in the HHRA; samples were collected in May 1995, August 1997, and July 2003. Samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the West Ditch surface water samples used in the HHRA.

Groundwater

The site was divided into five groundwater exposure units based on potential receptor groups: off-landfill IDA groundwater, AOC 1 UWBZ groundwater, AOC 1 IDA groundwater, AOC 2 UWBZ groundwater, and AOC 2 IDA groundwater. Human health risk evaluations were conducted for each exposure area presented in Table 1 of Appendix C and summarized below:

- Off-Landfill Groundwater (IDA) – Off-landfill groundwater samples from monitoring well LKWMW-7 were used for the evaluation of the future offsite resident scenarios (potable use and indoor air). Seven groundwater samples were used in the HHRA; samples were collected in June 1995, September 1997, November 1998, August and November 2003, and February and May 2004. Samples were analyzed for VOCs, SVOCs,

explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the off-landfill groundwater samples used in the HHRA.

- AOC 1 UWBZ Groundwater – AOC 1 groundwater samples from the UWBZ were used for the evaluation of the future offsite resident scenarios (potable use and indoor air) and the construction worker scenario. Thirty-one groundwater samples from eight monitoring wells were used in the HHRA; samples were collected in June 1995, September 1997, November 1998, August and November 2003, and February and May 2004. Samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the AOC 1 UWBZ groundwater samples used in the HHRA.
- AOC 1 IDA Groundwater – AOC 1 groundwater samples from the IDA were used to evaluate future offsite resident scenarios (potable use and indoor air). Twenty-four groundwater samples from four monitoring wells were used in the HHRA; samples were collected in June 1995, September 1997, November 1998, August and November 2003, and February and May 2004. Samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, herbicides, and/or dioxins/furans. Table 6-1 summarizes the AOC 1 IDA groundwater samples used in the HHRA.
- AOC 2 UWBZ Groundwater – AOC 2 groundwater samples from the UWBZ were used to evaluate future construction worker scenarios and the future onsite facility worker (indoor air) scenarios. Six groundwater samples from one monitoring well were used in the HHRA; samples were collected in September 1997, November 1998, August and November 2003, and February and May 2004. Samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, and/or dioxins/furans. Table 6-1 summarizes the AOC 2 UWBZ groundwater samples used in the HHRA.
- AOC 2 IDA Groundwater – AOC 2 groundwater samples from the IDA were used to evaluate future onsite facility worker (indoor air) scenarios. Six groundwater samples from one monitoring well were used in the HHRA; samples were collected in September 1997, November 1998, August and November 2003, and February and May 2004. Samples were analyzed for VOCs, SVOCs, explosives, metals, pesticides/PCBs, and/or dioxins/furans; however, only volatile organics were used in the evaluation. Table 6-1 summarizes the AOC 2 IDA groundwater samples used in the HHRA.

6.3.2 Selection of Chemicals of Potential Concern

All of the detected constituents were screened following the procedures described below. The maximum detected concentration of inorganic constituents was compared to background concentrations. If the maximum concentration was below the background concentration, the constituent was not selected as a COPC. The maximum detected concentration of each constituent in each medium, including inorganics exceeding background concentrations, was compared to the health-based criteria discussed below to select the COPCs. If the maximum concentration exceeded the criteria, the constituent was selected as a COPC. Additionally, for constituents that were not detected, the reporting limit was compared to the risk-based screening criteria to identify those constituents with reporting limits above the criteria. These constituents were not retained as COPC for quantitative evaluation in the risk assessment. As discussed in Section 6.7.1, excluding non-

detected chemicals whose reporting limit are greater than the screening level from quantification may result in an underestimation of risks. The COPC screening is presented in Appendix C, Tables 2.1 through 2.18.

Comparison to Background Concentrations

The maximum detected concentrations of naturally occurring inorganic constituents were compared to background concentrations for each media. Soil concentrations were compared to the background soil concentrations (Tables 2.3a through 2.3c for inorganic constituents established in the *Supplemental Phase II Environmental Baseline Survey Investigation* [IT 1995]). Sediment and surface water concentrations were compared to upgradient concentrations from collocated surface water and sediment samples collected during the Phase II SI from each branch of the ditch. Samples LCKSW-1 and LCKSD-1 were collected from the East Ditch and used as background comparison criteria for samples collected in the East Ditch. Samples LCKSW-3 and LCKSD-3 were collected from the West Ditch and used as background comparison criteria for samples collected in the West Ditch. The sediment and surface water background levels are presented in Tables 2-3a and 2-3b, respectively. Background groundwater data were collected from four monitoring wells located along the northern edge of the former Lockbourne AFB landfill: LCKMW-1 and LCKMW-8 from the UWBZ, and LCKMW-2 and LCKMW-9 from the IDA. The groundwater background levels are presented in Table 2-3c. Groundwater background concentrations from the UWBZ wells were used as comparison criteria for samples collected from monitoring wells in the UWBZ. Background concentrations from the IDA were used as comparison criteria for samples collected from monitoring wells in the IDA. A detailed discussion of soil, sediment, surface water, and groundwater background data are provided in Section 2.

As discussed in Section 2.5, the method recommended by Ohio EPA to calculate background concentration levels (i.e., the upper cutoff value of the data set defined as the upper quartile + 1.5 times the interquartile range) was not used for soil, groundwater, surface water, and sediment background levels. Soil background concentrations were identified as the 95th percentile or the maximum detected value if the maximum detected value was less than the 95th percentile. Groundwater background concentrations were identified as the 95/95 UTLs or the maximum detected value if the maximum detected value was less than 95/95 UTL. For surface water and sediment, too few samples were collected to calculate background concentrations; therefore, the maximum detected concentrations were used as representative background concentrations for these media. Uncertainties in the selection of COPCs that are associated with the calculation of soil and groundwater background concentrations are discussed in Section 6.7.4.

Comparison with Health-based Criteria for Soil

Soil data were compared to the USEPA regional screening levels (RSLs) table for residential soil (USEPA 2008). RSLs based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RSLs based on carcinogenic effects were used as presented in the USEPA RSL table. If more recent toxicity values were available for a constituent, a new RSL was calculated using the equations from the USEPA RSL table and the updated toxicity values. Although current and expected future land use at the former Lockbourne AFB landfill is industrial, the soil data were screened against residential soil RSLs. Residential soil RSLs are more conservative (i.e., lower) than industrial soil RSLs, and,

therefore, are protective of all potential receptors (i.e., maintenance workers, trespasser/visitors, offsite industrial workers, onsite facility worker, and construction workers).

Comparison with Health-based Criteria for Indoor Air (from Soil)

Soil vapor concentrations, as described below, were calculated using bulk soil data; the soil vapor concentrations were then compared to screening levels derived by applying a soil gas-to-indoor air attenuation factor to the USEPA indoor air RSLs assuming an industrial exposure scenario for AOC 2 (USEPA 2008). A soil gas-to-indoor air attenuation factor of 0.1 was used for soil samples. The soil gas RSLs were based on a target risk of 1×10^{-6} and a target non-cancer hazard quotient (HQ) of 0.1. The soil vapor RSLs are provided in Table 6-3. This screening was performed only for VOCs detected in soil.

Soil vapor concentrations (i.e., C_{source}) at the source of contamination (i.e., the maximum detected bulk soil concentration) was estimated using the methodology presented in Section 2.2 of the *Vapor Intrusion User's Guidance* (USEPA 2004b).

The following formula was used to estimate C_{source}:

$$C_{source} = (H'_{TS} \times C_r \times \rho_b)/(\theta_w + K_d \times \rho_b + H'_{TS} \times \theta_a)$$

Where:

C_{source} = vapor concentration at the source of contamination, micrograms per cubic meter ($\mu g/m^3$)

H'_{TS} = Henry's law constant at the system soil temperature, dimensionless (13.7 degrees Celsius [°C], soil temperature was assumed to be equal to site-specific groundwater temperature)

C_r = Initial soil concentrations, mg/kg (maximum detected concentration for COPCs)

ρ_b = Soil dry bulk density, grams per cubic centimeter (g/cm^3) (1.66 - default value for sand from Johnson and Ettinger [J&E] model)

θ_w = Soil water-filled porosity, cm^3/cm^3 (0.054 default value for sand from J&E model)

K_d = Soil-water partition coefficient, cm^3/g ($=K_{oc} \times f_{oc}$)

θ_a = Soil air-filled porosity, cm^3/cm^3 (0.321; default value for sand from J&E model)

K_{oc} = Soil organic carbon partition coefficient, cm^3/g (chemical-specific; source J&E model)

f_{oc} = Soil organic carbon weight fraction (0.002; default value for sand from J&E model)

Comparison with Health-based Criteria for Sediment

Sediment data were compared to the USEPA RSLs for residential soil (USEPA 2008). RSLs based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RSLs based on carcinogenic effects were used as presented in the RSL table. If more recent toxicity values were available for a constituent, a new RSL was calculated using the equations from the USEPA RSL table and the updated toxicity values.

Comparison with Health-based Criteria for Groundwater

Groundwater data were compared to the USEPA tap water RSLs. RSLs that are based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RSLs based on carcinogenic effects were used as presented in the RSL table. If more recent toxicity values were available for a constituent, a new RSL was calculated using the equations from the USEPA RSL table and the updated toxicity values.

Comparison with Health-based Criteria for Indoor Air (from Groundwater)

Groundwater data were compared to the target groundwater concentrations for protection of indoor air provided in Table 2c of the USEPA's *Draft Vapor Intrusion Guidance* (USEPA 2002a). The groundwater screening levels were based on a target risk of 1×10^{-6} and a target non-cancer HQ of 0.1 (Table 6-4). As noted in Table 6-4, the groundwater screening levels were updated using new toxicity data, where applicable, using the methodology presented in Appendix D of the 2002 USEPA *Draft Vapor Intrusion Guidance* (USEPA 2002a). This screening was performed only for VOCs detected in groundwater.

Comparison with Health-based Criteria for Surface Water

Surface water data were compared to the USEPA tap water RSLs. RSLs that are based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RSLs based on carcinogenic effects were used as presented in the RSL table. If more recent toxicity values were available for a constituent, a new RSL was calculated using the equations from the USEPA RSL table and the updated toxicity values.

Comparison of Lead Concentrations

Lead concentrations in groundwater and surface water were compared to the federal action level of 15 µg/L (USEPA 2004c). Lead concentrations in soil and sediment were compared to a soil screening level of 400 mg/kg (USEPA 1994a, 2008), a conservative approach that is considered protective of human health under residential land use. If the lead concentration exceeded the screening value, it was retained as a COPC for the risk assessment.

Essential Human Nutrients

Constituents that are considered essential nutrients, present at low concentrations (i.e., only slightly elevated above naturally occurring levels), and toxic only at very high doses were eliminated from the quantitative risk analysis. These constituents include calcium, magnesium, potassium, and sodium.

The WHO dioxin toxic equivalency factors were used to calculate the 2,3,7,8-TCDD toxic equivalent (TCDD TEQ) concentration for each sample where dioxins or furans were detected, as shown on Appendix C, Tables 2.1 through 2.20. The TCDD TEQ concentration

was used in the screening process. The individual dioxin/furan congeners are presented in the COPC screening tables for information purposes only.

The screening levels were calculated for two detected chemicals (dibenzofuran and di-n-octylphthalate) not listed on the RSL tables. Provisional Peer Reviewed Toxicity Values (PPRTVs**;** USEPA 2007b) provided by USEPA Region 2 were used to calculate the dibenzofuran screening level. Toxicity values presented in the 2004 USEPA Region 9 preliminary remediation goals (PRGs) table were used to calculate the screening levels for di-n-octylphthalate.

6.3.3 Summary of COPCs

Analytes that exceeded background concentrations (inorganics) and exceeded risk-based screening levels were identified as COPCs for specific exposure areas. The dioxin/furan congeners are included in the screening tables for information purposes only. As discussed in Section 6.2.2, TCDD TEQ concentrations were calculated using the dioxin/furan congener data. The TCDD TEQ was used to quantify risks in the HHRA evaluation. Table 6-5 identifies the constituents that were selected as COPCs for each of the media.

In summary, the following COPCs were identified for surface soil, total soil, sediment, surface water, and groundwater:

- **AOC 1, Surface Soil (0 to 1 foot bgs) —** Nine PAHs [benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenz(a,h)anthracene; fluoranthene; indeno(1,2,3-cd)pyrene; naphthalene; and pyrene], three PCBs (PBC 1242, PCB 1248, and PCB 1260), dioxins/furans (which will be quantified as TCDD TEQ), one SVOC (dibenzofuran), and three inorganics (lead, silver, and thallium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.1). Carbazole was selected as a COPC because it lacks an RSL for comparison. Five inorganics (aluminum, arsenic, cobalt, iron, and manganese) exceeded the RSLs; however, the concentrations of these inorganics were less than background concentrations, and they were eliminated as COPCs.

- **AOC 2, Surface Soil (0 to 1 foot bgs) —** Four PAHs [benz(a)anthracene; benz(a)pyrene; benzo(b)fluoranthene; and dibenz(a,h)anthracene], dioxins/furans (as TCDD TEQ), and three inorganics (cobalt, manganese, and thallium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.2). Three inorganics (aluminum, arsenic, and iron) exceeded the RSLs; however, the concentrations of these inorganics were less than background concentrations, and they were eliminated as COPCs.

- **AOC 1, Total Soil (0 to 10 feet bgs) —** Ten PAHs [benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenz(a,h)anthracene; fluoranthene; indeno(1,2,3-cd)pyrene; naphthalene; and pyrene], four PCBs (PBC 1242, PCB 1248, PCB 1254, and PCB 1260), dioxins/furans (as TCDD TEQ), one SVOC (dibenzofuran), and five inorganics (aluminum, lead, mercury, silver, and thallium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.3). Carbazole was selected as a COPC because it lacks an RSL for comparison. Four inorganics (arsenic, cobalt, iron, and manganese) exceeded the RSLs; however, the concentrations of these inorganics were less than background concentrations, and they were eliminated as COPCs.

- **AOC 2, Total Soil (0 to 10 feet bgs) —** Four PAHs [benz(a)anthracene; benz(a)pyrene; benzo(b)fluoranthene; and dibenz(a,h)anthracene], dioxins/furans (as TCDD TEQ), and four inorganics (arsenic, cobalt, manganese, and thallium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.4). Two inorganics (aluminum and iron) exceeded the RSLs; however, the concentrations of these inorganics were less than background concentrations, and they were eliminated as COPCs.
- **AOC 2, Indoor Air (Vapor Intrusion from Total Soil) —** Two VOCs (trans-1,3-dichloropropene and methylene chloride) and one PAH (naphthalene) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.5).
- **East Ditch, Sediment —** One inorganic (manganese) exceeded the screening criteria and was identified as a COPC (Appendix C, Table 2.6). Three inorganics (arsenic, cobalt, and iron) exceeded the RSLs; however, the concentrations of these inorganics were less than background concentrations, and they were eliminated as COPCs.
- **West Ditch, Sediment —** Two PAHs [benzo(a)pyrene and benzo(b)fluoranthene] and six inorganics (aluminum, arsenic, cobalt, iron, manganese, and thallium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.7).
- **East Ditch, Surface Water —** One inorganic (thallium) exceeded the screening criteria and was identified as a COPC (Appendix C, Table 2.8).
- **West Ditch, Surface Water —** One SVOC [bis(2-ethylhexyl)phthalate], one VOC (methylene chloride), dioxins/furans (as TCDD TEQ), and three inorganics (arsenic, lead, and thallium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.9).
- **Off-Landfill, IDA Groundwater —** Five PAHs [benz(a)anthracene; benz(a)pyrene; benzo(b)fluoranthene; dibenz(a,h)anthracene; and indeno(1,2,3-cd)pyrene], dioxins/furans (as TCDD TEQ), and three inorganics (iron, lead, and manganese) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.10). One inorganic (arsenic) exceeded the RSL; however, the concentration of this inorganic was less than the background concentration, and arsenic was eliminated as a COPC.
- **AOC 1, UWBZ Groundwater —** One SVOC [bis(2-ethylhexyl)phthalate], one VOC (methylene chloride), six PAHs [benz(a)anthracene; benz(a)pyrene; benzo(b)fluoranthene; dibenz(a,h)anthracene; indeno(1,2,3-cd)pyrene; and naphthalene], dioxins/furans (as TCDD TEQ), and 13 inorganics (aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, thallium, and vanadium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.11).
- **AOC 1, IDA Groundwater —** One SVOC [bis(2-ethylhexyl)phthalate], five PAHs [benz(a)pyrene; benzo(b)fluoranthene; dibenz(a,h)anthracene; indeno(1,2,3-cd)pyrene; and naphthalene], dioxins/furans (as TCDD TEQ), and six inorganics (aluminum, chromium, cobalt, iron, lead, and manganese) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.12). Two inorganics (arsenic and barium)

exceeded the RSL; however, the concentration of these inorganics were less than the background concentration, and they were eliminated as COPCs.

- **AOC 2, UWBZ Groundwater —** Five PAHs [benz(a)anthracene; benz(a)pyrene; benzo(b)fluoranthene; dibenz(a,h)anthracene; and indeno(1,2,3-cd)pyrene], dioxins/furans (as TCDD TEQ), and eight inorganics (aluminum, arsenic, cobalt, iron, lead, manganese, nickel, and vanadium) exceeded the screening criteria and were identified as COPCs (Appendix C, Table 2.13). One inorganic (chromium) exceeded the RSL; however, the concentration of this inorganic was less than the background concentration, and it was eliminated as a COPC.
- **Off-Landfill, Indoor Air (Vapor Intrusion from Groundwater - IDA) —** No volatile constituents exceeded the screening criteria; therefore, no COPCs were selected (Appendix C, Table 2.14).
- **AOC 1, Indoor Air (Vapor Intrusion from Groundwater - UWBZ) —** No volatile constituents exceeded the screening criteria; therefore, no COPCs were selected (Appendix C, Table 2.15).
- **AOC 1, Indoor Air (Vapor Intrusion from Groundwater - IDA) —** No volatile constituents exceeded the screening criteria; therefore, no COPCs were selected (Appendix C, Table 2.16).
- **AOC 2, Indoor Air (Vapor Intrusion from Groundwater - UWBZ) —** No volatile constituents exceeded the screening criteria; therefore, no COPCs were selected (Appendix C, Table 2.17).
- **AOC 2, Indoor Air (Vapor Intrusion from Groundwater - IDA) —** No volatile constituents exceeded the screening criteria; therefore, no COPCs were selected (Appendix C, Table 2.18).

6.4 Exposure Assessment

Exposure assessment is the estimation of the likelihood, magnitude, frequency, duration, and routes of exposure to a chemical. Exposure refers to the potential contact of an individual (or receptor) with a chemical. Exposure can occur when contaminants migrate from a source to an exposure point, or when a receptor comes into direct contact with contaminated media.

The three components of exposure assessment include:

- Characterization of exposure setting
- Identification of exposure pathways
- Quantification of exposure

6.4.1 Characterization of Exposure Setting

Characterization of exposure setting consists of two parts: (1) characterization of the site with respect to the physical characteristics, and (2) characterization of the site with respect to human populations at or near the site.

Physical Characteristics

The former Lockbourne AFB landfill is located at the western base boundary adjacent to the Village of Lockbourne. Currently, the site is covered with native grass, weeds, and tree overgrowth. The site is fenced on the north perimeter, with a drainage ditch to the southeast and southwest acting as a natural barrier (Figure 1-2).

A description of landfill is included in Section 1. Section 3 describes the physical setting of the site, including the physiography, climate, surface water hydrology, topography, geology, hydrogeology, and land and water use.

Potentially Exposed Populations

The former Lockbourne AFB landfill is unused. Table 6-2 summarizes the potentially exposed populations at the site. The receptors were discussed in Section 6.1.1.

6.4.2 Identification of Exposure Pathways

An exposure pathway can be described as the physical course that a COPC takes from the point of release (or source) to a receptor. To be complete, an exposure pathway must have all of the following components:

- A source (e.g., constituent residues in soil)
- A mechanism for chemical release and migration (e.g., leaching)
- An environmental transport medium (e.g., groundwater)
- A point or site of potential human contact (exposure point, for example, drinking water)
- A route of intake (e.g., ingestion of groundwater used as a drinking water source)

In the absence of any one of these components, an exposure pathway is considered incomplete and, by definition, there is no risk or hazard. In some cases, a receptor may contact a source directly, eliminating the release and transport pathways.

The potential exposure pathways for the former Lockbourne AFB landfill were identified in the CSM (Figure 6-1) and are shown in Table 6-2 and Appendix C, Table 1. The following subsections discuss the elements of the exposure pathways for the former Lockbourne AFB landfill.

Contaminant Sources

As shown on Figure 6-1, the source of contamination at the former Lockbourne AFB landfill was the burning, trenching/filling, and landfarming of waste.

Release and Transport Mechanisms

The fate and transport of chemicals in site media were determined by the physical characteristics of the site, as well as by the chemical and physical properties of the constituents. A detailed description of the fate and transport analysis for the site was included in Section 5.

Exposure Points and Exposure Routes

Exposure points are the locations where humans could contact site-related contamination. Onsite exposure points include soil, sediment, surface water, and groundwater. Offsite exposure points are groundwater and ambient air downgradient of the site.

Table 6-2 lists the exposure pathways that were evaluated in the risk assessment. Appendix C, Table 1, includes the exposure pathways that were considered, and presents the rational for evaluation of the exposure pathway.

Section 6.1.1 identifies the potential receptors and exposure pathways. In summary, the current land use exposure routes for quantitative evaluation include the following:

- Maintenance Worker — incidental ingestion, dermal contact, and inhalation of particulates and volatiles from surface soil at AOC 1 and AOC 2.
- Trespasser/Visitor (youth) — incidental ingestion, dermal contact, and inhalation of particulates and volatiles from surface soil at AOC 1 and AOC 2; incidental ingestion of and dermal contact with sediment in the East Ditch and West Ditch; and incidental ingestion of and dermal contact with surface water in the East Ditch and West Ditch.
- Offsite Industrial Worker — inhalation of particulates and volatiles from surface soil at AOC 1 and AOC 2.

The future land use exposure routes include current exposure routes and the following:

- Onsite Facility Worker — incidental ingestion, dermal contact, and inhalation of particulates from surface soil and inhalation indoor air (vapor intrusion) from total soil at AOC 2.
- Construction Worker — incidental ingestion, dermal contact, and inhalation of particulates and volatiles from total soil at AOC 1 and AOC 2; dermal contact and inhalation of volatiles from shallow groundwater at AOC 1 and AOC 2; incidental ingestion of and dermal contact with sediment in the East Ditch and West Ditch; and incidental ingestion of and dermal contact with surface water in the East Ditch and West Ditch.
- Offsite Resident (adult and child) — incidental ingestion, dermal contact, and inhalation of groundwater from the shallow aquifer (UWBZ) and intermediate aquifer (IDA) at AOC 1. In addition, off-landfill groundwater also was evaluated for offsite residential exposures. This exposure unit consists of one monitoring well, LCKMW-7, which is adjacent to the Village of Lockbourne and is screened in the IDA. Inhalation of indoor air (vapor intrusion) from groundwater was not evaluated because no COPCs were identified for this media.

6.4.3 Quantification of Exposure

Exposure is quantified by estimating the exposure point concentrations (EPCs) of COPCs in environmental media and COPC intake by the receptor.

Exposure Concentrations

EPCs are estimated constituent concentrations that a receptor may contact and are specific to each exposure medium and exposure unit. EPCs may be directly measured or estimated using environmental fate and transport models. Constituent concentrations in soil, sediment, surface water, and groundwater were measured for this assessment. Fate and transport modeling conducted for the risk assessment included (1) estimating volatile emissions from groundwater while showering using the Andelman Model as modified by Schaum et al. (Andelman 1990; Schaum et al. 1994) for residential receptors (Appendix C, Tables 7.17.RME Supplement B through 7.21.RME Supplement B), and (2) estimating volatile emissions from groundwater in an open excavation for a construction scenario using a Two-Film Volatilization Model (Appendix C, Table 7.10.RME Supplement B).

The EPCs for each exposure area are provided in Appendix C, Tables 3.1 through 3.13. For each COPC where five or more samples were available in the dataset, the upper confidence limit (UCL) on the mean concentration was calculated using the most recent version of ProUCL (Version 4.00.02; USEPA 2007c). The recommended UCL identified in the ProUCL output was used as the EPC if the UCL did not exceed the maximum detected concentration. If the UCL exceeded the maximum detected concentration, then the maximum detected concentration was used as the EPC. The ProUCL output for the COPCs is provided in Appendix D, Attachment 1.

Indoor air concentrations for vapor intrusion from total soil to indoor air were calculated using the USEPA's version (2004b) of the J&E model (Johnson and Ettinger 1991). Because the location of future building at AOC 2 is unknown at this time, the maximum detected concentrations of the three COPCs from total soil at AOC 2 were used to calculate the indoor air concentrations. The output from J&E model for the COPCs identified in AOC 2 total soil for the vapor intrusion pathway is included Appendix D, Attachment 2. The input parameters used for this model are listed in Table 6-6 for the industrial scenario (i.e., future onsite facility worker).

Estimation of Chemical Intakes

Chemical intake is the amount of the chemical constituent entering the receptor's body. The quantification of exposure is based on an estimate of the average daily intake, the average amount of the chemical contaminant entering the receptor's body per day. Chemical intakes are generally expressed as follows:

$$ADI = \frac{C \times CR \times CF \times EF \times ED}{BW \times AT}$$

Where:

ADI = average daily intake (mg/kg-day)
C = chemical concentration (µg/L, mg/kg)
CR = contact rate (L/day, mg/day)
CR = conversion factor (mg/L, mg/kg)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days)

The intake equation requires exposure parameters that are specific to each exposure pathway. Many of the exposure parameters have default values, which were used for this assessment. These assumptions, based on estimates of body weights, media intake levels, and exposure frequencies and duration, are provided in USEPA guidance. Appendix C, Tables 4.1.RME through 4.15.RME identify the exposure parameters and intake equations for each of the scenarios evaluated in the risk assessment.

For chemicals that act via a mutagenic mode of action (MMOA), carcinogenicity was evaluated using age-dependent adjustment factors (USEPA 2005a). All carcinogenic PAHs (cPAHs) are considered by USEPA to follow the MMOA. Age groups and associated exposure parameters used in the HHRA for the MMOA calculations are presented in Table 4.14.RME Supplement A and Table 4.14.RME Supplement B.

To estimate exposure via dermal contact with soil and sediment, two additional parameters are necessary. The first parameter, the dermal absorption fraction, estimates the amount of a constituent in soil or sediment that would be absorbed by the skin. The absorption fractions used for the COPCs are from USEPA's RAGS Part E (USEPA 2004a) and presented in Appendix C, Table 4 Supplement A. The second additional parameter necessary to estimate dermal expose to constituents in soil and sediment is the adherence factor (AF). The AF estimates the amount of soil and sediment that adheres to the skin per unit of surface area. The AFs were obtained from USEPA RAGS Part E (USEPA 2004a) and are included in Appendix C, Tables 4.1, 4.3, 4.7, 4.8, and 4.12.

The methods presented in the USEPA RAGS Part E (USEPA 2004a) for estimating dermal exposure to water were used to evaluate dermal exposure to surface water and groundwater. The models are shown in Appendix C, Tables 4.6, 4.10, 4.13, and 4.14. Values for the chemical-specific parameters used in the models were obtained from USEPA's RAGS Part E (USEPA 2004a) and are presented in Appendix C, RAGS Part D Table 7 series.

6.5 Toxicity Assessment

Toxicity assessment defines the relationship between the magnitude of exposure and possible severity of adverse effects, and weighs the quality of available toxicological evidence. Toxicity assessment generally consists of two steps: hazard identification and dose-response assessment. Hazard identification is the process of determining the potential adverse effects from exposure to the constituent along with the type of health effect involved. Dose-response assessment is the process of quantitatively evaluating the toxicity information and characterizing the relationship between the dose of the constituent administered or received and the incidence of adverse health effects in the exposed population. Toxicity criteria (e.g., reference doses [RfDs], reference concentrations [RfCs], cancer slope factors [CSFs], and inhalation unit risks [IURs]) are derived from the dose-response relationship.

Health effects are divided into two broad groups: non-carcinogenic and carcinogenic effects. This division is based on the different mechanisms of action currently associated with each category. This section discusses non-carcinogenic and carcinogenic effects separately, and how these effects were assessed in this HHRA.

USEPA recommends that a tiered approach be used to obtain the toxicity values (RfDs, RfCs, CSFs, and IURs) used to calculate non-cancer and cancer risks, respectively (USEPA 2003a). The following hierarchy of sources was used to obtain toxicity data for COPCs:

- USEPA's Integrated Risk Information System (IRIS) database (USEPA 2009b)
- Provisional Peer Reviewed Toxicity Value (PPRTV) database maintained by USEPA's National Center for Environmental Assessment (NCEA) and the Superfund Health Risk Technical Support Center (STSC)
- Other USEPA and non-USEPA sources including NCEA, ATSDR, Health Effects Assessment Summary Tables (HEAST; USEPA 1997a), California Environmental Protection Agency, USEPA's Office of Water, and WHO

The use of provisional toxicity values, such as those from the PPRTV database, increases the uncertainty of the quantitative risk estimate. If no toxicity values were available for a detected constituent, surrogate constituents were selected and their RSLs were used for the COPC selection process.

6.5.1 Toxicity Information for Non-carcinogenic Effects

Non-carcinogenic health effects include a variety of toxic effects on body systems, such as renal toxicity (toxicity to kidney) and central nervous system disorders. The toxicity of a constituent was assessed by reviewing toxic effects noted in short-term (acute) animal studies, long-term (chronic) animal studies, and epidemiological investigations.

USEPA (1989a, 1989b) defines the chronic RfD as an estimate of a daily exposure to the human population, including sensitive subpopulations, which is likely to be without appreciable risk of deleterious effects during a lifetime. Chronic RfDs are developed to be protective for long-term exposure to a compound (7 years to a lifetime). Chronic RfDs may be overly protective if used to evaluate the potential for adverse health effects resulting from short-term exposure. NCEA develops subchronic RfDs for short-term exposure (2 weeks to 7 years). Subchronic RfDs have been peer-reviewed by USEPA and outside reviewers, but they have not undergone verification by an intra-USEPA workgroup, and as a result, are considered interim rather than verified toxicity values. Subchronic RfDs were used to evaluate the non-carcinogenic risks to the construction worker. If a subchronic RfD was not available, the chronic RfD was used. Chronic RfDs were used for all other receptors.

USEPA-derived oral and inhalation chronic and subchronic RfDs and RfCs, and associated uncertainty factors (UFs) and modifying factors (MFs), for the COPCs are listed in Appendix C, Tables 5.1 and 5.2 in.

6.5.2 Toxicity Information for Carcinogenic Effects

Potential carcinogenic effects are quantified using oral CSFs and IUR factors. CSFs may be derived from the results of chronic animal bioassays, human epidemiological studies, or both. Animal bioassays are usually conducted at dose levels much higher than are likely to be encountered in the environment. This design detects possible adverse effects in the relatively small test populations used in the studies. These high dose levels must be extrapolated to lower doses. A number of mathematical models and procedures have been

developed to extrapolate from the high doses used in the studies to the low doses typically associated with environmental exposures.

USEPA-derived oral and inhalation CSFs and IUR factors are listed in Appendix C, Tables 6.1 and 6.2.

6.5.3 Derivation of Dermal RfDs and Slope Factors

Oral RfDs and CSFs were converted to dermal RfDs and CSFs using an oral to dermal adjustment factor. This factor is designed to convert the orally administered dose toxicity factors to dermally absorbed dose toxicity factors (USEPA 2004a). The oral RfDs were converted to dermal RfDs by multiplying by the oral to dermal adjustment factor (gastrointestinal [GI] absorption factor) and the oral CSFs were converted to dermal CSFs by dividing by the GI absorption factor. If a chemical-specific GI absorption factor was not available or was greater than 50 percent, a GI absorption factor of 100 percent was assumed. The dermal RfDs are included in Appendix C, Table 5.1. The dermal CSFs are presented in Appendix C, Table 6.1.

6.5.4 Constituents Without Available USEPA Toxicity Values

Most of the constituents detected at the former Lockbourne AFB landfill have toxicity factors and USEPA RSLs. Detected constituents that did not have RSLs were compared to RSLs for appropriate surrogate constituents during the COPC selection process. Surrogates were selected based on previous recommendations from USEPA. The surrogates are identified in Appendix C, Tables 2.1 through 2.18.

Quantitative oral toxicity criteria are not available for lead. An interim approach to assessing risks associated with adult exposures to lead was developed by USEPA's Technical Review Workgroup for Lead (USEPA 2003b) and updated in 2005. This methodology is a variation of the Integrated Exposure Uptake Biokinetic (IEUBK) model used to evaluate lead exposures to children. The adult lead methodology (ALM) is used to evaluate risks associated with nonresidential adult exposures to lead in soil. The model focuses on estimating fetal blood lead levels (BLLs) in women exposed to lead in soil (USEPA 2003b). It was used in this risk evaluation to be protective of potentially sensitive receptors within a maintenance worker population and a construction worker population. Because the lead model is a probabilistic model, several of the USEPA default parameters are based on central tendency (i.e., average) values (USEPA 2003b). Therefore, the arithmetic mean for the lead concentration served as the input value for the soil concentration.

For the maintenance worker, the default exposure parameters used in the ALM for ingestion (50 mg/kg) and exposure frequency (219 days per year) were used to evaluate direct contact with soil. For the construction worker, the exposure parameters used in the ALM for ingestion and exposure frequency are the same as those that were used to evaluate direct contact with soil for the other COPCs. The soil ingestion rate of 330 milligrams per day (mg/day) and an exposure frequency of 250 days per year were assumed for the construction worker.

The ALM uses different sets of geometric standard deviation (GSD) and baseline BLLs for various ethnic groups and regions of the United States. The GSD is a measure of the inter-individual variability in BLLs in a population whose members are exposed to the same

nonresidential environmental lead levels. The baseline BLL is intended to represent the best estimate of a reasonable central value of BLL in women of childbearing age that are not exposed to lead-contaminated nonresidential soil or dust at the site (USEPA 2003b). In this analysis, geometric means for all ethnic groups and regions were used.

ALM spreadsheets provided by USEPA (2005b) were used to calculate BLLs for the various scenarios, as needed. The model results are expressed as the predicted geometric mean BLL for adults (i.e., women of childbearing age), the corresponding 95th percentile fetal BLLs, and the percent of the fetal population potentially experiencing concentrations above 10 micrograms per deciliter (µg/dL; below which adverse manifestations are not expected).

The potential risks associated with residential exposures to lead are assessed using the IEUBK Lead Model for Windows®, Version 1.0, Build 264 (USEPA 1994a, 2002b, 2005c). The IEUBK model was designed to provide predictions of the probability of elevated BLLs for children. This model addresses three components of environmental risk assessments: the multimedia nature of exposures to lead, lead pharmacokinetics, and significant variability in exposure and risk, through estimation of probability distributions of BLLs for children exposed to similar environmental concentrations. The arithmetic mean of the lead concentration in groundwater, along with the default input parameters, was used to evaluate site-specific exposures to lead.

6.6 Risk Characterization

Risk characterization combines the results of the previous elements of the risk assessment to evaluate the potential health risks associated with exposure to the COPCs. The risk characterization is then used as an integral component in remedial decision making and selection of potential remedies or actions, as necessary.

6.6.1 Non-carcinogenic and Carcinogenic Risk Estimation Methods

Potential human health risks are discussed independently for carcinogenic and non-carcinogenic constituents because of the different toxicological endpoints, relevant exposure duration, and methods used to characterize risk. Some constituents may produce both non-carcinogenic and carcinogenic effects, and were evaluated in both groups. The methodology used to estimate non-carcinogenic hazards and carcinogenic risks are described below. Following the description of the methodology, the non-carcinogenic hazards and carcinogenic risks for the former Lockbourne AFB landfill are discussed.

Non-carcinogenic Hazard Estimation

Non-carcinogenic health risks are estimated by comparing the calculated intake to an RfD or RfC. The calculated intake divided by the RfD or RfC is equal to the HQ:

$$HQ = Intake / RfD$$

The intake and RfD represent the same exposure period (i.e., chronic or subchronic) and the same exposure route (i.e., oral intakes are divided by oral RfDs). An HQ that exceeds 1 (i.e., the intake exceeds the RfD) indicates that there is a potential for adverse health effects associated with exposure to that constituent.

To assess the potential for non-carcinogenic health effects posed by exposure to multiple constituents, a hazard index (HI) approach is used (USEPA 1986). This approach assumes that non-carcinogenic hazards associated with exposure to more than one constituent are additive. Synergistic or antagonistic interactions between constituents are not considered. The HI may exceed 1 even if all of the individual HQs are less than 1. HIs also are added across exposure routes and media to estimate the total non-carcinogenic health effects to a receptor posed by exposure through multiple routes and media. A HI greater than 1 indicates that there is some potential for adverse non-carcinogenic health effects associated with exposure to the contaminants of concern. However, if the HI is greater than 1, separate HIs for the different target organs/effects are calculated, to determine if the HI for a specific target organ/effect is greater than 1. If the HI for each target organ/effect is not above 1, it can be assumed that there is no unacceptable non-carcinogenic hazard to the receptor.

6.6.2 Carcinogenic Risk Estimation

The potential for carcinogenic effects because of exposure to site-related constituents is evaluated by estimating the excess lifetime carcinogenic risk (ELCR). ELCR is the excess incremental increase in the probability of developing cancer during one's lifetime as a result of the assumed exposures to the site over an individual's risks without exposure to the site.

Estimated daily intakes averaged over a lifetime of exposure were multiplied by CSFs to calculate the incremental risks of hypothetical receptors developing cancer. The following formula was used to estimate ELCR from site exposures:

$$\text{ELCR} = \text{Intake} \times \text{CSF}$$

Daily average indoor air and ambient air concentrations (from soil and groundwater) were multiplied by the inhalation unit risk factor (URF) (USEPA 2009a) to calculate incremental risks of hypothetical receptors developing cancer. The following formula was used to estimate potential ELCR from inhalation exposure:

$$\text{ELCR} = \text{Air Concentration} \times \text{URF}$$

The combined risk from exposure to multiple constituents was evaluated by adding the risks from individual constituents. Risks also were added across the exposure routes and media if an individual would be exposed through multiple routes and to multiple media.

When a cumulative carcinogenic risk to an individual receptor under the assumed reasonable maximum exposure (RME) exposure conditions at the site exceeds 100 in a million (i.e., 10^{-4} excess carcinogenic risk), CERCLA generally requires remedial action to reduce risks at the site (USEPA 1991). If the cumulative risk is less than 10^{-4}, action generally is not required, but may be warranted if a risk-based chemical-specific standard (e.g., maximum contaminant level [MCL]) is exceeded. Ohio EPA's target risk level is 1×10^{-5} (Ohio EPA 2004). Therefore, the total estimated ELCR for each receptor group is compared to a target level of 1×10^{-5}.

6.6.3 Risk Assessment Results

The results of the risk characterization are presented below by receptor. The risks are calculated in Appendix C, Tables 7.1.RME through 7.22.RME. The risks are summarized in Appendix C, Tables 9.1.RME through 9.22.RME. A summary of the RME results is provided

in Table 6-7. Appendix C, Tables 10.1.RME through 10.13.RME show the receptor scenarios with a total HI greater than 1.0 and/or total carcinogenic risks greater than 1 x 10^{-5}. Constituents that contribute HIs greater than 0.1 or carcinogenic risks greater than 1x10^{-6} are included in the table.

Current/Future Maintenance Worker

The risk assessment assumed that a current/future maintenance worker could be exposed to surface soil in AOC 1 and AOC 2 through incidental ingestion, dermal contact, and inhalation of particulates. Appendix C, Tables 9.1.RME and 9.2.RME summarize the hazard and risk to the current/future maintenance workers exposures to surface soil in AOC 1 and AOC 2, respectively.

- **AOC 1, Surface Soil**: The RME non-carcinogenic hazard (0.017) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk (1.9x10^{-4}) exceeds Ohio EPA's target risk level of 1x10^{-5}. The carcinogenic risk is primarily associated with ingestion and dermal contact with PAHs and, to a smaller extent, PCBs. Seven individual COPCs exceed an ELCR of 1x10^{-6}: benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(k)fluoranthene; dibenz(a,h)anthracene; indeno(1,2,3-cd)pyrene; and PCB 1248.

  Lead was identified as a COPC in AOC 1 surface soil. Site-specific lead exposures were evaluated for adult maintenance workers using the ALM. The input parameters are provided in Appendix C, Table 11.1a. The results of the model are presented in Appendix C, Table 11.1b. The mean soil lead concentration of 318 mg/kg results in geometric mean BLLs ranging from 1.8 to 2.4 µg/dL for women of childbearing age in various populations. The corresponding 95th percentile fetal blood lead concentrations range from 5.5 to 7.6 µg/dL. The probabilities that the fetal BLLs exceed 10 µg/dL range from 0.7 to 2.4 percent. These values are less than the BLL goal as described in the 1994 Office of Solid Waste and Emergency Response (OSWER) Directive of no more than 5 percent of children (fetuses of exposed women) exceeding 10 µg/dL blood lead.

- **AOC 2, Surface Soil**: The RME non-carcinogenic hazard (0.018) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk (2.0x10^{-7}) is less than Ohio EPA's target risk level of 1x10^{-5}.

Current/Future Youth Trespasser/Visitor

The risk assessment assumed that a current/future youth trespasser/visitor could be exposed to surface soil in AOC 1 and AOC 2 through incidental ingestion, dermal contact, and inhalation of particulates; and sediment and surface water in the East and West ditches through incidental ingestion and dermal contact. Appendix C, Tables 9.3.RME through 9.6.RME, summarize the hazards and risks for the current/future youth trespasser/visitor exposures to surface soil, sediment and surface water.

- **AOC 1, Surface Soil**: The RME non-carcinogenic hazard (0.025) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk (1.1x10^{-4}) exceeds Ohio EPA's target level of 1x10^{-5}. The carcinogenic risk is primarily associated with ingestion and dermal contact with PAHs and, to a smaller extent, PCBs. Six individual COPCs exceed an ELCR of 1x10^{-6}: benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; dibenz(a,h) anthracene; indeno(1,2,3-cd)pyrene; and PCB 1248.

- **AOC 2, Surface Soil**: The RME non-carcinogenic hazard (0.029 is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($1.2x10^{-7}$) is less than Ohio EPA's target level of $1x10^{-5}$.
- **East Ditch, Sediment**: The RME non-carcinogenic hazard (0.00072) is less than Ohio EPA's target HI of 1. None of the COPCs is carcinogenic; therefore, carcinogenic risks were not calculated.
- **East Ditch, Surface Water**: The RME non-carcinogenic hazard (0.014) is less than Ohio EPA's target HI of 1. None of the COPCs is carcinogenic; therefore, carcinogenic risks were not calculated.
- **West Ditch, Sediment**: The RME non-carcinogenic hazard (0.043) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($3.1x10^{-6}$) is less than Ohio EPA's target level of $1x10^{-5}$. One individual COPC (arsenic) exceeded an ELCR of $1x10^{-6}$.
- **West Ditch, Surface Water**: The RME non-carcinogenic hazard (0.15) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($2.7x10^{-6}$) is less than Ohio EPA's target level of $1x10^{-5}$. One COPC (TCDD TEQ) exceeded an ELCR of $1x10^{-6}$.
- **Total Cumulative Risk**: Risks for the current/future youth trespasser were added across the exposure media to evaluate potential cumulative risk across multiple routes and multiple media. Only the maximum risk estimate from each media (e.g., AOC 1 or AOC 2 surface soil) was included in the cumulative risk estimate so that the cumulative risks were not overestimated. The potential maximum cumulative RME non-carcinogenic hazard associated with youth trespasser/visitor exposures to surface soil, sediment, and surface water (0.22) is less than Ohio EPA's target HI of 1. The cumulative RME carcinogenic risk (1.1×10^{-4}) exceeds Ohio EPA's target level of $1x10^{-5}$, primarily because of PAHs and PCBs in AOC 1 surface soil.

Current/Future Offsite Industrial Worker

The risk assessment assumed that a current/future offsite industrial worker could be exposed to surface soil in AOC 1 and AOC 2 through inhalation of particulates. Appendix C, Tables 9.7.RME and 9.8.RME summarize the hazard and risk for the current/future offsite industrial worker exposures to surface soil in AOC 1 and AOC 2, respectively.

- **AOC 1, Surface Soil**: The RME non-carcinogenic hazard (0.0049) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($2.4x10^{-7}$) is less than Ohio EPA's target level of $1x10^{-5}$.
- **AOC 2, Surface Soil**: The RME non-carcinogenic hazard (0.012) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($3.6\ x10^{-8}$) is less than Ohio EPA's target level of $1x10^{-5}$.

Future Onsite Facility Worker

The risk assessment assumed that a future onsite facility worker could be exposed to surface soil in AOC 2 through incidental ingestion, dermal contact, and inhalation of particulates if AOC 2 is developed in the future. Exposure via inhalation of volatiles that have migrated

from total soil to indoor air through vapor intrusion also was assumed. Appendix C, Table 9.9.RME summarizes the hazard and risk to the future onsite facility worker exposed to surface soil in AOC 2.

- **AOC 2, Surface Soil**: The RME non-carcinogenic hazard (0.031) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($1.4x10^{-6}$) is less than Ohio EPA's target level of $1x10^{-5}$. None of the COPCs exceeded an ELCR of $1x10^{-6}$.
- **AOC 2, Indoor Air (Vapor Intrusion from Total Soil)**: The RME non-carcinogenic hazard (0.21) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($7.2x10^{-6}$) is less than Ohio EPA's target level of $1x10^{-5}$. Three individual COPCs exceed an ELCR of $1x10^{-6}$: trans-1,3-dichloropropene; methylene chloride; and naphthalene.
- **Total Cumulative Risk**: Risks for the future onsite facility worker were added across the exposure media to evaluate potential cumulative risk across multiple routes and multiple media. The potential maximum cumulative RME non-carcinogenic hazard associated with onsite facility worker exposures to surface soil and indoor air (0.24) is less than Ohio EPA's target HI of 1. The cumulative RME carcinogenic risk (8.6×10^{-6}) is less than Ohio EPA's target level of $1x10^{-5}$.

Future Construction Worker

The risk assessment assumed that a future adult construction worker could be exposed to total soil (i.e., combined surface and subsurface soil) in AOC 1 and AOC 2 through incidental ingestion, dermal contact, and inhalation of particulates, to groundwater through dermal contact and inhalation of vapors, and to sediment and surface water in the East and West ditches through incidental ingestion and dermal contact. Appendix C, Tables 9.10.RME through 9.13.RME summarize the hazards and risks for the future adult construction worker exposures to surface soil, sediment, surface water, and groundwater.

- **AOC 1, Total Soil**: The RME non-carcinogenic hazard (0.39) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($1.0x10^{-4}$) exceeds Ohio EPA's target level of $1x10^{-5}$. The carcinogenic risk is primarily associated with ingestion and dermal contact with PAHs and, to a smaller extent, PCBs. Six individual COPCs exceed an ELCR of $1x10^{-6}$: benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; dibenz(a,h) anthracene; indeno(1,2,3-cd)pyrene; and PCB 1248.
- Lead was selected as a COPC in AOC 1 total soil. Site-specific lead exposures were evaluated for adult construction workers using the ALM. The input parameters are provided in Appendix C, Table 11.2a. The results of the model are presented in Appendix C, Table 11.1b. The mean soil lead concentration of 223 mg/kg results in geometric mean BLLs ranging from 3.8 to 4.4 µg/dL for women of childbearing age in various populations. The corresponding 95th percentile fetal blood lead concentrations range from 11.3 to 14.5 µg/dL. The probabilities that the fetal BLLs exceed 10 µg/dL range from 7.1 to 11.5 percent. These values are greater than the BLL goal as described in the 1994 OSWER Directive of no more than 5 percent of children (fetuses of exposed women) exceeding 10 µg/dL blood lead.

- **AOC 2, Total Soil**: The RME non-carcinogenic hazard (0.33) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($1.1x10^{-6}$) is less than Ohio EPA's target level of $1x10^{-5}$. One individual COPC (arsenic) exceeded an ELCR of $1x10^{-6}$.
- **AOC 1, UWBZ Groundwater**: The RME non-carcinogenic hazard (2.5) exceeds Ohio EPA's target HI of 1. The primary contributor to hazard is TCDD TEQ (HI=2.4). One target organ exceeds the target HI of 1 (developmental, HI=2.4). The RME carcinogenic risk ($1.4x10^{-5}$) exceeds Ohio EPA's target level of $1x10^{-5}$. The carcinogenic risk is primarily associated with dermal contact with PAHs and dioxins/furans. Three individual COPCs exceed an ELCR of $1x10^{-6}$: benzo(a)pyrene; dibenz(a,h)anthracene; and TCDD TEQ.
- **AOC 2, UWBZ Groundwater**: The RME non-carcinogenic hazard (3.1) exceeds Ohio EPA's target HI of 1. The primary contributor to hazard is TCDD TEQ (HI=3.1). One target organ exceeds the target HI of 1 (developmental, HI=3.1). The RME carcinogenic risk ($3.0x10^{-5}$) exceeds Ohio EPA's target level of $1x10^{-5}$. The carcinogenic risk is primarily associated with dermal contact with PAHs and dioxins/furans. Four individual COPCs exceed an ELCR of $1x10^{-6}$: benzo(a)pyrene; dibenz(a,h)anthracene; indeno(1,2,3-cd)pyrene; and TCDD TEQ.
- **East Ditch, Sediment**: The RME non-carcinogenic hazard (0.00040) is less than Ohio EPA's target HI of 1. None of the COPCs is carcinogenic; therefore, carcinogenic risks were not calculated.
- **East Ditch, Surface Water**: The RME non-carcinogenic hazard (0.011) is less than Ohio EPA's target HI of 1. None of the COPCs is carcinogenic; therefore, carcinogenic risks were not calculated.
- **West Ditch, Sediment**: The RME non-carcinogenic hazard (0.019) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($5.8x10^{-8}$) is less than Ohio EPA's target level of $1x10^{-5}$.
- **West Ditch, Surface Water**: The RME non-carcinogenic hazard (0.18) is less than Ohio EPA's target HI of 1. The RME carcinogenic risk ($3.3x10^{-7}$) is less than Ohio EPA's target level of $1x10^{-5}$.
- **Total Cumulative Risk**: Risks for the future adult construction worker were added across the exposure media to take into account potential cumulative risk across multiple routes and multiple media. Only the maximum risk estimate from each media was included in the cumulative risk estimate so that the cumulative risks were not overestimated. The potential cumulative RME non-carcinogenic hazard associated with future adult construction worker exposures to total soil, groundwater, sediment, and surface water (3.7) exceeds Ohio EPA's target HI of 1, primarily because of dioxins/furans in AOC 2 (UWBZ) groundwater. The cumulative RME carcinogenic risk (1.3×10^{-4}) exceeds Ohio EPA's target level of $1x10^{-5}$, primarily because of PAHs and PCBs in AOC 1 total soil and PAHs in AOC 2 UWBZ groundwater. The hazard and risk estimates for AOC 1 UWBZ groundwater also exceed Ohio EPA's target HI and risk goal.

Future Offsite Adult Resident (Non-carcinogenic Hazard)

The risk assessment assumed that a future offsite adult resident could be exposed to surficial aquifer (UWBZ) groundwater and intermediate aquifer (IDA) groundwater used as a potable water supply through ingestion, and dermal contact and inhalation while showering. Groundwater data were grouped into three exposure units: groundwater from an offsite monitoring well adjacent to the Village of Lockbourne (off-landfill IDA groundwater), groundwater from the UWBZ monitoring wells in AOC 1 (AOC 1 UWBZ groundwater), and groundwater from the IDA monitoring wells in AOC 1 (AOC 1 IDA groundwater). Appendix C, Tables 9.14.RME, 9.17.RME, and 9.20.RME, summarize the hazards to the future adult resident. Carcinogenic risks were not calculated for an adult resident but were calculated for a lifetime resident, following USEPA guidance.

- **Off-Landfill, IDA Groundwater**: The RME non-carcinogenic hazard (5.7) exceeds Ohio EPA's target HI of 1. The primary contributor to the hazard is TCDD TEQ (HI=5.4). One target organ exceeds the target HI of 1 (developmental, HI=5.4).

  Lead was identified as a COPC in off-landfill groundwater; however, site-specific lead exposures were not evaluated for adult residents. Exposures were evaluated for the more-conservative child residential scenario using the IEUBK model. The results of the IEUBK model, described below for the future child resident, indicate that lead concentrations in off-landfill groundwater are less than the criterion for BLLs in exposed children (residential scenario).

- **AOC 1, UWBZ Groundwater**: The RME non-carcinogenic hazard (28) exceeds Ohio EPA's target HI of 1. The primary contributors to the hazard are arsenic (HI=2.2), iron (HI=1.9), manganese (HI=2.2), thallium (HI=3.7), and TCDD TEQ (HI=15), all with HIs above 1. Target organs with HIs exceeding 1 include blood (HI=3.7), GI (HI=1.9), nervous system (HI=2.4), skin (HI=2.2), and developmental (HI=15).

  Lead was identified as a COPC in AOC 1 UWBZ groundwater; however, site-specific lead exposures were not evaluated for adult residents. Exposures were evaluated for the more-conservative child residential scenario using the IEUBK model. The results of the IEUBK model, described below for the future child resident, indicate that lead concentrations in AOC 1 UWBZ groundwater exceed the criterion for BLLs in exposed children (residential scenario).

- **AOC 1, IDA Groundwater**: The RME non-carcinogenic hazard (7.7) exceeds Ohio EPA's target HI of 1. The primary contributors to hazard are naphthalene (HI=1.5) and TCDD TEQ (HI=4.4). Two target organs exceed the target HI of 1 – respiratory (HI=1.5) and developmental (HI=4.4).

  Lead was identified as a COPC in AOC 1 IDA groundwater; however, site-specific lead exposures were not evaluated for adult residents. Exposures were evaluated for the more-conservative child residential scenario using the IEUBK model. The results of the IEUBK model, described below for the future child resident, indicate that lead concentrations in AOC 1 IDA groundwater is less than the criterion for BLLs in exposed children (residential scenario).

Future Child Resident (Non-carcinogenic Hazard)

The risk assessment assumed that a future child resident could be exposed to surficial aquifer (UWBZ) groundwater and intermediate aquifer (IDA) groundwater used as a potable water supply through ingestion, and dermal contact and inhalation while showering. Groundwater data were grouped into three exposure units: groundwater from an offsite monitoring well adjacent to the Village of Lockbourne (off-landfill IDA groundwater), groundwater from the UWBZ monitoring wells in AOC 1 (AOC 1 UWBZ groundwater), and groundwater from the IDA monitoring wells in AOC 1 (AOC 1 IDA groundwater). Appendix C, Tables 9.15.RME, 9.18.RME, and 9.21.RME summarize the hazards to the future child resident. Carcinogenic risks were not calculated for a child resident but were calculated for a lifetime resident, in accordance with USEPA guidance.

- **Off-Landfill, IDA Groundwater**: The RME non-carcinogenic hazard (13) exceeds Ohio EPA's target HI of 1. The primary contributor to hazard is TCDD TEQ (HI=12). One target organ exceeds the target HI of 1 (developmental, HI=12).

  Site-specific lead exposures were evaluated for residential children using the IEUBK model. This calculation was based on the arithmetic mean concentration of lead detected in off-landfill groundwater (15.1 µg/L) and the IEUBK model default soil concentration. The results of the model are presented in Appendix C, Table 11.3a. The corresponding input parameters and distribution probability plot are provided in Appendix C, Table 11.3b. The predicted geometric mean BLL for a young child was 3.6 µg/dL, with 1.5 percent of the population potentially experiencing concentrations exceeding 10 µg/dL, below which adverse manifestations are not expected. These results indicate that the percent of the exposed population with a BLL exceeding 10 µg/dL (0.06 percent) would be less than the 5 percent level considered by USEPA to be protective of human health.

- **AOC 1, UWBZ Groundwater**: The RME non-carcinogenic hazard (63) exceeds Ohio EPA's target HI of 1. The primary contributors to the hazard are arsenic (HI=5.2), cobalt (HI=1.6), iron (HI=4.4), manganese (HI=5.4), thallium (HI=8.6), and TCDD TEQ (HI=34). Target organs with HIs exceeding 1 include blood (HI=8.6), GI (HI=4.5), kidney (HI=1.4), nervous system (HI=5.8), skin (HI=5.2), developmental (HI=34), and thyroid (HI=1.6).

  Lead was identified as a COPC in AOC 1 UWBZ groundwater. The results of the IEUBK model, based on the arithmetic mean concentration (28.4 µg/L) of lead detected in AOC 1 UWBZ groundwater, are presented in Appendix C, Table 11.4a. The corresponding input parameters and distribution probability plot are provided in Appendix C, Table 11.4b. The predicted geometric mean BLL for a young child was 5.1 µg/dL, with 7.8 percent of the population potentially experiencing concentrations exceeding 10 µg/dL, below which adverse manifestations are not expected. These results indicate that the percent of the exposed population with a BLL exceeding 10 µg/dL (0.06 percent) would be greater than the 5 percent level considered by USEPA to be protective of human health.

- **AOC 1, IDA Groundwater**: The RME non-carcinogenic hazard (17) exceeds Ohio EPA's target HI of 1. The primary contributors to hazard are iron (HI=1.3), manganese (HI=2.0), naphthalene (HI=2.6), and TCDD TEQ (HI=9.8). Target organs with HIs

exceeding 1 include GI (HI=1.3), nervous system (HI=2.1), respiratory (HI=2.6), and developmental (HI=9.8).

Lead was identified as a COPC in AOC 1 IDA groundwater. The results of the IEUBK model, based on the arithmetic mean concentration (15.6 µg/L) of lead detected in AOC 1 groundwater (IDA), are presented in Appendix C, Table 11.4a. The corresponding input parameters and distribution probability plot are provided in Appendix C, Table 11.4b. The predicted geometric mean BLL for a young child was 4.3 µg/dL, with 3.4 percent of the population potentially experiencing concentrations exceeding 10 µg/dL, below which adverse manifestations are not expected. These results indicate that the percent of the exposed population with a BLL exceeding 10 µg/dL (0.06 percent) would be less than the 5 percent level considered by USEPA to be protective of human health.

Future Lifetime Resident (carcinogenic risk)

The risk assessment assumed that a lifetime resident could be exposed to surficial aquifer (UWBZ) groundwater and intermediate aquifer (IDA) groundwater used as a potable water supply through ingestion, and dermal contact and inhalation while showering. Groundwater data were grouped into three exposure units: groundwater from an offsite monitoring well adjacent to the Village of Lockbourne (off-landfill IDA groundwater), groundwater from the UWBZ monitoring wells in AOC 1 (AOC 1 UWBZ groundwater), and groundwater from the IDA monitoring wells in AOC 1 (AOC 1 IDA groundwater). Appendix C, Tables 9.16.RME, 9.19.RME, and 9.22.RME summarize the RME carcinogenic risk to the future lifetime resident.

- **Off-Landfill, IDA Groundwater**: The RME carcinogenic risk (7.6×10^{-3}) exceeds Ohio EPA's target level of 1×10^{-5}. The carcinogenic risk is primarily associated with ingestion and dermal contact with PAHs and TCDD TEQ. Six individual COPCs exceed an ELCR of 1×10^{-6}: benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; dibenz(a,h)anthracene; indeno(1,2,3-cd)pyrene; and TCDD TEQ.
- **AOC 1, UWBZ Groundwater**: The RME carcinogenic risk (9.2×10^{-3}) exceeds Ohio EPA's target level of 1×10^{-5}. The carcinogenic risk is primarily associated with ingestion, dermal contact, and inhalation with PAHs, TCDD TEQ, metals, VOCs, and SVOCs. Ten individual COPCs exceed an ELCR of 1×10^{-6}: arsenic; benz(a)anthracene; benzo(a)pyrene: benzo(b)fluoranthene: bis(2-ethylhexyl) phthalate: dibenz(a,h)anthracene: indeno(1,2,3-cd)pyrene: methylene chloride: naphthalene: and TCDD TEQ.
- **AOC 1, IDA Groundwater**: The RME carcinogenic risk (7.6×10^{-3}) exceeds Ohio EPA's target level of 1×10^{-5}. The carcinogenic risk is primarily associated with ingestion, dermal contact, and inhalation with PAHs, TCDD TEQ, metals, and SVOCs. Seven individual COPCs exceed an ELCR of 1×10^{-6}: benzo(a)pyrene: benzo(b)fluoranthene: bis(2-ethylhexyl) phthalate: dibenz(a,h)anthracene: indeno(1,2,3-cd)pyrene: naphthalene: and TCDD TEQ.

6.7 Uncertainty Associated with Human Health Assessment

The risk measures used in HHRAs are not fully probabilistic estimates of risk, but are conditional estimates given that a set of assumptions about exposure and toxicity are realized. Thus, it is important to specify the assumptions and uncertainties inherent in the risk assessment to place the risk estimates in proper perspective (USEPA 1989a).

6.7.1 Uncertainty Associated with Data Evaluation

The datasets for each media at the site represent a compilation of several subsets. These subsets consist of samples that were collected at various times for different investigations and were analyzed by different laboratories. Combining these datasets involves some uncertainty in the HHRA. However, the degree of potential overestimation or underestimation of risk resulting from combining all of the data is unknown.

The age of the analytical data contributes some uncertainty to the HHRA. Historical data collected in 1995, 1997, and 1998 were included in the datasets. These data may no longer be representative of site conditions since volatilization and degradation most likely has occurred over time. The degree of potential overestimation of site concentrations, and therefore risks associated with the site, is unknown.

The general assumptions used in the COPC selection process were conservative to ensure that true COPCs were not eliminated from the quantitative risk assessment and that the highest possible risk was estimated. RSLs based on residential assumptions were used to select the COPCs for all of the scenarios, including nonresidential scenarios.

A limited number of samples were collected for sediment, in particular the East Ditch in which one sample was collected. It is unlikely that one sample can adequately represent exposure and risk for the East Ditch.

During the COPC selection process, inorganics that were detected at concentrations consistent with background levels were eliminated as COPCs. Exclusion of chemicals present at concentrations consistent with background concentrations does not have an impact on potential site-related risk estimates. Organics were not eliminated as COPCs based on background concentrations. Dioxin/furan samples were collected during the Phase II SI from off-landfill locations for soil, sediment, surface water, and groundwater. Dioxin/furan concentrations from samples collected on the former Lockbourne AFB landfill were compared to the concentrations from the samples collected from off-landfill locations, as presented below. As can be seen in the table, concentrations of dioxins/furans from media within the former Lockbourne AFB landfill are generally similar to concentrations from off-landfill locations.

Turbidity levels in groundwater data collected in 1995 and 1998 are considered high, with a number of measurements above 200 NTU and as high as 1,000 NTU. Highly turbid groundwater may not be representative of the exposure to actual well users, particularly inorganics.

PAHs are one of the primary risk drivers in groundwater. As seen in Appendix C, Tables 2.11 through 2.14, PAHs were detected infrequently. In off-landfill IDA groundwater, the frequency of detect (FOD) for cPAHs was one detection out of five samples. The FOD for

cPAHs in AOC 1 UWBZ groundwater was 6 out of 30 samples, or less; the FOD for cPAHs in AOC 1 IDA groundwater was 2 out of 22 samples or less; and the FOC for cPAHs in AOC 2 UWBZ groundwater was one out of five samples.

Medium	Landfill	TCDD-TEQ Conc. Range*	Off-Landfill	TCDD-TEQ Conc. Range*
Surface Soil	AOC 1	9.12E-07 – 1.20E-05	Northern perimeter (SB-08, SB-09)	1.73E-06 – 1.81E-06
	AOC 2	1.30-06 – 4.63E-06	RANGB (14MW1, SO-49, SO-323)	1.91E-06 – 8.37E-06
			Railroad (SO-24, SO-25)	1.84E-06 – 6.11E-06
			Village of Lockbourne (SO-22, SO-23)	3.16E-06 – 5.14E-06
Groundwater	UWBZ	1.10E-09 – 4.93E-08	UWBZ (14MW1, MW-02, MW-09)	3.60E-09 – 8.92E-09
	IDA	1.46E-09 – 9.68E-09	IDA (MW-01, MW-08)	3.82E-09 – 5.18E-09
Sediment	West Ditch	1.46E-06 – 4.06E-06	Upstream (SD-01, SD-03, SD-10, SD-11, SD-12)	1.53E-06 – 3.12E-05
Surface Water	West Ditch	1.07E-09 – 5.44E-09	Upstream (SW-01, SW-03)	6.35E-09 – 7.22E-09

*All concentrations are mg/kg for soil and sediment and mg/L for groundwater and surface water; all water results are reported as unfiltered results.

Laboratories typically report concentrations that are below the reporting limits but above the method detection limit. Any concentration that was above the method detection limit but below the reporting limit is J qualified and was used in the risk assessment as a detected concentration. However, constituents that were not detected (were below the detection limit) were not quantitatively evaluated in the risk assessment, even if the detection limit was above the screening level. Use of data below the reporting limit (i.e., J-qualified data) may result in an under- or over-estimation of risk. The exclusion of non-detected constituents whose reporting limits are greater than the screening level may result in an underestimation of risks.

Chemicals that were not detected in any of the samples within an environmental medium were not selected as COPCs. However, sample-specific reporting limits were compared to screening levels (Appendix D, Attachment 3). The majority of the reporting limits for soil were below the screening criteria, with the exception of various SVOCs, pesticides/PCBs, and a few VOCs. The majority of the reporting limits for sediment were below the screening criteria, with the exception of various SVOCs, and a few VOCs and metals. A number of surface water reporting limits were above the screening criteria, including SVOCs, VOCs, pesticides/PCBs, metals, and a few explosives and dioxins/furans. The surface water screening levels are very conservative and are based on groundwater screening criteria, while the sediment screening levels are based on soil screening criteria. The majority of the reporting limits for groundwater were below the screening criteria, with the exception of various SVOCs, VOCs, pesticides/PCBs, and a few dioxins/furans, explosives, and metals.

6.7.2 Uncertainty Associated with Exposure Assessment

Site-related contamination is expected to decrease with time because of naturally occurring attenuation processes (e.g., degradation because of weathering, volatilization, advection, dispersion, leaching because of infiltrating precipitation, etc.). The risk assessment assumed concentrations would remain constant throughout the exposure period and that these concentrations occur everywhere throughout the site. This assumption likely results in an overestimation of risk, particularly since some of the data included in the risk assessment were collected more than 10 years ago.

The exposure factors used for the quantitation of exposure were conservative and reflect worst-case or upper bound assumptions on the exposure. The reliability of the values chosen for the exposure factors also contributes substantially to the uncertainty of the resulting risk estimates. Because most of the exposure factors are worst-case or upper bound assumptions, the resulting risks are worst case and likely overestimate the actual risk.

EPCs were calculated when there were at least five sample available. However, 95 percent UCLs are not reliable when the sample size is as small as five. USEPA (2007c) recommends that eight or more samples be used in the 95 percent UCL calculation. As eight samples were not available for all of the data sets evaluated in the risk assessment, there is uncertainty associated with the EPCs used in the risk assessment, which most likely over-estimate the true mean.

6.7.3 Uncertainty Associated with Toxicity Assessment

Uncertainty associated with the non-carcinogenic toxicity factors is included in Appendix C, Tables 5.1 and 5.2. Several UFs were applied by USEPA to extrapolate dose points from animal studies to humans. These UFs range between 1 and 3,000. Additional modification factors also are used based on the professional judgment of USEPA. Therefore, there is a high degree of uncertainty in the non-carcinogenic toxicity criteria, based on the available scientific data for each constituent. The non-carcinogenic toxicity factors are most likely an overestimate of actual toxicity.

The uncertainty associated with CSFs is mostly associated with the low dose extrapolation where carcinogenicity at low doses is assumed to be a linear response. This is a conservative assumption, which introduces a high uncertainty into slope factors that are extrapolated from this area of the dose-response curve. The CSFs are based on the assumption that there is no threshold level for carcinogenicity; however, most of the experimental studies indicate existence of a threshold level. Therefore, CSFs developed by USEPA represent upper bound estimates. Carcinogenic risks generated in this assessment should be regarded as an upper bound estimate on the potential carcinogenic risks, rather than an accurate representation of carcinogenic risk. The true carcinogenic risk is likely to be less than the predicted value (USEPA 1989a). Uncertainty is also associated with the application of the MMOA for the cPAHs; this may overestimate risks.

Additional uncertainty is in the prediction of relative sensitivities of different species of animals and the applicability of animal data to humans.

There is a large degree of uncertainty associated with the oral to dermal adjustment factors (based on constituent-specific GI absorption factors) used to transform the oral RfDs and

CSFs based on administered doses to dermal RfDs and CSFs based on absorbed doses. It is not known if the adjustment factor results in an underestimation or overestimation of the actual toxicity associated with dermal exposure.

Surrogate chemicals were used for detected constituents without screening levels and toxicity values. The use of surrogate chemicals may underestimate or overestimate the potential risks or hazards. Carbazole has no screening level or toxicity values available. Exclusion of this constituent from the evaluation may underestimate potential risks or hazards.

6.7.4 Uncertainty in Risk Characterization

The uncertainties identified in each component of risk assessment ultimately contribute to uncertainty in risk characterization. The addition of risks and HIs across pathways and chemicals contributes to uncertainty based on the interaction of chemicals such as additivity, synergism, potentiation, and susceptibility of exposed receptors. The simple assumption of additivity used for this site may or may not be accurate and may overestimate or underestimate risk; however, a better alternative is not available at this time.

As discussed in Sections 2.5 and 6.3.2, the methodology recommended by Ohio EPA to calculate background concentrations was not used in the risk assessment. Background concentrations calculated following Ohio EPA methodology could result in values higher or lower than those used in the risk assessment, thus adding or eliminating inorganic COPCs. In addition, hot spots could have been missed. In the case of AOC 2, use of lower background concentrations could result in the addition of COPCs and higher risk estimates. However, seven of the 10 inorganic constituents in surface soil originally eliminated as COPCs based on background would be eliminated as COPCs because they are below the RSLs. In total soil, six of the eight constituents originally eliminated as COPCs based on background would be eliminated as COPCs because they are below the RSLs. The concentrations of the inorganics exceeding RSLs (aluminum, arsenic, and iron) would not result in risks above the target goals for either surface soil or total soil. Adding inorganic COPCs to the risk evaluation would not affect the decision to implement a remedy for AOC 1 soil and sitewide groundwater because the risks are already above the target risk goal. Eliminating some of the COPCs from the risk evaluation would not reduce the risks for sitewide groundwater and soil at AOC 1 to below the acceptable target risk levels; the primary risk drivers in these two media are organics (e.g. dioxins/furans, PAHs).

6.8 Human Health Risk Summary

This HHRA was performed to evaluate potential current and future risks associated with detected constituents at the former Lockbourne AFB landfill. Surface soil, subsurface soil, sediment, surface water, and groundwater analytical data were evaluated in the HHRA. Potential risks were evaluated for the exposure pathways presented in the following table.

Exposure Area	Exposure Medium	Human Receptors
AOC 1	Surface soil	Current/Future Maintenance, Trespasser/Visitor, and Offsite Industrial Worker
AOC 1	Total soil*	Future Construction Worker
AOC 1	UWBZ Groundwater	Future Construction Worker and Offsite Residents
AOC 1	IDA Groundwater	Future Offsite Residents
AOC 1	Indoor Air (Vapor intrusion from Groundwater - UWBZ) [1]	Future Offsite Residents
AOC 1	Indoor Air (Vapor intrusion from Groundwater - IDA) [1]	Future Offsite Residents
AOC 2	Surface soil	Current/Future Maintenance, Trespasser/Visitor, and Offsite Industrial Worker
		Future Onsite Facility Worker
AOC 2	Total soil*	Future Construction Worker
AOC 2	Indoor Air (vapor intrusion from Total Soil*)	Future Onsite Facility Worker
AOC 2	UWBZ Groundwater	Future Construction Worker
AOC 2	Indoor Air (Vapor intrusion from Groundwater - UWBZ) [1]	Future Onsite Facility Worker
AOC 2	Indoor Air (Vapor intrusion from Groundwater - IDA) [1]	Future Onsite Facility Worker
East Ditch	Sediment and Surface water	Current/Future Trespasser/Visitor
		Future Construction Worker
West Ditch	Sediment and Surface water	Current/Future Trespasser/Visitor
		Future Construction Worker
Off-Landfill	IDA Groundwater	Future Offsite Residents
Off-Landfill	Indoor Air (Vapor intrusion from Groundwater - IDA)[1]	Future Offsite Residents

* Total Soil – surface soil and subsurface soil combined (0 to 10 feet bgs.)
[1] No COPCs were identified for indoor air (vapor intrusion from groundwater).

Table 6-7 and Appendix C, Tables 9.1.RME through 9.22.RME summarize the RME cancer risks and hazard indices. Tables 10.1.RME through 10.13.RME show only the constituents that contributed HIs above 0.1 to total cumulative receptor HIs or target organs greater than 1 or carcinogenic risks greater than 10^{-6} to total cumulative receptor carcinogenic risks greater than 10^{-5}.

The exposure scenarios that do not exceed risk targets (i.e., risk target of $1x10^{-5}$ and hazard target of 1) are identified in the following table.

Exposure Scenarios that do not Exceed Risk Targets		
Exposure Area	**Exposure Medium**	**Human Receptors**
AOC 1	Surface soil	Offsite Industrial Worker
AOC 2	Surface soil	Current/Future Maintenance, Trespasser/Visitor, and Offsite Industrial Worker Future Onsite Facility Worker
AOC 2	Total soil	Future Construction Worker
AOC 2	Indoor Air (vapor intrusion from Total Soil)	Future Onsite Facility Worker
East Ditch	Sediment and Surface water	Current/Future Trespasser/Visitor Future Construction Worker
West Ditch	Sediment and Surface water	Current/Future Trespasser/Visitor Future Construction Worker

The exposure scenarios do exceed risk targets are identified in the following table along with the risk drivers.

Exposure Scenarios that Exceed Risk Targets			
Exposure Area	**Exposure Medium**	**Human Receptors**	**Risk Drivers**
AOC 1	Surface soil	Current/Future maintenance, trespasser/visitor	PAHs, PCBs
AOC 1	Total soil	Future construction worker	PAHS, PCBs, lead
AOC 1	UWBZ Groundwater	Future construction worker and offsite residents	PAHs, phthalates, dioxins, metals (aluminum, arsenic, cadmium, cobalt, copper, iron, manganese, thallium, vanadium, and lead), VOCs (methylene chloride)
AOC 1	IDA Groundwater	Future offsite residents	PAHs, phthalates, dioxins, metals (iron and manganese)
AOC 2	UWBZ Groundwater	Future construction worker	PAHs, dioxins
Off-Landfill	IDA Groundwater	Future offsite residents	PAHs, dioxins

For soil exposure scenarios that exceed the risk target goals (i.e., AOC 1 current/future maintenance and trespasser/visitor, and future construction worker), risks are driven primarily by cPAHs and PCBs. Exposure to lead in the AOC 1 soil by future construction workers would result in BLLs in children (fetuses of exposed construction workers) that exceed the acceptable criterion for BLLs for fetuses.

For groundwater exposure scenarios that exceed risk target goals (i.e., future construction workers and offsite residents), risks are driven primarily by PAHs and dioxins, and to a lesser extent by metals, VOCs, and phthalates. Lead concentrations in AOC 1 UWBZ groundwater would exceed the criterion for BLL in future children exposed to offsite groundwater.

SECTION 7

Ecological Risk Assessment

This section presents the ERA that was conducted to assess the risk to potential risk to ecological receptors at the former Lockbourne AFB landfill site from exposure to site-related constituents. The ERA for the site consists of a screening ecological risk assessment (SERA; Steps 1 and 2 of the ERA process) and the first step (Step 3) of the baseline ecological risk assessment (BERA). This ERA was conducted in accordance with EM 200-1-4, *Risk Assessment Handbook: Volume II – Environmental Evaluation* (USACE 1996) and *Ecological Risk Assessment Guidance Document* (Ohio EPA 2008b), as well as incorporating input from the following documents:

- *Guidelines for Ecological Risk Assessment* (USEPA 1998)
- *Ecological Risk Assessment Guidance for Superfund* (USEPA 1997c)
- *Framework for Ecological Risk Assessment* (USEPA 1992)
- *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (USEPA 1999)
- *USEPA Region 3: Interim Ecological Risk Assessment Guidelines* (USEPA 1994b)
- *Wildlife Exposure Factors Handbook, Volume I of II* (USEPA 1993a)
- *RAGS, Volume II: Environmental Evaluation Manual* (USEPA 1989b)
- EP 200-1-15, *Standard Scopes of Work for HTRW Risk Assessments*, Final (USACE 2001b)
- *Tri-Service Remedial Project Manager's Technical Handbook for Ecological Risk Assessment*. (Wentsel et al. 2000)
- Ecological Risk Assessment Issue Papers (USEPA 1994c)
- ECO Updates, Volumes 1 and 2 (OSWER) (USEPA 1991-1994)

The objective of this ERA is to determine whether COPCs are present at the site, and if present, whether additional action/evaluation is warranted. This section is comprised of the following subsections:

- **Section 7.1 – Problem Formulation** – Characterizes the site setting and develops an ecological CSM, including an identification of assessment endpoints and measures of effects and selection of receptors for evaluation.
- **Section 7.2 – Screening Assessment –** Completes the SERA.
- **Section 7.3 – Refined Risk Characterization –** Completes the first step (Step 3) of the BERA.

- **Section 7.4 – Risk Description –** Evaluates the outcomes of the SERA and Step 3 of the BERA and identifies uncertainties associated with those risk estimates.
- **Section 7.5 – Ecological Risk Conclusions –** Summarizes the outcome of the ERA.

7.1 Problem Formulation

The problem formulation established the goals, scope, and focus of the ERA. As part of the screening problem formulation, the environmental setting of the site was characterized in terms of the habitats and biota known or likely to be present. The types and concentrations of constituents present in ecologically relevant media also were described based on available analytical data. A CSM was developed that describes potential source areas, transport pathways and exposure media, exposure pathways and routes, and receptors. Assessment endpoints and measures of effects were selected to evaluate those receptors for which critical exposure pathways exist. The fate, transport, and toxicological properties of the constituents present, particularly the potential for bioaccumulation, also were considered during this process.

7.1.1 Ecological Setting

Historic aerial photographs of the former Lockbourne AFB landfill taken in 1964, 1971, 1980, 1996, and 2003 (Appendix A) show the re-colonization of the vegetative communities over time throughout AOC 1 and AOC 2

In 1964, the former Lockbourne AFB landfill area was generally barren of trees, except for a small, uncut plot in the northeast corner of the site and a probable fence line running north to south. Landfilling operations were scattered throughout the central portion of the site but were concentrated mainly along the western boundary of the site. In 1971, the site remained largely devoid of trees, but tree re-colonization was commencing in the southern corner of the site where landfill operations appeared to be largely closed down, along the eastern boundary of the site, and between the western perimeter ditch and the railroad tracks. In 1980, this same pattern of re-vegetation continued with areas slowly filling in with trees, particularly between the perimeter ditch and the railroad tracks. Landfill operations were concentrated in the northwestern corner of the site. In 1996, trees continued to fill in the southern corner of the site, the northeast corner and along the eastern boundary, and west of and along the perimeter ditch. What were heavily used landfill areas remained devoid of vegetation. Photography of the former Lockbourne AFB landfill taken in 2003 shows the former Lockbourne AFB landfill to be largely wooded. Ruderal areas currently occur in the locations in the northwest and approximate center of the site that historic photos indicate were the most heavily used portions of the former Lockbourne AFB landfill.

CH2M HILL conducted an ecological site visit in March 2009 to identify the status of habitats and ecological communities present on the site. The following habitat characterizations are based on observations made during that site visit.

Habitat Identification

Terrestrial Habitat

The 146-acre former Lockbourne AFB landfill study area consists of essentially two terrestrial habitats: ruderal/old field and wooded. Each is discussed below.

Ruderal / Old Field. There are two major ruderal/old field areas within the site, with the larger and smaller areas comprising approximately 21 and approximately 6 acres, respectively. Areas within the ruderal habitat located in the northwest corner of the site that are considered "lime sludge" areas are devoid of vegetation. The dominant vegetation of the ruderal areas consists of common teasel (*Dipsacus sylvestris*), Queen Anne's lace (*Daucus carota*), goldenrod (*Solidago* spp.), common burdock (*Arctium minus*), and grasses.

Wooded Habitat. The wooded portion of the site is approximately 100 acres. The canopy of the wooded portions of the site is dominated by eastern cottonwood (*Populus deltoides*) followed by box elder (*Acer negundo*). Additional canopy trees include elms (*Ulmus* spp.), maples (*Acer* spp.), and eastern sycamore (*Platanus occidentalis*). The invasive Amur honeysuckle (*Lonicera maackii*) dominates the understory.

Aquatic Habitat

There is no natural surface water on the former Lockbourne AFB landfill site. Historically the site perimeter ditch may have been an intermittent headwater, however, presently it functions as a surface water/storm water ditch excavated along the eastern and western boundaries of the site, and has functioned in this capacity for at least the past four decades. This ditch also receives stormwater runoff from the Rickenbacker Airport property and RANGB.

The ditch varies in size along its course. On the eastern site boundary, the East Ditch is a ranges from 2 to 5 feet wide and overgrown with various shrubs and vines. The East Ditch at its widest point (10 feet) confluences with the western drainage ditch at the southwestern edge of the site. Sediment within the East Ditch is comprised of silt and sand with an abundant of organic debris.

The West Ditch originates offsite as a drainage ditch along the roadway. Upon confluence with the East Ditch, the West Ditch widens to about 15 to 20 feet. Upon reaching the oil water separator, the ditch narrows to about 10 feet wide. There is an approximately 6- to 8-foot drop in water elevation from upstream to downstream of the oil/water separator.

The steep-sided banks of the perimeter ditch are colonized by scouring rush (*Equisetum* spp), cottonwood, sycamore, various shrubs and vines, and grasses. The steepest bank slopes are largely devoid of vegetation because of erosion. Water depth is generally 1 to 3 feet. Bottom sediments are firm and range from gravel to sand or silt. The channel is nearly straight in all reaches, with a marked lack of sinuosity, indicating the dredged nature of the watercourse.

The perimeter ditch terminates at a junction box under the intersection of Vause and Canal roads. From this junction point, drainage from the north along Canal Road and the perimeter ditch divert to a 60-inch corrugated metal culvert that discharges to a drainage behind the Village of Lockbourne, with eventual discharge to Big Walnut Creek. The

junction box/culvert system essentially isolates the perimeter ditch from any potential upstream migration of aquatic organisms.

The drainage ditch system contains two IRP sites (PMC 2000): Site 25 is the drainage system in the southwest quadrant, and Site 27 is the drainage ditch near the former Lockbourne AFB landfill gate. Presumed sources of contaminants included runoff from previously existing facilities, runoff from aircraft maintenance, and parking areas. Both sites were recommended for no further remedial action.

Wetland Habitat

Eight wetland areas are identified on the National Wetlands Inventory (NWI) maps for the site. The areas identified on the maps consisted of one 0.3-acre of PFO1C (palustrine, forested, broad-leaved deciduous, seasonally flooded), one 0.9-acre area of PFO1A (palustrine, forested, broad-leaved deciduous, temporarily flooded), and 5.3 acres of PEMC (palustrine, emergent, seasonally flooded areas) spread among six sites (Figure 7-1). A formal wetland delineation was not conducted as part of the ecological site visit in March 2009.

Ecological Resources

The information presented in the Ecological Site Description subsection is essential to developing a realistic conceptual model and selecting appropriate assessment endpoints, measures of effects, and target receptors for evaluation in this ERA. A site visit was conducted in November 2003 by IT to identify the potential wildlife communities and the species present in each habitat type in the vicinity of the former Lockbourne AFB site. Subsequently, CH2M HILL conducted a site visit in March 2009 to verify the species identified by IT and to assess the aquatic habitats present on site. The following narrative describes the terrestrial and aquatic ecological resources for the study area.

Terrestrial Habitat

Birds observed on site that are year-round residents of Ohio in the study area included northern cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Parus carolinensis*), blue jay (*Cyanocitta cristata*), white-breasted nuthatch (*Sitta carolinensis*), American robin (*Turdus migratorius*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), mourning dove (*Zenaida macroura*), common flicker (*Colaptes auratus*), American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), and killdeer (*Charadrius vociferous*). Dark-eyed junco (*Junco hyemalis*) and yellow-rumped warbler are common migrant and winter resident species.

White-tailed deer (*Odocoileus virginianus*) were observed onsite. Numerous woodchuck (*Marmota monax*) burrows and a couple of woodchuck skulls onsite indicate the presence of this burrowing mammal, although none was observed. Fox (*Vulpes vulpes*) also are known to occur onsite.

Aquatic Habitat

An assessment of the habitat and biota in the perimeter ditches was performed during the March 2009 ecological site visit. Stream habitat quality was determined using two habitat assessment methods, Ohio EPA's Qualitative Habitat Evaluation Index (QHEI) (Rankin 1989) and USEPA's Rapid Bioassessment Protocol (RBP) For Use in Streams and Wadeable Rivers (Barbour et al. 1999). The QHEI is used to assess the quality of instream habitat for

fish. A higher QHEI score represents a more diverse habitat for colonization of fish species. The RBP method is used nationwide to provide an overall assessment of the quality of available habitat for all aquatic organisms. As with the QHEI, a higher RBP score indicates better habitat for aquatic organisms. QHEI scores for the East Ditch and West Ditch were 25 and 46, respectively. The low QHEI scores for the East and West ditches indicate a lack of suitable habitat to sustain a viable diverse fish population. RBP scores for the East Ditch and West Ditch were 47 (indicating poor habitat quality) and 69 (indicating marginal habitat quality), respectively.

The macroinvertebrate population was assessed using a semi-quantitative method, which included collecting macroinvertebrates via a D-frame net using the jab and sweep method. Macroinvertebrates were field identified and immediately returned to the respective ditch. Within each ditch, the only macroinvertebrates identified were midge larva, black fly larva, and aquatic worms. Minnow (species could not be identified) were noted in a small pool at the East Ditch confluence with the West Ditch.

In 1996, Ohio EPA conducted a biological and water quality study of Big Walnut Creek and Walnut Creek tributaries. The 1996 study sampled 795 fish, representing 40 species and 2 hybrids, from Big Walnut Creek. The Walnut Creek tributaries evaluated, including a manmade channel 0.5 mile long, contained fish populations deemed "fair, marginally good, good, very good, and very good/exceptional" by Ohio EPA's exceptional warmwater habitat (EWH) criteria (Ohio EPA 1998). Based on the results of the habitat and biota assessments of the West Ditch and East Ditch, it is unlikely that these tributaries could support a viable fish population to be an appreciable source for human consumption, thus they were not considered to be of concern for human health (ATSDR 2000).

Rare, Threatened, and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) and the Ohio Natural Heritage Program (ONHP) maintain records and databases of rare and endangered species for the state. USFWS listed the Indiana bat (*Myotis sodalist)* and running buffalo clover (*Trifolium stoloniferum)* as endangered species in Ohio and eastern prairie fringed orchid (*Platanthera leucophea)*, lakeside daisy (*Hymenoxys herbacea)*, northern wild monkshood (*Aconitum noveboracense),*small whorled pogonia *(Isotria medeoloides),* and Virginia spiraea *(Spiraea virginiana)* as threatened species in Ohio (USFWS 2008). ONHP has listed only two special-status species as being observed within 1 mile of the study area: river redhorse (*Moxostoma carinatum*) and the upland sandpiper (*Bartramia longicauda*) (ODNR 2004). The river redhorse is of special concern, which indicates that either it might become threatened in Ohio under continued or increased stress or it is a species or subspecies for which there is some concern but for which information is insufficient to permit an adequate status evaluation. The sandpiper is threatened throughout its range in Ohio.

The dark-eyed junco *(Junco hyemalis),* also identified by ONHP as a state-listed species, was observed during the November 2003 site visit conducted by IT, but was not observed during the March 2009 site visit conducted by CH2M HILL. It is likely that these birds were migrants, given that the junco is not known to breed in Ohio outside of the northeastern counties. It is primarily a seed-eater but also will consume insects, most likely during the breeding season. A target receptor protective of an herbivorous bird (i.e., feeding guild of herbivore or higher) was selected to ensure that risks to the junco were considered in this Tier I ERA.

There are no existing or proposed state nature preserves at the site, and there are no known unique ecological sites, geologic features, breeding or non-breeding animal concentrations, champion trees, state parks, state forests, scenic rivers, or wildlife areas within the project area (ODNR 2004).

7.1.2 Conceptual Site Model

The CSM relates potentially exposed receptor populations with potential source areas based upon physical site characteristics and complete exposure pathways. Important components of the CSM are identifying potential source areas, transport pathways, exposure media, exposure pathways and routes, and receptor groups. Actual or potential exposures of ecological receptors associated with a site were determined by identifying the most likely, and most important, pathways of contaminant release and transport. A complete exposure pathway has three components: (1) a source of constituents that results in a release to the environment; (2) a pathway of constituent transport through an environmental medium; and (3) an exposure or contact point for an ecological receptor. The main objective of the CSM in the SERA was to identify any complete and critical exposure pathways that may be present. Figure 7-2 illustrates a diagrammatic terrestrial ecological CSM and Figure 7-3 illustrates the aquatic ecological CSM for the site. Key components of the CSM are discussed in the following subsections.

Potential Source Areas

The initial tier of the CSM describes the primary sources and the mechanisms by which contaminants from these source areas are released and distributed within the habitats of the former Lockbourne AFB site. A number of source areas are associated with historical operations and waste disposal practices and were provided in the description of the site history (Section 1.2).

A complete description of the potential source areas associated and the contaminants associated with these areas was discussed in Section 1.2. Historical contaminant releases to the aquatic and terrestrial habitats of the former Lockbourne AFB site have occurred principally as a result of the former practices of burning and burying wastes from the base, surface disposal of various wastes, and disposal of pesticides and herbicides, ammunition, airplane parts, toxic and hazardous material, household-type garbage, and construction debris in trenches and on the ground surface.

Migration and distribution of chemical of potential ecological concern (COPECs) throughout the terrestrial and aquatic habitats are principally the result of volatilization/particulates, and runoff of contaminated soil from the current potential source areas and migration of groundwater to surface water.

Transport Pathways and Exposure Media

A transport pathway describes the mechanisms whereby site-related constituents, once released, may be transported from a source to ecologically relevant media (surface soil, sediment, and surface water) where exposures may occur. The primary mechanisms for constituent transport from the source areas include the following:

- Direct release during historic site activities to site surface soil

- Transport of stormwater runoff via surficial runoff and/or direct release of constituents to the East and West ditches
- Infiltration of chemicals that have been released to surface soil and/or that have been released directly to subsurface soil into groundwater with subsequent discharge to surface water
- Uptake by biota such as invertebrates, plants, and small mammals from surface soil, sediment, and/or surface water and transfer through the food chain to upper-trophic level receptors (i.e., birds, mammals, and fish) via the consumption of contaminated prey

Exposure Pathways and Routes

An exposure pathway links a source with one or more receptors through exposure via one or more media and exposure routes, and it is assumed that receptors are exposed to media regardless of contamination. Exposure, and thus potential risk, can only occur if complete exposure pathways exist. Figures 7-2 and 7-3 presents the potentially complete exposure pathways to ecological receptors at and adjacent to the site and are discussed below. An exposure route describes the specific mechanism(s) by which a receptor is exposed to a constituent present in an environmental medium and are discussed below.

Soil

Soil pathways include direct contact of contaminated soil by invertebrates and small mammals and birds as well as uptake of soil contaminants by plants. Food chain transfer of COPCs in soil to herbivorous, invertivorous, and carnivorous birds and mammals provides a pathway of indirect exposure.

Surface Water

Surface water pathways include the direct contact and absorption of contaminants in fish, aquatic invertebrates, and aquatic plants as well as the consumption of water from these streams by mammals and birds to meet hydration requirements or incidental to the foraging of prey. In addition, the transfer of bioaccumulative chemicals in surface water through the food chain represents a potentially significant mechanism of exposure to aquatic and terrestrial species.

Sediment

Sediment pathways include direct contact of contaminated sediment by invertebrates and small mammals and birds as well as uptake of sediment contaminants by plants. Food chain transfer of COPCs in sediment to invertivorous and piscivorous birds and mammals provides a pathway of indirect exposure. Taxa evaluated in the East and West ditches therefore include surface water biota such as aquatic plants, fish and invertebrates, as well as piscivorous birds and mammals and predators that feed on them.

Based on the general fate properties (e.g., relatively high adsorption to solids) of the most common site-related constituents and the protection offered by hair or feathers, potential dermal exposures for upper-trophic level receptors are not considered significant relative to ingestion exposures and were not evaluated in this ERA. The upper-trophic level receptors considered in this ERA are unlikely to be exposed to significant airborne sources of constituents via inhalation because the primary constituents present (metals) typically

adsorb to soil and do not volatilize, suggesting that exposure via inhalation is limited. Incidental ingestion of soil during feeding, preening, or grooming activities, however, was considered in the risk estimates.

Assessment Endpoints and Measures of Effects

The problem formulation includes selecting ecological endpoints, which are based on the CSM. Two types of endpoints, assessment endpoints and measures of effects, are defined as part of the ERA process (USEPA 1997c). An assessment endpoint is an explicit expression of the environmental component or value that is to be protected. Measures of effects are measurable ecological characteristics that are related to the component or value chosen as the assessment endpoint. The considerations for selecting assessment endpoints and measures of effects are summarized by USEPA (1997c) and discussed in detail in Suter (1989 and 1993).

Endpoints for this ERA were selected to address the potential for both direct and indirect impacts to the environment because of COPEC contamination in soil, surface water, and sediment. For example, organisms inhabiting or using the perimeter drainage ditches as a water or food supply may be exposed through direct contact with surface water and sediment, ingestion of contaminated surface water and/or sediment, and indirectly by incorporation of contaminants into the aquatic food chain.

Although additional relevant endpoints could be used logically to evaluate potential risks from COPECs, endpoints were selected for evaluation that would, in a focused approach, best characterize the ecological risks using data and information currently available for this site.

Assessment Endpoints and Measures of Effects Selected for Lockbourne AFB Landfill

Target Receptors or Communities	Assessment Endpoints	Measures of Effects
Benthic invertebrate community in the eastern and western perimeter drainage ditches.	Survival, reproduction, growth, and indigenous community composition of benthic organisms in eastern and western perimeter drainage ditches.	Comparisons of chemical concentrations in sediment and surface water with criteria and guidance values for freshwater sediment and surface water.
Fish community in the eastern and western perimeter drainage ditches.	Survival, reproduction, growth, and indigenous community composition of fish species in the eastern and western perimeter drainage ditches.	Comparisons of chemical concentrations in surface water to criteria and guidance values.
Herbivorous and piscivorous birds foraging in the eastern and western perimeter drainage ditches.	Survival, reproduction, and growth of herbivorous and piscivorous birds foraging in the eastern and western perimeter drainage ditches.	Modeling of algae, aquatic vegetation, aquatic invertebrate, and fish tissue chemical accumulation, and avian (mallard and kingfisher) dietary exposure modeling. Comparison of dietary exposure doses with reference toxicity values (RTVs) for birds.
Herbivorous and piscivorous mammals foraging in the eastern and western perimeter drainage ditches.	Survival, reproduction, and growth of herbivorous and piscivorous mammals foraging in the eastern and western perimeter drainage ditches.	Modeling of algae, aquatic vegetation, aquatic invertebrate, and fish tissue chemical accumulation, and mammalian (muskrat and mink) dietary exposure modeling. Comparison of dietary exposure doses with RTVs for mammals.

Assessment Endpoints and Measures of Effects Selected for Lockbourne AFB Landfill		
Target Receptors or Communities	**Assessment Endpoints**	**Measures of Effects**
Vegetation in the ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Survival, germination, and growth of plants in the ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Comparison of chemical concentrations in soil with phtyotoxic effects thresholds found in literature for plants.
Soil fauna in the ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Survival, reproduction, and growth of soil fauna in ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Comparison of chemical concentrations in soil with toxic effects thresholds found in literature for soil invertebrates.
Insectivorous and carnivorous birds foraging in the ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Survival, reproduction, and growth of birds foraging in the ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Modeling of plant and soil invertebrate tissue chemical accumulation, and avian (American robin and red-tailed hawk) dietary exposure modeling. Comparison of dietary exposure doses with RTVs for birds.
Herbivorous, invertivorous, and carnivorous mammals foraging the ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Survival, reproduction, and growth of mammals foraging in the ruderal/old-field and wooded areas of the former Lockbourne AFB landfill.	Modeling of plant and soil invertebrate tissue chemical accumulation, and mammalian (deer mouse, short-tailed shrew, and red fox) dietary exposure modeling. Comparison of dietary exposure doses with RTVs for mammals.

Receptors

Receptors are the components of an ecosystem that are potentially affected by a chemical or other stressor. Endpoints are characteristics of an ecological component that may be affected by a stressor. It is difficult, if not impossible, to assess potential impacts to every endpoint for every possible receptor; therefore, “key” receptors and endpoints were selected to be representative species in the major feeding guilds and habitats onsite.

The focus of the receptor selection process was on individual species, groups of species (such as lower-trophic receptors [i.e., benthic invertebrates /soil invertebrates] and upper-trophic receptors [i.e., birds, mammals, and fish]), or functional groups (i.e., feeding guilds) potentially at risk, rather than on higher organizational levels such as communities and ecosystems. Each trophic level is comprised of many different species and encompasses numerous feeding guilds; e.g., upper-trophic level receptors include a variety of birds and mammals in various feeding guilds such as herbivores, insectivores, and carnivores. After evaluating the types of populations, communities, and habitats present on the site, key receptor species were selected considering the following (USACE 1996; States et al. 1978):

- Likelihood of exposure
- Sensitivity to the COPECs
- Critical to the structure and function of the particular ecosystem which they inhabit
- Threatened, endangered, or of special concern

- Recreational value
- Indicative of important changes in the ecosystem
- Amount of exposure and/or toxicity data that are available for evaluation

The species selected as receptors of concern represent a range of feeding relationships within the habitats occurring on and surrounding the former Lockbourne AFB landfill (see Sections 7.1.1 for habitat identification and ecological resource descriptions). It is important to note that even though a select few receptor species were chosen for evaluation in this ERA, they serve as common representative species for the site and subsequently will represent risk to other species within comparable feeding guilds (i.e., the American robin will represent the feeding guild of other invertivorous birds).

Birds and mammals within several feeding guilds were selected from the Ohio EPA list of receptors to serve as key receptors in this ERA (see the following table). Species were selected based upon the criteria noted above as well as on assessment endpoints, onsite habitats, and feeding habits.

Key Wildlife Receptors		
	Target Species by Habitat	
Feeding Guild	**Terrestrial Habitat**	**Aquatic Habitat**
Herbivore	Deer mouse (*Peromyscus maniculatus)*, Mourning dove (*Zenaida macroura)*	Mallard (*Anas platyrhynchos)*, muskrat (*Ondatra zibethicus*)
Invertivore	American robin (*Turdus migratorius*), short-tailed shrew *(Blarina brevicauda)*	Marsh wren (*Cistothorus palustris)*
Carnivore	Red-tailed hawk (*Buteo jamaicensis)*, red fox (*Vulpes vulpes)*	---
Piscivore	---	Belted kingfisher (*Ceryle alcyon)*, mink (*Mustela vison)*

7.2 Screening Assessment

The following sections complete the SERA for the evaluation of potential impacts to lower-trophic level species (i.e., plants and invertebrates) and wildlife from the presence of chemicals in soil, sediment, and surface water. Section 7.2.1 summarizes the data used for the evaluation, Section 7.2.2 provides an overview of the approach used to screen for lower-trophic level and wildlife risks, Section 7.2.3 discusses the approach used to estimate receptor exposure, Section 7.2.4 summarizes the literature-based toxicity values used for comparison to evaluate the potential for adverse effect, and Section 7.2.5 presents the approach used to characterize risks in the SERA**.**

7.2.1 Analytical Data Summary and Selection

The first step in the ERA was to determine which data would be included in the evaluation. Detailed results of the sampling at the former Lockbourne AFB landfill were presented in Sections 2 and 4.

Details on data quality for the samples collected during the SIs were provided in the Phase I SI (LAW 1995a) and the Phase II SI (PMC 2000). EEG validated the RI data collected through August 2003; the results were presented in the *Quality Control Summary Report* (EEG 2004). CH2M HILL validated three quarters of groundwater data collected by during the RI by EEG (November 2003, February 2004, and May 2004) (Appendix E).

A review of the data identified the following criteria for data usability:

- Estimated values flagged with a J qualifier were treated as unqualified detected concentrations.
- Data qualified with an R (rejected) were not used in the risk assessment.
- For conservatism, B-qualified data were included in the evaluation.
- A-, a-, C-, CON-, D-, E-, I-, H-, L-, M-, N-, PR-, Q-, and *-qualified data were treated as unqualified detected concentrations. These qualifiers are defined in Appendix C, Tables 2-1 through 2-18.
- For duplicate samples, the maximum concentration between the two samples was used as the sample concentration.

For this ERA, datasets were grouped by medium (soil, surface water, and sediment), and habitat use categories (e.g., AOC 1 and AOC 2; East Ditch and West Ditch). Data groupings are as follows:

- <u>Soil</u>
  AOC 1 – Soil 0 to 4 feet deep
  AOC 2 – Soil 0 to 4 feet deep
- <u>Surface water</u>
  East Ditch
  West Ditch
- <u>Sediment (surficial)</u>
  East Ditch
  West Ditch

7.2.2 Screening Assessment Approach

The screening assessment evaluated the potential for adverse effects to both lower-trophic level receptors (plants and invertebrates) from direct exposure to site soil, sediment, and surface water, and the potential adverse effects to upper-trophic level receptors (i.e., birds, mammals, and fish) from the ingestion of prey that have accumulated chemicals via the food web. Preliminary COPECs were identified using the following process for surface soil and surface water:

- Inorganic constituents for each media were compared to background and eliminated if the maximum site concentrations were less than the background maximum and/or upper threshold limit

- Constituents exceeding background or in cases where background data were not available were compared to media specific screening values;
- If maximum constituent concentrations exceeded respective screening values the constituent was retained for further evaluation
- Detected constituents without screening values were also retained for further evaluation
- Non-detected constituents with laboratory reporting limits exceeding respective screening values and non-detected constituents without screening values were not retained as COPECs, but are discussed in the uncertainty section.

For sediment, COPECs were selected using the following screening approach:

- Inorganic constituents for each sediment were compared to the Ohio EPA sediment reference values (SRVs) (Ohio EPA 2008b) and eliminated if the maximum site concentrations were less than the sediment reference value (SRV).
- Inorganic constituents exceeding the respective SRV were compared to background concentration.
- If maximum constituent concentrations exceeded respective background concentration, it was retained as a COPEC.
- Inorganic constituents exceeding background and all other constituents lacking background concentrations were then compared to sediment screening values.
- If maximum constituent concentrations exceeded respective screening value, the constituent was retained for further evaluation.
- Detected constituents without screening values also were retained for further evaluation.
- Non-detected constituents with laboratory reporting limits exceeding respective screening values and non-detected constituents without screening values were not retained as COPECs, but are discussed in the uncertainty section.

7.2.3 Screening Exposure Assessment

The principal activity associated with the exposure assessment is estimating constituent concentrations in applicable media to which the receptors may be exposed. These concentrations are termed EPCs. This is accomplished through the selection of appropriate sets of the available analytical data using a set of criteria (e.g., validation status, sampling date, etc.). Once the analytical datasets are selected, EPCs are calculated as a particular point on the distribution of concentrations. At the screening level (Step 2), the EPC is the maximum detected concentration. To prepare a conservative assessment, the reporting limit for constituents analyzed for but not detected were compared to medium-specific screening values. This was done to ascertain whether detection limits were less than or equal to constituent concentrations at which potential adverse effects to ecological receptors could occur.

EPCs for dioxins and furans were calculated using a TEQ approach. This approach was used to adjust all dioxin/furan concentrations in terms of 2,3,7,8-TCDD by applying TEFs. The TEQs were then summed to a dioxin equivalent, or TEQ. TEQ value was calculated using measured concentrations of dioxins and furans based on WHO-derived TEFs. Van den Berg et al. (1998) was used to calculate TEQs for fish and birds, and Van den Berg et al. (2006) for mammals. Refer to Appendix F for supporting TEQ calculations.

7.2.4 Screening Effects Assessment

The purpose of the screening effects assessment is to establish constituent exposure levels (screening values) that represent conservative thresholds for adverse ecological effects.

Background Comparison

The maximum detected concentrations of naturally occurring inorganic constituents were compared to background concentrations for each given media. Soil concentrations were compared to the background soil concentrations (Tables 7-1 and 7-2) for inorganic constituents established in the *Supplemental Phase II Environmental Baseline Survey Investigation* (IT 1995).

As indicated above, before comparing sediment inorganic results to background, the data were compared to the Ohio EPA SRV. The Ohio EPA SRVs were developed to identify representative background sediment concentrations for lotic water bodies. The same biological reference sites that were used to develop biological criteria in Ohio also were the basis for developing background sediment concentrations, which account for Ohio regional differences. The former Lockbourne AFB site falls within the Eastern Corn Belt Plains region. Although not to be used as a standard or criteria, the maximum sediment concentration values were compared against the SRV screening values to identify site-related contamination. Sediment constituents that exceeded the Ohio EPA SRV were then compared to background sediment samples; LCKSD-1 is the upgradient station for East Ditch, and LCKSD-3 is the upgradient station for West Ditch (Tables 7-3 and 7-4).

Surface water concentrations were compared to upgradient concentrations from collocated surface water and sediment samples from each branch of the ditch (i.e., LCKSW-1 for East Ditch and LCKSW-3 for West Ditch upgradient locations) (Table 7-5).

Medium-Specific Screening Values

Numerous types of screening level ecological toxicity benchmarks have been developed to be protective of organisms using a variety of habitats. Consequently, the ecological benchmarks represent medium-specific contaminant concentrations considered protective of biota inhabiting that medium. Ecological benchmarks were obtained from a variety of sources, including federal and state regulatory values, USEPA and other agency reports, and scientific literature. A list of benchmarks selected for this ERA is provided in Tables 7-6 through 7-8.

The maximum detected concentration of a chemical within a medium was compared with the hierarchal screening benchmark for that medium. If a chemical exceeded its medium-specific benchmark, it was retained as a COPEC. In addition, if a benchmark was not available for a chemical, it also was retained as a COPEC. Within the former Lockbourne

AFB, the potential direct exposure media include soil, surface water, and sediment. As such, the ecological benchmarks summarized in the subsections below were compiled. In addition, for surface soil and sediment PAHs were evaluated based on calculated total high molecular weight (HMW) and total low molecular weight (LMW) classes (for non-detected constituents, one-half the detection limit was used) and total PAHs (sediment only). Total PCB concentrations were calculated following the same methodology as for deriving total PAH concentrations.

Soil Benchmarks

As noted in Ohio EPA 2008b, the following hierarchy of sources was used to obtain soil benchmarks:

- USEPA ecological soil screening levels (Eco-SSLs). (Note: The lower of the two values for plants or invertebrates was selected for direct exposure evaluation of the lower-trophic receptors.) (http://www.epa.gov/ecotox/ecossl/)
- PRGs for ecological endpoints (Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones, August 1997, ES/ER/TM-162/R2, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831. (http://www.esd.ornl.gov/programs/ecorisk/ documents/tm162r2.pdf)
- USEPA Region 5 ecological screening levels (ESLs) (USEPA 2003c)

Surface Water Benchmarks

As noted in Ohio EPA 2008a, the following sources, were used to obtain surface water benchmarks. The hierarchy used to select surface water benchmarks is as follows:

- Ohio EPA (2008b), Water Quality Criteria for the Protection of Aquatic Life: When available surface water benchmarks were selected from the list of water quality criteria for the protection of aquatic life as listed in OAC 3745-1. In addition, in accordance with OAC 3745-1, outside mixing zone maximum (OMZM) was used in this ERA given that the surface water data collected from the East and West Ditch were single ambient samples. Note that several of the criteria are hardness- or pH-dependent. The site-specific minimum hardness (an assumed 100 milligrams [mg] of calcium carbonate [$CaCO_3$] per liter) was used to derive all hardness-dependent values. This hardness value will result in the most protective criteria values applicable to site-specific conditions. A pH of 6.5 was used to derive pH-dependent values since site-specific pH data were not available.
- ESLs, USEPA, Region 5, 2003c: Criteria not listed in OAC 3745-1 were supplemented with USEPA Region 5 surface water ESLs.

Sediment Benchmarks

The following sources, in order of preference, were used to obtain sediment benchmarks.

- MacDonald et al. (2000), Consensus-based Values: MacDonald et al. evaluated the predictive ability of previously derived probable effect concentrations for major classes of compounds including metals, PAHs, pesticides, and PCBs. A database was developed from 92 published reports that included 1,657 samples with high-quality matching sediment toxicity and chemistry data. The database was composed primarily of 10- to

14-day or 28- to 42-day toxicity tests with the amphipod *Hyalella azteca* (designated as the HA10 or HA28 tests) and 10- to 14-day toxicity tests with the midges *Chironomus tentans* or *C. riparius* (designated as the CS10 test). Endpoints reported in these tests were primarily survival or growth. From these data, both threshold effect concentrations (TECs) and probable effect concentrations (PECs) were developed. TECs identify contaminant concentrations below which harmful effects on sediment-dwelling organisms are not expected. Only TECs were used in this evaluation. TECs include the following sediment quality guidelines (SQGs): threshold effect levels (TELs), effect range low values (ER-Ls), lowest effect levels (LELs), minimal effect threshold (METs), and sediment quality advisory levels (SQALs). TECs were calculated by determining the geometric mean of the SQGs. Consensus-based TECs were calculated only if three or more published SQGs were available for a chemical.

- USEPA Region 5 (2003c), Resource Conservation and Recovery Act (RCRA) ESLs: The ESLs are the initial tool used in assessing adverse risk to the environment through the RCRA Corrective Action and Permit programs within Region 5. The ESLs provide protective benchmarks for 223 contaminants and four environmental media, including air, water, sediment, and soil. With the exception of a few, the majority of sediment ESLs was derived using the equilibrium partitioning (EqP) equation and the corresponding water ESL.
- Other sources: In cases where benchmarks were not listed in MacDonald et al. or USEPA Region 5 ESLs, benchmarks were obtained from other sources such as the USEPA Region 3 freshwater sediment benchmarks.

Ingestion Screening Values

Food web exposure was assessed for surface soil by direct comparison to the USEPA Eco-SSLs for terrestrial mammals/birds (lower of the two values) and Region 5 ESLs for soil when Eco-SSLs were not available (Table 7-9). The soil ESLs represent a conservative screening value that is the lowest value for a given constituent that is protective from exposure via direct contact, ingestion, or food web exposure. The Region 5 soil ESLs are based predominantly on exposure to a masked shrew (*Sorex cinerus*); therefore, at this stage of the screening, food web exposure was not estimated for upper-trophic level terrestrial receptors. Detected constituents exceeding respective benchmarks, or where benchmarks were not available were retained for further evaluation.

For sediment and surface water, ingestion screening values for these constituents and the receptor species evaluated (or suitable surrogate species) via food web modeling were obtained from the literature. Toxicological information for wildlife species most closely related to the receptor species was used, where available, but was supplemented by laboratory studies of non-wildlife species (such as laboratory mice) where necessary. Toxicity studies involving long-term (i.e., chronic) exposure were used preferentially. Survival, growth, and reproduction were emphasized as toxicological endpoints because these are the most relevant to maintaining viable populations and are generally the most studied chronic toxicological endpoints for ecological receptors. If several chronic toxicological studies were available from the literature, the most appropriate study was selected for each receptor species based upon study design, study methodology, study duration, study endpoint, and test species. For the screening exposure estimates, the uptake

of constituents from the abiotic media into these food items was based upon conservative (e.g., 90th percentile) bioconcentration factors (BCFs) or bioaccumulation factors (BAFs) from the literature, where available. The use of 90th percentile values generally is recommended to provide a conservative screening assessment (Sample et al. 1998a, 1998b; Bechtel Jacobs 1998b). Default factors of 1 were used only when data were not available in the literature for a constituent. BCFs and BAFs used in this ERA are presented in Tables 7-10 and 7-11.

For receptor species used in food web modeling, the dietary intake (i.e., dose) of each constituent (in mg constituent per kg of body weight per day) was calculated by using species-specific life history information, where available, and the following formula (modified from USEPA 1993):

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)]]}{BW}(AUF)$$

Where:

DI_x	=	Dietary intake for constituent x (mg constituent/kg body weight/day)
FIR	=	Food ingestion rate (kg/day, dry-weight)
FC_{xi}	=	Concentration of constituent x in food item i (mg/kg, dry-weight)
PDF_i	=	Proportion of diet composed of food item i (dry-weight basis)
SC_x	=	Concentration of constituent x in soil/sediment (mg/kg, dry-weight)
PDS	=	Proportion of diet composed of soil/sediment (dry-weight basis)
BW	=	Body weight (kg, wet-weight)
AUF	=	Area use factor; percent (decimal) of habitat used by receptor

Receptor-specific values used as inputs to this equation are provided in Table 7-12. It was assumed that constituents were 100 percent bioavailable to the receptor, and it also was assumed that each receptor spent 100 percent of its time at the site (i.e., an area use factor of 1 was assumed). Minimum body weights and maximum ingestion rates were used to develop conservative exposure estimates.

Ingestion-based screening values were derived for both chronic no observed adverse effect level (NOAEL) and chronic lowest adverse effect level (LOAEL) endpoints. The applicable uncertainty factors from Table 7-13 were applied to derive these screening values, where necessary. Ingestion screening values for mammals and birds are summarized in Tables 7-14 and 7-15, respectively.

7.2.5 Screening Risk Calculation

In this step, the maximum exposure concentrations (abiotic media) or exposure doses (upper-trophic level receptor species) were compared with the corresponding screening values to derive screening risk estimates. The outcome of this step is a list of COPECs for each medium-pathway-receptor combination evaluated or a conclusion of acceptable risk.

Identification of COPECs

COPECs were identified using the HQ method. HQs were calculated by dividing the constituent concentration in the medium being evaluated by the corresponding medium-specific screening value, or by dividing the exposure dose by the corresponding ingestion screening value Constituents with HQs greater than 1 were considered a COPC in the SERA. Detected constituents for which toxicological data were not available also were retained as COPCs in the SERA.

HQs exceeding 1 indicate the potential for risk because the constituent concentration or dose (exposure) exceeds the screening value (effect). However, screening values and exposure estimates were derived using intentionally conservative assumptions such that HQs greater than 1 do not necessarily indicate that risks are present or impacts are occurring. Rather, it identifies constituent-pathway-receptor combinations requiring further evaluation. HQs that are less than 1 indicate that risks are very unlikely (USEPA 1997c), enabling a conclusion of no unacceptable risk to be reached with high confidence.

Tables 7-16 through 7-21 summarize the COPECs identified in surface soil (AOC 1 and AOC 2), sediment, and surface water as a result of the direct exposure evaluation. Tables 7-22 and 7-23 present a summary of HQs for food web exposures for terrestrial receptors (based on soil screening levels protective of terrestrial receptors) of AOC 1 and AOC 2, and Tables 7-24 and 7-25 present a summary of HQs for food web exposures (aquatic receptors) for the West Ditch and East Ditch. The following table summarizes the COPECs identified by medium and exposure scenario.

COPEC Summary (STEP 2)

	Direct Exposure[1]						Food Web Exposures			
	Surface Soil		Sediment		Surface Water		Terrestrial Receptors[3]		Aquatic Receptors	
COPEC	AOC 1	AOC 2	W. Ditch	E. Ditch	W. Ditch	E. Ditch	AOC 1	AOC 2	W. Ditch	E. Ditch
Inorganics										
Aluminum	√						NSV[2]			
Antimony							√			
Arsenic		√	√					√	√	
Barium	√									
Cadmium							√			
Chromium, total	√									
Cobalt		√								
Copper	√						√			
Lead	√		√				√	√	√	
Manganese		√								
Mercury	√						√			
Selenium	√	√					√			
Silver							√			
Thallium	√	√					√	√		
Vanadium										
Zinc	√	√					√	√		
Pesticides/PCBs										
Chlordane, gamma-	√						√			
DDD, p,p'-			√							
DDE, p,p'-		√	√					√		
DDT, p,p'-	√	√	√				√	√		
PCB 1242							√			
PCB 1248	√						√			

COPEC Summary (STEP 2)

	Direct Exposure[1]						Food Web Exposures			
	Surface Soil		Sediment		Surface Water		Terrestrial Receptors[3]		Aquatic Receptors	
COPEC	AOC 1	AOC 2	W. Ditch	E. Ditch	W. Ditch	E. Ditch	AOC 1	AOC 2	W. Ditch	E. Ditch
PCB 1254	√						√			
PCB 1260							√			
Total PCBs	√		√				√		√	
SVOCs										
Acenaphthene	√		√							
Benzo(a)anthracene	√		√				√			
Benzo(a)pyrene	√		√				√			
Benzo(b)fluoranthene	√						√			
Benzoic Acid	NSV[2]	NSV[2]					NSV[2]	NSV[2]		
Benzo(k)fluoranthene	√						√			
Butylbenzyl phthalate	NSV[2]						NSV[2]			
Bis(2-ethylhexyl)phthalate	√		NSV[2]				√			
Carbazole	NSV[2]						NSV[2]			
Chrysene	√		√				√			
Dibenzo(a,h)anthracene	√						√			
Dibenzofuran	NSV[2]	NSV[2]					NSV[2]	NSV[2]		
Di-n-butyl phthalate	√						√			
Di-n-butyl phthalate	NSV[2]						NSV[2]			
Fluoranthene	√		√				√			
Fluorene	√									
Indeno(1,2,3-cd)pyrene	√						√			
Methylnaphthalene-2	√		√				√			
Methylphenol, 3- and/or 4-	NSV[2]						NSV[2]			
Naphthalene	√	√					√	√		
Phenanthrene	√		√				√			

COPEC Summary (STEP 2)

COPEC	Direct Exposure[1]						Food Web Exposures			
	Surface Soil		Sediment		Surface Water		Terrestrial Receptors[3]		Aquatic Receptors	
	AOC 1	AOC 2	W. Ditch	E. Ditch	W. Ditch	E. Ditch	AOC 1	AOC 2	W. Ditch	E. Ditch
Pyrene	√		√				√			
Total Low Molecular Weight PAHs	√		√	√			√			
Total High Molecular Weight PAHs	√		√	√			√	√		
Total PAHs			√	√						
VOCs										
Acetone	√	√	√				√	√		
Explosives										
Trinitrotoluene, 2,4,6-	NSV[2]						NSV[2]			
Dioxins										
TCDD-TEQ	√	√	√		√		√	√		

Notes:
1 – Direct exposures based on maximum concentration for each media
2 – No screening value available. Constituent was retained as COPEC and further evaluated in the risk characterization section

3 – Food web exposures for terrestrial receptors were based on comparison of maximum constituent concentration to USEPA Region 5 ESL (based on exposure to a masked shrew (*Sorex cinerus*)) and USEPA Eco-SSLs for Mammals and Avian Receptors

7.3 Refined Risk Characterization

The SERA resulted in a set of COPCs for each medium. This set of COPCs includes constituents with HQs exceeding 1 (based upon maximum exposures) and detected constituents lacking screening values.

According to Superfund guidance (USEPA 1997c), Step 3 initiates the problem formulation phase of the BERA (identified as Step 3A by USACE [Wentsel et al. 2000]). The BERA begins with a preliminary step in which the conservative assumptions employed in the SERA are refined and risk estimates are recalculated using the same CSM. In addition, the reevaluation may include consideration of other factors such as background and upgradient data, detection frequency, and constituent-specific bioavailability.

The assumptions, parameter values, and methods that were modified for the preliminary Step 3 re-evaluation were as follows:

- EPCs were based on 95 percent UCLs; in cases where 95 percent UCLs could not be calculated maximum concentrations were used (refer to Appendix G for ProUCL outputs for calculation of 95 percent UCLs).
- A two tiered evaluation was used to evaluate upper-trophic level terrestrial receptors:
  - EPCs based on 95 percent UCLs were compared to the Region 5 ESLs.
  - Constituents exceeding HQs of 1 were retained for evaluation using receptor-specific food web models.
- Risk estimates based upon maximum constituent concentrations were supplemented by risk estimates based upon central tendency estimates (e.g., arithmetic mean). In addition, BAFs and BCFs were based on, or modeled from, central tendency estimates (e.g., median or mean) from the literature as opposed to the maximum or high-end (such as 90th percentile) estimates used in the SERA for many constituents. Revised bioaccumulation factor (BAF) and bioconcentration factor (BCF) values for the identified COPECs used for refinements are provided in Tables 7-26 through 7-28.
- Central tendency estimates (e.g., mean, median, or midpoint) for body weight and ingestion rate were used to develop exposure estimates for upper-trophic level receptors, rather than the minimum body weights and maximum ingestion rates used in the SERA (Table 7-29). Central tendency estimates for these exposure parameters are more relevant for a BERA because these better represent the characteristics of a greater proportion of the individuals in the population. Populations (rather than individual organisms) were emphasized during the development of the assessment endpoints for the ERA.
- The food web exposures presented in the SERA above conservatively identified constituents as COPECs if the estimated dose for at least one upper-trophic level receptor exceeded the NOAEL. The actual dose that is protective of an individual receptor, however, will fall between the NOAEL and the LOAEL. Both the NOAEL and LOAEL were used for comparison in the BERA. Ingestion screening values for aquatic mammals and birds were the same as presented in the SERA above. Ingestion screening values for terrestrial mammals and birds are summarized in Tables 7-30 and 7-31, respectively.

Only complete and critical pathways identified in the SERA were re-evaluated at this stage; similarly, only COPECs and receptors identified in the SERA as requiring further evaluation were considered. Although some aspects of the estimation of exposure were modified in Step 3A (see above), the screening values (effects) used in stage were the same as the values used in the SERA.

7.3.1 Direct Exposures

The comparison of 95 percent UCL COPEC concentrations in surface soil to soil screening levels are presented in Tables 7-32 and 7-33 for AOC 1 and AOC 2. Comparison of 95 percent UCL COPEC concentrations in sediment within the West Ditch to sediment

screening values is presented in Table 7-34. Given that insufficient number of samples were available to calculate 95 percent UCL concentrations for sediment (East Ditch) and surface water (West Ditch and East Ditch) the constituents identified in the SERA above as COPECs were retained as COPCs for the refined risk characterization.

AOC 1 – Surface Soil

The following constituents in surface soil within AOC 1 were retained as COPCs based on 95 percent UCL HQs exceeding 1:

- Inorganic – manganese, mercury, selenium, and thallium
- Pesticides/PCBs – DDT, PCB 1248, PCB 1254, and total PCBs
- SVOCs – total LMW PAHs and total HMW PAHs
- VOCs – acetone
- Dioxins and furans

AOC 2 – Surface Soil

The following constituents in surface soil within AOC 2 were retained as COPCs based on 95 percent UCL HQs exceeding 1:

- Inorganic – cobalt, manganese, selenium, and thallium
- Pesticides – DDE and DDT
- VOCs – acetone
- Dioxins and furans

West Ditch - Sediment

The following constituents in sediment within the West Ditch were retained as COPCs based on 95 percent UCL HQs exceeding 1, or for select constituents with insufficient number of samples with maximum HQs exceeding 1:

- Inorganic – arsenic
- Pesticides/PCBs – DDD, DDE, DDT, and total PCBs
- SVOCs – total LMW PAHs, total HMW PAHs, and total PAHs
- VOCs – acetone
- Dioxins and furans

Though acetone exhibited HQs exceeding 1, given the low residence time in soil and sediment, no known sources of acetone onsite; and that acetone is a common laboratory contaminant, no further evaluation of acetone is warranted.

7.3.2 Food Web Exposures

As discussed above, for terrestrial receptors, a two-tiered evaluation was conducted which included an initial comparison of 95 percent UCL concentrations to the USEPA Region 5 ESLs for soil. Constituents with HQs greater than 1 were retained and were evaluated via food web exposure for each terrestrial receptor.

AOC 1 – Terrestrial Receptors

Table 7-35 presents the results of the 95 percent UCL HQs for AOC 1 for the COPECs identified above and constituents with HQs greater than 1 were further evaluated via receptor specific food web models.

Food web exposures were evaluated for all six terrestrial receptors (deer mouse, short-tailed shrew, red fox, American robin, mourning dove, and red-tailed hawk) for exposure to the COPCs listed above. HQs based upon 95 percent UCL food web exposures for these terrestrial receptors are provided in Table 7-36. Based upon a comparison to NOAELs, the 95 percent UCL-based HQs for lead, mercury, thallium, zinc, Aroclor-1248, total PCBs, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, pyrene, and dioxin/furan TEQ – for both mammals and birds, exceeded 1 for one or more receptors.

HQs based on maximum allowable toxic concentrations (MATCs) exceeded 1 (for one or more receptor) for lead, thallium, Aroclor-1248, total PCBs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, pyrene, and dioxin/furan TEQ – for both mammals and birds. However, HQs based on LOAELs were greater than 1 for lead (for the morning dove and American robin), thallium (for the shrew), Aroclor-1248 (for the shrew) total PCBs (for the shrew, deer mouse, red fox, and American robin), benzo(a)anthracene (for the shrew), benzo(a)pyrene (for the shrew), pyrene (for the shrew), and dioxin/furan TEQ – mammals (for the shrew).

AOC 2 – Terrestrial Receptors

Table 7-37 presents the results of the 95 percent UCL HQs for AOC 2 (maximum concentration used in cases when an insufficient number of samples were available to calculate a 95 percent UCL).

Food web exposures were evaluated for all six terrestrial receptors (deer mouse, short-tailed shrew, red fox, American robin, mourning dove, and red-tailed hawk) for exposure to the COPCs listed above. HQs based upon 95 percent UCL food web exposures and/or maximum concentration for these terrestrial receptors are provided in Table 7-38. Based upon a comparison to NOAELs, HQs for thallium exceeded 1 for the short-tailed shrew and deer mouse, while dioxin/furan TEQ exceeded 1 for only the short-tailed shrew. No other receptors were encountered with HQs greater than 1 for any other constituent.

HQs based on MATCs exceeded 1 for thallium and dioxin/furan TEQ for both the short-tailed shrew; however, HQs based on LOAEL for the shrew exceeded 1 for thallium. All other receptors had MATCs and LOAEL-based HQs less than 1 for all constituents. As a result, thallium was retained as COPCs for omnivorous mammals.

West Ditch – Aquatic Receptors

Food web exposures were evaluated for all five aquatic receptors (mink, muskrat, marsh wren, belted kingfisher, and mallard) for exposure to the COPECs identified in the SERA. HQs based upon 95 percent UCL food web exposures and/or maximum concentrations for these aquatic receptors are provided in Table 7-39. HQs based on the NOAEL and MATCs exceed 1 for total PCBs to the mink; however, the LOAEL was less than 1 for exposure of the mink to total PCBs. No other receptor had HQs based on NOAEL, MATCs, or LOAEL

exceeding 1 for any constituent. Given that LOAELs were not exceeded for exposure of any constituent to any aquatic receptor, no constituents were retained as COPCs for upper-trophic aquatic receptors within the West Ditch.

East Ditch – Aquatic Receptors

Based on the results of the SERA presented above, no constituents were retained as COPCs for upper-trophic aquatic receptors within the East Ditch and as a result, further evaluation of these receptors was not required.

7.3.3 Uncertainty Assessment

Uncertainties are present in all ERAs because of the limitations of the available data and the need to make certain assumptions and extrapolations based upon incomplete information. In addition, the use of various models (e.g., uptake and food web exposures) each carries with it some associated uncertainty as to how well the model reflects actual conditions. The uncertainties in this ERA are mainly attributable to the following factors:

- **Duplicate Analyses -** When evaluating samples with field duplicates, the value used in the ERA was always the detected concentration when one result was a detect and the duplicate was a non-detect, regardless of the non-detected value. In these cases, the use of the detect has less uncertainty because it represents an actual measured value (versus an upper limit bound). In situations when both values in the parent and duplicate were both detected or both non-detected, the maximum concentration was used.
- **Ingestion Screening Values/Toxicity Reference Values (TRVs) -** Data on the toxicity of some constituents to the upper-trophic level receptor species were sparse or lacking, requiring the extrapolation of data from other wildlife species or from laboratory studies with non-wildlife species. This is a typical limitation and extrapolation for ERAs because so few wildlife species have been tested directly for most constituents. The uncertainties associated with toxicity extrapolation were minimized by selecting the most appropriate test species for which suitable toxicity data were available. The factors considered in selecting a test species to represent a receptor species included taxonomic relatedness, trophic level, foraging method, and similarity of diet.
- **Direct Exposure Screening Values –** Some chemicals in site-related media were detected but had no available screening value. Even though these chemicals were identified as COPCs, potential risks could not be determined for these chemicals and they are not considered risk drivers. The focus of this assessment was on detected constituents with ecotoxicological (effects) data. These constituents are typically the most common/important risk drivers. While there is some uncertainty with the inability to consider constituents without screening values as part of the risk evaluation in this assessment, that uncertainty is considered low because of the attention paid the COPCs with screening values in the same chemical groups. For constituents with screening values, care was taken to measure concentrations using analytical methods that could measure below appropriate action (screening) levels.
- **Constituent Mixtures and Cumulative Concentrations -** Information on the ecotoxicological effects of constituent interactions is generally lacking, which required (as is standard for ERAs) that the constituents be evaluated on an individual basis

during the comparison to screening values. This could result in an underestimation of risk (if there are additive or synergistic effects among constituents) or an overestimation of risks (if there are antagonistic effects among constituents).

For soil and sediment, total LMW and HMW concentrations (and total PAH concentrations) as well as total PCBs were calculated and evaluated as well as addressing individual compounds from these groups. There are a couple types of uncertainty associated with this part of the assessment. First, the practice of using one-half the non-detect value when summing the sample-specific concentrations could have potentially overestimated the concentration, and thus potential for risks. Secondly, assuming a cumulative concentration for these groups could either overestimate risk (assuming additivity) or result in the possibility of overlooking the impacts from individual compounds. However, the uncertainty associated with combining concentrations was considered low because more ecotoxicological data are available for the grouped (totaled) constituents relative to individual constituents.

- **Receptor Species Selection -** Reptiles and amphibians also are potential receptors in association with site habitats, but were not evaluated quantitatively even when exposure pathways were likely to be complete. For food web exposures, these taxonomic groups were evaluated using other fauna (birds and mammals) as surrogates because of the general lack of taxon-specific ingestion-based toxicological data. This represents an uncertainty in the ERA.

  It also was assumed that reptiles and amphibians were not exposed to significantly higher concentrations of constituents and were not more sensitive to constituents than other receptor species evaluated in the ERA. Based upon limited direct comparisons of toxicity, amphibians are generally more sensitive to metals relative to fish in water exposures, but not more sensitive to organic constituents than fish (Birge et al. 2000). For sediment exposures, amphibian-based no observed effect concentration (NOEC) values are higher than typical sediment screening values from the literature (such as the ones used in this ERA) that are based upon data from other aquatic receptors for selected metals. There are few comparable data for reptiles.

  In addition, there is some uncertainty associated with the use of specific receptor species to represent larger groups of organisms (such as guilds).

- **Food Web Exposure Modeling -** Constituent concentrations in aquatic food items (wetland/aquatic plants, benthic invertebrates, fish, and frogs) were modeled from measured media concentrations and were not directly measured. The use of generic, literature-derived exposure models and BAFs introduces some uncertainty into the resulting estimates. The values selected and methodology employed were intended to provide a conservative (screening) or reasonable (baseline) estimate of potential food web exposure concentrations.

  Another source of uncertainty was the use of default assumptions (values) for exposure parameters such as BCFs and BAFs. Although BCFs or BAFs for most bioaccumulative constituents were readily available from the literature and were used in this ERA, the use of a default factor of 1 to estimate the concentration of some constituents in receptor prey items is a source of uncertainty.

- **95 percent UCLs Versus Mean Media Concentrations -** As is typical in an ERA, a finite number of environmental media samples were used to develop the exposure estimates. At the Step 3-level of assessment, 95 percent UCLs were used to represent EPCs; however, some UCLs could not be calculated because of small samples sizes. In these situations, the maximum concentration was used by default. A 95 percent UCL is considered a conservative estimate and could over estimate risks; therefore, some uncertainty exists for these EPCs. However, use of 95 percent UCL ensured that some constituents were not overlooked as COPCs and resulted in a more comprehensive assessment.
- **Detected Constituents lacking screening values –** Several constituents were detected in various media without media – specific screening values. These constituents were primarily SVOC and VOC constituents that have low octanol-water partition coefficients (K_{ow}s) and are not known to be highly bioaccumulative. In addition, these constituents were not widely detected within the various media, further indicating that these are not likely related to historical activities at the site. As a result; though there is uncertainty around these constituents, it is unlikely that at the concentration and frequency detected that these constituents pose unacceptable risk
- **Non-detected constituents with reporting limits exceeding screening values –** Several constituents were not detected; however, laboratory reporting limits exceeded the screening value. Although we do not have detected concentrations for constituents with reporting limits greater than respective screening value, there is some degree of uncertainty with respect to these constituents.

7.4 Risk Description

The risk description is the part of the ERA in which the risk assessors integrate and interpret the available information into conclusions about risks to the assessment endpoints. The integration and interpretation of information is in a qualitative form, given the measures of effects used to evaluate risk and the risk estimation technique employed. Essentially, the risk description is a technical narrative supporting the risk estimates and a critical interpretation of the ecological significance of those estimates.

The risk description has two primary elements. The first is the ecological risk summary, which summarizes the results of the risk estimation and discusses the uncertainties associated with the integral steps of the ERA. This section contains the weight-of-evidence analysis. A weight-of-evidence analysis summarizes the results of the risk estimation and uncertainty analysis and assesses confidence in the risk estimates through a discussion of the different lines of evidence. The second element is the interpretation of ecological significance, which may be described in terms of the spatial and temporal extent of effects and, when possible, as an estimation of the recovery potential once the stressor is removed (Norton et al. 1992). Another element, a discussion of the effect of additional data or analyses on uncertainty, also is provided.

7.4.1 Ecological Risk Summary

As discussed in the problem formulation, a number of endpoints were measured and evaluated to provide a weight-of-evidence approach to the assessment of risk. Not all endpoints are equivalent in their ecological significance.

The role of the weight-of-evidence approach in the risk characterization is to assess the measures of effects findings and their associated uncertainty to determine whether there could be potential impacts to assessment endpoints. Agreement between different lines of evidence increases confidence in the conclusions derived in the risk estimation. When lines of evidence disagree, it is important to distinguish between true inconsistencies and those related to uncertainty and variability associated with each measure of effect. As with assigning qualitative significance ratings to the measures of effects, professional judgment is required when evaluating the various results and conflicting lines of evidence.

The following were considered when evaluating the individual lines of evidence in the weight-of-evidence analysis (USEPA 1997c).

- **Relevance of evidence to the assessment endpoint –** Often lines of evidence that are most closely linked to the assessment endpoints have greater importance than those not as closely linked.
- **Relevance of evidence to the conceptual model –** Some lines of evidence may be particularly useful in verifying points of the conceptual model (e.g., biomarker results may confirm exposure to COPCs).
- **Sufficiency and quality of data and experimental design used in key studies –** For example: Were enough samples collected, and were testing protocols followed?
- **Strength of cause and effect relationships –** Precise attribution of effect to stressor is usually not possible when multiple stressors are present; however, observed or predicted effects should coincide somewhat with current or predicted stressor distribution.
- **Relative uncertainties of each line of evidence –** The limitations of each line of evidence must always be considered when evaluating the relative strength of each line of evidence.

The assessment methods used in this ERA considered only comparisons of media concentrations or modeled doses with benchmark values. Consequently, the measures of effects were roughly equivalent in their ecological significance or in their ability to predict risk. Although only one line of evidence was used in this assessment, a weight-of-evidence approach was presented to help describe the risk at each site. The framework for this approach was developed by the New England Weight of Evidence Workgroup and is detailed in *A Weight-of-Evidence Approach for Evaluating Ecological Risks* (Menzie et al. 1996).

Scoring Measures of Effects

In the weight-of-evidence evaluation, 11 attributes of each measure of effect were evaluated. Each of the 11 attributes considered (Table 7-40) was assigned a weighting factor of high, medium, or low. Subsequently, for each of the measures of effects evaluated in an

assessment endpoint (in this case only one per assessment endpoint), a qualitative score was assigned to each attribute (Table 7-41). Based on the scores of the individual attributes (all attributes were considered of equal importance), an overall score of low to high was assigned to each measure of effect indicating how well the measure of effect represents the assessment endpoint. Table 7-42 presents a summary of weights assigned to the modeled exposure and effects the measure of effect associated with all of the assessment endpoints evaluated in this risk assessment. In addition, a brief summary of the rationale used to determine that attribute score is presented.

The endpoint score assigned to each measure of effect was an average of the scores from the 11 attributes. The modeled exposure and effects line of evidence had six medium and four high attribute scores (one attribute was not applicable) and was therefore given an overall score of medium-high.

Magnitude of Response in Measures of Effects

The magnitude of the response in a measure of effect was considered together with the measure of effect weight in judging the overall weight of evidence. The magnitude of response was divided into two questions:

1. Does the measure of effect indicate the presence or absence of harm (yes, no, or undetermined)?
2. Is the response low or high?

The endpoint weight of evidence of harm and magnitudes of responses for all measures of effects are presented by habitat in Tables 7-43 through 7-46.

Terrestrial Habitat. In AOC 1, evidence of harm was indicated for lower-trophic receptors (i.e., plants and invertebrates), herbivorous birds and mammals, and invertivorous birds and mammals. The magnitude of harm was considered low for all of the measures of effects except for lower-trophic receptors and short-tailed shrew, which was considered high (Table 7-43).

In AOC 1 evidence of harm was indicated all receptor groups except for carnivorous birds. The magnitude of harm was considered low for all other receptors except for the short-tailed shrew for which the magnitude of harm was considered high (Table 7-44).

Aquatic Habitat. In the western perimeter ditch, evidence of harm was indicated only for lower-trophic aquatic receptors aquatic from surface water (magnitude high) and sediment (magnitude high) (Table 7-45).

In the eastern perimeter ditch, evidence of harm was indicated only for lower-trophic aquatic receptors from exposure to sediment (magnitude high) (Table 7-46).

Concurrence Among Measures of Effects

The third and final component of the weight-of-evidence approach involved examining concurrence among measures of effects as they related to the assessment endpoint. The methodology for displaying the level of concurrence involved graphically plotting the letter designation of each measure of effect within a matrix that also included the weight of each endpoint and the associated degree of response. Since in this risk assessment only one

measure of effect per assessment endpoint was evaluated, the concurrence discussion is not provided.

7.4.2 Interpretation of Ecological Significance

The interpretation of ecological significance evaluated responses observed in the measures of effects and those expected in the assessment endpoints and judged whether any expected response could be considered ecologically significant. It is important to clarify that statistical significance and ecological significance are not synonymous, and that the primary goal of this portion of the risk assessment was to assign significance to responses that could reasonably be expected to affect ecosystem structure and function. The goal of the interpretation of ecological significance was to provide the risk manager with some context for evaluating the risk estimate in the context of determining whether there is an unacceptable baseline risk, and to evaluate the management goals (i.e., protection of ecological and human health), and if remedial action is warranted.

The following five criteria are proposed for evaluating adverse changes in assessment endpoints (USEPA 1997c; USACE 1996; Ohio EPA 2008a).

- Nature of effects
- Intensity of effects
- Spatial scale
- Temporal scale
- Potential for recovery

The extent to which the five criteria were evaluated depended on the scope and complexity of the risk assessment. In evaluating the nature and intensity of effects, the risk assessor distinguished adverse ecological changes that were different than those expected as part of normal ecosystem variability, or that result in little or no significant alteration of the system.

Spatial and temporal scales also need to be considered in assessing the significance of effects. The duration, extent, and pattern of stressors need to be considered in the context of the surrounding landscape. Depending on the types of effects, habitats, and potential receptors present, effects to small areas may be as, if not more, ecologically significant than impacts to larger, less critical areas. The duration of any effect is dependent on the persistence of the stressors as well as how often receptors may come into contact with the stressors. Even short-term effects can be ecologically significant if exposure occurs during critical life stages of receptors, or results in an acute response.

The final consideration in evaluating ecological significance was the rate and extent to which ecosystem recovery is possible. Recovery is defined as the rate and extent of return of a population or community to a condition that existed before the introduction of stressors (USEPA 1997c).

Because ecosystems are dynamic and, even under natural conditions, are constantly changing in response to factors other than anthropogenic stressors, it may be unrealistic to expect that an ecosystem will be able to return to exactly the same state that existed prior to its being disturbed, with or without removal of the stressors.

This discussion evaluated and attributed a level of ecological significance and risk to any adverse response predicted from COPCs associated with the former Lockbourne AFB landfill. It is important to realize that, owing to the complexity of contaminants and environments identified on site, precise attribution of effects to specific chemicals or chemical groups was not attempted. In addition, as noted previously, measures of effects reflecting changes in an individual are appropriate given that toxicity of contaminants to individual organisms can have consequences at the population, community, and ecosystem level (USACE 1996; Ohio EPA 2008a). As such, potential risks to individual target receptors noted below were extrapolated to higher levels of ecosystem organization.

The comparison of soil, sediment, and surface water concentrations to benchmarks resulted in a qualitative evaluation identifying whether potential impacts to the associated floral and faunal communities were possible based on the estimated COPC concentrations in the respective medium. While the ecological significance of these lines of evidence may not be as great as other measures of effects, this endpoint can serve as a tool in establishing causal links between COPCs and effects, as described in following subsections. In general, conservative assumptions were used to evaluate exposure and develop TRVs in the avian and mammalian exposure models.

As presented previously, the overall weight-of-evidence rating of the benchmark comparisons and avian and mammalian receptor modeling is considered medium-high.

Based on the risk calculations represented in Section 7.3, COPCs were identified in media based on direct exposures. The following section presents a detailed discussion of the potential for the COPCs that pose unacceptable risk to receptor populations. Table 7-47 summarizes the findings of ecological significance.

Terrestrial Habitat

AOC 1. Based on a comparison of soil concentrations to benchmarks, lower-trophic receptors may be at risk because of exposure to aluminum, chromium, mercury, selenium, thallium, zinc, DDT, PCBs, PAHs, bis(2-ethylhexyl)phthalate, and dioxins/furans.

Based on results of the food web modeling, invertivorous mammals may be at risk because of thallium, PCBs, benzo(a)anthracene, benzo(a)pyrene, pyrene, and TEQ. Herbivorous mammals and carnivorous mammals may be at risk to PCBs, birds and mammals may be at risk from pesticides, PCBs, PAHs, 2,4,6-trinitrotoluene, bis(2-ethylhexyl)phthalate, lead, silver, and thallium, but herbivorous mammals may be at risk from low molecular weight PAHs only.

AOC 2. Based on a comparison of soil concentrations to benchmarks, potential risk to lower-trophic receptors exists for direct exposure to cobalt, selenium, thallium, DDT, and dioxins/furans. The results of the food web modeling indicated potential risk to insectivorous mammals from exposures to thallium. Herbivorous and carnivorous mammals and birds do thallium, but herbivorous mammals do not appear to be at risk.

Aquatic Habitat

Western Perimeter Ditch. Based on a comparison of surface water to benchmarks, potential risk to lower-trophic aquatic receptors exists for direct exposure to dioxins/furans. Comparisons of sediment concentrations to benchmarks indicate potential risks for lower-

trophic aquatic receptors from direct exposure to arsenic, DDD, DDE, DDT, PAHs (LMW, HWM, and total PAHs), and dioxins/furans. The results of the food web modeling indicated that no potential risk to upper-trophic aquatic receptors from exposure to site-related COPCs is present in the West Ditch.

Eastern Perimeter Ditch. Based on a comparison of surface water concentrations to benchmarks, significant ecological risks were not indicated for surface water. Comparison of sediment concentrations to benchmarks indicates potential risk to lower-trophic aquatic receptors from exposure to PAHs (LMW, HMW, and total PAHs). The results of the food web modeling indicated that no potential risk to upper-trophic aquatic receptors from exposure to site-related COPCs is present in the East Ditch.

7.5 Ecological Risk Refinements

This section provides a discussion of the COPCs identified in AOC 2 surface soil and ditches to support risk management decisions. As presented in Section 1, the presumptive remedy for AOC 1 is a landfill cap to address potential risk to terrestrial receptors. As a result, no further refinements will be presented with respect to AOC 1.

As presented above, the following COPCs were identified within AOC 2:

- Potential unacceptable risk to lower-trophic receptors via direct exposure
  - Cobalt
  - Selenium
  - Thallium
  - DDT
  - Dioxins/Furans
- The results of the food web modeling indicated potential risk to insectivorous mammals from exposures to thallium.

Each constituent identified as a COPC was further evaluated with the following consideration:

- Background concentrations,
- Uncertainty of the risk estimates based on conservative screening thresholds, and
- Application of less conservative toxicity reference values to bound the risk estimates.

7.5.1 Background Concentrations

During the COPC selection process, inorganics that were detected at concentrations consistent with background levels were eliminated as COPCs. Exclusion of chemicals present at concentrations consistent with background does not have an impact on potential site-related risk estimates. Organic compounds were not eliminated as COPCs based on background concentrations. However, dioxin/furan samples were collected during the Phase II SI from off-landfill locations for soil, sediment, surface water, and groundwater. Dioxin/furan concentrations from samples collected on the former Lockbourne AFB landfill were compared to the concentrations from the samples collected from off-landfill locations, as presented below. As shown in the table, concentrations of dioxins/furans from media

within the former Lockbourne AFB landfill in AOC 1 and AOC 2 are generally similar to concentrations from off-landfill locations. Given that similar concentrations were encountered offsite, dioxins/furans do not appear to be elevated onsite and pose unacceptable risk above local background conditions.

Medium	Landfill	TCDD-TEQ Conc. Range*	Off-Landfill	TCDD-TEQ Conc. Range*
Surface Soil	AOC 1	9.12E-07 – 1.20E-05	Northern perimeter (SB-08, SB-09)	1.73E-06 – 1.81E-06
	AOC 2	1.30-06 – 4.63E-06	RANGB (14MW1, SO-49, SO-323)	1.91E-06 – 8.37E-06
			Railroad (SO-24, SO-25)	1.84E-06 – 6.11E-06
			Village of Lockbourne (SO-22, SO-23)	3.16E-06 – 5.14E-06
Sediment	West Ditch	1.46E-06 – 4.06E-06	Upstream (SD-01, SD-03, SD-10, SD-11, SD-12)	1.53E-06 – 3.12E-05
Surface Water	West Ditch	1.07E-09 – 5.44E-09	Upstream (SW-01, SW-03)	6.35E-09 – 7.22E-09

*All concentrations are mg/kg for soil and sediment and mg/L for surface water; all water results are reported as unfiltered results.

7.5.2 Screening Threshold Values

This ERA was conducted using conservative direct exposure screening values. In some cases, screening values are derived using uncertainty factors due to limited toxicological studies to derive screening values. As a result, of applying uncertainty factors, in many cases risk to lower-receptors is overestimated. This section provides a discussion of the direct screening values for constituents identified as COPCs in AOC 2.

Based on the direct exposure evaluation, cobalt, selenium, thallium, DDT, and dioxins/furans were identified as COPCs in AOC 2. As presented above, onsite concentrations of dioxins/furans were similar to those encountered offsite. In addition, a conservative screening value was used for the direct exposure pathway and the potential risk is likely overestimated. The maximum onsite concentration for 2,3,7,8-TCDD, the congener that is assumed to be the most toxic, concentration was 4.8×10^{-6} mg/kg, or ppm. Reinecke and Nash (1984) reported that two species of earthworms (*Allolobophophora caliginosa* and *Lumbricus rubellus*) showed no adverse effects when held for 85 days in soil containing 5 ppm of 2,3,7,8-TCDD, but both species died at 10 ppm. Because the maximum detected concentration of 2,3,7,8-TCDD was significantly less than concentrations shown to be toxic to soil invertebrates and because the food web modeling showed dioxins/furans to pose no unacceptable risk, no further evaluation is warranted.

Cobalt was detected in all eight surface soil samples; however, only one sample exceeded the screening value of 13 mg/kg. The 95 percent UCL for the data is 19.99 mg/kg, which resulted in a an HQ slightly great than 1. The screening value used in this ERA is the USEPA Eco-SSL for plants (USEPA 2005i). The studies used to derive the screening level were

reviewed and the basis for each toxicity value reported for each study was the effects concentration for 20 percent of the population (EC_{20}), as presented below.

Data Used to Derive Eco-SSL for Cobalt			
Reference	**Test Organism**	**Toxicity Parameter**	**Toxicity Value Soil Concentration (mg/kg)**
TN & Associates, Inc. 2000	Alfalfa	EC20	0.6
TN & Associates, Inc. 2000	Barley	EC20	29.8
TN & Associates, Inc. 2000	Radish	EC20	14.5
TN & Associates, Inc. 2000	Alfalfa	EC20	13.4
TN & Associates, Inc. 2000	Barley	EC20	36.4
TN & Associates, Inc. 2000	Radish	EC20	45.2
Data Not Used to Derive Eco-SSL for Cobalt			
Rehab, F.I., 1978	Cotton	LOAEC	100

Notes:
EC_{20} = Effect concentration for 20% of text population

The range of EC_{20} values for the six studies used to derive the Eco-SSL ranged from 0.6 to 45.2 mg/kg. Of these studies, the 95 percent UCL for cobalt falls well below in three of the six. In addition, the 95 percent UCL falls well below LOAEC of 100 mg/kg reported by Rehab 1978 (although this study was not used to derive the Eco-SSL, it met the criteria to be used). Given that only one sample exhibited concentrations of cobalt above the Eco-SSL, and the fact that all concentrations are well below the NOAEC and below three of the six EC_{20} values, it is unlikely that cobalt poses unacceptable risk to lower-trophic receptors.

Selenium was detected in seven of 16 surface soil samples within AOC 2, of which only three exceeded the Eco-SSSL of 0.44 mg/kg. The 95 percent UCL HQ for this data set was 1.02. The Eco-SSL used in this ERA was derived using plant toxicity data from eight studies presented in the table below.

Data Used to Derive Eco-SSL for Selenium			
Reference	**Test Organism**	**Toxicity Parameter**	**Toxicity Value Soil Concentration (mg/kg)**
TN & Associates, Inc. 2000	Alfalfa	EC20	0.1
TN & Associates, Inc. 2000	Barley	EC20	0.2
TN & Associates, Inc. 2000	Brassica	EC20	0.2
Singh et al, 1980a	Raya	MATC	1.4
Singh et al., 1980b	Berseem	MATC	1.6
Wan et al., 1988	Alfalfa	MATC	0.9
Wan et al., 1988	Alfalfa	MATC	0.9
Singh and Singh, 1979	Cowpea	MATC	0.8

Notes:
EC_{20} = Effect concentration for 20% of text population
MATC = Maximum acceptable toxicant concentration

The MATCs listed above range from 0.8 mg/kg to 1.6 mg/kg; when compared to the MATCs, a less conservative toxicity value than the EC_{20}, all surface soil samples exhibited concentrations that were well below these values. Given the low frequency of exceedances of the Eco-SSL, and the fact that all selenium concentrations were below the MATCs, it is unlikely that selenium poses risk to lower-trophic receptors. As a result, no further evaluation with respect to selenium is warranted.

Thallium was detected in four out of eight surface soil samples, all four of which exceeded the soil screening value of 1.0 mg/kg. The 95 percent UCL for this data set exceeded the maximum concentration and, as a result, the maximum value (2.2 mg/kg) was used by default. The soil screening value used in the ERA was based on one plant toxicity study, as reported in Efroymson et al.; as a result, the confidence of this screening value is relatively low. Given the relatively low frequency of detection and low magnitude of exceedances, it is unlikely that thallium poses unacceptable risk to lower-trophic receptors and, therefore, no further evaluation is warranted.

DDT was detected in only three out of 16 surface soil samples, all three of which exceeded the soil screening benchmark of 0.0035 mg/kg. The benchmark used in this ERA was the USEPA Region 5 ecological screening level for surface soil (USEPA 2003c) and is based on exposure to the masked shrew. Eco SSL benchmarks were not available based on exposure to lower-trophic receptors; however, several studies were evaluated (USEPA 2007i) and summarized below.

Plant Toxicity Data for DDT (USEPA 2007i)			
Reference	**Test Organism**	**Toxicity Parameter**	**Toxicity Value Soil Concentration (mg/kg)**
Pareek and Gaur 1970	Common bean	MATC	7.1
Rajanna and De la Cruz 1977	Cotton	NOAEC	50
Rajanna and De la Cruz 1977	Soybean	NOAEC	50
Rajanna and De la Cruz 1977	Corn	NOAEC	50
Rajanna and De la Cruz 1977	Wheat	NOAEC	50
Invertebrate Toxicity Data for DDT (USEPA 2007)			
Harris 1966	Common cricket	LC_{50}	0.08
Harris 1966	Common cricket	LC_{50}	1.75
Harris 1966	Common cricket	LC_{50}	3.1
Harris 1966	Common cricket	LC_{50}	4.1
Harris 1966	Common cricket	LC_{50}	4.3
Harris 1966	Common cricket	LC_{50}	11.4
Harris 1966	Common cricket	LC_{50}	4.2
Harris 1966	Common cricket	LC_{50}	11.8
Harris 1966	Common cricket	LC_{50}	20.4
Harris 1966	Common cricket	LC_{50}	45.3
Harris 1966	Common cricket	LC_{50}	77.2

Notes:
LC_{50} = Concentration lethal to 50% of test population

All surface soil samples exhibited DDT concentrations well below the toxicity values for plants and invertebrates. Given this and the low frequency of detection, no further evaluation of DDT is warranted with respect to lower-trophic receptors.

7.5.3 Toxicity Reference Values

This ERA was conducted using conservative TRV for upper-trophic receptors. In some cases, screening values are derived using uncertainty factors due to limited toxicological studies to obtain screening values. As a result of applying uncertainty factors in many cases, risk to upper-receptors is overestimated. This section provides a discussion of the toxicity reference values for thallium, the only COPC for upper-trophic receptors in AOC 2.

Thallium was identified as a potential COPC, based on the LOAEL HQ of 1.1 for the short-tailed shrew. It is important to note that the HQ was based on the maximum concentration because the 95 percent UCL exceeded the maximum concentration (likely attributed to small sample size). When the mean concentration (1.26 mg/kg) is used in the food web model, the LOAEL HQ was well below 1. Although using a mean concentration on such a small sample size would likely result in an underestimation of risk, the thallium exposure concentration for upper-trophic receptors is likely somewhere between the mean and maximum (i.e., between 1.26 and 2.2 mg/kg).

The TRV used in this ERA for thallium was based on a subchronic LOAEL of 0.74 mg/kg/d (Sample et al. 1996). As indicted above, an uncertainly factor of 4 was applied to the convert the subchronic LOAEL of 0.74 mg/kg/d to a chronic LOAEL of 0.185 mg/kg/d. Removing the uncertainty factors would provide a less conservative exposure assessment. When the subchronic LOAEL is used along with the maximum thallium concentration from AOC 2, the result is an HQ of 0.3. Given that thallium was detected at relatively low concentrations in only 50 percent of the samples, that the LOAEL HQ (using maximum concentration) was slightly above 1, and that the LOAEL HQ using the uncorrected subchronic TRV resulted in an HQ well below 1 for the short-tailed shrew, no further evaluation with respect to thallium is warranted for AOC 2.

7.6 Ecological Risk Conclusions

Based on the results of this ERA, potential ecological risks were identified with respect to lower-trophic and upper-trophic terrestrial receptors within AOC 1 and AOC 2, and lower-trophic receptors within the West Ditch and East Ditch. No further evaluation was recommended for AOC 1 or the East or West Ditch because it is assumed the applicable remedial action for AOC 1 is a landfill cap and reworking of the ditches, which will address the ecological risk identified above.

Based on the results of the refinements to the COPCs identified within AOC 2, it is unlikely that lower- or upper-trophic receptors are at risk and no further evaluation is warranted. Furthermore, AOC 2 will be developed for commercial and/or industrial use and, as a result, it is likely that the current habitat present onsite will become limited or eliminated in some areas resulting in reduced exposure potential as receptors re-locate to areas where adequate habitat is present.

This ERA was performed to evaluate the actual or potential ecological effects from exposures to the former Lockbourne AFB landfill site. This multi-pathway analysis was based on reasonable, protective assumptions about the potential for ecological receptors (lower-trophic and upper-trophic terrestrial and aquatic receptors) to be exposed to and be adversely affected by exposure to COPCs.

The upper-trophic receptors were selected as surrogate species representing estimated exposure and subsequently risk to other species within comparable feeding guilds. Key wildlife receptors include the deer mouse, American robin, mourning dove, short-tailed shrew, red-tailed hawk, red fox, mallard, marsh wren, muskrat, belted kingfisher, and mink.

The results of the ERA are summarized below, including the exposure area, medium, and COPCs, which are those chemicals that exceed the ecological HQs of 1 and where the lines of evidence (i.e., habitat, frequency of exceedances, background contributions) support the ecological quotient exceedances.

Summary of Ecological Risks

Exposure Area	Exposure Medium	Receptors	Chemicals of Potential Concern
AOC 1	Surface soil (0–4 feet)	Terrestrial Mammals	Thallium, PAHs, PCBs, Dioxins/Furans
		Terrestrial Birds	Lead, PCBs
		Lower-Trophic Receptors	Aluminum, chromium, lead, mercury, selenium, thallium, zinc, DDT, PCBs, PAHs, Dixons/Furans
AOC 2	Surface soil (0–4 feet)	Terrestrial Mammals	NR
		Lower-Trophic Receptors	NR
East Ditch	Surface water	Lower-Trophic Receptors	NR
		Upper-Trophic Receptors	NR
	Sediment	Lower-Trophic Receptors	PAHs
		Upper-Trophic Receptors	NR
West Ditch	Surface water	Lower-Trophic Receptors	Dioxins/Furans
	Sediment	Lower-Trophic Receptors	Arsenic, DDD, DDE, DDT, PCBs, PAHs, Dioxins/Furans

Note: NR = negligible risk as determined in the ERA

SECTION 8

Summary

This report evaluates the results of sampling efforts conducted at the former Lockbourne AFB landfill in several investigations. Constituents of interest were identified in soil, sediment, surface water, and groundwater. The interpretations were made by comparing every detected result against readily available RSLs.

8.1 Physical Setting

Several factors influence the potential migration of chemicals at the site. Groundwater is typically 4 to 25 feet bgs, suggesting that in some areas limited attenuation may occur in the unsaturated soil. The f_{oc} of soil was moderate, ranging from 0.014 to 0.036.

As discussed in Section 3, hydrogeologic data collected to date indicate that a three-aquifer system exists at the site.

- **UWBZ –** This zone is overlain by unconsolidated material consisting of silty clay with sand lenses. The shallow water table exists within the silty clay, ranging in depth from approximately 4 to 16 feet bgs, and is possibly under perched water conditions. Groundwater flow in the shallow unconsolidated deposits is toward the west and southwest at the former Lockbourne AFB landfill. The average hydraulic gradient of the shallow potentiometric surface was found to be approximately 0.0075 ft/ft, with K values ranging from approximately 1 to 28 feet per day.
- **IDA –** This zone consists of sand and gravel and exists below the silty clay layer. An upper silty clay unit contains a gray clay layer that occurs at depths ranging from approximately 18 to 48 feet bgs; is laterally continuous, more than 20 feet thick, and dense; and has a low permeability. Thus, it is considered an effective aquitard separating the UWBZ from the lower aquifers (intermediate and deep). The IDA exists under confined conditions, with the groundwater surface approximately 20 to 30 feet bgs, and groundwater flow is generally toward the west-southwest with a horizontal gradient of approximately 0.004 ft/ft, and K values ranging from approximately 0.5 to 18 feet per day.
- **Deep Aquifer –** This zone consists of sand and gravel overlain by a clay unit present at a depth of approximately 130 feet bgs that separates the IDA from a deep aquifer (ES 1992).

Based on the shallow water table of the perched UWBZ and the presence of unconsolidated material consisting of silty clay with sand lenses overlying this zone, the potential exists for soil constituents to leach to the shallow zone.

The former Lockbourne AFB is located on the drainage divide between Big Walnut Creek and Walnut Creek. Surface drainage at the site is controlled through an extensive network of storm drains, which include corrugated metal and concrete drainage pipes, and open

drainage ditches. While there is no natural surface water on the former Lockbourne AFB landfill site, the site perimeter ditch functions as a surface water/storm water ditch; this ditch was created by excavation along the eastern and western boundaries of the site and receives stormwater runoff from the Rickenbacker Airport property and RANGB.

8.2 Environmental Impact at the Site

8.2.1 Surface Soil

Surface soil samples were collected from a depth of 0 to 1 foot bgs during the 2003, 1998, 1997, and 1995 sampling events. The following were observed:

- Although a limited number of VOCs were detected in the surface soil samples, the concentrations of the detected VOCs were low. No VOCs in any of the samples collected exceeded their respective RSLs.
- Occurrence of SVOCs was more widespread. The more prevalent SVOCs are PAHs, which are commonly associated with site activities (burning and disposal of wastes). A total of nine SVOCs (benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(ah)anthracene, dibenzofuran, indeno(1,2,3-cd)pyrene, naphthalene) showed exceedances, and these SVOCs were detected throughout the former Lockbourne AFB landfill.
- The more commonly occurring pesticides found at the site were p,p′-DDD; p,p′-DDE; and p,p′-DDT. These pesticides were detected during the RI and both SIs. PCBs also were detected during the RI but not during the Phase I and Phase II SIs. In addition, exceedances were noted with four PCBs (PCB 1242, PCB 1248, PCB 1254, and PCB 1260).
- Although low concentrations of two explosive compounds were detected in soil during the RI, none was detected during the SIs. No explosive compounds were detected in soil above RSLs.
- Dioxin/furan congeners were detected in surface soil samples collected during the RI and Phase II SI. Among the different dioxins that were detected, the most commonly occurring dioxins were heptachlorodibenzo-p-dioxin and octachlorodibenzo-p-dioxin. Based on TCDD-TEQ, exceedances were noted in nine samples.
- The most frequently detected metals were arsenic, barium, chromium, lead, and zinc, and among these, arsenic concentrations were found to be above its RSL in most of the samples collected. Exceedances were also noted with cobalt and lead, but less frequently.

8.2.2 Subsurface Soil

Subsurface soil samples were collected during the 2003, 1997, and 1995 sampling events. The following were observed:

- Although a limited number of VOCs were detected in the subsurface soil samples, the concentrations of the detected VOCs were low. No VOCs in any of the samples collected exceeded their respective RSLs.

- SVOCs were detected more frequently in subsurface samples. The SVOCs, primarily PAHs, detected in subsurface soil samples were similar to that found in surface soil. A total of six PAHs showed exceedances.
- Although PCBs and pesticides were detected, the frequency of occurrence was low as well as the concentrations of the detected pesticides. Concentration of PCB 1254 exceeded its RSL at one location only.
- Dioxin/furan congeners were detected in subsurface soil samples collected during the RI and Phase II SI. Among the different dioxins that were detected, five dioxin/furan congeners exceeded their respective RSLs, including heptachlorodibenzofurans, heptachlorodibenzo-p-dioxins, hexachlorodibenzofurans, hexachlorodibenzo-p-dioxins, and pentachlorodibenzo-p-dioxins. Based on TCDD-TEQ, exceedances were noted in four samples.
- No explosives were detected above their reporting limits.
- The key metals detected in subsurface soil were arsenic, barium, chromium, lead, and zinc, although exceedances were noted only with arsenic.

8.2.3 Surface Water

Surface water samples were collected during the 2003, 1998, 1997, and 1995 sampling events. The following were observed:

- Although no VOCs were detected in the surface water samples during the RI, VOCs were detected in samples collected during the Phase I and II SI; however, detected concentrations were low. Methylene chloride were detected above its RSL in samples collected during Phase I SI.
- Although SVOCs were detected in samples collected during the RI and Phase I SI, only two SVOCs were detected in each investigation. Only bis(2-ethylhexyl phthalate) was detected above its RSL in one sample.
- Significant amounts of dioxins were detected in samples collected during the Phase II SI, while no dioxins were detected in any of the samples collected during the RI. Based on TCDD-TEQ, exceedances were noted in six samples.
- The five most frequently detected metals in surface water were barium, calcium, magnesium, manganese, and sodium. Arsenic, lead, and thallium were detected above their respective RSLs.

8.2.4 Sediment Sampling

Sediment samples were collected during the 2003, 1998, 1997, and 1995 sampling events. The following were observed:

- VOCs were detected in sediment samples collected from the East and West ditches.
- A pronounced oil sheen and hydrocarbon odor were observed at one of the location (SD-02). Seventeen SVOCs were detected at this location.

- SVOCs also were detected above their reporting limits in the sediment samples collected from other locations. Exceedances were noted with two SVOCs during the Phase I SI sampling event, although no such exceedances were noted in the subsequent sampling events.
- The more commonly occurring pesticides in sediment samples were p,p′-DDD; p,p′-DDE; and p,p′-DDT. Although pesticides were detected, the frequency of occurrence was low as well as the concentrations of the detected pesticides. The detection of PCBs was infrequent.
- No dioxins were reported in any of the samples collected during the RI. During the Phase II SI, dioxins were detected in both background samples and those collected from the East and West ditches. Based on TCDD-TEQ, exceedances were noted in five samples. A review of available data suggests there are sources that may have contributed to surface water and sediment dioxin loading upgradient of the Lockbourne AFB Landfill.

The key metals in sediment were aluminum, arsenic, calcium, chromium, and lead. Based on concentrations of metals in the collected sediment samples, it was noted that arsenic concentrations were detected above its RSL. It also was noted that in addition to arsenic, chromium and iron were detected above their respective RSLs in background samples.

8.2.5 Groundwater

Groundwater samples were collected during the 2003, 1998, 1997, and 1995 sampling events. Groundwater samples also were collected in November 2003, February 2004, and May 2004. The following were observed:

- Although VOCs were detected in groundwater samples collected during all investigation activities, concentrations of VOCs detected were low. During the 1995 sampling event, methylene chloride was detected across all media. This can be associated with laboratory contamination and does not appear to be related to the surface contents of the former Lockbourne AFB landfill. The only VOC detected above its RSL was methylene chloride.
- Although no SVOCs were detected during the Phase II sampling event, five SVOCs were detected during the Phase I SI and 12 SVOCs were detected during the RI. A total of nine SVOCs were detected above their respective RSLs.
- Dioxins were detected in groundwater more frequently in the Phase II SI samples compared with the RI samples; overall dioxin detections decreased in each successive sampling event. The trend in lower dioxin concentrations between the 1997 Phase II SI versus the 1998 Phase II SI and 2003 RI may be in part because of the difference in sample collection techniques: bottom-emptying bailer sample collection during the 1997 sampling event versus low-flow sampling collection during the 1998 and 2003 sampling events.
- Metals were detected in the majority of well locations in 2003, including background wells. Arsenic was detected primarily in the UWBZ wells. IDA arsenic concentrations from site wells were similar to concentrations in IDA background wells. All detected

arsenic concentrations, except in LCKMW-7 in the eastern side of Village of Lockbourne, exceeded the RSLs. Metals, besides arsenic, that were detected above their respective RSLs were aluminum, barium, cobalt, iron, and manganese.

- The observed three to four orders of magnitude greater inorganic concentrations detected in groundwater during the Phase I SI compared to the Phase II SI concentrations detected may be the result differences in sampling methods.

8.3 Human Risk Assessment

The HHRA was performed to evaluate potential current and future risks associated with detected constituents at the former Lockbourne AFB landfill. Surface soil, subsurface soil, sediment, surface water, and groundwater analytical data were evaluated in the HHRA. Potential risks were evaluated for the exposure pathways presented in the following table.

Exposure Area	Exposure Medium	Human Receptors
AOC 1	Surface soil	Current/Future Maintenance, Trespasser/Visitor, and Offsite Industrial Worker
AOC 1	Total soil*	Future Construction Worker
AOC 1	UWBZ Groundwater	Future Construction Worker and Offsite Residents
AOC 1	IDA Groundwater	Future Offsite Residents
AOC 1	Indoor Air (Vapor intrusion from Groundwater - UWBZ) [1]	Future Offsite Residents
AOC 1	Indoor Air (Vapor intrusion from Groundwater - IDA) [1]	Future Offsite Residents
AOC 2	Surface soil	Current/Future Maintenance, Trespasser/Visitor, and Offsite Industrial Worker
		Future Onsite Facility Worker
AOC 2	Total soil*	Future Construction Worker
AOC 2	Indoor Air (vapor intrusion from Total Soil*)	Future Onsite Facility Worker
AOC 2	UWBZ Groundwater	Future Construction Worker
AOC 2	Indoor Air (Vapor intrusion from Groundwater - UWBZ) [1]	Future Onsite Facility Worker
AOC 2	Indoor Air (Vapor intrusion from Groundwater - IDA) [1]	Future Onsite Facility Worker
East Ditch	Sediment and Surface water	Current/Future Trespasser/Visitor
		Future Construction Worker
West Ditch	Sediment and Surface water	Current/Future Trespasser/Visitor
		Future Construction Worker
Off-Landfill	IDA Groundwater	Future Offsite Residents

Exposure Area	Exposure Medium	Human Receptors
Off-Landfill	Indoor Air (Vapor intrusion from Groundwater - IDA)[1]	Future Offsite Residents

* Total Soil – surface soil and subsurface soil combined (0 to 10 feet bgs.)
[1] No COPCs were identified for indoor air (vapor intrusion from groundwater).

The exposure scenarios that exceed risk targets are identified in the following table.

Exposure Scenarios that Exceed Risk Targets

Exposure Area	Exposure Medium	Human Receptors	Risk Drivers
AOC 1	Surface soil	Current/Future maintenance, trespasser/visitor	PAHs, PCBs
AOC 1	Total soil	Future construction worker	PAHS, PCBs, lead
AOC 1	UWBZ Groundwater	Future construction worker and offsite residents	PAHs, phthalates, dioxins, metals (aluminum, arsenic, cadmium, cobalt, copper, iron, manganese, thallium, vanadium, and lead, VOCs (methylene chloride)
AOC 1	IDA Groundwater	Future offsite residents	PAHs, phthalates, dioxins, metals (iron and manganese)
AOC 2	UWBZ Groundwater	Future construction worker	PAHs, dioxins
Off-Landfill	IDA Groundwater	Future offsite residents	PAHs, dioxins

For soil exposure scenarios that exceed the risk target goals (i.e., AOC 1 current/future maintenance and trespasser/visitor, and future construction worker), risks are driven primarily by cPAHs and PCBs. Exposure to lead in the AOC 1 soil by future construction workers would result in BLLs in children (fetuses of exposed construction workers) that exceed the acceptable criterion for BLLs for fetuses.

For groundwater exposure scenarios that exceed risk target goals (i.e., future construction workers and offsite residents), risks are driven primarily by PAHs and dioxins, and to a lesser extent by metals, VOCs, and phthalates. Lead concentrations in AOC 1 UWBZ groundwater would exceed the criterion for BLL in future children exposed to offsite groundwater.

8.4 Ecological Risk Assessment

Based on the results of the ERA, potential ecological risks were identified with respect to lower-trophic and upper-trophic terrestrial receptors within AOC 1, and lower-trophic receptors within the West Ditch and East Ditch. The ecological risks will be addressed upon

implementation of the presumptive remedy for the site and the remedy includes a landfill cap and reworking of the ditches.

Based on the results of the refinements to the COPCs identified within AOC 2, it is unlikely that lower or upper-trophic receptors are at risk, and as a result no further evaluation is warranted. Furthermore, AOC 2 will be developed for commercial and/or industrial use and as a result, it is likely that the current habitat present onsite will become limited or eliminated in some areas, resulting in reduced exposure potential as receptors are relocated to areas where adequate habitat is present.

This ERA was performed to evaluate the actual or potential ecological effects from exposures to the former Lockbourne AFB landfill site. This multi-pathway analysis was based on reasonable, protective assumptions about the potential for ecological receptors (lower-trophic and upper-trophic terrestrial and aquatic receptors) to be exposed to and be adversely affected by exposure to COPCs.

The upper-trophic receptors were selected as surrogate species representing estimated exposure and subsequently risk to other species within comparable feeding guilds. Key wildlife receptors include the deer mouse, American robin, mourning dove, short-tailed shrew, red-tailed hawk, red fox, mallard, marsh wren, muskrat, belted kingfisher, and mink.

The results of the ERA are summarized below, including the exposure area, medium, and COPCs, which are those chemicals that exceed the ecological HQs of 1 and where the lines of evidence (i.e., habitat, frequency of exceedances, background contributions) support the ecological quotient exceedances.

Summary of Ecological Risks

Exposure Area	Exposure Medium	Receptors	Chemicals of Potential Concern
AOC 1	Surface soil (0–4 feet)	Terrestrial Mammals	Thallium, PAHs, PCBs, Dioxins/Furans
		Terrestrial Birds	Lead, PCBs
		Lower-Trophic Receptors	Aluminum, chromium, lead, mercury, selenium, thallium, zinc, DDT, PCBs, PAHs, Dixons/Furans
AOC 2	Surface soil (0–4 feet)	Terrestrial Mammals	NR
		Lower-Trophic Receptors	NR
East Ditch	Surface water	Lower-Trophic Receptors	NR
		Upper-Trophic Receptors	NR
	Sediment	Lower-Trophic Receptors	PAHs
		Upper-Trophic Receptors	NR
West Ditch	Surface water	Lower-Trophic Receptors	Dioxins/Furans
	Sediment	Lower-Trophic Receptors	Arsenic, DDD, DDE, DDT, PCBs, PAHs, Dioxins/Furans

Note: NR = negligible risk as determined in the ERA

8.5 Extent of Impact

The primary fate and transport mechanisms occurring at the site were identified based on review of the distribution (nature and extent) of the site-related constituents of interest relative to the environmental setting, their physical and chemical properties, and comparison to screening levels. Based on this review, the presence of site-related chemicals throughout the former Lockbourne AFB landfill are principally the result of runoff of impacted soil and subsequent transport to downgradient drainage ditches.

It was determined that the migration pathways from surface soil to subsurface soil and sediment are significant, while the migration pathway from surface soil to groundwater is moderate. Based on the comparison of the analytical data of surface soil and surface water, this migration pathway was considered less significant. Finally, based upon a comparison of the constituents in groundwater and surface water, it was concluded that discharge of shallow groundwater to surface water is not significant.

Migration of constituents from surface soil to surface water and sediment may occur because of surface runoff of impacted soil resulting from precipitation. Migration of constituents from surface soil to subsurface soil and groundwater can occur as a result of infiltration. Finally, any release to air from the site is considered to be minimal.

Landfills can be significant generators of gases because of decomposition of organic waste materials. Because of the age of the former Lockbourne AFB landfill and the depth of waste, significant generation of these gases would not be expected at this site. This is further supported by the gas monitoring study completed as part of the additional SI completed by CH2M HILL.

8.6 Recommendations

As stated earlier, the objectives for the RI report were to present and evaluate the results obtained from previous investigations conducted at the former Lockbourne AFB landfill. This report discussed the nature and extent of impact (i.e., types, concentrations, and distribution of constituents detected in different media sampled), their migration pathways, and transport mechanisms in soil and groundwater at the site. This report also documented the potential human health and environmental risks associated with current site conditions and evaluated potential future exposure.

The RI was completed with the assumption that a presumptive remedy involving containment will be implemented in the future for AOC 1 along with institutional controls restricting future land use and potable groundwater use for AOCs 1 and 2. The objectives of the remedial action for AOC 1 and AOC 2 are:

- Eliminate human and ecological exposure in both AOC 1 and 2;
- Minimize or eliminate potential human exposure to COPCs present in groundwater and minimize downgradient migration of COPCs in groundwater in AOCs 1 and 2;
- Minimize impacts to nearby surface water resources;

- Promote the beneficial reuse of onsite materials during the remedial action and provide for sustainability, to the extent practicable for AOCs 1 and 2;
- Restore the former landfill area to a condition consistent with beneficial reuse; and
- Separate AOC 2 from the remedial action at AOC 1 and develop a separate Proposed Plan and Decision Document for it to achieve No Further Action status. This process will include an environmental covenant for AOC 2 that includes a land use restriction (commercial/industrial usage only) and the restriction of groundwater usage.

The presumptive remedy for AOC 1 involves the installation of a soil cover/cap on the landfill. A focused feasibility study will be conducted to determine the appropriate remedial alternative for the site. The presumptive remedy is based on restricting land use to industrial/commercial use only. The components of the environmental covenants that are proposed include the following:

- Land use at AOC 1 and AOC 2 will be restricted to commercial/industrial activities only;
- Restrict the use of groundwater at AOC 1 and AOC 2 to limit exposure; and
- Intrusive activities will be restricted at the AOC 1 covered/capped area and the cap will be maintained.

SECTION 9

References

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Tables

TABLE 2-1a

Surface and Subsurface Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Sample Date	Type	Depth	Duplicate Name	Resampled
LCK-SO1	Phase I	5/24/1995	Surface Soil	0 - 1		
LCK-SO2	Phase I	5/24/1995	Surface Soil	0 - 1		
LCK-SO2	Phase I	5/24/1995	Surface Soil	0 - 1		Yes
LCK-SO3	Phase I	5/25/1995	Surface Soil	0 - 1		
LCK-SO4	Phase I	5/25/1995	Surface Soil	0 - 1		
LCK-SO5	Phase I	5/24/1995	Surface Soil	0 - 1		
LCK-SO6	Phase I	5/23/1995	Surface Soil	0 - 1		
LCK-SO6	Phase I	5/23/1995	Surface Soil	0 - 1		Yes
LCK-SO7	Phase I	5/23/1995	Surface Soil	0 - 1		
LCK-SO8	Phase I	5/23/1995	Surface Soil	0 - 1		
LCK-SO8	Phase I	5/23/1995	Surface Soil	0 - 1		Yes
LCK-SO9	Phase I	5/24/1995	Surface Soil	0 - 1		
LCK-SO10	Phase I	5/24/1995	Surface Soil	0 - 1		
LCK-SO11	Phase I	5/25/1995	Surface Soil	0 - 1		
LCK-SO12	PhaseI	5/25/1995	Surface Soil	0 - 1		
LCK-SO1	Phase II	7/28/1997	Surface Soil	0 - 1		
LCK-SO6	Phase II	7/24/1997	Surface Soil	0 - 1		
LCK-SO7	Phase II	7/28/1997	Surface Soil	0 - 1		
LCK-SO7	Phase II	7/28/1997	Surface Soil	0 - 1	LCKSO-11	
LCK-SO7	Phase II	7/28/1997	Surface Soil	0 - 1	LCKSO-9	
LCK-SO8	Phase II	7/28/1997	Surface Soil	0 - 1		
LCKSO-22	Phase II	11/10/1998	Surface Soil	0 - 0.5		
LCKSO-23	Phase II	11/10/1998	Surface Soil	0 - 0.5		
LCKSO-24	Phase II	11/10/1998	Surface Soil	0 - 0.5		
LCKSO-25	Phase II	11/10/1998	Surface Soil	0 - 0.5		
LCKSO-49	Phase II	11/10/1998	Surface Soil	0 - 0.5		
LCKSO-49	Phase II	11/10/1998	Surface Soil	0 - 0.5	LCKSO-30	
LCKSO-49	Phase II	11/10/1998	Surface Soil	0 - 0.5	LCKSO-49 Dup	
LCKSB-8	Phase II	7/17/1997	Surface Soil	0 - 0.5		
LCKSB-9	Phase II	7/16/1997	Surface Soil	0 - 0.5		
LCKSB-10	Phase II	7/21/1997	Surface Soil	0 - 0.5		
LCKSB-11	Phase II	7/21/1997	Surface Soil	0 - 0.5		
LCKSB-11	Phase II	7/21/1997	Surface Soil	0 - 0.5	LCKSB-18	
LCKSB-11	Phase II	7/21/1997	Surface Soil	0 - 0.5	LCKSB-15	
LCKSB-12	Phase II	7/25/1997	Surface Soil	0 - 0.5		
LCKSB-13	Phase II	7/24/1997	Surface Soil	0 - 0.5		
LCKSB-13	Phase II	7/24/1997	Surface Soil	0 - 0.5	LCKSB-16	
LCKSB-14	Phase II	7/30/1997	Surface Soil	0 - 0.5		
14MW1	Phase II	11/13/1998	Surface Soil	0 - 0.5		
LCKSO-323	Phase II	11/13/1998	Surface Soil	0 - 0.5		
EEGLKB-SS01	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS01	RI	7/30/2003	Surface Soil	0 - 1		Yes
EEGLKB-SS02	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS03	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS04	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS05	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS06	RI	7/29/2003	Surface Soil	0 - 1		

TABLE 2-1a

Surface and Subsurface Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Sample Date	Type	Depth	Duplicate Name	Resampled
EEGLKB-SS07	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS07	RI	7/30/2003	Surface Soil	0 - 1		Yes
EEGLKB-SS08	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS08	RI	7/28/2003	Surface Soil	0 - 1	EEGLKB-SS08 Dup02	
EEGLKB-SS09	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS09	RI	7/29/2003	Surface Soil	0 - 1	EEGLKB-SS09 Dup03	
EEGLKB-SS10	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS11	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS12	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS13	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS14	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS15	RI	7/29/2003	Surface Soil	0 - 1		
EEGLKB-SS16	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS17	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS18	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS19	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS20	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS20	RI	7/28/2003	Surface Soil	0 - 1	EEGLKB-SS20 Dup01	
EEGLKB-SS21	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS22	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS23	RI	7/28/2003	Surface Soil	0 - 1		
EEGLKB-SS24	RI	7/28/2003	Surface Soil	0 - 1		
LCKSO-1	Phase I	5/24/1995	Subsurface Soil	2 - 3		
LCKSO-2	Phase I	5/24/1995	Subsurface Soil	2 - 3		
LCKSO-3	Phase I	5/25/1995	Subsurface Soil	2 - 3		
LCKSO-3	Phase I	5/25/1995	Subsurface Soil	2 - 3	LCKSO-3 Dup	
LCKSO-4	Phase I	5/24/1995	Subsurface Soil	2 - 3		
LCKSO-4	Phase I	5/25/1995	Subsurface Soil	2 - 3		Yes
LCKSO-5	Phase I	5/24/1995	Subsurface Soil	2 - 3		
LCKSO-6	Phase I	5/23/1995	Subsurface Soil	2 - 3		
LCKSO-6	Phase I	5/23/1995	Subsurface Soil	2 - 3		Yes
LCKSO-7	Phase I	5/23/1995	Subsurface Soil	2 - 3		
LCKSO-7	Phase I	5/23/1995	Subsurface Soil	2 - 3		Yes
LCKSO-8	Phase I	5/23/1995	Subsurface Soil	2 - 3		
LCKSO-8	Phase I	5/23/1995	Subsurface Soil	2 - 3	LCKSO-8 Dup	
LCKSO-8	Phase I	5/23/1995	Subsurface Soil	2 - 3	LCKSO-8 Dup RE	Yes
LCKSO-9	Phase I	5/24/1995	Subsurface Soil	2 - 3		
LCK-SO10	Phase I	5/24/1995	Subsurface Soil	2 - 3		
LCKSO-11	Phase I	5/25/1995	Subsurface Soil	2 - 3		
LCK-SO12	Phase I	5/25/1995	Subsurface Soil	2 - 3		
LCKSO-12	Phase I	5/25/1995	Subsurface Soil	2 - 3		Yes
LCK-SO12	Phase I	5/25/1995	Subsurface Soil	2 - 3	LCK-SO12 DUP	
LCKSO-1	Phase II	7/28/1997	Subsurface Soil	2 - 3		
LCKSO-6	Phase II	7/24/1997	Subsurface Soil	2 - 3		
LCKSO-7	Phase II	7/28/1997	Subsurface Soil	2 - 3		
LCKSO-8	Phase II	7/28/1997	Subsurface Soil	2 - 3		
LCKSB-8	Phase II	7/17/1997	Subsurface Soil	2 - 4		Yes
LCKSB-9	Phase II	7/16/1997	Subsurface Soil	2 - 4		
LCKSB-10	Phase II	7/21/1997	Subsurface Soil	2 - 4		
LCKSB-11	Phase II	7/21/1997	Subsurface Soil	2 - 4		
LCKSB-12	Phase II	7/25/1997	Subsurface Soil	8 - 10		
LCKSB-13	Phase II	7/24/1997	Subsurface Soil	8 - 10		
LCKSB-14	Phase II	7/30/1997	Subsurface Soil	2 - 4		
LCKMW-15	RI	8/5/2003	Subsurface Soil	4 - 6		
LCKMW-15	RI	8/5/2003	Subsurface Soil	4 - 6		Yes
LCKMW-16	RI	8/6/2003	Subsurface Soil	8 - 10		
LCKMW-16	RI	8/6/2003	Subsurface Soil	8 - 10		Yes

TABLE 2-1b

Surface Water Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Sample Date	Location	Duplicate Name	Resampled
LCK-SW1	Phase I	5/26/1995	West Ditch		
LCK-SW2	Phase I	5/26/1995	West Ditch		
LCK-SW2-RE	Phase I	5/26/1995	West Ditch		yes
LCK-SW3	Phase I	5/26/1995	West Ditch		
LCKSW-1	Phase II	8/25/1997	Background		
LCKSW-2	Phase II	8/25/1997	East Ditch		
LCKSW-3	Phase II	8/25/1997	Background		
LCKSW-4	Phase II	8/25/1997	West Ditch		
LCKSW-5	Phase II	8/25/1997	West Ditch		
LCKSW-5	Phase II	8/25/1997	West Ditch	LCKSW-6	
LCKSW-5	Phase II	8/25/1997	West Ditch	LCKSW-7	
EEGLKB-SW01	RI	7/30/2003	West Ditch		
EEGLKB-SW02	RI	7/31/2003	West Ditch		
EEGLKB-SW02	RI	7/31/2003	West Ditch	EEGLKB-SW02 Dup04	
EEGLKB-SW03	RI	7/31/2003	West Ditch		

TABLE 2-1c

Sediment Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Date	Area	Duplicate Name	Reanalyzed
LCK-SE1	Phase I	5/26/1995	West Ditch		
LCK-SE1	Phase I	5/26/1995	West Ditch		Yes
LCK-SE2	Phase I	5/26/1995	West Ditch		
LCK-SE2	Phase I	5/26/1995	West Ditch		Yes
LCK-SE3	Phase I	5/26/1995	West Ditch		
LCK-SE3	Phase I	5/26/1995	West Ditch	LCK-SEDUP1	
LCK-SE3 Dup 1	Phase I	5/26/1995	West Ditch	LCK-SEDUP1-RE	
LCKSD-1	Phase II	8/25/1997	Background		
LCKSD-2	Phase II	8/25/1997	East Ditch		
LCKSD-3	Phase II	8/25/1997	Background		
LCKSD-4	Phase II	8/25/1997	West Ditch		
LCKSD-5	Phase II	8/25/1997	West Ditch		
LCKSD-5	Phase II	8/25/1997	West Ditch	LCKSD-6	
LCKSD-5	Phase II	8/25/1997	West Ditch	LCKSD-8	
LCKSD-10	Phase II	11/10/1998	Background		
LCKSD-11	Phase II	11/10/1998	Background		
LCKSD-11	Phase II	11/10/1998	Background	Dup	
LCKSD-11	Phase II	11/10/1998	Background	LCKSD-20	
LCKSD-12	Phase II	11/10/1998	Background		
EEGLKB-SD01	RI	7/30/2003	West Ditch		
EEGLKB-SD02	RI	7/31/2003	West Ditch		
EEGLKB-SD02	RI	7/31/2003	West Ditch	EEGLKB-SD02 Dup04	
EEGLKB-SD03	RI	7/31/2003	West Ditch		
EEGLKB-SD04	RI	7/31/2003	West Ditch		

TABLE 2-1d

Seep Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Duplicate Name	Date
LCK-SW4	Phase I		5/26/1995
LCK-SW5	Phase I		5/26/1995
LCK-SW5	Phase I	LCK-SWDUP1	5/26/1995
LCKSP-1	Phase II		8/26/1997
LCKSP-1	Phase II	LCKSP-6	8/26/1997
LCKSP-1	Phase II	LCKSP-7	8/26/1997
LCKSP-2	Phase II		8/26/1997
LCKSP-3	Phase II		8/26/1997
EEGLKB-SP01	RI		8/7/2003

TABLE 2-1e

Groundwater Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Sample Date	Acquifer	Location	Duplicate Name
Background Wells					
LCKMW-1[A]	Phase I	6/6/1995	IDA	Background	
LCK-MW2[A]	Phase I	6/6/1995	UWBZ	Background	
LCKMW-1	Phase II	9/24/1997	IDA	Background	
LCKMW-2	Phase II	9/24/1997	UWBZ	Background	
LCKMW-8	Phase II	9/23/1997	IDA	Background	
LCKMW-9	Phase II	9/23/1997	UWBZ	Background	
14MW1	Phase II	11/13/1998	UWBZ	Background	
LCKMW-1	RI	8/11/2003	IDA	Background	
LCKMW-1	RI	8/11/2003	IDA	Background	LCKMW-1 Dup01
LCKMW-1	RI	11/14/2003	IDA	Background	
LCKMW-1	RI	11/14/2003	IDA	Background	LCKMW-1 Dup
LCKMW-1	RI	2/23/2004	IDA	Background	
LCKMW-1	RI	2/23/2004	IDA	Background	LCKMW-1 Dup
LCKMW-1	RI	5/18/2004	IDA	Background	
LCKMW-1	RI	5/18/2004	IDA	Background	LCKMW-1 Dup
LCKMW-2	RI	8/11/2003	UWBZ	Background	
LCKMW-2	RI	11/13/2003	UWBZ	Background	
LCKMW-2	RI	2/23/2004	UWBZ	Background	
LCKMW-2	RI	5/18/2004	UWBZ	Background	
LCKMW-8	RI	8/11/2003	IDA	Background	
LCKMW-8	RI	11/13/2003	IDA	Background	
LCKMW-8	RI	2/26/2004	IDA	Background	
LCKMW-8	RI	5/18/2004	IDA	Background	
LCKMW-9	RI	8/11/2003	UWBZ	Background	
LCKMW-9	RI	11/13/2003	UWBZ	Background	
LCKMW-9	RI	2/26/2004	UWBZ	Background	
LCKMW-9	RI	5/18/2004	UWBZ	Background	
Site Wells					
LCK-MW3[A]	Phase I	6/7/1995	IDA	Site	
LCKMW-4[A]	Phase I	6/7/1995	UWBZ	Site	
LCKMW-5[A]	Phase I	6/6/1995	IDA	Site	
LCKMW-6[A]	Phase I	6/5/1995	UWBZ	Site	
LCKMW-6[A]	Phase I	6/5/1995	UWBZ	Site	DUP
LCKMW-7[A]	Phase I	6/7/1995	UWBZ	Site	
LCKMW-3	Phase II	9/18/1997	IDA	Site	
LCKMW-4	Phase II	9/16/1997	UWBZ	Site	
LCKMW-5	Phase II	9/16/1997	IDA	Site	
LCKMW-5	Phase II	9/16/1997	IDA	Site	LCKMW-15
LCKMW-6	Phase II	9/19/1997	UWBZ	Site	
LCKMW-7	Phase II	9/19/1997	UWBZ	Site	
LCKMW-7	Phase II	11/11/1998	UWBZ	Site	
LCKMW-7	Phase II	11/11/1998	UWBZ	Site	LCKMW-30
LCKMW-10	Phase II	9/22/1997	IDA	Site	
LCKMW-10	Phase II	11/12/1998	IDA	Site	
LCKMW-11	Phase II	9/22/1997	UWBZ	Site	
LCKMW-11	Phase II	11/12/1998	UWBZ	Site	
LCKMW-12A[B]	Phase II	9/17/1997	IDA	Site	
LCKMW-12A[B]	Phase II	9/17/1997	IDA	Site	LCKMW-16
LCKMW-12A[B]	Phase II	11/12/1998	IDA	Site	

TABLE 2-1e

Groundwater Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Sample Date	Acquifer	Location	Duplicate Name
LCKMW-13	Phase II	9/17/1997	UWBZ	Site	
LCKMW-13	Phase II	9/17/1997	UWBZ	Site	LCKMW-17
LCKMW-13	Phase II	11/12/1998	UWBZ	Site	
LCKMW-14	Phase II	9/16/1997	IDA	Site	
RB25-MW7	Phase II	9/18/1997	UWBZ	Site	
RB25MW-9	Phase II	9/17/1997	UWBZ	Site	
RB25MW-9	Phase II	9/17/1997	UWBZ	Site	LCKMW-20
LCKMW-3	RI	8/13/2003	IDA	Site	
LCKMW-3	RI	11/13/2003	IDA	Site	
LCKMW-3	RI	2/27/2004	IDA	Site	
LCKMW-3	RI	5/20/2004	IDA	Site	
LCKMW-4	RI	8/12/2003	UWBZ	Site	
LCKMW-4	RI	11/12/2003	UWBZ	Site	
LCKMW-4	RI	2/26/2004	UWBZ	Site	
LCKMW-4	RI	5/19/2004	UWBZ	Site	
LCKMW-5	RI	8/13/2003	IDA	Site	
LCKMW-5	RI	11/12/2003	IDA	Site	
LCKMW-5	RI	2/25/2004	IDA	Site	
LCKMW-5	RI	5/20/2004	IDA	Site	
LCKMW-6	RI	8/13/2003	UWBZ	Site	
LCKMW-6	RI	11/12/2003	UWBZ	Site	
LCKMW-6	RI	2/25/2004	UWBZ	Site	
LCKMW-6	RI	5/20/2004	UWBZ	Site	
LCKMW-7	RI	8/13/2003	UWBZ	Site	
LCKMW-7	RI	11/13/2003	UWBZ	Site	
LCKMW-7	RI	2/24/2004	UWBZ	Site	
LCKMW-7	RI	2/24/2004	UWBZ	Site	LCKMW-7 Dup
LCKMW-7	RI	5/20/2004	UWBZ	Site	
LCKMW-10	RI	8/14/2003	IDA	Site	
LCKMW-10	RI	11/11/2003	IDA	Site	
LCKMW-10	RI	2/24/2004	IDA	Site	
LCKMW-10	RI	5/19/2004	IDA	Site	
LCKMW-11	RI	11/11/2003	UWBZ	Site	
LCKMW-11	RI	2/24/2004	UWBZ	Site	
LCKMW-11	RI	5/19/2004	UWBZ	Site	
LCKMW-12A[B]	RI	8/14/2003	IDA	Site	
LCKMW-12A[B]	RI	11/11/2003	IDA	Site	
LCKMW-12A[B]	RI	2/25/2004	IDA	Site	
LCKMW-12A[B]	RI	5/17/2004	IDA	Site	
LCKMW-13	RI	8/14/2003	UWBZ	Site	
LCKMW-13	RI	11/11/2003	UWBZ	Site	
LCKMW-13	RI	2/25/2004	UWBZ	Site	
LCKMW-13	RI	5/17/2004	UWBZ	Site	
LCKMW-14	RI	8/14/2003	IDA	Site	
LCKMW-14	RI	11/12/2003	IDA	Site	
LCKMW-14	RI	2/26/2004	IDA	Site	
LCKMW-14	RI	5/19/2004	IDA	Site	
LCKMW-15	RI	8/12/2003	UWBZ	Site	
LCKMW-15	RI	8/12/2003	UWBZ	Site	LCKMW-15 Dup02
LCKMW-15	RI	11/10/2003	UWBZ	Site	
LCKMW-15	RI	11/10/2003	UWBZ	Site	LCKMW-15Dup
LCKMW-15	RI	2/24/2004	UWBZ	Site	
LCKMW-15	RI	5/18/2004	UWBZ	Site	
LCKMW-15	RI	5/18/2004	UWBZ	Site	LCKMW-15Dup

TABLE 2-1e

Groundwater Samples Collected During Phase I, Phase II, and Remedial Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Phase	Sample Date	Acquifer	Location	Duplicate Name
LCKMW-16	RI	8/12/2003	UWBZ	Site	
LCKMW-16	RI	11/14/2003	UWBZ	Site	
LCKMW-16	RI	2/27/2004	UWBZ	Site	
LCKMW-16	RI	5/19/2004	UWBZ	Site	
MW-11	RI	8/14/2003	UWBZ	Site	
RB25-MW7	RI	8/11/2003	UWBZ	Site	
RB25-MW7	RI	11/12/2003	UWBZ	Site	
RB25-MW7	RI	2/27/2004	UWBZ	Site	
RB25-MW7	RI	5/20/2004	UWBZ	Site	

[A] - The designation LCK-GW1 and LCKMW-1 are both names of samples from LCKMW-1. The term GW was used in the Phase I assessment. The term MW was used in all subsequent assessments.

[B] - LCKMW-12 was never completed. LCKMW-12A was installed adjacent to LCKMW-12 and sampled during the Phase II and the RI sampling events.

TABLE 2-2
Survey Coordinates Collected During Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Lockbourne AFB Former Landfill Survey Data						
Well ID	**Screened Interval (SI)**	**Northing (Y)**	**Easting (X)**	**TOC Elevation (feet)**	**Ground Surface Elevation (feet)**	**Total Depth**
Monitoring Well Locations						
LCKMW-1	IDA	660296.91	1841487.70	730.75	728.28	80.06
LCKMW-2	UWBZ	660297.46	1841479.16	730.52	727.90	19.10
LCKMW-3	IDA	658628.55	1838946.66	719.71	717.61	69.28
LCKMW-4	UWBZ	657918.48	1839516.60	725.64	723.27	12.98
LCKMW-5	IDA	659680.80	1838207.72	718.45	716.31	79.85
LCKMW-6	UWBZ	659697.37	1838216.94	717.97	715.71	22.63
LCKMW-7	IDA	659161.32	1837652.66	714.33	711.88	56.00
LCKMW-8	IDA	660233.22	1840606.80	726.54	724.36	71.33
LCKMW-9	UWBZ	660235.84	1840601.07	726.49	724.40	13.63
LCKMW-10	IDA	660326.87	1838953.95	718.89	716.68	86.85
LCKMW-11	UWBZ	660323.91	1838960.44	719.00	716.47	15.52
LCKMW-12A	IDA	659137.05	1838613.94	733.02	730.13	74.91
LCKMW-13	UWBZ	659148.36	1838601.29	732.02	729.12	26.57
LCKMW-14	IDA	657924.42	1839505.54	725.68	722.91	91.10
LCKMW-15	UWBZ	660185.94	1838305.75	712.83	710.38	16.00
LCKMW-16	UWBZ	657999.72	1840238.10	725.81	723.45	16.00
LCKMW-TW1	UWBZ	659074.17	1838434.69	713.36	713.36	7.86
RB25-MW7	UWBZ	658611.80	1838950.15	719.80	717.52	19.35
Seep, Sediment, and Surface Water Locations						
EEGLKB-SP1	NA	659174.44	1838425.36	NA	703.17	NA
EEGLKB-SD/SW1	NA	659978.58	1837973.22	NA	699.00	NA
EEGLKB-SD/SW2	NA	659137.54	1838471.41	NA	701.36	NA
EEGLKB-SD/SW3	NA	658621.18	1838910.00	NA	-	NA
EEGLKB-SD4	NA	660365.72	1837988.72	NA	700.03	NA

Notes:
Coordinates are State Plane Coordinate System, Ohio South Zone.
Elevations are in feet above mean sea level, 1929 National Geodetic Vertical Datum.
IDA: Intermediate depth aquifer
MW: Monitoring well
NA: Not applicable
SD/SW: Co-located surface water and sediment sample pair
SI: Screened Interval
SP: Seep Sample
TOC: Top of Casing
TW: Temporary well
UWBZ: Upper water bearing zone

TABLE 2-3a
Soil Background Screening Levels
Former Lockbourne Air Force Base, Lockbourne, Ohio

Parameter	Units	Background Screening Levels
Volatile Organic Compounds		
1,1,2,2 – Tetrachloroethane	mg/kg	0.0042
Methylene Chloride	mg/kg	0.01
Toluene	mg/kg	0.068
Semi-Volatile Organic Compounds		
Benzo(b)fluoranthene	mg/kg	0.25
Di-n-butylphthalate	mg/kg	0.62
Fluoranthene	mg/kg	0.22
Pyrene	mg/kg	0.23
Pesticides and PCBs		None Detected
Metals		
Aluminum	mg/kg	19,000
Arsenic	mg/kg	22.0
Barium	mg/kg	190
Beryllium	mg/kg	1.20
Cadmium	mg/kg	0.990
Calcium	mg/kg	47,000
Chromium	mg/kg	23.0
Cobalt	mg/kg	20.0
Copper	mg/kg	39.0
Iron	mg/kg	41,000
Lead	mg/kg	29.0
Magnesium	mg/kg	15,000
Manganese	mg/kg	1,100
Nickel	mg/kg	67.0
Potassium	mg/kg	2,000
Silver	mg/kg	1.30
Vanadium	mg/kg	45.0
Zinc	mg/kg	120

Note: mg/kg = milligrams per kilogram

Background soil concentrations were obtained during the Supplemental Phase II Environmental Baseline Survey Investigation (IT Corporation [IT] 1995). The representative background concentration was taken to be the 95th percentile or the maximum detected value if the maximum detected value was less than the 95th percentile.

TABLE 2-3b
Surface Water Background Screening Levels
Former Lockbourne Air Force Base, Lockbourne, Ohio

Parameter	Units	LCKSW-1 Background	Qualifier	LCKSW-3 Background	Qualifier
Volatile Organic Compounds					
Acetone	mg/L	0.01	U	0.01	U
Carbon disulfide	mg/L	0.001	U	0.0016	
Dichloroethenes, 1,2-, total	mg/L	0.0013		0.001	U
Methylene chloride	mg/L	0.001	U	0.001	U
Semi-Volatile Organic Compounds					
Benzoic acid	mg/L				
Bis(2-ethylhexyl) phthalate	mg/L	0.01	U	0.01	U
Diethyl phthalate	mg/L	0.01	U	0.01	U
Di-n-butyl phthalate	mg/L	0.01	U	0.01	U
Dioxins					
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	mg/L	7.2E-09	U	4E-09	J
Heptachlorodibenzo-p-dioxins, total	mg/L	7.2E-09	U	4E-09	J
Hexachlorodibenzofuran, 1,2,3,4,7,8-	mg/L	4E-09	U	3.3E-09	U
Hexachlorodibenzofuran, 2,3,4,6,7,8-	mg/L	3.9E-09	U	4.9E-09	
Hexachlorodibenzofurans, total	mg/L	3.7E-09	U	4.9E-09	
Hexachlorodibenzo-p-dioxins, total	mg/L	7E-09	U	4.9E-09	U
Octachlorodibenzofuran	mg/L	1.25E-08	J	1.1E-08	U
Octachlorodibenzo-p-dioxin	mg/L	3.8E-08	J	6.82E-08	
Tetrachlorodibenzofuran, 2,3,7,8-	mg/L	5.8E-09	B	2.6E-09	U
Tetrachlorodibenzofurans, total	mg/L	9.2E-09	BJ	2.6E-09	U
Metals					
Aluminum	mg/L	0.1	U	0.1	U
Arsenic	mg/L	0.005	U	0.005	U
Arsenic, dissolved	mg/L	0.005	U	0.005	U
Barium	mg/L	0.07	J	0.08	J
Barium, dissolved	mg/L	0.08		0.08	
Calcium	mg/L	110	J	95	J
Calcium, dissolved	mg/L	110		97	
Copper	mg/L	0.02	U	0.02	U
Iron	mg/L	0.64	J	0.29	J
Lead	mg/L	0.005	U	0.005	U
Magnesium	mg/L	33	J	30	J
Magnesium, dissolved	mg/L	33		31	
Manganese	mg/L	0.09	J	0.04	J
Manganese, dissolved	mg/L	0.09		0.04	
Potassium	mg/L	5	U	6.2	
Potassium, dissolved	mg/L	5	U	5.6	
Selenium	mg/L	0.005	U	0.005	U
Sodium	mg/L	9.3		4	
Sodium, dissolved	mg/L	9.3		4.2	
Thallium	mg/L	0.005	U	0.006	
Thallium, dissolved	mg/L	0.005	U	0.005	
Zinc	mg/L	0.02	J	0.02	U
Zinc, dissolved	mg/L	0.02		0.02	U

Note:
(dis) = Filtered (dissolved) fraction
J = Estimated value; U = Target analyte not detected
mg/L = milligrams per liter

TABLE 2-3c
Groundwater Background Screening Levels
Former Lockbourne Air Force Base, Lockbourne, Ohio

Parameter	Units	Groundwater Zone	
		IDA	UWBZ
Aluminum	mg/L	0.12	22
Antimony	mg/L	< 0.06	< 0.06
Arsenic	mg/L	0.014	0.006
Barium	mg/L	0.46	0.24
Beryllium	mg/L	< 0.005	< 0.005
Cadmium	mg/L	< 0.005	< 0.005
Calcium	mg/L	110	230
Chromium	mg/L	< 0.01	0.04
Cobalt	mg/L	< 0.01	0.03
Copper	mg/L	0.06	0.09
Iron	mg/L	1.8	49
Lead	mg/L	< 0.005	0.043
Magnesium	mg/L	38	78
Manganese	mg/L	0.04	1.3
Mercury	mg/L	< 0.0002	< 0.002
Nickel	mg/L	< 0.04	0.08
Potassium	mg/L	< 5	7.8
Selenium	mg/L	< 0.005	< 0.005
Silver	mg/L	< 0.01	< 0.01
Sodium	mg/L	14	6.3
Thallium	mg/L	< 0.005	< 0.005
Vanadium	mg/L	< 0.01	0.06
Zinc	mg/L	< 0.02	0.19

Note:
IDA = Intermediate depth aquifer
UWBZ = Upper water-bearing zone
mg/L = milligrams per liter

TABLE 3-1

Geotechnical Data Summary – Remedial Investigation

Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Depth (ft-bgs)	ASTM Classification	Moisture Content (%)	Liquid Limit	Plastic Limit	Organic Content (%)	Bulk Density (pcf)	pH	<#200 Sieve %	Particle Distribution (%)							
										Gravel (%)		Sand (%)			Fines (%)		
										Coarse	Fine	Coarse	Med.	Fine	Silt	Clay	Colloids
EEGLKB-DPT-02S	2-4	CL	21.8	46	25	3.6	99.6	7.7	64.5	0	5	5	9	16	31	13	21
EEGLKB-DPT-02S	5-7	CL	18	49	22	2	107	7.7	74	0	3	2	6	15	32	11	31
EEGLKB-DPT-02S	10-12	SC	14.9	17	16	1.4	117.9	7.8	18.8	1	5	8	43	24	13	2	4
EEGLKB-DPT-03N	2-4	CH	23.4	51	24	2.2	98.6	6.2	81.2	0	3	2	4	10	32	10	39
EEGLKB-DPT-03N	6-8	CL	16.3	31	22	2.2	112.7	7.4	64.1	0	5	3	8	20	36	9	19
EEGLKB-DPT-03N	10-12	SC	12.4	27	19	1.9	121.4	7.6	48.8	0	8	6	16	21	27	7	15

Key: ft-bgs = feet below ground surface; pcf = pounds per cubic foot

Geotechnical analyses for these samples were performed by Midwest Testing Laboratory, Inc., Fargo, ND

TABLE 3-2

Geotechnical Data Summary – Phase I and Phase II Site Investigations

Former Lockbourne Air Force Base, Lockbourne, Ohio

Borehole	Depth (ft-bgs)	ASTM Description	ASTM Classification	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %	<#200 Sieve %	% Gravel <75, >4.75	% Sand <4.75, >0.075	% Silt <0.075, >0.0005	% Clay <0.0005
LCKSB-8	22-24	Sandy, Silty Clay	CL-ML	10.8	21	14	7	54.8	5.7	39.5	35.7	19.1
LCKSB-8	38-43	Poorly Graded Sand with Silt	SP-SM	18.1	NP	NP	NP	8.3	0.7	91	7.6	0.7
LCKSB-8	45-47	Silty, Clayey Sand with Gravel	SC-SM	9.3	20	14	6	24.6	21.1	54.3	15.7	8.9
LCKSB-8	53-58	Clayey Sand	SC	11.5	22	14	8	44.5	5.3	50.2	35.9	8.6
LCKSB-8*	58-63	Lean Clay with Sand	CL	11.9	26	16	10		6.1	42.2	24.5	27.2
LCKSB-8	74.5-78	Silty Sand	SM	9.5	18	14	4	25.2	12.2	62.6	19	6.2
LCKSB-9*	8.0-10	Clayey Sand with Gravel	SC	16.6	26	15	11		25.8	34.6	19.4	20.2
LCKSB-10	9.0-13.5	Silty, Clayey Sand	SC-SM	10.4	20	14	6	48.5	6.6	44.9	34.3	14.2
LCKSB-10	23.5-28.5	Silty, Clayey Sand	SC-SM	8.3	19	14	4	44.6	8.6	46.8	40.1	4.5
LCKSB-10	34-39	Clayey Sand	SC	9.9	23	15	7	49.1	7.1	43.8	31.3	17.8
LCKSB-10	44-49	Poorly Graded Sand with Silt and Gravel	SP-SM	10.5	NP	NP	NP	5.1	20.8	74.1	4.6	0.5
LCKSB-10	64.5-69.5	Silty, Clayey Sand	SC-SM	11.5	18	14	4	38.9	6.8	54.3	27	11.9
LCKSB-10*	80-85	Silty, Clayey Sand	SC-SM	10	18	14	4		14	44.1	26.6	15.3
LCKSB-12	7.5-8.0	Poorly Graded Sand with Silt and Gravel	SP-SM	29.5	NP	NP	NP	5.1	14.8	80.1	4.7	0.4
LCKSB-12	13.5-14	Well Graded Sand with Gravel	SW	12.7	NP	NP	NP	3.3	46.4	50.3	2.6	0.7
LCKSB-12	29.5-30	Silty, Clayey Sand with Gravel	SC-SM	13.4	18	14	5	41.6	16.9	41.5	31	10.6
LCKSB-12	44.5-45	Poorly Graded Sand with Silt and Gravel	SP-SM	8.7	NP	NP	NP	6.8	45.7	47.5	4.7	2.1
LCKSB-12	54.5-55	Clayey Sand	SC	9.5	21	14	7	45.6	6.5	47.9	33.6	12
LCKSB-12*	69.5-70	Poorly Graded Sand with Silt	SP-SM	12.3	16	13	3		7.2	80.9	6.7	5.2
LCKSB-13	6.0-6.5	Poorly Graded Sand with Silt	SP-SM	30.8	NP	NP	NP	5.6	9.4	85	5.2	0.4
LCKSB-13*	18-18.5	Lean Clay with Sand	CL	32.1	36	21	15		12.1	29	28.6	30.3
LCKSB-14	5.5-6.0	Clayey Sand with Gravel	SC	NA	44	24	20	30.5	23.3	46.2	16.7	13.8
LCKSB-14	11.5-12	Poorly Graded Sand with Silt	SP-SM	20.8	NP	NP	NP	6.3	3	90.7	5.3	1
LCKSB-14	28.5-29	Silty Sand	SM	15.6	NP	NP	NP	17.6	0	82.4	14.5	3.1
LCKSB-14	43.5-44	Lean Clay with Sand	CL	15	29	18	12	79.2	2.9	17.9	42	37.2
LCKSB-14	63.5-64	Silty, Clayey Sand	SC-SM	9.1	20	14	6	37.4	11	51.6	23.7	13.7
LCKSB-14*	78.5-79	Silty, Clayey Sand with Gravel	SC-SM	11.9	19	14	5		26.1	54	11.8	8.1

*Geotechnical analyses for these samples (with the exception of moisture content) were performed by H.C. Nutting Company.

Key: CL = Lean clay; ML = Silt; SC = Clayey sand; SM = Silty sand; SP = Poorly graded sand with gravel; SW = Well graded sand with gravel

ft-bgs = Feet below ground surface; NA = Sample jar was broken upon receipt, moisture content not analyzed; NP = Sample not plastic

TABLE 3-3

Details of Monitoring Wells

Former Lockbourne Air Force Base, Lockbourne, Ohio

Well ID	Screened Interval	Phase Installed	Total Depth (feet)	Northing	Easting	Ground surface Elevation (feet)	Top of Casing Elevation (feet)	Data Acquired from	Notes
LCKMW-1	IDA	Phase I SI (LAW 1995a)	80.06	660296.91	1841487.70	728.28	730.75	EEG 2003	
LCKMW-2	UWBZ	Phase I SI (LAW 1995a)	19.10	660297.46	1841479.16	727.90	730.52	EEG 2003	
LCKMW-3	IDA	Phase I SI (LAW 1995a)	69.28	658628.55	1838946.66	717.61	719.71	EEG 2003	
LCKMW-4	UWBZ	Phase I SI (LAW 1995a)	12.98	657918.48	1839516.60	723.27	725.64	EEG 2003	
LCKMW-5	IDA	Phase I SI (LAW 1995a)	79.85	659680.80	1838207.72	716.31	718.45	EEG 2003	
LCKMW-6	UWBZ	Phase I SI (LAW 1995a)	22.63	659697.37	1838216.94	715.71	717.97	EEG 2003	
LCKMW-7	IDA	Phase I SI (LAW 1995a)	56.00	659161.32	1837652.66	711.88	714.33	EEG 2003	Located downgradient of landfill
LCKMW-8	IDA	Phase II SI (PMC 2000)	71.33	660233.22	1840606.80	724.36	726.54	EEG 2003	
LCKMW-9	UWBZ	Phase II SI (PMC 2000)	13.63	660235.84	1840601.07	724.40	726.49	EEG 2003	
LCKMW-10	IDA	Phase II SI (PMC 2000)	86.85	660326.87	1838953.95	716.68	718.89	EEG 2003	
LCKMW-11	UWBZ	Phase II SI (PMC 2000)	15.52	660323.91	1838960.44	716.47	719.00	EEG 2003	
LCKMW-12A	IDA	Phase II SI (PMC 2000)	74.91	659137.05	1838613.94	730.13	733.02	EEG 2003	
LCKMW-13	UWBZ	Phase II SI (PMC 2000)	26.57	659148.36	1838601.29	729.12	732.02	EEG 2003	
LCKMW-14	IDA	Phase II SI (PMC 2000)	91.10	657924.42	1839505.54	722.91	725.68	EEG 2003	
LCKMW-15	UWBZ	RI (EEG 2003)	16.00	660185.94	1838305.75	710.38	712.83	EEG 2003	
LCKMW-16	UWBZ	RI (EEG 2003)	16.00	657999.72	1840238.10	723.45	725.81	EEG 2003	
RB25-MW7	UWBZ	IRP site activities	19.35	658611.80	1838950.15	719.80	719.80	EEG 2003	
RB25-MW9	UWBZ	IRP site activities		658346.13	1840658.51	721.8	724.05		Abandoned
LCKPZ-1	UWBZ	Phase II SI (PMC 2000)	17	659653.11	1838064.34	713.87	717.67	PMC 2000	
LCKPZ-2	UWBZ	Phase II SI (PMC 2000)	16	659045.5	1838497.88	712.11	714.86	PMC 2000	
LCKPZ-3	UWBZ	Phase II SI (PMC 2000)	18	657867.45	1839448.78	721.44	724.48	PMC 2000	
14MW01	UWBZ								Located upgradient of landfill
LCKMW-TW1	UWBZ	RI (EEG 2003)	7.86	659074.17	1838434.69	713.36	713.36	EEG 2003	

Key: IDA = Intermediate depth aquifer; MW = Monitoring well; NA = Not applicable; PZ = Piezometer; SG = Stream gauge; SP = Seep

SW/SED = Co-located surface water/sediment pair; UWBZ = Upper water-bearing zone

Notes: Elevations are in feet relative to mean sea level (1929 National Geodetic Vertical Datum).

Coordinates are on the Ohio State Plane Coordinate System (South Zone) North American Datum 1983.

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	**LCK-SO1**	**LCK-SO2**	**LCK-SO2**	**LCK-SO3**	**LCK-SO4**	**LCK-SO5**	**LCK-SO6**	**LCK-SO6**	**LCK-SO7**	**LCK-SO8**	**LCK-SO8**	**LCK-SO9**	**LCK-SO10**	**LCK-SO11**	**LCK-SO12**
Sample Date	**5/24/1995**	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**	**5/24/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**
Sample Depth (ft bgs)	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Investigation Phase[1]	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**PhaseI**
PARAMETER_NAME			**Resampled**					**Resampled**			**Resampled**				
Volatile Organic Compound (mg/kg)															
Acetone	0.011 U	**0.009 JB**	NA	**0.009**	0.012 U	**0.005 JB**	NA	**0.029 J**	0.012 U	NA	**0.018 JH**	0.012 U	0.012 U	**0.024 JB**	0.013 U
Dichloropropene, 1,3-, trans-	0.006 U	0.006 U	NA	0.006 U	0.006 U	**0.003 JQ**	NA	0.006 U	0.006 U	NA	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
Methylene chloride	**0.016 JB**	**0.016 JB**	NA	**0.015 JB**	**0.018 JB**	**0.017 JB**	NA	**0.02 JB**	0.026 **JB**	NA	**0.011 JB**	**0.015 JB**	**0.013 JB**	**0.023 JB**	**0.016 JB**
Toluene	0.006 U	**0.002 JQ**	NA	0.006 U	0.006 U	0.007 U	NA	0.006 U	0.006 U	NA	**0.0023 JQ**	0.006 U	0.006 U	0.006 U	**0.003 JQ**
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compound (mg/kg)															
Acenaphthene	**1.5 JQ**	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	**0.26 JQ**	0.4 U	0.41 U
Acenaphthylene	1.8 U	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	**0.12 JQ**	0.43 U	NA	0.39 U	0.73 U	0.4 U	0.41 U
Anthracene	**4.4**	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	**0.15 JQ**	**0.047 JQ**	NA	**0.096 JQ**	**0.95**	0.4 U	0.41 U
Benz(a)anthracene	**10**	NA	**230**	0.4 U	**0.13 JQ**	0.44 U	**0.043 JQ**	NA	**0.14 JQ**	**0.15 JQ**	NA	**0.47**	**4.8**	0.4 U	0.41 U
Benzo(a)pyrene	**11**	NA	**210**	0.4 U	**0.17 JQ**	0.44 U	0.4 U	NA	**0.42**	**0.18 JQ**	NA	**0.6**	**4.9**	0.4 U	0.41 U
Benzo(b)fluoranthene	**9.7**	NA	**190**	0.4 U	**0.16 JQ**	0.44 U	0.4 U	NA	**0.35 JQ**	**0.14 JQ**	NA	**0.6**	**4.2**	0.4 U	0.41 U
Benzo(ghi)perylene	**4.5**	NA	**76**	0.4 U	**0.11 JQ**	0.44 U	0.4 U	NA	**0.44**	**0.12 JQ**	NA	**0.47**	**2.8**	0.4 U	0.41 U
Benzo(k)fluoranthene	**12**	NA	**220**	0.4 U	**0.13 JQ**	0.44 U	0.4 U	NA	**0.39 JQ**	**0.17 JQ**	NA	**0.6**	**4.5**	0.4 U	0.41 U
Benzoic acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	1.8 U	NA	1 U	0.4 U	0.41 U	0.44 U	**0.21 JQ**	NA	0.4 U	0.43 U	NA	**0.061 JQ**	0.73 U	0.4 U	0.41 U
Carbazole	**2.9**	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	**0.058 JQ**	0.43 U	NA	**0.062 JQ**	**0.28 JQ**	0.4 U	0.41 U
Chrysene	**10**	NA	**220**	0.4 U	**0.16 JQ**	0.44 U	**0.046 JQ**	NA	**0.42**	**0.17 JQ**	NA	**0.63**	**4.6**	0.4 U	0.41 U
Dibenz(ah)anthracene	**1.9**	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	**0.12 JQ**	0.43 U	NA	**0.16 JQ**	**0.98**	0.4 U	0.41 U
Dibenzofuran	**0.94 JQ**	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	**0.098 JQ**	0.4 U	0.41 U
Di-n-butyl phthalate	1.8 U	NA	1 U	0.4 U	**0.041 JQ**	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	0.73 U	**0.038 JB**	**0.04 JB**
Di-n-octyl phthalate	1.8 U	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	0.73 U	0.4 U	0.41 U
Fluoranthene	**20**	NA	**440**	**0.049 JQ**	**0.32 JQ**	**0.048 JQ**	**0.079 JQ**	NA	**0.77**	**0.32 JQ**	NA	**0.93**	**7.8**	0.4 U	0.41 U
Fluorene	**1.8**	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	**0.22 JQ**	0.4 U	0.41 U
Indeno(1,2,3-cd)pyrene	**4.8**	NA	**82**	0.4 U	**0.095 JQ**	0.44 U	0.4 U	NA	**0.34 JQ**	**0.11 JQ**	NA	**0.44**	**2.7**	0.4 U	0.41 U
Methylnaphthalene, 2-	1.8 U	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	0.73 U	0.4 U	0.41 U
Methylphenol, 3- and/or 4-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	1.8 U	NA	1 U	0.4 U	**0.043 JQ**	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	0.73 U	0.4 U	0.41 U
Nitrosodiphenylamine, N-	1.8 U	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	0.73 U	0.4 U	0.41 U
Phenanthrene	**16**	NA	**210**	0.4 U	**0.17 JQ**	0.44 U	**0.078 J**	NA	**0.39 JQ**	**0.18 JQ**	NA	**0.41**	**3.5**	0.4 U	0.41 U
Phenol	**0.88 JQ**	NA	1 U	0.4 U	0.41 U	0.44 U	0.4 U	NA	0.4 U	0.43 U	NA	0.39 U	0.73 U	0.4 U	0.41 U
Pyrene	**17**	NA	**360**	**0.046 JQ**	**0.25 JQ**	0.44 U	**0.073 J**	NA	**0.61**	**0.33 JQ**	NA	**0.85**	**7.8**	**0.041 JQ**	0.41 U
Pesticide/PCB (mg/kg)															
Chlordane, alpha-	0.0072 U	0.039 U	NA	0.002 U	0.0021 U	0.0022 U	0.002 U	NA	0.004 U	0.0044 U	NA	0.0079 U	0.0037 U	0.002 U	0.002 U
Chlordane, gamma-	0.0072 U	0.039 U	NA	0.002 U	0.0021 U	0.0022 U	0.002 U	NA	0.004 U	0.0044 U	NA	0.0079 U	0.0037 U	0.002 U	0.002 U
DDD, p,p'-	0.014 U	0.077 U	NA	0.004 U	**0.017**	0.0045 U	0.004 U	NA	0.0079 U	**0.026**	NA	0.016 U	0.0075 U	0.004 U	0.004 U
DDE, p,p'-	0.014 U	0.077 U	NA	0.004 U	**0.81 E**	0.0045 U	0.004 U	NA	**0.019**	**0.028**	NA	**0.05**	0.0075 U	0.004 U	0.004 U
DDT, p,p'-	**0.021**	0.077 U	NA	0.004 U	**0.46 E**	0.0045 U	0.004 U	NA	**0.057**	**0.083**	NA	**0.078**	0.0075 U	0.004 U	0.004 U
PCB 1242	0.14 U	0.77 U	NA	0.04 U	0.041 U	0.045 U	0.04 U	NA	0.079 U	0.089 U	NA	0.16 U	0.075 U	0.04 U	0.04 U
PCB 1248	0.14 U	0.77 U	NA	0.04 U	0.041 U	0.045 U	0.04 U	NA	0.079 U	0.089 U	NA	0.16 U	0.075 U	0.04 U	0.04 U
PCB 1254	0.14 U	0.77 U	NA	0.04 U	0.041 U	0.045 U	0.04 U	NA	0.079 U	0.089 U	NA	0.16 U	0.075 U	0.04 U	0.04 U
PCB 1260	0.14 U	0.77 U	NA	0.04 U	0.041 U	0.045 U	0.04 U	NA	0.079 U	0.089 U	NA	0.16 U	0.075 U	0.04 U	0.04 U
Dioxin (mg/kg)															
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	**LCK-SO1**	**LCK-SO2**	**LCK-SO2**	**LCK-SO3**	**LCK-SO4**	**LCK-SO5**	**LCK-SO6**	**LCK-SO6**	**LCK-SO7**	**LCK-SO8**	**LCK-SO8**	**LCK-SO9**	**LCK-SO10**	**LCK-SO11**	**LCK-SO12**
Sample Date	**5/24/1995**	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**	**5/24/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**
Sample Depth (ft bgs)	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Investigation Phase[1]	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**PhaseI**
PARAMETER_NAME			**Resampled**					**Resampled**			**Resampled**				
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCDD-TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (mg/kg)															
Trinitrobenzene, 1,3,5-	0.24 U	0.24 U	NA	0.23 U	0.24 U	0.23 U	0.24 U	NA	0.24 U	0.22 U	NA	0.23 U	0.23 U	0.24 U	0.22 U
Trinitrotoluene, 2,4,6-	0.24 U	0.24 U	NA	0.23 U	0.24 U	0.23 U	0.24 U	NA	0.24 U	0.22 U	NA	0.23 U	0.23 U	0.24 U	0.22 U
Metals (mg/kg)															
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	**1.8**	**6**	NA	**5.2**	**11**	**4**	**5.8**	NA	**5.8 JL**	**5.2**	NA	**3.4**	**5.3**	**5.1**	**4.6**
Barium	**31.8**	**54**	NA	**79.9**	**74.9**	**130**	**80.6**	NA	**89.2**	**180**	NA	**87.7**	**184**	**68**	**101**
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.54 U	0.58 U	NA	0.43 U	0.44 U	0.67 U	0.42 U	NA	**0.67**	**1.1**	NA	0.6 U	0.56 U	0.43 U	**0.53**
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, total	**2.2**	**11.1**	NA	**8.2**	**9.1**	**14**	**9.6**	NA	**10**	**11.5**	NA	**14.8**	**9.2**	**9.7**	**13.3**
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	**12.9**	**33.7**	NA	**26.7**	**23.2**	**14.2**	**15.5**	NA	**27.6 J**	**23.3**	NA	**41**	**23.6**	**21.3**	**15.5**
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.11 U	0.12 U	NA	**0.08**	0.062 U	0.13 U	0.06 U	NA	**0.08**	0.07 U	NA	0.12 U	0.11 U	0.061 U	0.061 U
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.54 U	0.58 U	NA	**0.47**	**0.42**	0.67 U	**0.22**	NA	0.14 U	0.16 U	NA	0.6 U	0.56 U	**0.49**	**0.26**
Silver	1.1 U	1.2 U	NA	**0.44**	0.44 U	1.3 U	0.42 U	NA	0.42 U	0.47 U	NA	1.2 U	1.1 U	0.43 U	0.43 U
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**17.7**	**69.7**	NA	**81.6**	**67.7**	**73.3**	**59.4**	NA	**84.1 JL**	**70.1**	NA	**91.7**	**52.9**	**58.5**	**69.1**

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	**LCK-SO1**	**LCK-SO6**	**LCK-SO7**	**LCK-SO7**	**LCK-SO7**	**LCK-SO8**	**LCKSO-22**	**LCKSO-23**	**LCKSO-24**	**LCKSO-25**	**LCKSO-49**	**LCKSO-49**	**LCKSO-49 Dup**
Sample Date	**7/28/1997**	**7/24/1997**	**7/28/1997**	**7/28/1997**	**7/28/1997**	**7/28/1997**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**
Sample Depth (ft bgs)	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**
Investigation Phase[1]	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**
PARAMETER_NAME				**Duplicate**	**Duplicate**							**Duplicate**	**Duplicate**
Volatile Organic Compound (mg/kg)													
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloropropene, 1,3-, trans-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compound (mg/kg)													
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(ah)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene, 2-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylphenol, 3- and/or 4-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrosodiphenylamine, N-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/PCB (mg/kg)													
Chlordane, alpha-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlordane, gamma-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DDD, p,p'-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DDE, p,p'-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DDT, p,p'-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB 1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB 1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB 1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin (mg/kg)													
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	0.0000021 U	**0.0000017**	**0.0000064 J**	**0.0000089**	**0.0000068 J**	**0.0000083**	**0.0000052**	**0.0000059**	**0.0000048 J**	**0.0000069**	**0.0000101 J**	**0.000026 J**	**0.0000063 C**
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	0.0000027 U	0.0000007 U	0.0000021 U	0.0000012 U	0.0000026 U	**0.00000064 J**	0.0000006 U	**0.00000046 C**	0.0000004 U	0.0000002 U	0.0000015 U	**0.000002 J**	0.0000018 U
Heptachlorodibenzofurans, total	0.0000023 U	**0.0000033**	**0.0000088 J**	**0.0000236**	**0.0000155 J**	**0.0000178**	**0.0000111**	**0.0000133 C**	**0.0000109 C**	**0.0000173**	**0.0000211 J**	**0.0000642 J**	**0.0000125 C**
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	**0.0000241**	**0.0000052**	**0.0000195**	**0.0000279**	**0.0000193**	**0.000034**	**0.0000304**	**0.0000499**	**0.0000168**	**0.0000185**	**0.0000345 J**	**0.000108 J**	**0.0000245 C**
Heptachlorodibenzo-p-dioxins, total	**0.000062**	**0.0000098**	**0.0000401**	**0.000062**	**0.0000407**	**0.0000676**	**0.0000724**	**0.000117**	**0.0000397**	**0.0000416**	**0.0000804 J**	**0.000211 J**	**0.0000627 C**
Hexachlorodibenzofuran, 1,2,3,4,7,8-	0.0000013 U	0.0000005 U	**0.0000039**	**0.0000062 R**	**0.0000049 R**	**0.0000033**	**0.00000095 C**	**0.0000014 J**	**0.0000017 J**	**0.0000012 J**	0.0000005 U	**0.0000055 J**	**0.0000012 J**
Hexachlorodibenzofuran, 1,2,3,6,7,8-	0.000001 U	0.0000004 U	**0.00000073 J**	**0.0000014**	0.0000011 U	**0.00000096**	**0.00000076 J**	**0.00000064 C**	**0.0000005 C**	**0.00000056 JC**	**0.0000012 J**	**0.0000034 J**	0.0000005 U
Hexachlorodibenzofuran, 2,3,4,6,7,8-	0.0000012 U	**0.00000063**	**0.0000018 R**	**0.0000013**	0.0000014 U	**0.0000019**	**0.0000014 J**	**0.0000012 J**	**0.00000092 J**	**0.00000087 J**	**0.0000019 J**	**0.0000039 J**	**0.0000013 J**
Hexachlorodibenzofurans, total	**0.0000051**	**0.0000026**	**0.0000195 J**	**0.0000228 E**	**0.0000128 J**	**0.0000157**	**0.0000153 C**	**0.0000128 C**	**0.0000082 C**	**0.0000091 C**	**0.0000205 CJ**	**0.0000657 CJ**	**0.000014 C**
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	0.0000023 U	0.0000007 U	0.0000019 U	**0.00000076**	0.0000022 U	**0.0000009**	**0.00000055 C**	**0.000001 J**	0.0000004 U	**0.00000055 JC**	0.0000009 U	**0.0000025 J**	0.000001 U
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	0.0000019 U	0.0000006 U	0.0000016 U	**0.0000012**	0.0000019 U	**0.0000017 J**	**0.0000015 J**	**0.0000015 C**	**0.00000091 J**	**0.0000015 J**	**0.0000013 JC**	**0.0000066 J**	0.0000009 U

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	LCK-SO1	LCK-SO6	LCK-SO7	LCK-SO7	LCK-SO7	LCK-SO8	LCKSO-22	LCKSO-23	LCKSO-24	LCKSO-25	LCKSO-49	LCKSO-49	LCKSO-49 Dup
Sample Date	**7/28/1997**	**7/24/1997**	**7/28/1997**	**7/28/1997**	**7/28/1997**	**7/28/1997**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**	**11/10/1998**
Sample Depth (ft bgs)	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**
Investigation Phase[1]	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**
PARAMETER_NAME				**Duplicate**	**Duplicate**							**Duplicate**	**Duplicate**
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	0.000002 U	0.0000006 U	0.0000016 U	**0.0000015 R**	0.000002 U	**0.0000017 R**	**0.0000022 J**	**0.0000025 J**	**0.0000014 J**	**0.0000018 J**	**0.000002 J**	**0.0000064 J**	0.0000011 U
Hexachlorodibenzo-p-dioxins, total	0.0000021 U	**0.0000025**	**0.0000092 J**	**0.0000115**	**0.0000065**	**0.0000137**	**0.0000175 C**	**0.0000196 C**	**0.0000101**	**0.0000313 C**	**0.0000162 CJ**	**0.0000474 CJ**	**0.0000093**
Octachlorodibenzofuran	0.0000083 U	**0.0000022 J**	**0.0000128**	**0.0000142**	**0.0000105**	**0.0000137**	**0.0000061 J**	**0.0000072 J**	**0.0000078 J**	**0.0000135**	**0.00001 J**	**0.0000365 J**	**0.0000057 JC**
Octachlorodibenzo-p-dioxin	**0.000265**	**0.0000579 J**	**0.000375**	**0.000757**	**0.000307**	**0.000464**	**0.000693**	0.000001 U	**0.000134**	**0.00012**	**0.00157**	**0.00133 J**	**0.00132**
Pentachlorodibenzofuran, 1,2,3,7,8-	0.0000009 U	0.0000005 U	0.0000009 U	**0.0000014**	0.0000012 U	**0.00000075 J**	0.0000003 U	**0.00000011 C**	**0.00000047 C**	**0.00000079 JC**	0.0000006 U	**0.0000018 J**	0.0000007 U
Pentachlorodibenzofuran, 2,3,4,7,8-	0.0000009 U	0.0000005 U	**0.0000016**	**0.000001**	**0.0000021**	**0.0000019**	**0.00000057 C**	**0.00000066 C**	**0.00000081 C**	**0.0000006 JC**	0.0000006 U	**0.0000022 J**	0.0000007 U
Pentachlorodibenzofurans, total	**0.0000076 Q**	**0.000003 EJ**	**0.0000126 J**	**0.0000275 E**	**0.00003 Q**	**0.0000142**	**0.0000214 C**	**0.0000137 C**	**0.0000081 C**	**0.0000124 C**	**0.0000212 CJ**	**0.0000553 CJ**	**0.0000181 QC**
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	0.0000013 U	0.0000007 U	0.0000014 U	0.0000006 U	0.0000016 U	**0.00000086**	**0.00000062 C**	**0.0000011 C**	**0.00000035 C**	**0.00000071 JC**	0.0000007 U	**0.0000017 J**	0.0000008 U
Pentachlorodibenzo-p-dioxins, total	0.0000013 U	0.0000007 U	**0.0000026 J**	**0.0000016**	**0.0000026 J**	**0.0000017**	**0.0000039 C**	**0.0000045 C**	**0.0000031 C**	**0.0000255 C**	0.0000007 U	**0.0000162 CJ**	0.0000008 U
TCDD-TEQ	**2.12642E-06**	**1.95901E-06**	**3.39878E-06**	**2.96212E-06**	**8.03075E-06**	**4.94067E-06**	**3.15741E-06**	**5.39687E-06**	**1.83668E-06**	**6.11085E-06**	**2.2195E-06**	**8.36665E-06**	**1.90707E-06**
Tetrachlorodibenzofuran, 2,3,7,8-	**0.00000082**	**0.00000065**	**0.0000015 B**	**0.0000012 B**	0.000001 U	**0.0000033 B**	**0.0000009 C**	**0.00000054 J**	**0.00000098 J**	**0.0000014**	**0.00000053 J**	**0.0000014 J**	**0.00000055 J**
Tetrachlorodibenzofurans, total	**0.0000055 Q**	**0.00000065**	**0.0000102**	**0.0000081 E**	**0.0000111 Q**	**0.0000288**	**0.0000254 C**	**0.0000245 B**	**0.000023 B**	**0.0000284 C**	**0.0000145 CB**	**0.0000369 CJ**	**0.0000117 CB**
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	0.0000006 U	**0.0000011**	0.0000009 U	0.0000005 U	**0.0000048 J**	**0.0000012 J**	**0.00000097 J**	**0.0000025 C**	0.0000003 U	**0.000004**	0.0000006 U	**0.000001 J**	0.0000007 U
Tetrachlorodibenzo-p-dioxins, total	**0.0000016 J**	**0.0000011**	**0.0000021 J**	**0.0000018 J**	**0.0000072 J**	**0.0000027 J**	**0.0000033 C**	**0.0000056 C**	**0.0000034**	**0.000026 C**	**0.0000042 J**	**0.00001 CJ**	**0.0000038**
Explosives (mg/kg)													
Trinitrobenzene, 1,3,5-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trinitrotoluene, 2,4,6-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)													
Aluminum	**1800**	**8800 J**	**6700**	**7600**	**6900**	**16000**	NA	NA	NA	NA	NA	NA	NA
Antimony	66 U	7 UJ	7 U	7 U	6 U	40 U	NA	NA	NA	NA	NA	NA	NA
Arsenic	**3.89 J**	**2.92 J**	**12.9 J**	**6.77 J**	**6.36 J**	**12 J**	NA	NA	NA	NA	NA	NA	NA
Barium	**110**	**59 J**	**130**	**91**	**110**	**130**	NA	NA	NA	NA	NA	NA	NA
Beryllium	6 U	**0.79 J**	**0.839**	**0.848**	**0.787**	3 U	NA	NA	NA	NA	NA	NA	NA
Cadmium	6 U	**0.727 J**	0.59 U	0.58 U	0.56 U	3 U	NA	NA	NA	NA	NA	NA	NA
Calcium	**160000**	**74000 J**	**53000**	**40000**	**38000**	**81000**	NA	NA	NA	NA	NA	NA	NA
Chromium, total	11 U	**12 J**	**11**	**11**	**10**	**24**	NA	NA	NA	NA	NA	NA	NA
Cobalt	11 U	**8.4 J**	**6.6**	**6.8**	**9.4**	**7.8**	NA	NA	NA	NA	NA	NA	NA
Copper	22 U	23 U	**20**	**30**	**22**	**140**	NA	NA	NA	NA	NA	NA	NA
Iron	**6100**	**24000 J**	**16000**	**16000**	**16000**	**18000**	NA	NA	NA	NA	NA	NA	NA
Lead	**42.6**	**15.2 J**	**22.7**	**24.1**	**23.2**	**9340**	NA	NA	NA	NA	NA	NA	NA
Magnesium	**25000**	**22000 J**	**11000**	**9200**	**9700**	**16000**	NA	NA	NA	NA	NA	NA	NA
Manganese	**230**	**560 J**	**350**	**340**	**380**	**390**	NA	NA	NA	NA	NA	NA	NA
Mercury	0.11 U	0.12 U	0.12 U	0.12 U	0.11 U	0.13 U	NA	NA	NA	NA	NA	NA	NA
Nickel	44 U	**21 J**	**18**	**18**	**19**	26 U	NA	NA	NA	NA	NA	NA	NA
Potassium	5500 U	**2900 J**	**2500**	**2400**	**2500**	3300 U	NA	NA	NA	NA	NA	NA	NA
Selenium	0.56 U	0.58 U	0.6 U	0.59 U	0.57 U	**0.9**	NA	NA	NA	NA	NA	NA	NA
Silver	11 U	1 UJ	1 U	1 U	1 U	6 U	NA	NA	NA	NA	NA	NA	NA
Sodium	1100 U	120 U	120 U	120 U	110 U	660 U	NA	NA	NA	NA	NA	NA	NA
Thallium	6 U	0.58 U	0.59 U	0.58 U	0.56 U	3 U	NA	NA	NA	NA	NA	NA	NA
Vanadium	11 U	**24 J**	**23**	**22**	**21**	**23**	NA	NA	NA	NA	NA	NA	NA
Zinc	**55**	**62 J**	**68**	**77**	**67**	**130**	NA	NA	NA	NA	NA	NA	NA

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	LCKSB-8	LCKSB-9	LCKSB-10	LCKSB-11	LCKSB-11	LCKSB-11	LCKSB-12	LCKSB-13	LCKSB-13	LCKSB-14	14MW1	LCKSO-323	EEGLKB-SS01	EEGLKB-SS01
Sample Date	7/17/1997	7/16/1997	7/21/1997	7/21/1997	7/21/1997	7/21/1997	7/25/1997	7/24/1997	7/24/1997	7/30/1997	11/13/1998	11/13/1998	7/29/2003	7/30/2003
Sample Depth (ft bgs)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1
Investigation Phase[1]	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	RI	RI
PARAMETER_NAME					Duplicate	Duplicate			Duplicate					Resampled
Volatile Organic Compound (mg/kg)														
Acetone	0.012 U	0.012 U	0.012 UJ	0.011 U	0.012 U	0.012 U	**0.025**	0.012 UJ	0.012 U	**0.02**	NA	NA	NA	**3.2**
Dichloropropene, 1,3-, trans-	0.0061 U	0.0059 U	0.0058 U	0.0055 U	0.0058 U	0.0058 U	0.0061 U	0.006 U	0.006 U	0.0053 U	NA	NA	NA	0.0075 U
Methylene chloride	**0.0046**	0.0059 U	0.0058 U	0.0055 U	0.0058 U	**0.012 J**	0.0061 U	0.006 U	0.006 U	0.0053 U	NA	NA	NA	0.015 U
Toluene	0.0061 U	0.0059 U	0.0058 U	0.0055 U	0.0058 U	0.0058 U	0.0061 U	0.006 U	0.006 U	0.0053 U	NA	NA	NA	0.0075 U
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0043 J**
Semi-Volatile Organic Compound (mg/kg)														
Acenaphthene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	**0.021 J**	NA
Acenaphthylene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	0.046 U	NA
Anthracene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**11**	**4.6 J**	4 U	0.35 U	NA	NA	**0.052 J**	NA
Benz(a)anthracene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**49**	**17 J**	**6.9 J**	0.35 U	NA	NA	**0.14**	NA
Benzo(a)pyrene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**44**	**17 J**	**6.6 J**	0.35 U	NA	NA	**0.15**	NA
Benzo(b)fluoranthene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**61**	**21 J**	**8.4 J**	0.35 U	NA	NA	**0.13**	NA
Benzo(ghi)perylene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**32**	**11 J**	**3.7 J**	0.35 U	NA	NA	**0.088 J**	NA
Benzo(k)fluoranthene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**20**	**10 J**	**2.7 J**	0.35 U	NA	NA	**0.15 J**	NA
Benzoic acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.94 U	NA
Bis(2-ethylhexyl) phthalate	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**16**	4 U	4 U	0.35 U	NA	NA	0.23 U	NA
Carbazole	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**4.9 J**	4 U	4 U	0.35 U	NA	NA	0.23 U	NA
Chrysene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**42**	**15 J**	**6.2 J**	0.35 U	NA	NA	**0.21 J**	NA
Dibenz(ah)anthracene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**9**	**2.4 J**	4 U	0.35 U	NA	NA	**0.028 J**	NA
Dibenzofuran	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	**0.009 J**	NA
Di-n-butyl phthalate	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	0.23 U	NA
Di-n-octyl phthalate	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**15**	4 U	4 U	0.35 U	NA	NA	0.46 U	NA
Fluoranthene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**77**	**25 J**	**12 J**	0.35 U	NA	NA	**0.47 J**	NA
Fluorene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	**0.018 J**	NA
Indeno(1,2,3-cd)pyrene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**35**	**11 J**	**4 J**	0.35 U	NA	NA	**0.07**	NA
Methylnaphthalene, 2-	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	0.046 U	NA
Methylphenol, 3- and/or 4-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	NA
Naphthalene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	0.046 U	NA
Nitrosodiphenylamine, N-	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	0.046 U	NA
Phenanthrene	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**49**	**18 J**	**7.6 J**	0.35 U	NA	NA	**0.22**	NA
Phenol	0.4 U	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	8.1 U	4 U	4 U	0.35 U	NA	NA	0.23 U	NA
Pyrene	**0.21 J**	0.39 U	0.39 U	0.38 U	0.38 U	0.39 U	**72**	**31 J**	**13 J**	0.35 U	NA	NA	**0.34**	NA
Pesticide/PCB (mg/kg)														
Chlordane, alpha-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0024 U	NA
Chlordane, gamma-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0024 U	NA
DDD, p,p'-	0.004 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0041 U	0.004 U	0.004 U	**0.021**	NA	NA	0.0024 U	NA
DDE, p,p'-	**0.062**	**0.012**	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0041 U	0.004 U	0.004 U	0.0036 U	NA	NA	0.0024 U	NA
DDT, p,p'-	0.004 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0041 U	0.004 U	0.004 U	0.0036 U	NA	NA	0.0024 U	NA
PCB 1242	0.04 U	0.039 U	0.039 U	0.038 U	0.038 U	0.039 U	0.041 U	0.04 U	0.04 U	0.035 U	NA	NA	0.023 U	NA
PCB 1248	0.04 U	0.039 U	0.039 U	0.038 U	0.038 U	0.039 U	0.041 U	0.04 U	0.04 U	0.035 U	NA	NA	0.023 U	NA
PCB 1254	0.04 U	0.039 U	0.039 U	0.038 U	0.038 U	0.039 U	0.041 U	0.04 U	0.04 U	0.035 U	NA	NA	0.023 U	NA
PCB 1260	0.04 U	0.039 U	0.039 U	0.038 U	0.038 U	0.039 U	0.041 U	0.04 U	0.04 U	0.035 U	NA	NA	0.023 U	NA
Dioxin (mg/kg)														
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	**0.0000041**	**0.0000026**	**0.0000026 J**	**0.0000019 J**	**0.0000014 J**	**0.0000027**	**0.000028**	**0.0000145 J**	NA	**0.0000055**	**0.0000034 JB**	**0.0000032 JB**	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	0.0000006 U	**0.00000034 J**	0.0000005 U	0.0000018 U	0.0000005 U	0.000001 U	0.000002 U	0.0000039 UJ	NA	0.0000008 U	0.0000005 U	0.0000003 U	NA	NA
Heptachlorodibenzofurans, total	**0.000007**	**0.0000026**	**0.0000042 J**	**0.0000019 J**	**0.0000017**	**0.0000054 J**	**0.0000849**	**0.0000385 J**	NA	**0.0000128**	**0.0000071 B**	**0.0000045 B**	NA	NA
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	**0.0000097**	**0.0000094**	**0.0000055**	**0.0000066**	**0.000004**	**0.0000064**	**0.0000902**	**0.000088 J**	NA	**0.0000221**	**0.0000261**	**0.0000755**	NA	NA
Heptachlorodibenzo-p-dioxins, total	**0.0000221**	**0.0000213**	**0.0000114**	**0.0000066**	**0.000008**	**0.0000064**	**0.000188**	**0.000175 J**	NA	**0.000055**	**0.0000539**	**0.000174**	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	**0.0000013**	**0.0000008**	**0.0000012**	0.0000012 U	**0.00000052**	0.0000006 U	**0.0000031**	**0.0000046 J**	NA	**0.0000019**	**0.00000093 JB**	**0.00000084 JB**	NA	NA
Hexachlorodibenzofuran, 1,2,3,6,7,8-	**0.00000057**	**0.00000039**	**0.00000059**	0.000001 U	0.0000003 U	0.0000005 U	**0.0000015**	**0.0000017 J**	NA	0.0000004 U	**0.00000043 JB**	**0.00000047 JB**	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	**0.0000017 B**	**0.0000012 B**	**0.000001**	0.0000012 U	**0.00000068 J**	0.0000006 U	**0.0000029 J**	**0.0000023 B**	NA	**0.0000015 B**	**0.0000004 JB**	**0.00000059 JB**	NA	NA
Hexachlorodibenzofurans, total	**0.0000116**	**0.0000099**	**0.0000049**	**0.0000018**	**0.0000037**	**0.0000025**	**0.0000303**	**0.0000254 J**	NA	**0.0000037**	**0.0000055 CB**	**0.0000047 CB**	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	0.0000008 U	0.0000005 U	0.0000005 U	0.0000014 U	0.0000004 U	0.0000008 U	**0.0000024**	0.0000029 UJ	NA	**0.0000006 J**	**0.00000037 JC**	**0.00000062 J**	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	**0.00000067**	**0.00000041 J**	**0.00000059 J**	0.0000012 U	0.0000003 U	0.0000007 U	**0.0000067**	**0.0000046 J**	NA	**0.00000099**	**0.0000008 JC**	**0.00000094 J**	NA	NA

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	LCKSB-8	LCKSB-9	LCKSB-10	LCKSB-11	LCKSB-11	LCKSB-11	LCKSB-12	LCKSB-13	LCKSB-13	LCKSB-14	14MW1	LCKSO-323	EEGLKB-SS01	EEGLKB-SS01
Sample Date	7/17/1997	7/16/1997	7/21/1997	7/21/1997	7/21/1997	7/21/1997	7/25/1997	7/24/1997	7/24/1997	7/30/1997	11/13/1998	11/13/1998	7/29/2003	7/30/2003
Sample Depth (ft bgs)	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	0 - 1
Investigation Phase[1]	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	RI	RI
PARAMETER_NAME					Duplicate	Duplicate			Duplicate					Resampled
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	0.000001	0.000001 J	0.00000098	0.0000013 U	0.00000051 J	0.0000012 J	0.0000079	0.000008 J	NA	0.0000017	0.0000011 J	0.0000017 J	NA	NA
Hexachlorodibenzo-p-dioxins, total	0.0000075	0.0000055	0.0000024	0.0000013 U	0.0000021 B	0.0000046 BJ	0.0000543	0.0000445 J	NA	0.0000104	0.00001 C	0.0000135 C	NA	NA
Octachlorodibenzofuran	0.0000059	0.0000059	0.0000032	0.0000056	0.0000025	0.0000046 J	0.0000654	0.0000342 J	NA	0.0000101	0.0000058 J	0.0000026 J	NA	NA
Octachlorodibenzo-p-dioxin	0.00021	0.000487	0.000068	0.000081	0.0000507	0.0000822	0.000961	0.00117 J	NA	0.00095	0.00119	0.00908 E	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-	0.0000005 U	0.0000004 U	0.0000004 U	0.000001 U	0.0000003 U	0.0000005 U	0.0000008 U	0.000001 UJ	NA	0.0000004 U	0.0000002 U	0.0000002 U	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-	0.00000065	0.00000038	0.0000004 U	0.000001 U	0.0000003 U	0.0000005 U	0.0000008 U	0.0000009 UJ	NA	0.0000004 U	0.0000001 U	0.00000038 JB	NA	NA
Pentachlorodibenzofurans, total	0.0000078 E	0.0000117 E	0.0000063	0.0000049 J	0.0000055	0.0000026 J	0.0000183	0.0000155 JE	NA	0.0000022	0.0000044 B	0.0000039 CB	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	0.0000007 U	0.0000005 U	0.0000007 U	0.0000016 U	0.0000005 U	0.0000008 U	0.0000017	0.0000015 UJ	NA	0.0000007 U	0.00000025 JC	0.0000002 U	NA	NA
Pentachlorodibenzo-p-dioxins, total	0.0000011	0.0000005 U	0.00000087 J	0.0000016 U	0.0000005 U	0.0000008 U	0.0000033	0.0000032 J	NA	0.0000023 J	0.0000027 CB	0.0000012 CB	NA	NA
TCDD-TEQ	1.73409E-06	1.81269E-06	1.30162E-06	2.09266E-06	8.6732E-07	1.22218E-06	6.14964E-06	5.34992E-06	NA	3.56501E-06	2.03208E-06	2.8648E-06	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	0.0000009 U	0.0000007 U	0.0000007 J	0.0000006 U	0.00000082	0.0000003 U	0.0000013 B	0.0000037 J	NA	0.0000021	0.00000082 JB	0.00000097 JB	NA	NA
Tetrachlorodibenzofurans, total	0.0000039 E	0.000003	0.0000029	0.0000006 U	0.000001	0.0000003 U	0.0000067	0.0000253 JQ	NA	0.0000101	0.0000067 CB	0.0000034 CB	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	0.0000005 U	0.00000073	0.0000004 U	0.0000009 U	0.0000003 U	0.0000005 U	0.0000006 U	0.0000009 UJ	NA	0.0000018	0.00000084 J	0.00000025 JC	NA	NA
Tetrachlorodibenzo-p-dioxins, total	0.00000083 J	0.0000016	0.00000093	0.0000009 U	0.00000045 BJ	0.00000089 BJ	0.00000097	0.0000013 J	NA	0.0000018	0.0000012 CB	0.0000011 CB	NA	NA
Explosives (mg/kg)														
Trinitrobenzene, 1,3,5-	0.0007 U	0.0007 U	0.0007 U	0.0007 U	0.0007 U	0.0007 U	0.0007 U	0.0007 U	0.0007 U	0.0007 U	NA	NA	NA	NA
Trinitrotoluene, 2,4,6-	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	NA	NA	NA	NA
Metals (mg/kg)														
Aluminum	9000 J	8200 J	7800 J	9200 J	10000 J	16000 J	6300	4900	6200	5200	NA	NA	3100	NA
Antimony	7 U	7 U	6 UJ	6 U	6 U	14 U	15 U	14 UJ	14 U	12.6 U	NA	NA	35 U	NA
Arsenic	11.6 J	12.3 J	9.13 J	10.8 J	13.8 J	8.85 J	15.4 J	12.3 J	11.5 J	10.1 J	NA	NA	18	NA
Barium	87 J	91 J	160 J	84 J	93 J	200 J	160	110	120	31	NA	NA	490	NA
Beryllium	0.775 J	0.708 J	0.661 J	0.703 J	0.805 J	1.3 J	1.94	1 U	1 U	1 U	NA	NA	2.8 U	NA
Cadmium	0.6 U	0.59 U	0.57 U	0.57 U	0.57 U	1 U	1.2 U	1 U	1 U	1 U	NA	NA	3.5 U	NA
Calcium	5900 J	15000 J	3200 J	2700 J	3400 J	5400 J	87000	110000	92000	65000	NA	NA	280000	NA
Chromium, total	12 J	11 J	10 J	12 J	15 J	22 J	13 J	5.6 J	13 J	8.5	NA	NA	5 J	NA
Cobalt	8.6 J	12 J	6.1 J	8.2 J	9 J	26 J	6.3 J	2.5 J	5.7 J	5.6	NA	NA	1.2 J	NA
Copper	19 U	21 U	15 U	15 U	20 U	34 U	36	22	24	18	NA	NA	21 U	NA
Iron	18000 J	18000 J	16000 J	18000 J	19000 J	33000 J	19000	14000	16000	12000	NA	NA	5400	NA
Lead	22.8 J	20.9 J	15.3 J	17.6 J	23.3 J	40.2 J	665 J	63.6 J	130 J	15.7	NA	NA	3.8 J	NA
Magnesium	3200 J	5600 J	1500 J	1800 J	2100 J	3300 J	12000	23000	25000	25000	NA	NA	17000	NA
Manganese	550 J	690 J	990 UJ	480 J	460 J	1600 J	250	300	290	210	NA	NA	260	NA
Mercury	0.12 U	0.12 U	0.12 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.1 U	NA	NA	0.00002 U	NA
Nickel	18 J	19 J	13 J	13 J	16 J	26 J	22 J	9 U	18 J	20	NA	NA	4.7 J	NA
Potassium	1700 J	1500 J	1300 J	2000 J	2300 J	3300 J	3600	4200	3900	2500	NA	NA	380 J	NA
Selenium	0.6 U	0.27	0.58 U	0.57 U	0.58 U	0.58 U	0.6 U	0.6 U	0.6 U	0.53 U	NA	NA	11 U	NA
Silver	1 U	1 U	1 UJ	1 U	1 U	2 U	2 U	2 UJ	2 U	2 U	NA	NA	7.1 U	NA
Sodium	120 U	120 U	110 U	110 U	110 U	230 U	370	270	250	210 U	NA	NA	1800 U	NA
Thallium	0.6 U	0.59 U	0.57 U	0.57 U	0.57 U	1 U	1.2 U	1 U	1 U	1 U	NA	NA	18 U	NA
Vanadium	25 J	23 J	21 J	26 J	28 J	44 J	29	19	25	15	NA	NA	7.3	NA
Zinc	65 J	61 J	44 J	49 J	58 J	95 J	250	120	140	57	NA	NA	12 J	NA

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	EEGLKB-SS02	EEGLKB-SS03	EEGLKB-SS04	EEGLKB-SS05	EEGLKB-SS06	EEGLKB-SS07	EEGLKB-SS07	EEGLKB-SS08	EEGLKB-SS08	EEGLKB-SS09	EEGLKB-SS09	EEGLKB-SS10	EEGLKB-SS11
Sample Date	7/29/2003	7/29/2003	7/29/2003	7/29/2003	7/29/2003	7/29/2003	7/30/2003	7/28/2003	7/28/2003	7/29/2003	7/29/2003	7/29/2003	7/29/2003
Sample Depth (ft bgs)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Investigation Phase[1]	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI
PARAMETER_NAME							Resampled		Duplicate		Duplicate		
Volatile Organic Compound (mg/kg)													
Acetone	0.07	0.75	0.029 U	0.58	4.6	NA	0.026 U	0.17 J	0.83	0.58 J	0.19	0.025 U	6.8
Dichloropropene, 1,3-, trans-	0.0083 U	0.0082 U	0.0056 U	0.0051 U	0.0055 U	NA	0.0066 U	0.0054 U	0.0065 U	0.0054 U	0.0051 U	0.0063 U	0.0057 U
Methylene chloride	0.017 U	0.016 U	0.011 U	0.01 U	0.011 U	NA	0.013 U	0.011 U	0.013 U	0.011 UJ	0.01 U	0.013 U	0.011 U
Toluene	0.0083 U	0.0082 U	0.0056 U	0.0051 U	0.0055 U	NA	0.0016 J	0.0054 U	0.0065 U	0.0015 B	0.0012 J	0.0014 J	0.0057 U
Trichlorofluoromethane	0.0083 U	0.0082	0.0035 J	0.0051 U	0.0015 J	NA	0.005 J	0.0054 U	0.0065 U	0.0047 B	0.0034 J	0.0035 J	0.0031 J
Semi-Volatile Organic Compound (mg/kg)													
Acenaphthene	0.21	0.022 J	0.066 J	54	85	0.27	NA	23	16	3.2	1.4	0.18 J	0.36
Acenaphthylene	0.19 U	0.047 U	0.2 U	0.7	0.66	0.36	NA	1.9	1.5	0.26	0.08 J	0.19 U	0.078 J
Anthracene	0.36 J	0.071 J	0.15 J	160 J	130 J	0.79 J	NA	67 J	48 J	7.1 J	4.2 J	0.82 J	1.6 J
Benz(a)anthracene	0.97	0.24	1.5	450	310	4.5	NA	200	160	22	14	4.9	4.6
Benzo(a)pyrene	0.71	0.22	1.6	380	290	5.2	NA	180 J	130 J	18 J	13	5.7	4.2
Benzo(b)fluoranthene	0.83	0.18	1.5	340	220	5.1	NA	140 J	110	18 J	14	4.5	4.6
Benzo(ghi)perylene	0.24 J	0.12 J	0.78	110 J	110 J	2.7 J	NA	46 J	49 J	6.9 J	6.2 J	2.8 J	2.3 J
Benzo(k)fluoranthene	0.6 J	0.21 J	1.7	340 J	250 J	5.3 J	NA	150 J	100 J	12 J	9.4 J	6.1 J	4.5 J
Benzoic acid	4.8	0.95 U	4.1 U	3.8 U	3.9 U	4.1 U	NA	19 R	19 U	4.1 U	4 U	3.9 U	4 U
Bis(2-ethylhexyl) phthalate	0.99 U	0.24 U	1 U	0.95 U	0.96 U	1 U	NA	4.7 U	4.7 U	1 U	1 U	0.98 U	1 U
Carbazole	0.99 U	0.24 U	1 U	70 J	88	0.36 J	NA	17 J	8.8	3.7 J	1.9 J	0.33 J	1 J
Chrysene	1.1 J	0.28 J	1.8	470 J	370 J	4.7 J	NA	180 J	130	18 J	12 J	4.5 J	4.8 J
Dibenz(ah)anthracene	0.19 U	0.047	0.38	71	57	1.3	NA	28	22	4	3.3	1	0.97
Dibenzofuran	0.87	0.014 J	0.41 U	25	42	1	NA	18	11	2.6	0.88	0.12 J	0.38 J
Di-n-butyl phthalate	0.99 U	0.24 U	1 U	0.95 U	0.96 U	1 U	NA	4.7 U	4.7 U	1 U	1 U	0.98 U	1 U
Di-n-octyl phthalate	1.9 U	0.47 U	2 U	1.9 U	1.9 U	2 U	NA	9.2 U	9.2 U	2 U	2 U	1.9 U	2 U
Fluoranthene	1.8 J	0.58 J	3.2	1100 J	950 J	7.1 J	NA	490 J	330 J	51 J	29 J	7.4 J	11 J
Fluorene	0.19 U	0.015 J	0.2 U	54	67	0.31	NA	32	19	4.1	1.5	0.16 J	0.42
Indeno(1,2,3-cd)pyrene	0.14 J	0.1	0.82	130	120	2.6	NA	50	54	7.5	7.1	2.9	2.2
Methylnaphthalene, 2-	3.3	0.047 U	0.2 U	3.4	14	4.4	NA	3.7	1.8	0.62	0.23	0.084 J	0.13 J
Methylphenol, 3- and/or 4-	0.4 U	0.095 U	0.41 U	0.25 J	0.21 J	0.41 U	NA	1.9 U	1.9 U	0.41 UJ	0.4 U	0.39 U	0.4 U
Naphthalene	1.4	0.047 U	0.2 U	1.9	13	2.2	NA	0.68 J	0.34 J	0.14 J	0.081 J	0.19 U	0.19 J
Nitrosodiphenylamine, N-	0.19 U	0.047 U	0.2 U	0.19 U	0.19 U	0.2 U	NA	0.92 U	0.92 U	0.2 U	0.2 U	0.19 U	0.2 U
Phenanthrene	4.9	0.19	0.74	480	600	6.5	NA	230	170	31	14	2.5	6.3
Phenol	0.99 U	0.24 U	1 U	0.054 J	0.068 J	1 U	NA	4.7 U	4.7 U	1 U	1 U	0.98 U	1 U
Pyrene	1.9	0.41	2.5	870	720	7.5	NA	300 J	230 J	38 J	21	7.2	8.9
Pesticide/PCB (mg/kg)													
Chlordane, alpha-	0.21 U	0.0024 U	0.21 U	0.19 U	0.2 U	0.21 U	NA	0.19 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlordane, gamma-	0.21 U	0.0024 U	0.21 U	0.44 J	0.2 U	0.21 U	NA	0.29 J	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U
DDD, p,p'-	0.21 U	0.0024 U	0.21 U	0.19 U	0.2 U	0.21 U	NA	0.19 U	0.4 U	0.2 U	0.2 U	0.2 U	0.36 J
DDE, p,p'-	0.21 U	0.0024 U	0.21 U	0.19 U	0.2 U	0.21 U	NA	0.19 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 J
DDT, p,p'-	0.21 U	0.0024 U	0.21 U	0.19 U	0.2 U	0.21 U	NA	0.19 U	0.4 U	0.2 U	0.2 U	0.2 U	0.42
PCB 1242	0.02 U	0.024 U	0.021 U	0.23	0.13	0.021 U	NA	0.37 U	0.38 U	0.02 U	0.02 U	2 U	0.02 U
PCB 1248	0.02 U	0.024 U	0.021 U	0.019 U	0.019 U	0.021 U	NA	0.37 U	0.38 U	0.02 U	0.02 U	16	0.02 U
PCB 1254	0.02 U	0.1	0.021 U	0.058	0.092	0.021 U	NA	0.37 U	0.38 U	0.065	0.02 U	2 U	0.02 U
PCB 1260	0.02 U	0.024 U	0.021 U	0.019 U	0.019 U	0.021 U	NA	0.37 U	0.38 U	0.02 U	0.02 U	2 U	0.02 U
Dioxin (mg/kg)													
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	0.0000033 J	NA	NA	NA	NA	NA	NA	0.000017 J	0.0000091	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	0.00000073 U	NA	NA	NA	NA	NA	NA	0.0000018 U	0.0000018 U	NA	NA	NA	NA
Heptachlorodibenzofurans, total	0.0000089	NA	NA	NA	NA	NA	NA	0.000057	0.000036	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	0.000013	NA	NA	NA	NA	NA	NA	0.000084	0.00004	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total	0.000026	NA	NA	NA	NA	NA	NA	0.00015	0.000073	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	0.0000006 U	NA	NA	NA	NA	NA	NA	0.0000037 U	0.0000022 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,6,7,8-	0.00000041 U	NA	NA	NA	NA	NA	NA	0.0000011 U	0.00000057 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	0.00000056 U	NA	NA	NA	NA	NA	NA	0.00000098 U	0.00000042 U	NA	NA	NA	NA
Hexachlorodibenzofurans, total	0.0000018 U	NA	NA	NA	NA	NA	NA	0.000015	0.000013	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	0.00000045 U	NA	NA	NA	NA	NA	NA	0.00000084 U	0.00000028 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	0.00000094 U	NA	NA	NA	NA	NA	NA	0.0000035 U	0.0000016 U	NA	NA	NA	NA

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	EEGLKB-SS02	EEGLKB-SS03	EEGLKB-SS04	EEGLKB-SS05	EEGLKB-SS06	EEGLKB-SS07	EEGLKB-SS07	EEGLKB-SS08	EEGLKB-SS08	EEGLKB-SS09	EEGLKB-SS09	EEGLKB-SS10	EEGLKB-SS11
Sample Date	**7/29/2003**	**7/29/2003**	**7/29/2003**	**7/29/2003**	**7/29/2003**	**7/29/2003**	**7/30/2003**	**7/28/2003**	**7/28/2003**	**7/29/2003**	**7/29/2003**	**7/29/2003**	**7/29/2003**
Sample Depth (ft bgs)	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Investigation Phase[1]	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**
PARAMETER_NAME							**Resampled**		**Duplicate**		**Duplicate**		
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	0.000001 U	NA	NA	NA	NA	NA	NA	0.0000031 U	0.0000017 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total	0.0000022 U	NA	NA	NA	NA	NA	NA	0.000007 U	**0.0000048**	NA	NA	NA	NA
Octachlorodibenzofuran	**0.00001 J**	NA	NA	NA	NA	NA	NA	0.000024 U	**0.000011 J**	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	**0.00026 J**	NA	NA	NA	NA	NA	NA	**0.0014**	**0.0008**	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-	0.00000032 U	NA	NA	NA	NA	NA	NA	0.00000018 U	0.00000012 U	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-	0.0000005 U	NA	NA	NA	NA	NA	NA	0.00000043 U	0.00000043 U	NA	NA	NA	NA
Pentachlorodibenzofurans, total	0.0000014 U	NA	NA	NA	NA	NA	NA	0.0000041 U	**0.0000098**	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	0.00000047 U	NA	NA	NA	NA	NA	NA	0.00000041 U	0.00000062 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total	0.00000047 U	NA	NA	NA	NA	NA	NA	0.0000017 U	0.00000062 U	NA	NA	NA	NA
TCDD-TEQ	**9.1165E-07**	NA	NA	NA	NA	NA	NA	**2.3362E-06**	**1.6311E-06**	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	0.00000075 U	NA	NA	NA	NA	NA	NA	0.00000059 U	0.00000046 U	NA	NA	NA	NA
Tetrachlorodibenzofurans, total	0.00000075 U	NA	NA	NA	NA	NA	NA	0.0000017 U	**0.0000055**	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	0.00000018 U	NA	NA	NA	NA	NA	NA	0.0000003 U	0.00000052 U	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total	0.00000029 U	NA	NA	NA	NA	NA	NA	0.0000004 U	0.00000052 U	NA	NA	NA	NA
Explosives (mg/kg)													
Trinitrobenzene, 1,3,5-	**1.6**	NA	NA	NA	NA	NA	NA	2.5 U	2.5 U	NA	NA	NA	NA
Trinitrotoluene, 2,4,6-	0.25 U	NA	NA	NA	NA	NA	NA	2.5 U	**5.3**	NA	NA	NA	NA
Metals (mg/kg)													
Aluminum	**2700**	**7600**	**9100**	**3900**	**3200**	**2100**	NA	**2100 J**	**2300**	**9500 J**	**9900**	**5400**	**8100**
Antimony	5.9 U	35 U	6.1 U	5.3 U	5.5 U	5.7 U	NA	5.2 UJ	5.4 U	5.7 UJ	5.7 U	**1.4 J**	**1.3 J**
Arsenic	**11**	**21**	**14**	**12**	**11**	**13**	NA	**4.6 J**	**5.9**	**13**	**12**	**9.8**	**12**
Barium	**100**	**370**	**100**	**76**	**58**	**33**	NA	**170 J**	**96**	**93 J**	**120**	**98**	**110**
Beryllium	**1.1**	2.8 U	**0.67**	**0.95**	**0.84**	**0.41 J**	NA	**0.72**	**0.74**	**0.52**	**0.53**	**1.3**	**1.2**
Cadmium	0.59 U	3.5 U	**0.39 J**	**0.58**	**0.5 J**	**0.18 J**	NA	**0.17 J**	**0.19 J**	**0.3 J**	**0.44 J**	**1.1**	**2.6**
Calcium	**810**	**250000**	**45000**	**94000**	**130000**	**77000**	NA	**140000 J**	**160000**	**21000 J**	**41000**	**83000**	**43000**
Chromium, total	**12**	**8.3**	**15**	**12**	**11**	**7.1**	NA	**6.4**	**6.8**	**14 J**	**15**	**14**	**18**
Cobalt	**5.1**	**3.8 J**	**7.8**	**4.2**	**3.5**	**2.3**	NA	**2.1**	**2.8**	**8.3 J**	**9.1**	**5**	**7.3**
Copper	**13**	**9.6 J**	**24**	**16**	**13**	**7.8**	NA	**9.7 J**	**12**	**22**	**24**	**26**	**55**
Iron	**21000**	**12000**	**25000**	**18000**	**13000**	**11000**	NA	**9000 J**	**11000**	**23000 J**	**22000**	**17000**	**25000**
Lead	**14**	**9.2 J**	**25**	**34**	**28**	**17**	NA	**9.3**	**12**	**20 J**	**28**	**55**	**150**
Magnesium	**290**	**18000**	**14000**	**17000**	**37000**	**23000**	NA	**14000**	**18000**	**7100 J**	**9500**	**24000**	**11000**
Manganese	**620**	**300**	**310**	**210**	**210**	**150**	NA	**100 J**	**130**	**380 J**	**380**	**240**	**290**
Mercury	**0.09**	**0.0099**	**0.021**	**0.023**	**0.017**	**0.034**	NA	**0.013 J**	**0.012**	**0.04**	**0.043**	**0.16**	**0.21**
Nickel	**6.2**	**11**	**26**	**12**	**12**	**7.4**	NA	**8.4**	**9.7**	**23 J**	**23**	**14**	**21**
Potassium	**520**	**880**	**1500**	**800**	**800**	**700**	NA	**710 J**	**780**	**1200 J**	**1400**	**1200**	**1400**
Selenium	**3.5**	10 U	**0.6 J**	**1.1 J**	**1.5 J**	**2**	NA	**0.9 J**	**0.9 J**	1.7 U	**0.5 J**	**0.7 J**	**0.7 J**
Silver	1.2 U	6.9 U	1.2 U	1.1 U	1.1 U	1.1 U	NA	1 U	1.1 U	1.1 UJ	1.1 U	**0.4 J**	**1.4**
Sodium	**220 J**	1800 U	**140 J**	**220 J**	**240 J**	**140 J**	NA	**190 J**	**220 J**	**110 J**	300 U	**110 J**	**270 J**
Thallium	**2.8 J**	17 U	**1.9 J**	**2 J**	**1.6 J**	**1.3 J**	NA	**1 J**	**1.4 J**	**1.8 J**	**1.7 J**	**1.7 J**	**2.2 J**
Vanadium	**24**	**14**	**26**	**17**	**17**	**12**	NA	**14**	**14**	**25 J**	**28**	**24**	**28**
Zinc	**18**	**27 J**	**88**	**87**	**48**	**21**	NA	**14 J**	**17**	**71 J**	**71**	**85**	**240**

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	EEGLKB-SS12	EEGLKB-SS13	EEGLKB-SS14	EEGLKB-SS15	EEGLKB-SS16	EEGLKB-SS17	EEGLKB-SS18	EEGLKB-SS19	EEGLKB-SS20	EEGLKB-SS20	EEGLKB-SS21	EEGLKB-SS22	EEGLKB-SS23	EEGLKB-SS24
Sample Date	7/29/2003	7/29/2003	7/29/2003	7/29/2003	7/28/2003	7/28/2003	7/28/2003	7/28/2003	7/28/2003	7/28/2003	7/28/2003	7/28/2003	7/28/2003	7/28/2003
Sample Depth (ft bgs)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Investigation Phase[1]	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI
PARAMETER_NAME										Duplicate				
Volatile Organic Compound (mg/kg)														
Acetone	**0.067**	0.027 U	**0.27 J**	0.021 U	**0.077 J**	**4.4**	**34**	0.02 U	**3.2 J**	**2.4**	**1.2**	**40**	**0.13**	**0.018 J**
Dichloropropene, 1,3-, trans-	0.0051 U	0.0068 U	0.0053 U	0.0051 U	0.005 U	0.0054 U	0.006 U	0.005 U	0.005 R	0.0052 U	0.0063 U	0.0072 U	0.0062 U	0.0068 U
Methylene chloride	0.01 U	0.014 U	0.011 U	0.01 U	0.0099 U	0.011 U	0.012 U	0.01 U	0.01 R	0.01 U	0.013 U	0.014 U	0.012 U	0.014 U
Toluene	0.0051 U	0.0068 U	**0.0013 J**	0.0051 U	0.005 U	0.0054 U	0.006 U	0.005 U	0.005 R	0.0052 U	0.0063 U	0.0072 U	0.0062 U	0.0068 U
Trichlorofluoromethane	**0.0013 J**	**0.0015 J**	**0.0021 J**	**0.00091 J**	**0.0028 J**	0.0054 U	0.006 U	**0.0043 J**	0.0028 R	0.0052 U	0.0063 U	**0.0049 J**	0.0062 U	**0.0053 J**
Semi-Volatile Organic Compound (mg/kg)														
Acenaphthene	**0.019 J**	0.043 U	0.038 U	0.039 U	**23**	0.041 U	0.043 U	0.04 U	0.039 UJ	0.039 U	**0.014 J**	**0.013 J**	0.044 U	**0.016 J**
Acenaphthylene	**0.013 J**	0.043 U	0.038 U	0.039 U	**1.2**	0.041 U	0.043 U	0.04 U	0.039 UJ	0.039 U	0.042 U	0.044 U	0.044 U	0.045 U
Anthracene	**0.079 J**	**0.029 J**	**0.021 J**	0.039 U	**43 J**	0.041 U	0.043 U	0.04 U	0.039 UJ	0.039 U	**0.045 J**	**0.033 J**	0.044 U	**0.038 J**
Benz(a)anthracene	**0.48**	**0.11**	**0.05**	0.039 U	**200**	0.041 U	**0.088**	**0.016 J**	**0.012 J**	**0.019 J**	**0.17**	**0.13**	0.044 U	**0.28**
Benzo(a)pyrene	**0.47**	**0.12**	**0.044**	0.039 U	**160 J**	0.041 U	**0.096 J**	**0.016 J**	**0.012 J**	**0.023 J**	**0.17 J**	**0.13 J**	0.044 U	**0.32 J**
Benzo(b)fluoranthene	**0.51**	**0.15**	**0.052**	**0.012 J**	**140**	**0.021 J**	**0.12**	**0.038 J**	**0.03 J**	**0.038 J**	**0.16**	**0.14**	**0.022 J**	**0.34**
Benzo(ghi)perylene	**0.16 J**	**0.051 J**	**0.031 J**	0.039 U	**43 J**	0.041 U	**0.081 J**	**0.022 J**	**0.024 J**	**0.023 J**	**0.11 J**	**0.063 J**	**0.016 J**	**0.15 J**
Benzo(k)fluoranthene	**0.56 J**	**0.14 J**	**0.051 J**	**0.016 J**	**150 J**	**0.023 J**	**0.1 J**	**0.028 J**	**0.023 J**	**0.032 J**	**0.18 J**	**0.14 J**	**0.022 J**	**0.32 J**
Benzoic acid	**0.62 J**	0.88 U	0.77 U	0.78 U	18 U	0.82 U	0.86 U	0.82 U	0.8 R	0.79 U	**1.1**	0.89 U	0.89 U	**0.81 J**
Bis(2-ethylhexyl) phthalate	**0.54**	0.22 U	**0.11 J**	0.19 U	4.4 U	0.21 U	0.22 U	0.2 U	0.2 UJ	0.2 U	0.21 U	0.22 U	0.22 U	0.23 U
Carbazole	**0.06 J**	0.22 U	0.19 U	0.19 U	**14**	0.21 U	0.22 U	0.2 U	0.2 UJ	0.2 U	0.21 U	0.22 U	0.22 U	0.23 U
Chrysene	**0.48 J**	**0.16 J**	**0.073 J**	**0.018 J**	**190**	**0.025 J**	**0.13**	**0.038 J**	**0.035 J**	**0.05**	**0.22**	**0.18**	**0.027 J**	**0.35**
Dibenz(ah)anthracene	**0.048**	0.043 U	0.038 U	0.039 U	**27**	0.041 U	**0.019 J**	0.04 U	0.039 UJ	0.039 U	**0.044**	**0.013 J**	0.044 U	**0.054**
Dibenzofuran	**0.034 J**	0.088 U	0.077 U	0.078 U	**17**	0.082 U	0.086 U	0.082 U	0.08 UJ	0.079 U	**0.07 J**	**0.053 J**	0.089 U	0.092 U
Di-n-butyl phthalate	0.19 U	0.22 U	0.19 U	0.19 U	4.4 U	0.21 U	0.22 U	0.2 U	0.2 UJ	0.2 U	0.21 U	0.22 U	0.22 U	0.23 U
Di-n-octyl phthalate	0.37 U	0.43 U	0.38 U	0.39 U	8.8 U	0.41 U	0.43 U	0.4 U	0.39 UJ	0.39 U	0.42 U	0.44 U	0.44 U	0.45 U
Fluoranthene	**1.1 J**	**0.32 J**	**0.13 J**	**0.025 J**	**390 J**	**0.044 J**	**0.25 J**	**0.063 J**	**0.07 J**	**0.062 J**	**0.29**	**0.24 J**	**0.054 J**	**0.66 J**
Fluorene	**0.024 J**	0.043 U	0.038 U	0.039 U	**21**	0.041 U	**0.0043 J**	0.04 U	0.039 UJ	0.039 U	0.042 U	0.044 U	0.044 U	0.045 U
Indeno(1,2,3-cd)pyrene	**0.16**	**0.035 J**	**0.013 J**	0.039 U	**49**	0.041 U	**0.057**	0.04 U	0.039 UJ	0.039 U	**0.081**	**0.044**	0.044 U	**0.15**
Methylnaphthalene, 2-	**0.078**	**0.028 J**	**0.034 J**	0.039 U	**5.2**	0.041 U	0.043 U	0.04 U	0.039 UJ	0.039 U	**0.28**	**0.15**	0.044 U	0.045 U
Methylphenol, 3- and/or 4-	0.074 U	0.088 U	0.077 U	0.078 U	1.8 U	0.082 U	0.086 U	0.082 U	0.08 UJ	0.079 U	0.086 U	0.089 U	0.089 U	0.092 U
Naphthalene	**0.045**	0.043 U	**0.02 J**	0.039 U	**1.6**	0.041 U	0.043 U	0.04 U	0.039 UJ	**0.017 J**	**0.12**	**0.057**	0.044 U	0.045 U
Nitrosodiphenylamine, N-	0.037 U	0.043 U	0.038 U	0.039 U	0.88 U	0.041 U	0.043 U	0.04 U	**0.026 J**	0.039 U	0.042 U	0.044 U	0.044 U	0.045 U
Phenanthrene	**0.53**	**0.16**	**0.11**	0.039 U	**200**	0.041 U	**0.086**	**0.026 J**	**0.025 J**	**0.031 J**	**0.35**	**0.36**	**0.021 J**	**0.18**
Phenol	0.19 U	0.22 U	0.19 U	0.19 U	4.4 U	0.21 U	0.22 U	0.2 U	0.2 UJ	0.2 U	0.21 U	0.22 U	0.22 U	0.23 U
Pyrene	**0.71**	**0.24**	**0.12**	**0.02 J**	**300 J**	0.041 U	**0.21 J**	0.04 U	0.039 UJ	0.039 U	**0.27 J**	**0.22 J**	0.044 U	**0.49 J**
Pesticide/PCB (mg/kg)														
Chlordane, alpha-	**0.16 J**	0.22 U	0.002 U	0.002 U	0.19 U	0.0021 U	0.0022 U	0.0021 U	0.01 U	0.01 U	0.011 U	0.012 U	0.0023 U	0.012 U
Chlordane, gamma-	**0.16 J**	0.22 U	0.002 U	0.002 U	0.19 U	0.0021 U	0.0022 U	0.0021 U	0.01 U	0.01 U	0.011 U	0.012 U	0.0023 U	0.012 U
DDD, p,p'-	0.19 U	0.22 U	**0.039 J**	0.002 U	0.19 U	0.0021 U	0.0022 U	0.0021 U	0.01 U	0.01 U	0.011 U	0.012 U	0.0023 U	0.012 U
DDE, p,p'-	0.19 U	0.22 U	**0.19 J**	0.002 U	0.19 U	0.0021 U	0.0022 U	**0.0072 J**	**0.042 J**	**0.024 J**	**0.17 J**	0.012 U	0.0023 U	0.012 U
DDT, p,p'-	**0.29**	0.22 U	**0.27**	0.002 U	0.19 U	**0.0066 J**	0.0022 U	**0.012 J**	**0.076 J**	**0.058 J**	**0.12 J**	0.012 U	0.0023 U	0.012 U
PCB 1242	0.019 U	0.022 U	0.019 U	0.02 U	0.36 U	0.02 U	0.043 U	0.02 U	0.02 U	0.02 U	0.022 U	0.022 U	0.022 U	0.022 U
PCB 1248	0.019 U	0.022 U	0.019 U	0.02 U	0.36 U	0.02 U	0.043 U	0.02 U	0.02 U	0.02 U	0.022 U	0.022 U	0.022 U	0.022 U
PCB 1254	0.019 U	0.022 U	0.019 U	0.02 U	0.36 U	0.02 U	0.043 U	0.02 U	0.02 U	0.02 U	0.022 U	0.022 U	0.022 U	0.022 U
PCB 1260	0.019 U	0.022 U	0.019 U	0.02 U	0.36 U	0.02 U	**0.26**	**0.0094 J**	0.02 U	0.02 U	0.022 U	0.022 U	0.022 U	**0.0097 J**
Dioxin (mg/kg)														
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	NA	NA	NA	NA	**0.000034 J**	NA	NA	NA	0.0000022 U	0.0000021 U	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	NA	NA	NA	NA	0.0000038 U	NA	NA	NA	0.00000048 U	0.0000014 U	NA	NA	NA	NA
Heptachlorodibenzofurans, total	NA	NA	NA	NA	**0.00017**	NA	NA	NA	0.0000022 U	0.0000021 U	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	NA	NA	NA	NA	**0.00077**	NA	NA	NA	**0.000005 J**	**0.0000072**	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	**0.0015**	NA	NA	NA	**0.000011**	**0.000015**	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	NA	NA	NA	NA	0.0000026 U	NA	NA	NA	0.00000031 U	0.0000011 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,6,7,8-	NA	NA	NA	NA	0.00000059 U	NA	NA	NA	0.00000045 U	0.0000011 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	NA	NA	NA	NA	0.0000003 U	NA	NA	NA	0.00000043 U	0.0000012 U	NA	NA	NA	NA
Hexachlorodibenzofurans, total	NA	NA	NA	NA	0.000015 U	NA	NA	NA	0.0000028 U	0.0000013 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	NA	NA	NA	NA	0.0000017 U	NA	NA	NA	0.00000043 U	0.0000012 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	NA	NA	NA	NA	0.0000077 U	NA	NA	NA	0.00000042 U	0.0000012 U	NA	NA	NA	NA

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	**EEGLKB-SS12**	**EEGLKB-SS13**	**EEGLKB-SS14**	**EEGLKB-SS15**	**EEGLKB-SS16**	**EEGLKB-SS17**	**EEGLKB-SS18**	**EEGLKB-SS19**	**EEGLKB-SS20**	**EEGLKB-SS20**	**EEGLKB-SS21**	**EEGLKB-SS22**	**EEGLKB-SS23**	**EEGLKB-SS24**
Sample Date	**7/29/2003**	**7/29/2003**	**7/29/2003**	**7/29/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**	**7/28/2003**
Sample Depth (ft bgs)	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**	**0 - 1**
Investigation Phase[1]	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**
PARAMETER_NAME										**Duplicate**				
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	NA	NA	NA	NA	0.0000051 U	NA	NA	NA	0.00000041 U	0.0000011 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	**0.000052**	NA	NA	NA	0.0000013 U	0.0000018 U	NA	NA	NA	NA
Octachlorodibenzofuran	NA	NA	NA	NA	**0.00031**	NA	NA	NA	0.0000014 U	0.0000019 U	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	NA	NA	NA	NA	**0.016**	NA	NA	NA	**0.00042**	**0.00019**	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-	NA	NA	NA	NA	0.00000064 U	NA	NA	NA	0.00000045 U	0.0000007 U	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-	NA	NA	NA	NA	0.0000005 U	NA	NA	NA	0.00000045 U	0.00000069 U	NA	NA	NA	NA
Pentachlorodibenzofurans, total	NA	NA	NA	NA	0.0000016 U	NA	NA	NA	**0.0000034**	0.0000018 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	NA	NA	NA	NA	0.0000013 U	NA	NA	NA	0.00000069 U	0.0000011 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	0.0000034 U	NA	NA	NA	0.0000012 U	0.0000011 U	NA	NA	NA	NA
TCDD-TEQ	NA	NA	NA	NA	**1.19615E-05**	NA	NA	NA	**4.62672E-06**	**4.2846E-06**	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	NA	NA	NA	NA	0.0000015 U	NA	NA	NA	0.00000027 U	0.00000052 U	NA	NA	NA	NA
Tetrachlorodibenzofurans, total	NA	NA	NA	NA	0.0000015 U	NA	NA	NA	**0.00000082**	**0.0000015**	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	NA	NA	NA	NA	0.000001 U	NA	NA	NA	**0.0000039**	**0.000003**	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	0.000001 U	NA	NA	NA	**0.0000039**	**0.000003**	NA	NA	NA	NA
Explosives (mg/kg)														
Trinitrobenzene, 1,3,5-	NA	NA	NA	NA	2.5 U	NA	NA	NA	0.25 U	0.25 U	NA	NA	NA	NA
Trinitrotoluene, 2,4,6-	NA	NA	NA	NA	**4.2**	NA	NA	NA	0.25 U	0.25 U	NA	NA	NA	NA
Metals (mg/kg)														
Aluminum	**5200**	**6000**	**7500**	**13000**	**2900**	**9500**	**9600**	**9500**	**7500 J**	**6000**	**6000**	**8700**	**11000**	**16000**
Antimony	5.4 U	6.3 U	5.5 U	5.8 U	26 U	5.9 U	6.1 U	5.8 U	5.4 UJ	5.7 U	5.9 U	6.4 U	6.1 U	6.5 U
Arsenic	**11**	**13**	**8.4**	**18**	11 U	**12**	**12**	**13**	**14 J**	**12**	**16**	**12**	**11**	**15**
Barium	**95**	**59**	**120**	**77**	**130**	**86**	**61**	**82**	**82 J**	**67**	**65**	**84**	**120**	**130**
Beryllium	**0.46**	**2.4**	**0.64**	**0.53**	2.1 U	**0.37 J**	**0.42 J**	**0.5**	**0.41 J**	**0.32 J**	**2.4**	**1.2**	**0.52**	**0.75**
Cadmium	**0.43 J**	**0.47 J**	**0.42 J**	0.58 U	2.6 U	0.59 U	**0.17 J**	**0.4 J**	**0.27 J**	**0.22 J**	0.59 U	**0.14 J**	0.61 U	**0.22 J**
Calcium	**89000**	**13000**	**3200**	**1800**	**220000**	**2000**	**43000**	**16000**	**36000 J**	**74000**	**4200**	**24000**	**3100**	**7700**
Chromium, total	**13**	**11**	**8**	**16**	**13**	**12**	**13**	**13**	**12**	**11**	**8.5**	**12**	**13**	**18**
Cobalt	**5.8**	**7.7**	**8.6**	**11**	**3.5 J**	**8.7**	**5.8**	**6.8**	**10**	**6.6**	**5.7**	**5**	**6.5**	**5.8**
Copper	**22**	**25**	**19**	**29**	**8 J**	**20**	**22**	**20**	**23 J**	**19**	**23**	**21**	**17**	**25**
Iron	**17000**	**26000**	**20000**	**31000**	**7000**	**20000**	**20000**	**20000**	**20000 J**	**17000**	**27000**	**20000**	**22000**	**29000**
Lead	**64**	**37**	**20**	**16**	**40**	**95**	**16**	**19**	**19**	**13**	**21**	**17**	**17**	**21**
Magnesium	**23000**	**3900**	**1700**	**1900**	**39000**	**1800**	**11000**	**6900**	**13000**	**32000**	**770**	**7600**	**2000**	**3700**
Manganese	**320**	**180**	**630**	**390**	**280**	**560**	**260**	**430**	**330 J**	**290**	**0.007**	**210**	**670**	**290**
Mercury	**0.044**	**0.13**	**0.11**	**0.033**	**0.012**	**0.047**	**0.043**	**0.034**	**0.018 J**	**0.033**	**0.036**	**0.049**	**0.034**	**0.057**
Nickel	**19**	**19**	**16**	**28**	**10**	**18**	**21**	**19**	**25**	**21**	**13**	**15**	**14**	**21**
Potassium	**1500**	**1700**	**900**	**1800**	**600**	**1000**	**1600**	**1200**	**1700 J**	**1600**	**600**	**1300**	**1000**	**1200**
Selenium	**0.8 J**	**0.8 J**	**0.7 J**	**0.6 J**	7.9 U	1.8 U	1.8 U	1.7 U	1.6 U	1.7 U	**0.6 J**	**0.6 J**	1.8 U	2 U
Silver	1.1 U	**0.51 J**	**190**	1.2 U	5.3 U	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U	**0.64 J**	1.3 U	1.2 U	1.3 U
Sodium	**160 J**	330 U	290 U	300 U	1400 U	**110 J**	**170 J**	**120 J**	**160 J**	**210 J**	**150 J**	**160 J**	320 U	**160 J**
Thallium	**1.5 J**	**2.1 J**	**2.2 J**	**2.5 J**	13 U	**1.9 J**	**1.8 J**	**2.1 J**	**2.1 J**	**1.5 J**	**2.2 J**	**2.2 J**	**2.2 J**	**2.1 J**
Vanadium	**26**	**28**	**19**	**33**	**12**	**24**	**26**	**25**	**20**	**19**	**22**	**25**	**28**	**36**
Zinc	**83**	**62**	**69**	**110**	**31**	**73**	**67**	**67**	**76 J**	**63**	**48**	**59**	**56**	**80**

TABLE 4-1
Concentrations of Detected Analytes in Surface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Notes:
1. Investigation phase indicates in which phase the samples were collected
   Phase I - Samples collected during Phase I Site Investigation (LAW, 1995).
   Phase II - Samples collected during Phase II Site Investigation (Program Management Company, 2000)
   RI - Samples collected as part of the Remedial Investigation field investigation conducted by Ellis Environmental.
2. TCDD-TEQ is a calculated number used for risk assessment purposes

Legend:
NA - not analyzed
Bold - Indicates analyte detected
A - Concentration exceeds the instrument calibration range
a - Concentration is below the reporting limit
B - Organics: The constituent was detected in associated field or laboratory blank samples
Inorganics: Reported value is less than the contract required detection limit but above the instrument detection limit
C - Confirmed by gas chromatography / mass spectrometry (GC/MS)
CON - Confirmation analysis for dioxins / furans
D or I - The original sample was diluted and re-analyzed because detected concentrations were outside the instrument detection range
E - Organics:The reported concentration exceeds the calibration range of the GC/MS instrument
Inorganics:The value is estimated due to matrix interferences
H - Possibly biased high based upon QC data (Phase I SI)
Alternate peak selection upon analytical review (RI)
J - While the identity of the constituent is positive, the reported concentration is estimated
L - Possibly biased low or a false negative based upon QC data
M - Result was manually integrated
N - Spiked sample recovery not within control limits
PR - Value is underestimated due to the presence of poorly resolved GC peaks
Q - Quantitative interference in sample (Phase II SI)
Detected below the practical quantitation limit (Phase I SI)
R - Data rejected based upon QC data
U - The constituent was not detected above RLs
* - Batch QC exceeds the upper or lower control limits

TABLE 4-2
RI Surface Soil Locations and Rationale
Former Lockbourne Air Force Base, Lockbourne, Ohio

Sample ID	Northing Y	Easting X	Reason For Sample Location
EEGLKB-SS01	659605.48	1838360.97	Lime sludge area
EEGLKB-SS02	659898.27	1838487.33	Burn area
EEGLKB-SS03	659492.46	1838695.95	Stressed vegetation area
EEGLKB-SS04	659461.11	1838890.88	Stressed vegetation area
EEGLKB-SS05	659520.90	1839070.67	Stressed vegetation area
EEGLKB-SS06	659702.99	1839079.40	Stressed vegetation, burn area
EEGLKB-SS07	659936.39	1838947.94	Stressed vegetation, burn area
EEGLKB-SS08	659580.90	1839211.44	Stressed vegetation, burn area
EEGLKB-SS09	659398.77	1839210.52	Stressed vegetation area
EEGLKB-SS10	658893.85	1839012.85	Stressed vegetation area
EEGLKB-SS11	658761.84	1839105.82	Stressed vegetation area
EEGLKB-SS12	658417.22	1839221.12	Stressed vegetation area
EEGLKB-SS13	658152.28	1839586.56	Landfill debris
EEGLKB-SS14	658961.38	1839660.91	Measured distance from transmitter building parking lot corner
EEGLKB-SS15	659384.72	1839983.01	Stressed vegetation area
EEGLKB-SS16	658776.45	1840214.05	Stressed vegetation area
EEGLKB-SS17	658543.10	1840337.73	Stressed vegetation area
EEGLKB-SS18	657915.45	1840396.99	Landfill debris
EEGLKB-SS19	658218.09	1840578.01	Suspected area from previous investigation
EEGLKB-SS20	660168.16	1841134.09	Burn area
EEGLKB-SS21	659736.69	1840413.99	Suspected area from previous investigation
EEGLKB-SS22	660091.89	1840205.09	Suspected area from previous investigation
EEGLKB-SS23	660277.54	1839511.52	Suspected area from previous investigation
EEGLKB-SS24	659984.75	1839385.18	Stressed vegetation area

TABLE 4-3
Concentrations of Detected Analytes in Subsurface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohic

Sample ID	**LCKSO-1**	**LCKSO-2**	**LCKSO-3**	**LCKSO-3**	**LCKSO-4**	**LCKSO-4**	**LCKSO-5**	**LCKSO-6**	**LCKSO-6**	**LCKSO-7**	**LCKSO-7**	**LCKSO-8**
Sample Date	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**	**5/24/1995**	**5/25/1995**	**5/24/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**
Sample Depth (ft BGS)	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**
Investigation Phase[1]	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**
Volatile Organic Compounds (mg/kg)				**Duplicate**		**Resampled**			**Resampled**		**Resampled**	
Acetone	0.012 U	0.012 U	NA	**0.016 JB**	NA	**0.013 JB**	**0.017 JB**	NA	**0.18**	NA	0.014 U	NA
Dichloroethenes, 1,2-, total	0.006 U	0.006 U	NA	0.006 U	NA	0.006 U	0.007 U	NA	0.044 U	NA	0.007 U	NA
Dichloropropene, 1,3-, trans-	0.006 U	0.006 U	0.007 U	0.006 U	NA	0.006 U	**0.005 JQ**	NA	0.044 U	NA	0.007 U	NA
Ethylbenzene	0.006 U	0.006 U	0.007 U	0.006 U	NA	0.006 U	0.007 U	NA	**0.026 JH**	NA	0.007 U	NA
Methyl ethyl ketone	0.012 U	0.012 U	0.014 U	0.013 U	NA	0.013 U	0.014 U	NA	0.088 U	NA	0.014 U	NA
Methylene chloride	**0.016 JB**	**0.023 JB**	NA	**0.012**	NA	**0.019 JB**	**0.005 JB**	NA	**0.16**	NA	**0.037 JB**	NA
Toluene	0.006 U	0.006 U	0.007 U	0.006 U	NA	0.006 U	0.007 U	NA	**0.014 JH**	NA	**0.005 JH**	NA
Trichloroethene	0.006 U	0.006 U	0.007 U	0.006 U	NA	0.006 U	0.007 U	NA	0.044 U	NA	0.007 U	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	0.012 U	0.012 U	0.014 U	0.013 U	NA	0.013 U	0.014 U	NA	0.088 U	NA	0.014 U	NA
Xylenes, total	0.006 U	0.006 U	0.007 U	0.006 U	NA	0.006 U	0.007 U	NA	**0.033 JH**	NA	0.007 U	NA
Semi-Volatile Organic Compound (mg/kg)												
Acenaphthene	**0.13 JQ**	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	0.43 U	NA	**0.082 JQ**
Anthracene	**0.43**	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	0.43 U	NA	**0.1 JQ**
Benz(a)anthracene	**0.94**	**0.14 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.11 JQ**	NA	**0.33 JQ**
Benzo(a)pyrene	**0.95**	**0.13 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.11 JQ**	NA	**0.26 JQ**
Benzo(b)fluoranthene	**0.85**	**0.13 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.092 JQ**	NA	**0.25 JQ**
Benzo(ghi)perylene	**0.45**	**0.066 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.076 JQ**	NA	**0.18 JQ**
Benzo(k)fluoranthene	**1.1**	**0.14 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.1 JQ**	NA	**0.27 JQ**
Bis(2-ethylhexyl) phthalate	0.4 U	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	**3 JQ**	NA	0.43 U	NA	**1.4**
Butylbenzyl phthalate	0.4 U	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	**0.73 JQ**	NA	0.43 U	NA	0.44 U
Carbazole	**0.3 JQ**	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	0.43 U	NA	**0.076 JQ**
Chrysene	**0.94**	**0.14 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.12 JQ**	NA	**0.38 JQ**
Dibenz(ah)anthracene	**0.19 JQ**	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	0.43 U	NA	0.44 U
Dibenzofuran	**0.072 JQ**	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	0.43 U	NA	0.44 U
Diethyl phthalate	0.4 U	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	**1.3 JQ**	NA	0.43 U	NA	0.44 U
Di-n-butyl phthalate	0.4 U	0.38 U	**0.051 JB**	**0.056 JB**	NA	**0.049 JB**	0.42 U	**2.6 JQ**	NA	0.43 U	NA	0.44 U
Fluoranthene	**2.1**	**0.28 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.21 JQ**	NA	**0.89**
Fluorene	**0.16 JQ**	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	0.43 U	NA	**0.071 JQ**
Indeno(1,2,3-cd)pyrene	**0.48**	**0.068 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.066 JQ**	NA	**0.17 JQ**
Methylnaphthalene, 2-	0.4 U	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	**0.86**	NA	0.43 U	NA	0.44 U
Naphthalene	0.4 U	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	**2 JQ**	NA	0.43 U	NA	0.44 U
Phenanthrene	**1.7**	**0.086 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	**0.35 JQ**	NA	**0.12 JQ**	NA	**0.58**
Pyrene	**1.8**	**0.25 JQ**	0.44 U	0.44 U	NA	0.41 U	0.42 U	3.5 U	NA	**0.19 JQ**	NA	**0.81**
Trichlorobenzene, 1,2,4-	0.4 U	0.38 U	0.44 U	0.44 U	NA	0.41 U	0.42 U	**2.1**	NA	0.43 U	NA	0.44 U
Pesticides/PCBs (mg/kg)												
Chlordane, alpha-	0.002 U	0.0019 U	0.0022 U	0.0022 U	NA	0.002 U	0.0021 U	0.012 U	NA	0.0022 U	NA	0.002 U
DDD, p,p'-	0.004 U	0.0039 U	0.0044 U	0.0043 U	NA	0.004 U	0.0043 U	0.023 U	NA	0.0044 U	NA	**0.029 J**
DDE, p,p'-	0.004 U	0.0039 U	0.0044 U	0.0043 U	NA	0.004 U	0.0043 U	0.023 U	NA	0.0044 U	NA	**0**
DDT, p,p'-	0.004 U	0.0039 U	0.0044 U	0.0043 U	NA	0.004 U	0.0043 U	0.023 U	NA	**0.011**	NA	0.018 U
PCB 1254	0.04 U	0.039 U	0.044 U	0.043 U	NA	0.04 U	0.043 U	0.23 U	NA	0.044 U	NA	**0.81 J**

TABLE 4-3
Concentrations of Detected Analytes in Subsurface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohic

Sample ID	**LCKSO-1**	**LCKSO-2**	**LCKSO-3**	**LCKSO-3**	**LCKSO-4**	**LCKSO-4**	**LCKSO-5**	**LCKSO-6**	**LCKSO-6**	**LCKSO-7**	**LCKSO-7**	**LCKSO-8**
Sample Date	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**	**5/24/1995**	**5/25/1995**	**5/24/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/23/1995**
Sample Depth (ft BGS)	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**
Investigation Phase[1]	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**
Dioxins/Furans (mg/kg)												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCDD-TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	**5.9**	**9.8**	**25.1**	**17.2**	**12.5**	NA	**5.1**	**5.1**	NA	**10.8**	NA	**11.9**
Barium	**61.9**	**67.2**	**66.6**	**66.9**	**60.8**	NA	**139**	**39.1**	NA	**136**	NA	**51.4**
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.59 U	0.58 U	0.46 U	**0.67**	0.43 U	NA	**0.65**	**4**	NA	0.46 U	NA	0.47 U
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, total	**7.2**	**11.7**	**12.9**	**12.1**	**10.8**	NA	**17.6**	**35.5**	NA	**6.4**	NA	**11.3**
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	**15.9**	**10.8**	**15**	**23.5**	**13**	NA	**24.7**	**54.6**	NA	**10.3**	NA	**25.9**
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.12 U	0.12 U	0.066 U	0.066 U	0.061 U	NA	0.13 U	**0.79**	NA	0.07 U	NA	0.07 U
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.59 U	0.58 U	**0.54**	**0.41**	**0.27**	NA	0.64 U	0.21 U	NA	**0.63**	NA	**0.62**
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**41.4**	**72.1**	**95.1**	**86.9**	**71.7**	NA	**125**	**1650**	NA	**136**	NA	**60.3**

TABLE 4-3
Concentrations of Detected Analytes in Subsurface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohic

Sample ID	**LCKSO-8**	**LCKSO-8**	**LCKSO-8**	**LCKSO-9**	**LCK-SO10**	**LCKSO-11**	**LCK-SO12**	**LCKSO-12**	**LCK-SO12**	**LCKSO-1**	**LCKSO-6**	**LCKSO-7**
Sample Date	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**	**5/25/1995**	**5/25/1995**	**7/28/1997**	**7/24/1997**	**7/28/1997**
Sample Depth (ft BGS)	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**
Investigation Phase[1]	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase II**	**Phase II**	**Phase II**
Volatile Organic Compounds (mg/kg)	**Resampled**	**Duplicate**	**Duplicate-Resampled**					**Resampled**	**Duplicate**			
Acetone	**0.025**	NA	0.012 U	0.012 U	0.012 U	**0.024 JB**	0.013 U	NA	**0.011 JB**	NA	NA	NA
Dichloroethenes, 1,2-, total	0.006 U	NA	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	NA	0.006 U	NA	NA	NA
Dichloropropene, 1,3-, trans-	0.006 U	NA	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	NA	0.006 U	NA	NA	NA
Ethylbenzene	NA	NA	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	NA	0.006 U	NA	NA	NA
Methyl ethyl ketone	0.013 U	NA	0.012 U	0.012 U	0.012 U	0.013 U	0.013 U	NA	0.013 U	NA	NA	NA
Methylene chloride	**0.021 JB**	NA	**0.018 JB**	**0.003 JB**	**0.007 JB**	**0.019 JB**	**0.021 JB**	NA	**0.014 JB**	NA	NA	NA
Toluene	NA	NA	0.006 U	0.006 U	**0.003 JQ**	0.006 U	0.006 U	NA	**0.002 JQ**	NA	NA	NA
Trichloroethene	0.006 U	NA	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	NA	0.006 U	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	0.013 U	NA	0.012 U	0.012 U	0.012 U	0.013 U	0.013 U	NA	0.013 U	NA	NA	NA
Xylenes, total	NA	NA	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	NA	0.006 U	NA	NA	NA
Semi-Volatile Organic Compound (mg/kg)												
Acenaphthene	NA	0.39 U	NA	**0.11 JQ**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Anthracene	NA	0.39 U	NA	**0.39**	**0.056 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Benz(a)anthracene	NA	0.39 U	NA	**1.7**	**0.13 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Benzo(a)pyrene	NA	0.39 U	NA	**1.9**	**0.14 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Benzo(b)fluoranthene	NA	0.39 U	NA	**1.8**	**0.11 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Benzo(ghi)perylene	NA	0.39 U	NA	**1.2**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Benzo(k)fluoranthene	NA	0.39 U	NA	**1.8**	**0.11 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Bis(2-ethylhexyl) phthalate	NA	**0.45**	NA	**0.047 JQ**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Butylbenzyl phthalate	NA	0.39 U	NA	0.39 U	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Carbazole	NA	0.39 U	NA	**0.23 JQ**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Chrysene	NA	**0.04 JQ**	NA	**2.1**	**0.17 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Dibenz(ah)anthracene	NA	0.39 U	NA	**0.42**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Dibenzofuran	NA	0.39 U	NA	**0.085 JQ**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Diethyl phthalate	NA	0.39 U	NA	0.39 U	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Di-n-butyl phthalate	NA	0.39 U	NA	0.39 U	0.4 U	**0.079 JB**	NA	**0.15 JB**	**0.049 JB**	NA	NA	NA
Fluoranthene	NA	**0.14 JQ**	NA	**3.4**	**0.28 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Fluorene	NA	0.39 U	NA	**0.15 JQ**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	0.39 U	NA	**1.2**	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Methylnaphthalene, 2-	NA	0.39 U	NA	0.39 U	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Naphthalene	NA	0.39 U	NA	0.39 U	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Phenanthrene	NA	**0.11 J**	NA	**2**	**0.25 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Pyrene	NA	**0.12 J**	NA	**3.1**	**0.31 JQ**	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Trichlorobenzene, 1,2,4-	NA	0.39 U	NA	0.39 U	0.4 U	0.41 U	NA	0.42 U	0.44 U	NA	NA	NA
Pesticides/PCBs (mg/kg)												
Chlordane, alpha-	NA	0.002 U	NA	0.0039 U	0.0041 U	0.0021 U	0.002 U	NA	0.0022 U	NA	NA	NA
DDD, p,p'-	NA	**0.0059 J**	NA	**0.013**	0.0082 U	0.0042 U	0.004 U	NA	0.0045 U	NA	NA	NA
DDE, p,p'-	NA	0.004 U	NA	**0.023**	0.0082 U	0.0042 U	0.004 U	NA	0.0045 U	NA	NA	NA
DDT, p,p'-	NA	0.004 U	NA	**0.015**	0.0082 U	0.0042 U	0.004 U	NA	0.0045 U	NA	NA	NA
PCB 1254	NA	0.04 U	NA	0.079 U	0.082 U	0.042 U	0.04 U	NA	0.045 U	NA	NA	NA

TABLE 4-3
Concentrations of Detected Analytes in Subsurface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohic

Sample ID	**LCKSO-8**	**LCKSO-8**	**LCKSO-8**	**LCKSO-9**	**LCK-SO10**	**LCKSO-11**	**LCK-SO12**	**LCKSO-12**	**LCK-SO12**	**LCKSO-1**	**LCKSO-6**	**LCKSO-7**
Sample Date	**5/23/1995**	**5/23/1995**	**5/23/1995**	**5/24/1995**	**5/24/1995**	**5/25/1995**	**5/25/1995**	**5/25/1995**	**5/25/1995**	**7/28/1997**	**7/24/1997**	**7/28/1997**
Sample Depth (ft BGS)	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**	**2 - 3**
Investigation Phase[1]	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase II**	**Phase II**	**Phase II**
Dioxins/Furans (mg/kg)												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000037 J**	**0.0000494**	**0.000317**
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0000011 U	**0.0000044**	**0.0000152**
Heptachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000148 J**	**0.000211 E**	**0.00135**
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.000065**	**0.000385**	**0.00124**
Heptachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.000163**	**0.000808**	**0.0021**
Hexachlorodibenzofuran, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000019 EJ**	**0.0000026 PR**	**0.0000253 J**
Hexachlorodibenzofuran, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0000005 U	**0.0000008**	**0.0000077**
Hexachlorodibenzofuran, 1,2,3,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0000007 U	**0.0000011**	**0.0000025**
Hexachlorodibenzofuran, 2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.00000092 PR**	**0.0000031 BPR**	**0.0000105 PR**
Hexachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.000008 E**	**0.0000783**	**0.000319**
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.000001**	0.0000021 U	**0.000036**
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000017**	**0.0000242**	**0.000118**
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000023 PR**	**0.0000057 PR**	**0.0000646 PR**
Hexachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000217**	**0.00011**	**0.000553**
Octachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.000011**	**0.000145**	**0.00131**
Octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.00341**	**0.00634**	**0.01079**
Pentachlorodibenzofuran, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0000004 U	0.0000009 U	**0.0000076**
Pentachlorodibenzofuran, 2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0000004 U	**0.0000014**	**0.0000078**
Pentachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000046 E**	**0.00001 E**	**0.000111**
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0000007 U	**0.00000048 J**	**0.0000158**
Pentachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000012 J**	**0.0000113 J**	**0.0000698**
TCDD-TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.6746E-06**	**1.4954E-05**	**6.6022E-05**
Tetrachlorodibenzofuran, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.00000088 B**	**0.0000163**	**0.0000055**
Tetrachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.000004 BE**	**0.0000259**	**0.0000957 Q**
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0000005 U	**0.0000019**	**0.000002**
Tetrachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0000011 J**	**0.0000078**	**0.0000486**
Metals (mg/kg)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	**8200**	**26000**	**11000**
Arsenic	NA	**9.2**	NA	**6.7**	**6.4**	**1.8**	**4.6**	NA	**6.7**	**10.2 J**	**14.6 J**	**7.29 J**
Barium	NA	**58.4**	NA	**131**	**51.5**	**105**	**69.5**	NA	**149**	**88**	**130**	**56**
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.728**	1.4 U	**3.32**
Cadmium	NA	0.42 U	NA	**6.3**	0.61 U	0.45 U	0.44 U	NA	0.47 U	0.59 U	1.4 U	0.56 U
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2400**	**33000**	**4300**
Chromium, total	NA	**11.8**	NA	**16.5**	**12.1**	**15.9**	**10.2**	NA	**17**	**11**	**19 J**	**8.1**
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	**12**	**7.7 J**	**3.9**
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	**15**	**51**	**18**
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	**17000**	**38000**	**11000**
Lead	NA	**26**	NA	**34.3**	**16.7**	**13.3**	**10.3**	NA	**28.6**	**22.5**	**29.4 J**	**8.29**
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1400**	**14000**	**660**
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	**900**	**480**	**74**
Mercury	NA	**0.26**	NA	0.12 U	0.12 U	0.064 U	0.062 U	NA	0.067 U	0.12 U	0.14 U	0.11 U
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	**14**	**32 J**	**10**
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2000**	**2600**	**1200**
Selenium	NA	**0.31**	NA	0.59 U	0.61 U	0.15 U	0.15 U	NA	0.16 U	0.59 U	0.7 U	**1.5**
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	120 U	**980**	110 U
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.59 U	1.4 U	0.56 U
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	**25**	**28**	**31**
Zinc	NA	**101**	NA	**98.6**	**61.7**	**68.3**	**70.4**	NA	**86.7**	**53**	**630**	**100**

TABLE 4-3
Concentrations of Detected Analytes in Subsurface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohic

Sample ID	**LCKSO-8**	**LCKSB-8**	**LCKSB-9**	**LCKSB-10**	**LCKSB-11**	**LCKSB-12**	**LCKSB-13**	**LCKSB-14**	**LCKMW-15**	**LCKMW-15**	**LCKMW-16**	**LCKMW-16**
Sample Date	**7/28/1997**	**7/17/1997**	**7/16/1997**	**7/21/1997**	**7/21/1997**	**7/25/1997**	**7/24/1997**	**7/30/1997**	**8/5/2003**	**8/5/2003**	**8/6/2003**	**8/6/2003**
Sample Depth (ft BGS)	**2 - 3**	**2 - 4**	**2 - 4**	**2 - 4**	**2 - 4**	**8 - 10**	**8 - 10**	**2 - 4**	**4 - 6**	**4 - 6**	**8 - 10**	**8 - 10**
Investigation Phase[1]	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**	**RI**
Volatile Organic Compounds (mg/kg)		**Resampled**								**Resampled**		**Resampled**
Acetone	NA	0.012 U	0.012 U	0.012 U	0.011 U	**11 EJ**	**1.7**	0.01 U	NA	**0.047**	NA	0.021 U
Dichloroethenes, 1,2-, total	NA	0.0061 U	0.0061 U	0.0058 U	0.0057 U	**0.014**	0.031 U	0.0052 U	NA	NA	NA	NA
Dichloropropene, 1,3-, trans-	NA	0.0061 U	0.0061 U	0.0058 U	0.0057 U	0.0061 U	0.031 U	0.0052 U	NA	0.005 U	NA	0.0052 U
Ethylbenzene	NA	0.0061 U	0.0061 U	0.0058 U	0.0057 U	0.0061 U	0.031 U	0.0052 U	NA	0.005 U	NA	0.0052 U
Methyl ethyl ketone	NA	0.012 U	0.012 U	0.012 U	0.011 U	**0.007 J**	0.062 U	0.01 U	NA	0.02 U	NA	0.021 U
Methylene chloride	NA	**0.0084**	**0.012**	**0.01**	**0.0072**	0.0061 U	0.031 U	0.0052 U	NA	0.01 U	NA	0.01 U
Toluene	NA	0.0061 U	0.0061 U	0.0058 U	0.0057 U	0.0061 U	0.031 U	0.0052 U	NA	0.005 U	NA	0.0052 U
Trichloroethene	NA	0.0061 U	0.0061 U	0.0058 U	0.0057 U	**0.017**	0.031 U	0.0052 U	NA	0.005 U	NA	0.0052 U
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005 U	NA	**0.0013 J**
Vinyl chloride	NA	0.0061 U	0.0061 U	0.0058 U	0.0057 U	**0.0098**	0.031 U	0.0052 U	NA	0.005 U	NA	0.0052 U
Xylenes, total	NA	0.0061 U	0.0061 U	0.0058 U	0.0057 U	0.0061 U	0.031 U	0.0052 U	NA	NA	NA	NA
Semi-Volatile Organic Compound (mg/kg)												
Acenaphthene	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Anthracene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**1.1 J**	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Benz(a)anthracene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**3.9**	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Benzo(a)pyrene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**1.2 J**	21 U	0.35 U	0.037 U	NA	**0.056**	NA
Benzo(b)fluoranthene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**4.6**	21 U	0.35 U	0.037 U	NA	**0.092**	NA
Benzo(ghi)perylene	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.037 U	NA	**0.051 J**	NA
Benzo(k)fluoranthene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**1.4 J**	21 U	0.35 U	0.037 U	NA	**0.081 J**	NA
Bis(2-ethylhexyl) phthalate	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.19 U	NA	0.2 U	NA
Butylbenzyl phthalate	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.075 U	NA	0.079 U	NA
Carbazole	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.19 U	NA	0.2 U	NA
Chrysene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**3.5**	21 U	0.35 U	0.037 U	NA	**0.11 J**	NA
Dibenz(ah)anthracene	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Dibenzofuran	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.075 U	NA	0.079 U	NA
Diethyl phthalate	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.075 U	NA	0.079 U	NA
Di-n-butyl phthalate	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.19 U	NA	0.2 U	NA
Fluoranthene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**9.5**	**10 J**	0.35 U	0.037 U	NA	**0.15 J**	NA
Fluorene	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Indeno(1,2,3-cd)pyrene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**1.2 J**	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Methylnaphthalene, 2-	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Naphthalene	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.037 U	NA	0.039 U	NA
Phenanthrene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**6.2**	21 U	0.35 U	0.037 U	NA	**0.068**	NA
Pyrene	NA	0.41 U	0.41 U	0.38 U	0.38 U	**3.7**	21 U	0.35 U	0.037 U	NA	**0.12**	NA
Trichlorobenzene, 1,2,4-	NA	0.41 U	0.41 U	0.38 U	0.38 U	1.6 U	21 U	0.35 U	0.19 U	NA	0.2 U	NA
Pesticides/PCBs (mg/kg)												
Chlordane, alpha-	NA	NA	NA	NA	NA	NA	NA	NA	0.0019 U	NA	0.002 U	NA
DDD, p,p'-	NA	0.0041 U	0.0041 U	0.0038 U	0.0038 U	0.0041 U	0.0041 U	0.0034 U	0.0019 U	NA	**0.014**	NA
DDE, p,p'-	NA	0.0041 U	0.0041 U	0.0038 U	0.0038 U	0.0041 U	0.0041 U	0.0034 U	0.0019 U	NA	**0.0058**	NA
DDT, p,p'-	NA	0.0041 U	0.0041 U	0.0038 U	0.0038 U	0.0041 U	0.0041 U	0.0034 U	0.0019 U	NA	**0.014**	NA
PCB 1254	NA	0.041 U	0.041 U	0.038 U	0.038 U	0.041 U	0.041 U	0.035 U	0.019 U	NA	0.02 U	NA

TABLE 4-3
Concentrations of Detected Analytes in Subsurface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohic

Sample ID	**LCKSO-8**	**LCKSB-8**	**LCKSB-9**	**LCKSB-10**	**LCKSB-11**	**LCKSB-12**	**LCKSB-13**	**LCKSB-14**	**LCKMW-15**	**LCKMW-15**	**LCKMW-16**	**LCKMW-16**
Sample Date	**7/28/1997**	**7/17/1997**	**7/16/1997**	**7/21/1997**	**7/21/1997**	**7/25/1997**	**7/24/1997**	**7/30/1997**	**8/5/2003**	**8/5/2003**	**8/6/2003**	**8/6/2003**
Sample Depth (ft BGS)	**2 - 3**	**2 - 4**	**2 - 4**	**2 - 4**	**2 - 4**	**8 - 10**	**8 - 10**	**2 - 4**	**4 - 6**	**4 - 6**	**8 - 10**	**8 - 10**
Investigation Phase[1]	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**	**RI**
Dioxins/Furans (mg/kg)												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	**0.0000262**	0.0000003 U	**0.00000046 J**	**0.000002**	0.0000006 U	**0.0000052 J**	**0.0000317**	0.0000005 U	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	**0.0000031 J**	0.0000004 U	0.0000004 U	0.0000005 U	0.0000008 U	0.0000027 U	**0.000002**	0.0000007 U	NA	NA	NA	NA
Heptachlorodibenzofurans, total	**0.000109**	0.0000004 U	**0.00000046 J**	**0.000002**	0.0000007 U	**0.000009**	**0.000075**	0.0000006 U	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	**0.00019**	**0.00000051 B**	**0.00000021 B**	**0.000005**	**0.00000047 J**	**0.0000621**	**0.000178**	**0.0000841**	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total	**0.000349**	**0.0000011 BJ**	**0.00000051 B**	**0.0000106**	**0.000001 J**	**0.000121**	**0.000357**	**0.000261**	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	**0.000005 EJ**	0.0000003 U	0.0000004 U	0.0000005 U	0.0000005 U	0.0000016 U	**0.0000084 EJ**	0.0000004 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,6,7,8-	**0.00000099 J**	0.0000002 U	0.0000003 U	0.0000004 U	0.0000004 U	0.0000012 U	**0.0000025**	0.0000004 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-	0.0000013 U	0.0000003 U	0.0000004 U	0.0000005 U	0.0000006 U	0.0000017 U	0.0000012 U	0.0000005 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	**0.00000087**	**0.0000004 B**	**0.00000045 B**	0.0000004 U	0.0000005 U	0.0000015 U	**0.0000047 PR**	**0.00000054 B**	NA	NA	NA	NA
Hexachlorodibenzofurans, total	**0.0000217 E**	**0.0000004 B**	**0.00000045 B**	**0.0000024 J**	0.0000005 U	**0.000008**	**0.0000356 E**	**0.00000054 B**	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	0.0000017 U	0.0000005 U	0.0000004 U	0.0000005 U	0.0000006 U	0.000003 U	**0.000003**	0.0000005 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	**0.0000118**	0.0000004 U	0.0000003 U	**0.00000056**	0.0000005 U	0.0000025 U	**0.0000074**	0.0000004 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	**0.0000051 PR**	**0.00000023 J**	**0.00000036**	0.0000004 U	0.0000005 U	0.0000026 U	**0.0000074 PR**	**0.00000067 J**	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total	**0.0000641**	**0.000001**	**0.00000036**	**0.0000031 B**	**0.0000023 BJ**	**0.0000158**	**0.0000623**	**0.000004 B**	NA	NA	NA	NA
Octachlorodibenzofuran	**0.000089**	0.0000005 U	**0.0000025**	**0.0000031**	0.0000005 U	**0.0000162**	**0.0000346**	0.0000008 U	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	**0.00214**	**0.000009 B**	**0.0000063 B**	**0.0000563**	**0.0000025 B**	**0.000482**	**0.00161**	**0.00943**	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-	0.0000006 U	0.0000004 U	0.0000004 U	0.0000004 U	0.0000005 U	0.0000013 U	**0.0000017**	0.0000004 U	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-	0.0000006 U	0.0000004 U	0.0000004 U	0.0000004 U	0.0000005 U	0.0000013 U	**0.0000029 J**	0.0000004 U	NA	NA	NA	NA
Pentachlorodibenzofurans, total	**0.0000051 E**	0.0000004 U	0.0000004 U	**0.0000022**	0.0000005 U	**0.0000101**	**0.0000535**	0.0000004 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	0.0000011 U	0.0000004 U	0.0000005 U	0.0000008 U	0.0000008 U	0.000002 U	**0.0000017**	0.0000006 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total	**0.0000018 J**	0.0000004 U	0.0000005 U	0.0000008 U	0.0000008 U	**0.000002 J**	**0.0000088**	0.0000006 U	NA	NA	NA	NA
TCDD-TEQ	**6.1869E-06**	**6.2753E-07**	**1.3856E-06**	**1.1054E-06**	**2.7495E-06**	**3.5638E-06**	**1.0086E-05**	**2.721E-06**	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	**0.0000023 B**	0.0000002 U	0.0000003 U	**0.00000076**	0.0000004 U	0.0000033 U	**0.0000031 B**	**0.0000014 J**	NA	NA	NA	NA
Tetrachlorodibenzofurans, total	**0.0000044**	0.0000002 U	0.0000003 U	**0.00000076**	0.0000004 U	**0.0000036 B**	**0.0000418**	0.0000002 U	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	0.0000006 U	0.0000003 U	**0.00000083**	0.0000005 U	**0.000002 J**	0.0000012 U	**0.00000086**	0.0000003 U	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total	**0.0000015**	0.0000003 U	**0.00000083**	**0.0000014 BJ**	**0.000002 J**	**0.0000022 J**	**0.0000121**	0.0000003 U	NA	NA	NA	NA
Metals (mg/kg)												
Aluminum	**6600**	**15000**	**10000**	**6900 J**	**5600**	**4200 J**	**4900 J**	**5000**	**5900**	NA	**7500**	NA
Arsenic	**12.5 J**	**23.9 J**	**25.8 J**	**10.4 J**	**15.7 J**	**13.5 J**	**20.4 J**	**5.8 J**	**13**	NA	**8.6**	NA
Barium	**210**	**79**	**71**	**56 J**	**40**	**53 J**	**70 J**	**65**	**53**	NA	**52**	NA
Beryllium	1.7 U	1 U	1.2 U	0.57 U	1 U	**3.15 J**	**4.43 J**	0.51 U	**0.33 J**	NA	**0.53**	NA
Cadmium	1.7 U	1 U	1.2 U	0.57 U	1 U	0.61 U	**1.07 J**	0.51 U	**0.3 J**	NA	**0.67**	NA
Calcium	**140000**	**2300**	**2500**	**52000 J**	**100000**	**19000 J**	**8700 J**	**1700**	**48000**	NA	**95000**	NA
Chromium, total	**14**	**19 J**	**15 J**	**8.8 J**	**9.3 J**	**10 J**	**13 J**	**7.8**	**5.9**	NA	**6.3**	NA
Cobalt	**5.7**	**12 J**	**17 J**	**7.7 J**	**7.8 J**	**5.2 J**	**6.6 J**	**4**	**7.1**	NA	**6.8**	NA
Copper	**30**	**40**	**41**	18 U	**22**	18 U	**47**	**9**	**23**	NA	**22**	NA
Iron	**17000**	**40000**	**34000**	**16000 J**	**19000**	**11000 J**	**17000 J**	**8400**	**21000**	NA	**16000**	NA
Lead	**38.2**	**16.7 J**	**19.6 J**	**10.8 J**	**9.69 J**	**40.5 J**	**89.2 J**	**8.17**	**8.8**	NA	**18**	NA
Magnesium	**13000**	**3000**	**2500**	**22000 J**	**48000**	**4800 J**	**2300 J**	**980**	**19000**	NA	**23000**	NA
Manganese	**310**	**520**	**760**	**370 J**	**410**	**79 J**	**85 J**	**310**	**420**	NA	**270**	NA
Mercury	0.33 U	0.12 U	0.12 U	0.12 U	0.11 U	0.12 U	**0.3**	0.1 U	**0.013**	NA	**0.024**	NA
Nickel	**16**	**45 J**	**41 J**	**19 J**	**30 J**	**14 J**	**22 J**	**9.3**	**27**	NA	**21**	NA
Potassium	**3300**	**3600**	**2700**	**1700 J**	**2200 J**	**700**	**660**	**1000**	**1700**	NA	**1600**	NA
Selenium	1.7 U	0.6 U	0.62 U	0.58 U	0.58 U	0.6 U	**0.63**	0.52 U	**0.5 J**	NA	**1.9**	NA
Sodium	350 U	240 U	250 U	110 U	230 U	120 U	**1300**	104 U	270 U	NA	310 U	NA
Thallium	1.7 U	1 U	1.2 U	0.57 U	1 U	0.61 U	0.62 U	0.51 U	**2 J**	NA	**1.4 J**	NA
Vanadium	**20**	**38**	**26**	**17 J**	**16**	**25 J**	**25 J**	**13**	**16**	NA	**21**	NA
Zinc	**110**	**100**	**94**	**45 J**	**57**	**47 J**	**1100 J**	**33**	**79**	NA	**75**	NA

TABLE 4-3
Concentrations of Detected Analytes in Subsurface Soil
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Notes:
1. Investigation phase indicates in which phase the samples were collected.
   Phase I - Samples collected during Phase I Site Investigation (LAW, 1995).
   Phase II - Samples collected during Phase II Site Investigation
   (Program Management Company, 2000)
   RI - Samples collected as part of the Remedial Investigation field investigation conducted
   by Ellis Environmental.
2. TCDD-TEQ is a calculated number used for risk assessment purposes

Legend:
NA - not analyzed
Bold - Indicates analyte detected
A - Concentration exceeds the instrument calibration range
a - Concentration is below the reporting limit
B - Organics: The constituent was detected in associated field or laboratory blank samples
Inorganics: Reported value is less than the contract required detection limit but above the instrument detection limit
C - Confirmed by gas chromatography / mass spectrometry (GC/MS)
CON - Confirmation analysis for dioxins / furans
D or I - The original sample was diluted and re-analyzed because detected concentrations were outside the instrument detection range
DUP - Duplicate
E - Organics:The reported concentration exceeds the calibration range of the GC/MS instrument
Inorganics:The value is estimated due to matrix interferences
H - Possibly biased high based upon QC data (Phase I SI)
Alternate peak selection upon analytical review (RI)
J - While the identity of the constituent is positive, the reported concentration is estimated
L - Possibly biased low or a false negative based upon QC data
M - Result was manually integrated
N - Spiked sample recovery not within control limits
PR - Value is underestimated due to the presence of poorly resolved GC peaks
Q - Quantitative interference in sample (Phase II SI)
Detected below the practical quantitation limit (Phase I SI)
R - Data rejected based upon QC data
RE - Reanalyzed
U - The constituent was not detected above RLs
* - Batch QC exceeds the upper or lower control limits

TABLE 4-4
Concentrations of Detected Analytes in Surface Water
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohic

Location	West Ditch	West Ditch	West Ditch	West Ditch	Background	East Ditch	Background	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch
Sample ID	**LCK-SW1**	**LCK-SW2**	**LCK-SW2-RE**	**LCK-SW3**	**LCKSW-1**	**LCKSW-2**	**LCKSW-3**	**LCKSW-4**	**LCKSW-5**	**LCKSW-5 Dup**	**LCKSW-5 Dup**	**EEGLKB-SW01**	**EEGLKB-SW02**	**EEGLKB-SW02**	**EEGLKB-SW03**
Sample Date	**5/26/1995**	**5/26/1995**	**5/26/1995**	**5/26/1995**	**8/25/1997**	**8/25/1997**	**8/25/1997**	**8/25/1997**	**8/25/1997**	**8/25/1997**	**8/25/1997**	**7/30/2003**	**7/31/2003**	**7/31/2003**	**7/31/2003**
Phase	**Phase I**	**Phase I**	**Phase I**	**Phase I**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**	**RI**
PARAMETER_NAME			**Resampled**							**Duplicate**	**Duplicate**			**Duplicate**	
Volatile Organic Compounds (mg/L)															
Acetone	**0.009 JB**	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	NA	NA	NA	NA
Carbon disulfide	0.005 U	0.005 U	NA	0.005 U	0.001 U	0.001 U	**0.0016**	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	NA	NA
Dichloroethenes, 1,2-, total	0.005 U	0.005 U	NA	0.005 U	**0.0013**	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	NA	NA
Methylene chloride	**0.022**	**0.004 JB**	NA	**0.007 JB**	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	NA	NA
Semi-Volatile Organic Compounds (mg/L)															
Benzoic acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	**0.02 J**	0.02 U	0.022 R
Bis(2-ethylhexyl) phthalate	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0051 U	0.0052 U	**0.028 ***	0.0054 U
Diethyl phthalate	**0.004 JQ**	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.002 U	0.0021 U	0.002 U	0.0022 U
Di-n-butyl phthalate	**0.002 JQ**	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0051 U	0.0052 U	0.0051 U	0.0054 U
Dioxin (mg/L)															
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	NA	NA	NA	NA	7.2E-09 U	NA	**0.000000004 J**	NA	5.8E-09 U	**3.8E-09 J**	**3.7E-09 J**	1.6E-09 U	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	7.2E-09 U	NA	**0.000000004 J**	NA	5.8E-09 U	**3.8E-09 J**	**0.000000003**	1.6E-09 U	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	NA	NA	NA	NA	0.000000004 U	NA	3.3E-09 U	NA	2.8E-09 U	**3.1E-09 J**	1.7E-09 U	7.8E-10 U	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	NA	NA	NA	NA	3.9E-09 U	NA	**4.9E-09**	NA	2.8E-09 U	**4.5E-09 J**	**3.8E-09**	8.1E-10 U	NA	NA	NA
Hexachlorodibenzofurans, total	NA	NA	NA	NA	3.7E-09 U	NA	**4.9E-09**	NA	2.7E-09 U	**4.5E-09 J**	**3.8E-09**	0.000000001 U	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	0.000000007 U	NA	4.9E-09 U	NA	**1.03E-08 J**	**7.2E-09 J**	**7.4E-09**	0.000000001 U	NA	NA	NA
Octachlorodibenzofuran	NA	NA	NA	NA	**1.25E-08 J**	NA	0.000000011 U	NA	8.7E-09 U	7.6E-09 U	4.6E-09 U	2.1E-09 U	NA	NA	NA
Octachlorodibenzo-p-dioxin	NA	NA	NA	NA	**0.000000038 J**	NA	**6.82E-08**	NA	**0.000000042 J**	**5.02E-08 J**	**4.14E-08**	5.9E-09 U	NA	NA	NA
TCDD-TEQ	NA	NA	NA	NA	**6.35005E-09**	NA	**7.21887E-09**	NA	**5.44214E-09**	**5.0264E-09**	**4.14837E-09**	**1.07035E-09**	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	NA	NA	NA	NA	**5.8E-09 B**	NA	2.6E-09 U	NA	0.000000002 U	1.7E-09 U	**0.000000007 B**	3.8E-10 U	NA	NA	NA
Tetrachlorodibenzofurans, total	NA	NA	NA	NA	**9.2E-09 BJ**	NA	2.6E-09 U	NA	0.000000002 U	1.7E-09 U	**0.000000007 B**	3.8E-10 U	NA	NA	NA
Metals (mg/L)															
Aluminum	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.17 J**	**0.18 J**	**0.074 J**	**0.071 J**	**0.066 J**	**0.16 J**
Arsenic	**0.005**	0.0018 U	NA	0.0018 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.02 U	0.02 U	0.02 U
Arsenic, dissolved	NA	NA	NA	NA	0.005 U	**0.023 J**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA	NA	NA
Barium	**0.0678**	**0.0541**	NA	**0.0582**	**0.07 J**	**0.08 J**	**0.08 J**	**0.08 J**	**0.08 J**	**0.08 J**	**0.08 J**	**0.068**	**0.078**	**0.074**	**0.081**
Barium, dissolved	NA	NA	NA	NA	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	**110 J**	**110 J**	**95 J**	**90 J**	**96 J**	**96 J**	**98 J**	**83**	**93**	**87**	**95**
Calcium, dissolved	NA	NA	NA	NA	**110**	**110**	**97**	**92**	**95**	**95**	**96**	NA	NA	NA	NA
Copper	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.0036 J**	**0.0026 J**	**0.0029 J**	**0.0032 J**
Iron	NA	NA	NA	NA	**0.64 J**	**0.42 J**	**0.29 J**	**0.43 J**	**0.48 J**	**0.71 J**	**0.78 J**	0.35 U	**0.47**	**0.28**	**0.42**
Lead	**0.0523**	**0.0016**	NA	**0.0083 J**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U
Magnesium	NA	NA	NA	NA	**33 J**	**34 J**	**30 J**	**28 J**	**31 J**	**31 J**	**32 J**	**24**	**27**	**25**	**27**
Magnesium, dissolved	NA	NA	NA	NA	**33**	**34**	**31**	**29**	**31**	**30**	**31**	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	**0.09 J**	**0.03 J**	**0.04 J**	**0.05 J**	**0.03 J**	**0.04 J**	**0.04 J**	**0.028**	**0.024**	**0.022**	**0.063**
Manganese, dissolved	NA	NA	NA	NA	**0.09**	**0.03**	**0.04**	**0.05**	**0.02**	**0.02**	**0.02**	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	5 U	**5.4**	**6.2**	**7.7**	**8.9**	**9.7**	**11**	**4.8**	**5.9**	**5.5**	**5.9**
Potassium, dissolved	NA	NA	NA	NA	5 U	5 U	**5.6**	**7.7**	**7.1**	**7.3**	**7.6**	NA	NA	NA	NA
Selenium	**0.0015**	**0.0012**	NA	0.0012 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 UJ	0.005 U	0.005 U	0.015 U	0.015 U	0.015 U	0.015 U
Sodium	NA	NA	NA	NA	**9.3**	**6.5**	**4**	**6.2**	**6.9**	**7.1**	**7.1**	**6.9**	**9.2**	**8.6**	**9.3**
Sodium, dissolved	NA	NA	NA	NA	**9.3**	**6.6**	**4.2**	**6.4**	**6.8**	**6.9**	**7.1**	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	0.005 U	**0.007**	**0.006**	**0.006**	**0.006**	**0.006**	**0.007**	0.025 U	0.025 U	0.025 U	0.025 U
Thallium, dissolved	NA	NA	NA	NA	0.005 U	**0.008**	**0.005**	**0.005**	**0.006**	0.005 U	0.005 U	NA	NA	NA	NA
Zinc	**0.0919**	**0.0141**	NA	**0.0131**	**0.02 J**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.024 J**	**0.078**	**0.015 J**	**0.036 J**
Zinc, dissolved	NA	NA	NA	NA	**0.02**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA

TABLE 4-4
Concentrations of Detected Analytes in Surface Water
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Notes:
1. Investigation phase indicates in which phase the samples were collected
   Phase I - Samples collected during Phase I Site Investigation (LAW, 1995).
   Phase II - Samples collected during Phase II Site Investigation (Program Management Company, 2000)
   RI - Samples collected as part of the Remedial Investigation field investigation conducted by Ellis Environmental.
2. TCDD-TEQ is a calculated number used for risk assessment purposes

Legend:
NA - not analyzed
Bold - Indicates analyte detected
A - Concentration exceeds the instrument calibration range
a - Concentration is below the reporting limit
B - Organics: The constituent was detected in associated field or laboratory blank samples
Inorganics: Reported value is less than the contract required detection limit but above the instrument detection limit
C - Confirmed by gas chromatography / mass spectrometry (GC/MS)
CON - Confirmation analysis for dioxins / furans
D or I - The original sample was diluted and re-analyzed because detected concentrations were outside the instrument detection range
DUP - Duplicate
E - Organics:The reported concentration exceeds the calibration range of the GC/MS instrument
Inorganics:The value is estimated due to matrix interferences
H - Possibly biased high based upon QC data (Phase I SI)
Alternate peak selection upon analytical review (RI)
J - While the identity of the constituent is positive, the reported concentration is estimated
L - Possibly biased low or a false negative based upon QC data
M - Result was manually integrated
N - Spiked sample recovery not within control limits
PR - Value is underestimated due to the presence of poorly resolved GC peaks
Q - Quantitative interference in sample (Phase II SI)
Detected below the practical quantitation limit (Phase I SI)
R - Data rejected based upon QC data
RE - Reanalyzed
U - The constituent was not detected above MDLs
* - Batch QC exceeds the upper or lower control limits

TABLE 4-5
Concentrations of Detected Analytes in Sediment
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Location	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	Background	East Ditch	Background	West Ditch	West Ditch
Sample ID	LCK-SE1	LCK-SE1-RE	LCK-SE2	LCK-SE2-RE	LCK-SE3	LCK-SE3 Dup 1	LCK-SE3	LCKSD-1	LCKSD-2	LCKSD-3	LCKSD-4	LCKSD-5
Sample Date	5/26/1995	5/26/1995	5/26/1995	5/26/1995	5/26/1995	5/26/1995	5/26/1995	8/25/1997	8/25/1997	8/25/1997	8/25/1997	8/25/1997
Phase	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	Phase II
PARAMETER_NAME		**Resampled**		**Resampled**		**Resampled**	**Duplicate**					
Volatile Organic Compounds (VOCs) (mg/kg)												
Acetone	NA	**0.019 JB**	NA	**0.004 JB**	NA	**0.033 JB**	**0.005 JB**	**0.012 J**	**0.028**	**0.031**	**0.14**	0.012 U
Carbon disulfide	NA	0.006 U	NA	0.006 U	NA	0.006 U	0.006 U	0.0096 U	**0.0059 J**	**0.0066 J**	0.011 U	0.0059 U
Chloroethane	NA	0.011 U	NA	0.012 U	NA	0.012 U	0.012 U	0.0096 U	0.0062 U	0.0069 U	0.011 U	0.0059 U
Methyl ethyl ketone	NA	0.011 U	NA	0.012 U	NA	0.012 U	0.012 U	0.019 U	**0.0096 J**	**0.012 J**	**0.036**	0.012 U
Methylene chloride	NA	**0.024**	NA	**0.063 JB**	NA	**0.026 JB**	**0.027 JB**	0.0096 U	0.0062 U	0.0069 U	0.011 U	0.0059 U
Toluene	NA	0.006 U	NA	**0.002 JQ**	NA	0.006 U	0.006 U	0.0096 U	0.0062 U	0.0069 U	0.011 U	0.0059 U
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (SVOCs) (mg/kg)												
Acenaphthene	0.4 U	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Anthracene	0.4 U	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Benz(a)anthracene	**0.063 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	**0.53 J**	0.41 U	0.46 U	0.73 U	0.39 U
Benzo(a)pyrene	**0.17 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	**0.55 J**	0.41 U	0.46 U	0.73 U	0.39 U
Benzo(b)fluoranthene	**0.26 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	**0.77**	0.41 U	**0.36 J**	**0.47 J**	0.39 U
Benzo(ghi)perylene	**0.16 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Benzo(k)fluoranthene	**0.2 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Bis(2-ethylhexyl) phthalate	**0.1 JQ**	NA	0.39 U	NA	**0.04 JQ**	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Chrysene	**0.2 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	**0.56 J**	0.41 U	**0.29 J**	**0.37 J**	0.39 U
Dibenzofuran	0.4 U	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Di-n-butyl phthalate	0.4 U	NA	**0.065 JB**	NA	**0.22 JB**	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Fluoranthene	**0.36 JQ**	NA	0.39 U	NA	**0.086 JQ**	NA	**0.062 JQ**	**1.2**	**0.23 J**	**0.53**	**0.71 J**	0.39 U
Fluorene	**0.05 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Indeno(1,2,3-cd)pyrene	**0.14 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Methylnaphthalene, 2-	0.4 U	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Naphthalene	0.4 U	NA	0.39 U	NA	0.4 U	NA	0.39 U	0.64 U	0.41 U	0.46 U	0.73 U	0.39 U
Phenanthrene	**0.16 JQ**	NA	0.39 U	NA	0.4 U	NA	0.39 U	**0.94**	0.41 U	**0.24 J**	0.73 U	0.39 U
Pyrene	**0.27 JQ**	NA	0.39 U	NA	**0.065 JQ**	NA	**0.049 JQ**	**1.1**	**0.22 J**	**0.42 J**	**0.63 J**	0.39 U
Pesticides/PCBs (mg/kg)												
DDD, p,p'-	**0.012**	NA	0.0038 U	NA	**0.01**	NA	**0.012**	0.0064 U	0.0041 U	0.0046 U	0.0073 U	**0.019**
DDE, p,p'-	0.0039 U	NA	0.0038 U	NA	0.0039 U	NA	0.0039 U	0.0064 U	0.0041 U	0.0046 U	0.0073 U	0.0039 U
DDT, p,p'-	0.0039 U	NA	0.0038 U	NA	**0.0063**	NA	**0.0047**	0.0064 U	0.0041 U	0.0046 U	0.0073 U	**0.0043**
PCB 1260	0.039 U	NA	0.038 U	NA	0.039 U	NA	0.039 U	0.064 U	0.041 U	0.046 U	0.073 U	0.039 U
Dioxin (mg/kg)												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.000025**	NA	**0.0000068**	NA	**0.000001 J**
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	NA	NA	NA	NA	NA	NA	NA	**0.0000028**	NA	0.0000006 U	NA	0.0000012 U
Heptachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	**0.0000659**	NA	**0.0000068 E**	NA	**0.000001**
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.000115**	NA	**0.0000224**	NA	**0.0000034 J**
Heptachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	**0.000218**	NA	**0.0000453**	NA	**0.0000067 J**
Hexachlorodibenzofuran, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000048**	NA	**0.0000025**	NA	0.0000008 U
Hexachlorodibenzofuran, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000021**	NA	**0.00000089**	NA	0.0000006 U
Hexachlorodibenzofuran, 2,3,4,6,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000032**	NA	**0.0000015 B**	NA	0.0000008 U

TABLE 4-5
Concentrations of Detected Analytes in Sediment
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Location	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	Background	East Ditch	Background	West Ditch	West Ditch
Sample ID	LCK-SE1	LCK-SE1-RE	LCK-SE2	LCK-SE2-RE	LCK-SE3	LCK-SE3 Dup 1	LCK-SE3	LCKSD-1	LCKSD-2	LCKSD-3	LCKSD-4	LCKSD-5
Sample Date	5/26/1995	5/26/1995	5/26/1995	5/26/1995	5/26/1995	5/26/1995	5/26/1995	8/25/1997	8/25/1997	8/25/1997	8/25/1997	8/25/1997
Phase	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	Phase II
PARAMETER_NAME		Resampled		Resampled		Resampled	Duplicate					
Dioxin (mg/kg)												
Hexachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	**0.0000418**	NA	**0.0000135**	NA	**0.00000089 J**
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000033**	NA	**0.00000095**	NA	0.0000013 U
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000061**	NA	**0.0000013**	NA	0.0000011 U
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	NA	NA	NA	NA	NA	NA	NA	**0.0000056**	NA	**0.0000022**	NA	0.0000012 U
Hexachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	**0.0000449**	NA	**0.0000149**	NA	**0.0000067 J**
Octachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	**0.0000515**	NA	**0.0000095**	NA	0.0000021 U
Octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	**0.00085**	NA	**0.000179**	NA	**0.0000313**
Pentachlorodibenzofuran, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000012**	NA	**0.00000059**	NA	0.0000007 U
Pentachlorodibenzofuran, 2,3,4,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000016**	NA	**0.00000093 B**	NA	0.0000007 U
Pentachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	**0.000024**	NA	**0.0000086**	NA	**0.0000009 J**
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000015**	NA	**0.00000082**	NA	0.0000013 U
Pentachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	**0.0000053**	NA	**0.0000035**	NA	**0.0000023 J**
TCDD-TEQ	NA	NA	NA	NA	NA	NA	NA	**8.25315E-06**	NA	**3.59135E-06**	NA	**3.05074E-06**
Tetrachlorodibenzofuran, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000013 B**	NA	**0.00000079 B**	NA	0.0000004 U
Tetrachlorodibenzofurans, total	NA	NA	NA	NA	NA	NA	NA	**0.0000141**	NA	**0.0000107**	NA	0.0000004 U
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	NA	NA	NA	NA	NA	NA	NA	**0.0000017**	NA	**0.00000093**	NA	**0.0000018 J**
Tetrachlorodibenzo-p-dioxins, total	NA	NA	NA	NA	NA	NA	NA	**0.0000045**	NA	**0.0000026**	NA	**0.0000018 J**
Metals (mg/kg)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	**8500**	**4400**	**4600**	**5700**	**3200**
Arsenic	**11.3 J**	NA	**14.1**	NA	**3**	NA	**4.2**	**42.8 J**	**10.1 J**	**6.35 J**	**16.8 J**	**9.78 J**
Barium	**12.5**	NA	**30.9**	NA	**17.2**	NA	**14.6**	89 U	24 U	52 U	29 U	29 U
Beryllium	NA	NA	NA	NA	NA	NA	NA	**2.09**	1.2 U	1.3 U	2.2 U	1.2 U
Cadmium	**0.48**	NA	**1.3**	NA	0.42 U	NA	0.42 U	**2.03**	1.2 U	**1.6**	2.2 U	1.2 U
Calcium	NA	NA	NA	NA	NA	NA	NA	**110000**	**130000**	**83000**	**160000**	**88000**
Chromium, total	**5.1**	NA	**5.7**	NA	**3.5**	NA	**4.4**	**40**	**9.6**	**10**	**12**	**6.9 J**
Cobalt	NA	NA	NA	NA	NA	NA	NA	**14**	**6.2**	**6.7**	**16**	**5.6**
Copper	NA	NA	NA	NA	NA	NA	NA	**54**	**18**	**20**	**26**	**13**
Iron	NA	NA	NA	NA	NA	NA	NA	**63000**	**18000**	**16000**	**24000**	**16000**
Lead	**15.1 JL**	NA	**11.4**	NA	**10.3**	NA	**12.8**	**114**	**12.4**	**20.2**	**16.5**	**11.3 J**
Magnesium	NA	NA	NA	NA	NA	NA	NA	**43000**	**46000**	**21000**	**44000**	**24000**
Manganese	NA	NA	NA	NA	NA	NA	NA	**360**	**380**	**380**	**420**	**300 J**
Mercury	0.06 U	NA	0.058 U	NA	0.06 U	NA	0.059 U	0.19 U	0.12 U	0.14 U	0.22 U	0.12 U
Nickel	NA	NA	NA	NA	NA	NA	NA	**47**	**19**	**20**	**36**	**16**
Potassium	NA	NA	NA	NA	NA	NA	NA	1912 U	1300 U	1381 U	2188 U	1177 U
Selenium	**0.27 JL**	NA	0.14 U	NA	0.14 U	NA	0.14 U	**4.03**	**0.704**	0.69 U	1.09 U	0.59 U
Sodium	NA	NA	NA	NA	NA	NA	NA	382 U	250 U	276 U	438 U	235 U
Thallium	NA	NA	NA	NA	NA	NA	NA	3 U	1 U	1 U	2 U	1 U
Vanadium	NA	NA	NA	NA	NA	NA	NA	**42**	**15**	**14**	**21**	**10**
Zinc	NA	NA	NA	NA	NA	NA	NA	**200**	**73**	**82**	**120**	**50 J**

TABLE 4-5
Concentrations of Detected Analytes in Sediment
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Location	West Ditch	West Ditch	Background	Background	Background	Background	Background	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch
Sample ID	LCKSD-5 Dup	LCKSD-5 Dup	LCKSD-10	LCKSD-11	LCKSD-11	LCKSD-11	LCKSD-12	EEGLKB-SD01	EEGLKB-SD02	EEGLKB-SD02	EEGLKB-SD03	EEGLKB-SD04
Sample Date	8/25/1997	8/25/1997	11/10/1998	11/10/1998	11/10/1998	11/10/1998	11/10/1998	7/30/2003	7/31/2003	7/31/2003	7/31/2003	7/31/2003
Phase	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	RI	RI	RI	RI	RI
PARAMETER_NAME	**Duplicate**	**Duplicate**			**Duplicate**	**Duplicate**				**Duplicate**		
Volatile Organic Compounds (VOCs) (mg/kg)												
Acetone	**0.0099 J**	0.013 U	NA	NA	NA	NA	NA	**0.016 J**	**9.8**	0.1 U	**1.6 J**	**0.043 J**
Carbon disulfide	0.0063 U	0.0063 U	NA	NA	NA	NA	NA	0.011 U	0.097 U	0.1 U	0.0099 U	0.014 U
Chloroethane	0.0063 U	0.0063 U	NA	NA	NA	NA	NA	0.0057 U	0.097 U	0.1 U	0.0049 U	**0.0048 J**
Methyl ethyl ketone	0.013 U	0.013 U	NA	NA	NA	NA	NA	0.023 U	0.097 U	0.1 U	0.02 U	0.028 U
Methylene chloride	0.0063 U	0.0063 U	NA	NA	NA	NA	NA	0.011 U	0.097 U	0.1 U	0.0099 R	0.014 U
Toluene	0.0063 U	0.0063 U	NA	NA	NA	NA	NA	**0.002 J**	0.024 U	0.025 U	0.0049 U	**0.0024 J**
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	**0.0038 J**	0.097 U	0.1 U	**0.0022 B**	**0.0035 J**
Semi-Volatile Organic Compounds (SVOCs) (mg/kg)												
Acenaphthene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.038**	**0.016 J**	**0.028 J**	0.048 U
Anthracene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.05 J**	**0.029 J**	**0.047 J**	0.048 U
Benz(a)anthracene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.13**	**0.073**	**0.082**	**0.021 J**
Benzo(a)pyrene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.1 J**	**0.051 J**	**0.072 J**	**0.029 J**
Benzo(b)fluoranthene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.16**	**0.09**	**0.11 J**	**0.035 J**
Benzo(ghi)perylene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.055 J**	**0.031 J**	**0.048 J**	**0.036 J**
Benzo(k)fluoranthene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.13 J**	**0.076 J**	**0.091 J**	**0.053 J**
Bis(2-ethylhexyl) phthalate	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.22 U	**0.15 J**	**0.15 J**	**0.13 J**	0.24 U
Chrysene	0.42 U	0.42 U	NA	NA	NA	NA	NA	**0.014 J**	**0.21 J**	**0.14 J**	**0.22 J**	**0.052 J**
Dibenzofuran	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.088 U	**0.019 J**	**0.02 J**	0.079 U	0.097 U
Di-n-butyl phthalate	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.22 U	0.18 U	0.2 U	0.2 U	0.24 U
Fluoranthene	0.42 U	0.42 U	NA	NA	NA	NA	NA	**0.024 J**	**0.65 J**	**0.32 J**	**0.57 J**	**0.074**
Fluorene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.019 J**	**0.017 J**	0.039 U	0.048 U
Indeno(1,2,3-cd)pyrene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.038**	**0.016 J**	**0.028 J**	0.048 U
Methylnaphthalene, 2-	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.047**	**0.029 J**	**0.048**	0.048 U
Naphthalene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.032 J**	0.039 U	0.039 U	0.048 U
Phenanthrene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.12**	**0.081**	**0.21**	0.048 U
Pyrene	0.42 U	0.42 U	NA	NA	NA	NA	NA	0.043 U	**0.37**	**0.24**	**0.35 J**	**0.069**
Pesticides/PCBs (mg/kg)												
DDD, p,p'-	**0.021**	**0.0082**	NA	NA	NA	NA	NA	0.011 U	**0.028**	**0.031**	**0.077**	**0.008**
DDE, p,p'-	0.0042 U	0.0042 U	NA	NA	NA	NA	NA	0.011 U	**0.0053**	**0.0068**	**0.0091 J**	0.0025 U
DDT, p,p'-	**0.0044**	0.0042 U	NA	NA	NA	NA	NA	0.011 U	**0.0064**	**0.0062**	**0.019**	**0.0067**
PCB 1260	0.042 U	0.042 U	NA	NA	NA	NA	NA	**0.023**	0.019 U	0.02 U	0.02 UJ	0.024 U
Dioxin (mg/kg)												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	**0.00000089 J**	**0.00000084 J**	**0.000107**	**0.0000288**	**0.0000257**	**0.0000236**	0.0000003 U	0.0000017 U	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	0.0000004 U	0.0000011 U	**0.0000091**	**0.0000135 CJ**	**0.0000019 JC**	0.0000017 U	0.0000004 U	0.00000032 U	NA	NA	NA	NA
Heptachlorodibenzofurans, total	**0.000002 J**	**0.00000084 J**	**0.000216 C**	**0.000085 JC**	**0.0000594 C**	**0.0000535 J**	0.0000004 U	0.0000017 U	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	**0.0000043**	**0.000004**	**0.000429**	**0.000131**	**0.000101**	**0.0001**	**0.0000014 J**	**0.000021**	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total	**0.0000087**	**0.0000076**	**0.000873**	**0.000257**	**0.000199**	**0.000207**	**0.0000032 C**	**0.000046**	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-	0.0000003 U	0.0000007 U	**0.0000241**	**0.0000055**	**0.0000056**	**0.000005 J**	**0.00000031 BJ**	0.00000094 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,6,7,8-	0.0000002 U	0.0000005 U	**0.0000128 C**	**0.0000034 J**	**0.0000031 J**	**0.000003 J**	0.0000002 U	0.00000049 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-	**0.00000063 B**	0.0000008 U	**0.0000118**	**0.0000035 J**	**0.0000036 J**	**0.0000035 J**	0.0000002 U	0.00000049 U	NA	NA	NA	NA

TABLE 4-5
Concentrations of Detected Analytes in Sediment
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Location	West Ditch	West Ditch	Background	Background	Background	Background	Background	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch
Sample ID	LCKSD-5 Dup	LCKSD-5 Dup	LCKSD-10	LCKSD-11	LCKSD-11	LCKSD-11	LCKSD-12	EEGLKB-SD01	EEGLKB-SD02	EEGLKB-SD02	EEGLKB-SD03	EEGLKB-SD04
Sample Date	8/25/1997	8/25/1997	11/10/1998	11/10/1998	11/10/1998	11/10/1998	11/10/1998	7/30/2003	7/31/2003	7/31/2003	7/31/2003	7/31/2003
Phase	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	RI	RI	RI	RI	RI
PARAMETER_NAME	Duplicate	Duplicate			Duplicate	Duplicate				Duplicate		
Dioxin (mg/kg)												
Hexachlorodibenzofurans, total	0.00000092	0.0000009 J	0.000193 C	0.0000659 JC	0.000061	0.000055 C	0.00000046 CB	0.0000015 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	0.0000004 U	0.0000013 U	0.0000097	0.0000023 J	0.0000021 JC	0.0000021 JC	0.0000003 U	0.0000006 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	0.0000004 U	0.0000011 U	0.0000256	0.0000081 J	0.0000064	0.0000042 JC	0.0000003 U	0.000001 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	0.0000004 U	0.0000011 U	0.0000276	0.0000059	0.0000067	0.0000056	0.0000003 U	0.0000015 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total	0.0000013 J	0.0000011	0.000217 C	0.0000561 C	0.0000491 C	0.0000426 C	0.00000095 C	0.0000027 U	NA	NA	NA	NA
Octachlorodibenzofuran	0.0000015 J	0.0000022 U	0.000141	0.0000459	0.0000408	0.0000371	0.0000005 U	0.0000028 U	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	0.0000341	0.0000274	0.00358	0.00173	0.00127	0.00175	0.0000327	0.0013	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-	0.0000003 U	0.0000008 U	0.0000057 C	0.0000015 JC	0.0000018 J	0.0000012 J	0.0000002 U	0.00000052 U	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-	0.0000003 U	0.0000008 U	0.0000099 C	0.0000022 J	0.0000021 JC	0.000002 JC	0.0000002 U	0.00000051 U	NA	NA	NA	NA
Pentachlorodibenzofurans, total	0.0000012 J	0.0000008 U	0.000154 C	0.0000632 JC	0.0000605 C	0.0000593 C	0.0000002 U	0.0000015 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	0.0000005 U	0.0000016 U	0.0000064 C	0.0000018 J	0.0000021 J	0.0000015 J	0.0000002 U	0.00000077 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total	0.0000005 U	0.0000016 U	0.000066 C	0.000013 JC	0.0000173 C	0.0000162 C	0.0000002 U	0.000001 U	NA	NA	NA	NA
TCDD-TEQ	4.06296E-06	2.92175E-06	3.11931E-05	8.88559E-06	9.20208E-06	7.57321E-06	1.5348E-06	1.45674E-06	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-	0.0000002 U	0.0000005 U	0.0000043	0.0000014	0.0000014	0.0000012	0.00000053 J	0.00000045 U	NA	NA	NA	NA
Tetrachlorodibenzofurans, total	0.0000002 U	0.0000005 U	0.000118 C	0.0000427 C	0.0000339 CB	0.000036 C	0.0000132 B	0.00000074	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	0.0000035 J	0.0000015	0.000002	0.0000011	0.0000015	0.0000011	0.0000012	0.00000058 U	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total	0.0000035 J	0.0000015	0.0000317 C	0.0000111 JC	0.0000097 C	0.0000082 C	0.0000031 C	0.0000029	NA	NA	NA	NA
Metals (mg/kg)												
Aluminum	4200	3100	NA	NA	NA	NA	NA	8300	2700	2300	3100 J	12000
Arsenic	11.3 J	10.9 J	NA	NA	NA	NA	NA	10	22	16	13 J	18
Barium	19 U	17 U	NA	NA	NA	NA	NA	95	16	17	38 J	110
Beryllium	1.2 U	1.2 U	NA	NA	NA	NA	NA	0.43 J	0.22 J	0.16 J	0.24 J	0.56
Cadmium	1.2 U	1.2 U	NA	NA	NA	NA	NA	0.15 J	0.44 J	0.34 J	0.63	0.67 U
Calcium	93000	110000	NA	NA	NA	NA	NA	18000	110000	100000	85000 J	11000
Chromium, total	8.4	7	NA	NA	NA	NA	NA	12	6.4	5	6.4	16
Cobalt	6.3	5.1	NA	NA	NA	NA	NA	8	4.8	3.4	6.6	10
Copper	16	15	NA	NA	NA	NA	NA	20	17	10	23 J	24
Iron	17000	14000	NA	NA	NA	NA	NA	20000	21000	15000	14000 J	28000
Lead	15.6	12.5	NA	NA	NA	NA	NA	14	21	18	29	51
Magnesium	31000	40000	NA	NA	NA	NA	NA	6400	30000	32000	25000	6300
Manganese	250	320	NA	NA	NA	NA	NA	410	260	260	240 J	200
Mercury	0.13 U	0.13 U	NA	NA	NA	NA	NA	0.029	0.018	0.02	0.022	0.042
Nickel	19	15	NA	NA	NA	NA	NA	25	15	10	19	28
Potassium	1254 U	1257 U	NA	NA	NA	NA	NA	1600	1100	840	1300 J	2100
Selenium	0.63 U	0.63 U	NA	NA	NA	NA	NA	1.9 U	0.5 J	0.7 J	0.7 J	2 U
Sodium	250 U	251 U	NA	NA	NA	NA	NA	180 J	200 J	200 J	230 J	200 J
Thallium	1 U	1 U	NA	NA	NA	NA	NA	1.9 J	1.7 J	1.3 J	2 J	2 J
Vanadium	14	12	NA	NA	NA	NA	NA	23	10	8.5	13	29
Zinc	58	48	NA	NA	NA	NA	NA	72	58	48	90 J	90

TABLE 4-5
Concentrations of Detected Analytes in Sediment
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Notes:
1. Investigation phase indicates in which phase the samples were collected
   Phase I - Samples collected during Phase I Site Investigation (LAW, 1995).
   Phase II - Samples collected during Phase II Site Investigation (Program Management Company, 2000)
   RI - Samples collected as part of the Remedial Investigation field investigation conducted by Ellis Environmental.
2. TCDD-TEQ is a calculated number used for risk assessment purposes

Legend:
NA - not analyzed
Bold - Indicates analyte detected
A - Concentration exceeds the instrument calibration range
a - Concentration is below the reporting limit
B - Organics: The constituent was detected in associated field or laboratory blank samples
Inorganics: Reported value is less than the contract required detection limit but above the instrument detection limit
C - Confirmed by gas chromatography / mass spectrometry (GC/MS)
CON - Confirmation analysis for dioxins / furans
D or I - The original sample was diluted and re-analyzed because detected concentrations were outside the instrument detection range
DUP - Duplicate
E - Organics:The reported concentration exceeds the calibration range of the GC/MS instrument
Inorganics:The value is estimated due to matrix interferences
H - Possibly biased high based upon QC data (Phase I SI)
Alternate peak selection upon analytical review (RI)
J - While the identity of the constituent is positive, the reported concentration is estimated
L - Possibly biased low or a false negative based upon QC data
M - Result was manually integrated
N - Spiked sample recovery not within control limits
PR - Value is underestimated due to the presence of poorly resolved GC peaks
Q - Quantitative interference in sample (Phase II SI)
Detected below the practical quantitation limit (Phase I SI)
R - Data rejected based upon QC data
RE - Reanalyzed
U - The constituent was not detected above RLs
* - Batch QC exceeds the upper or lower control limits

TABLE 4-6
Concentrations of Detected Analytes in Seep Water
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Location	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	West Ditch	East Ditch	West Ditch
Sample ID	LCK-SW4	LCK-SW5	LCK-SW5	LCKSP-1	LCKSP-1	LCKSP-1	LCKSP-2	LCKSP-3	EEGLKB-SP01
			DUP1		LCKSP-6 DUP	LCKSP-7 DUP			
Sample Date	5/26/1995	5/26/1995	5/26/1995	8/26/1997	8/26/1997	8/26/1997	8/26/1997	8/26/1997	8/7/2003
Phase	Phase I	Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	Phase II	RI
PARAMETER_NAME			Duplicate		Duplicate	Duplicate			
Volatile Organic Compounds (mg/L)									
Carbon disulfide	0.005 U	0.005 U	0.005 U	0.001 U	**0.016 J**	**0.023**	**0.002**	0.001 U	0.002 U
Dichloroethenes, 1,2-, total	0.005 U	0.005 U	0.005 U	**0.00067 J**	**0.00066 J**	**0.00062 J**	**0.00085 J**	0.001 U	NA
Methylene chloride	**0.003 JB**	**0.004 JB**	**0.002 B**	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U
Trichloroethene	0.005 U	0.005 U	0.005 U	**0.00063 J**	**0.00061 J**	**0.00072 J**	0.001 U	0.001 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)									
Bis(2-ethylhexyl) phthalate	**0.004 JQ**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.012 U
Diethyl phthalate	0.01 U	**0.003 JQ**	**0.002 Q**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0019 U
Di-n-butyl phthalate	0.01 U	**0.002 JQ**	**0.0009 Q**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0048 U
Dioxins / Furans (mg/L)									
Octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	**0.00000014**
Metals (mg/L)									
Aluminum	NA	NA	NA	**21 J**	**2.7 J**	**1.6 J**	**21 J**	**17 J**	**62**
Arsenic	0.0018 U	**0.0023**	0.0018 U	**0.224 J**	**0.037 J**	**0.05 J**	**0.006**	**0.007**	**0.13**
Arsenic, dissolved	NA	NA	NA	**0.021 J**	0.005 U	**0.021 J**	0.005 U	0.005 U	NA
Barium	**0.0386**	**0.0785**	**0.0499**	**0.29 J**	**0.08 J**	**0.08 J**	**0.33 J**	**0.16 J**	**0.55**
Barium, dissolved	NA	NA	NA	**0.06**	**0.06**	**0.06**	**0.16**	**0.06**	NA
Beryllium	NA	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	**0.0056**
Cadmium	0.0035 U	0.0035 U	0.0035 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	**0.011**
Calcium	NA	NA	NA	**470 J**	**260 J**	**270 J**	**310 J**	**260 J**	**920**
Calcium, dissolved	NA	NA	NA	**250**	**250**	**260**	**140**	**140**	NA
Chromium, total	0.0042 U	**0.0046**	0.0042 U	**0.03 J**	0.01 U	0.01 U	**0.03 J**	**0.03 J**	**0.13**
Cobalt	NA	NA	NA	**0.02 J**	0.01 U	0.01 U	**0.02 J**	**0.02 J**	**0.086**
Copper	NA	NA	NA	**0.08 J**	0.02 U	0.02 U	**0.06 J**	**0.14 J**	**0.29**
Iron	NA	NA	NA	**130 J**	**19 J**	**23 J**	**53 J**	**56 J**	**210**
Iron, dissolved	NA	NA	NA	**10**	**10**	**11**	0.1 U	0.1 U	NA
Lead	0.0015 U	**0.0193 J**	**0.0115 J**	**0.068 J**	0.005 U	0.005 U	**0.021 J**	**0.078 J**	**0.34**
Magnesium	NA	NA	NA	**140 J**	**94 J**	**98 J**	**110 J**	**110 J**	**210**
Magnesium, dissolved	NA	NA	NA	**92**	**93**	**96**	**48**	**60**	NA
Manganese	NA	NA	NA	**1.7 J**	**0.44 J**	**0.44 J**	**0.98 J**	**0.58 J**	**2.8**
Manganese, dissolved	NA	NA	NA	**0.35**	**0.35**	**0.35**	**0.1**	**0.02**	NA
Mercury	0.0001 U	0.0001 U	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	**0.00083**
Nickel	NA	NA	NA	**0.05 J**	0.04 U	0.04 U	**0.05 J**	**0.06 J**	**0.24**
Potassium	NA	NA	NA	**38 J**	**26 J**	**30 J**	**28 J**	**15**	**20**
Potassium, dissolved	NA	NA	NA	**27**	**28**	**31**	**19**	**11**	NA
Selenium	0.0012 U	0.0012 U	0.0012 U	0.005 UJ	0.005 U	0.005 U	0.005 U	**0.014**	**0.022**
Silver	0.0035 U	**0.0042**	0.0035 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Sodium	NA	NA	NA	**37**	**36**	**37**	**16**	**9.6**	**5.2**
Sodium, dissolved	NA	NA	NA	**36**	**36**	**38**	**15**	**8.6**	NA
Thallium	NA	NA	NA	0.005 U	0.005 U	**0.008**	**0.008**	**0.007**	**0.019 J**
Thallium, dissolved	NA	NA	NA	**0.006**	**0.006**	**0.008**	**0.013**	**0.011**	NA
Vanadium	NA	NA	NA	**0.05 J**	0.01 U	0.01 U	**0.05 J**	**0.05 J**	**0.17**
Zinc	**0.0052**	**0.0584 J**	**0.0126 J**	**0.26 J**	**0.03 J**	**0.05 J**	**0.21 J**	**0.32 J**	**1.4**

***Representatives of CH2M HILL, Ohio EPA, and USACE agreed at an onsite meeting that the seeps do not exist and will be excluded from the scope of the SI report and from further evaluation in this RI report. Previous seep sampling and analytical resulsts are presented here for reference only.**

Notes:
1. Investigation phase indicates in which phase the samples were collected
   Phase I - Samples collected during Phase I Site Investigation (LAW, 1995).
   Phase II - Samples collected during Phase II Site Investigation (Program Management Company, 2000)
   RI - Samples collected as part of the Remedial Investigation field investigation conducted by Ellis Environmental.
2. TCDD-TEQ is a calculated number used for risk assessment purposes

Legend:
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Detected below the practical quantitation limit (Phase I SI)
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RE - Reanalyzed
U - The constituent was not detected above RLs
* - Batch QC exceeds the upper or lower control limits

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	IDA Background LCKMW-1[3] 6/6/1995 Phase I	IDA Background LCKMW-1 9/24/1997 Phase II	IDA Background LCKMW-1 8/11/2003 RI	IDA Background LCKMW-1 DUP 8/11/2003 RI	IDA Background LCKMW-1 11/14/2003 RI	IDA Background LCKMW-1 DUP 11/14/2003 RI	IDA Background LCKMW-1 2/23/2004 RI	IDA Background LCKMW-1 DUP 2/23/2004 RI	IDA Background LCKMW-1 5/18/2004 RI	IDA Background LCKMW-1 DUP 5/18/2004 RI	UWBZ Background LCKMW-2[3] 6/6/1995 Phase I
Volatile Organic Compounds (mg/L)												
Acetone		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide		0.005 U	**0.00068** J	0.002 UJ	0.002 U	0.002 UJ	0.002 UJ	0.002 U*	0.002 U*	0.002 UJ	0.002 UJ	0.005 U
Methylene chloride		**0.006** JB	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	**0.002** JB
Toluene	1	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.01 U	0.01 U	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U	0.001 U	0.001 U	0.00098 U	0.011 U
Benz(a)anthracene		0.01 U	0.01 U	0.00022 U	0.00022 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.011 U
Benzo(a)pyrene	0.0002	0.01 U	0.01 U	0.00022 U	0.00022 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.011 U
Benzo(b)fluoranthene		0.01 U	0.01 U	0.00022 U	0.00022 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	**0.00016** J	0.0002 U	0.011 U
Benzo(ghi)perylene		0.01 U	0.01 U	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U	0.001 U	0.001 U	0.00098 U	0.011 U
Benzo(k)fluoranthene		0.01 U	0.01 U	0.00022 UJ	0.00022 U	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	**0.00019** J	0.0002 U	0.011 U
Chrysene		0.01 U	0.01 U	0.00055 U	0.00054 U	0.00049 U	0.0005 U	0.00051 U	0.00051 U	0.00051 U	0.00049 U	0.011 U
Dibenz(ah)anthracene		0.01 U	0.01 U	0.00022 U	0.00022 U	0.0002 U	0.0002 U	**0.00038**	0.0002 U	0.0002 U	0.0002 U	0.011 U
Indeno(1,2,3-cd)pyrene		0.01 U	0.01 U	0.00022 U	0.00022 U	0.0002 U	0.0002 U	**0.00036**	0.0002 U	0.0002 U	0.0002 U	0.011 U
Naphthalene		0.01 U	0.01 U	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U	0.001 U	0.001 U	0.00098 U	0.011 U
Bis(2-ethylhexyl) phthalate	0.006	0.01 U	0.01 U	0.0055 U	0.0054 U	0.0049 U	0.005 U	0.0051 U	0.0051 U	**0.0051** J	0.0098 U	0.011 U
Butylbenzyl phthalate		0.01 U	0.01 U	0.0022 U	0.0022 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.011 U
Diethyl phthalate		0.01 U	0.01 U	0.0022 U	0.0022 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.011 U
Di-n-octyl phthalate		0.01 U	0.01 U	0.011 U	0.011 U	0.0098 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.0098 U	0.011 U
Phenol		0.01 U	0.01 U	0.0055 UJ	0.0054 U	0.0049 U	0.005 U	0.0051 U	0.0051 U	0.0051 U	0.0049 U	0.011 U
Trichlorobenzene, 1,2,3-		NA	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		NA	**2.2E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total		NA	**2.2E-09** BJ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		NA	**1.3E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		NA	1.5E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		NA	**0.000000002** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total		NA	**0.000000002** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin		NA	**1.48E-08** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin; Dissolved		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		NA	1.6E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total		NA	1.6E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		NA	1.3E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total		NA	1.3E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		NA	**2.8E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		NA	1.7E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofurans, total		NA	**2.8E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		NA	1.3E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	IDA Background LCKMW-1[3] 6/6/1995 Phase I	IDA Background LCKMW-1 9/24/1997 Phase II	IDA Background LCKMW-1 8/11/2003 RI	IDA Background LCKMW-1 DUP 8/11/2003 RI	IDA Background LCKMW-1 11/14/2003 RI	IDA Background LCKMW-1 DUP 11/14/2003 RI	IDA Background LCKMW-1 2/23/2004 RI	IDA Background LCKMW-1 DUP 2/23/2004 RI	IDA Background LCKMW-1 5/18/2004 RI	IDA Background LCKMW-1 DUP 5/18/2004 RI	UWBZ Background LCKMW-2[3] 6/6/1995 Phase I
Hexachlorodibenzofuran, 1,2,3,6,7,8-		NA	**1.5E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		NA	1.4E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		NA	**4.5E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofurans, total		NA	**1.5E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran		NA	**8.2E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		NA	1.2E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		NA	1.2E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzofurans, total		NA	1.2E-09 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-		NA	**8.4E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzofurans, total		NA	**8.4E-09** B	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCDD-TEQ	3E-08	NA	**3.8208E-09**	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCDD-TEQ; Dissolved	3E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/L)												
Aluminum		NA	0.1 U	**0.065** J	**0.064** J	0.2 U	0.2 U	0.039 U	0.034 U	0.2 U	0.029 U	NA
Arsenic	0.01	**0.007**	**0.007**	**0.013** J	**0.012** J	**0.015** J	**0.014** J	**0.01** J	**0.011** J	**0.011** J	**0.012** J	**0.0029**
Arsenic, dissolved	0.01	NA	**0.006**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2	**0.886**	**0.08**	**0.072**	**0.071**	**0.071**	**0.072**	**0.067**	**0.067**	**0.074**	**0.071**	**0.19**
Barium, dissolved	2	NA	**0.08**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.004	NA	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	NA
Cadmium	0.005	0.0035 U	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0035 U
Calcium		NA	**110**	**110** J	**110**	**110**	**110**	**110**	**110**	**110**	**110**	NA
Calcium, dissolved		NA	**100**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, total	0.1	**0.0042**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0031 U	0.0034 U	0.01 U	**0.0021** J	**0.0162**
Cobalt		NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0014 U	0.0016 U	0.01 U	0.01 U	NA
Copper	1.3	NA	0.02 U	**0.0026** J	**0.0027** J	0.003 U	0.0021 U	0.01 U	0.01 U	0.002 U	0.003 U	NA
Copper, dissolved	1.3	NA	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron		**4.06**	**1.8**	**1.8**	**1.8**	**2** J	**1.9** J	**1.9** J	**2** J	**1.8**	**1.8**	**23**
Iron, dissolved		NA	**0.81**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.015	**0.0032**	0.005 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	**0.0099**
Magnesium		NA	**38**	**38**	**39**	**38**	**39**	**38**	**38**	**39**	**38**	NA
Magnesium, dissolved		NA	**33**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese		**0.0605**	**0.03**	**0.032**	**0.031**	**0.033**	**0.033**	**0.032**	**0.032**	**0.033**	**0.034**	**0.477**
Manganese, dissolved		NA	**0.03**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.002	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0001 U
Nickel		NA	0.04 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.0025** J	**0.0026** J	0.01 U	0.01 U	NA
Potassium		NA	5 U	**2.5**	**2.5**	**2.7**	**2.8**	**2.6**	**2.6**	**2.6**	**2.6**	NA
Potassium, dissolved		NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	0.0012 U	0.005 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.0012 U
Sodium		**15.8**	**14**	**15**	**16**	**16**	**17**	**17**	**16**	**17**	**17**	**9.61**
Sodium, dissolved		NA	**15**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.002	NA	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA
Vanadium		NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0029 U	0.0029 U	0.01 U	0.01 U	NA
Zinc		NA	0.02 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.023 J	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	UWBZ Background LCKMW-2 9/24/1997 Phase II	UWBZ Background LCKMW-2 8/11/2003 RI	UWBZ Background LCKMW-2 11/13/2003 RI	UWBZ Background LCKMW-2 2/23/2004 RI	UWBZ Background LCKMW-2 5/18/2004 RI	IDA Site LCKMW-3[3] 6/7/1995 Phase I	IDA Site LCKMW-3 9/18/1997 Phase II	IDA Site LCKMW-3 8/13/2003 RI	IDA Site LCKMW-3 11/13/2003 RI	IDA Site LCKMW-3 2/27/2004 RI	IDA Site LCKMW-3 5/20/2004 RI
Volatile Organic Compounds (mg/L)												
Acetone		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide		0.001 U	0.002 U	0.002 UJ	0.002 U*	0.002 UJ	0.005 U	0.001 U	0.002 U	0.002 UJ	0.002 U*	0.002 U*
Methylene chloride		0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U
Toluene	1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.01 U	0.0011 U	0.001 U	0.001 U	0.00098 U	0.011 U	0.01 U	0.00099 U	0.001 U	0.001 U	0.00099 U
Benz(a)anthracene		0.01 U	0.00021 U	0.0002 U	0.0002 U	0.0002 U	0.011 U	0.01 U	0.0002 U	0.0002 U	0.00021 U	0.0002 U
Benzo(a)pyrene	0.0002	0.01 U	0.00021 U	0.0002 U	0.0002 U	0.0002 U	0.011 U	0.01 U	0.0002 U	0.0002 U	0.00021 U	0.0002 U
Benzo(b)fluoranthene		0.01 U	0.00021 U	0.0002 U	0.0002 U	**0.00017** J	0.011 U	0.01 U	0.0002 U	0.0002 U	0.00021 U	0.0002 U
Benzo(ghi)perylene		0.01 U	0.0011 U	0.001 U	0.001 U	0.00098 U	0.011 U	0.01 U	0.00099 U	0.001 U	**0.00021** J	0.00099 U
Benzo(k)fluoranthene		0.01 U	0.00021 U	0.0002 UJ	0.0002 UJ	**0.00022**	0.011 U	0.01 U	0.0002 U	0.0002 UJ	**0.00021** UJ	0.0002 U
Chrysene		0.01 U	0.00053 U	0.0005 U	0.0005 U	0.00049 U	0.011 U	0.01 U	0.0005 U	0.0005 U	0.00052 U	0.0005 U
Dibenz(ah)anthracene		0.01 U	0.00021 U	0.0002 U	0.0002 U	0.0002 U	0.011 U	0.01 U	0.0002 U	0.0002 U	**0.00021**	0.0002 U
Indeno(1,2,3-cd)pyrene		0.01 U	0.00021 U	0.0002 U	0.0002 U	0.0002 U	0.011 U	0.01 U	0.0002 U	0.0002 U	**0.0002** J	0.0002 U
Naphthalene		0.01 U	0.0011 U	0.001 U	0.001 U	0.00098 U	0.011 U	0.01 U	0.00099 U	0.001 U	0.001 U	0.00099 U
Bis(2-ethylhexyl) phthalate	0.006	0.01 U	0.0053 U	0.005 U	0.005 U	0.0098 U	0.011 U	0.01 U	0.005 U	**0.0055**	**0.017**	0.0099 U
Butylbenzyl phthalate		0.01 U	0.0021 U	0.002 U	0.002 U	0.002 U	0.011 U	0.01 U	0.002 U	0.002 U	0.0021 U	0.002 U
Diethyl phthalate		0.01 U	0.0021 U	0.002 U	0.002 U	0.002 U	0.011 U	0.01 U	0.002 U	0.002 U	0.0021 U	0.002 U
Di-n-octyl phthalate		0.01 U	0.011 U	0.01 U	0.01 U	0.0098 U	0.011 U	0.01 U	0.0099 U	0.01 U	0.01 U	0.0099 U
Phenol		0.01 U	0.0053 U	0.005 U	0.005 U	0.0049 U	0.011 U	0.01 U	0.005 U	0.005 U	0.0052 U	0.005 U
Trichlorobenzene, 1,2,3-		NA	0.001 U	0.001 U	0.001 U	**0.00064** J	NA	NA	0.001 U	0.001 U	0.001 U	0.001 U
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		**1.03E-08** B	NA	NA	NA	NA	NA	**3.9E-09**	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total		**2.27E-08** B	NA	NA	NA	NA	NA	**3.9E-09**	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		1.9E-09 U	NA	NA	NA	NA	NA	2.5E-09 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		1.7E-09 U	NA	NA	NA	NA	NA	2.1E-09 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		1.6E-09 U	NA	NA	NA	NA	NA	2.1E-09 U	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total		**2.5E-09** B	NA	NA	NA	NA	NA	2.2E-09 U	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin		**0.00000052**	NA	NA	NA	NA	NA	**1.68E-08**	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin; Dissolved		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		**0.000000002** B	NA	NA	NA	NA	NA	2.1E-09 U	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total		**0.000000002** B	NA	NA	NA	NA	NA	2.1E-09 U	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		**0.000000004** J	NA	NA	NA	NA	NA	1.8E-09 U	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total		**0.000000004** J	NA	NA	NA	NA	NA	1.8E-09 U	NA	NA	NA	NA
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		**3.2E-09** B	NA	NA	NA	NA	NA	0.000000002 U	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		0.000000002 U	NA	NA	NA	NA	NA	2.3E-09 U	NA	NA	NA	NA
Heptachlorodibenzofurans, total		**3.4E-09** B	NA	NA	NA	NA	NA	2.1E-09 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		**3.6E-09** B	NA	NA	NA	NA	NA	**2.4E-09** B	NA	NA	NA	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	UWBZ Background LCKMW-2 9/24/1997 Phase II	UWBZ Background LCKMW-2 8/11/2003 RI	UWBZ Background LCKMW-2 11/13/2003 RI	UWBZ Background LCKMW-2 2/23/2004 RI	UWBZ Background LCKMW-2 5/18/2004 RI	IDA Site LCKMW-3[3] 6/7/1995 Phase I	IDA Site LCKMW-3 9/18/1997 Phase II	IDA Site LCKMW-3 8/13/2003 RI	IDA Site LCKMW-3 11/13/2003 RI	IDA Site LCKMW-3 2/27/2004 RI	IDA Site LCKMW-3 5/20/2004 RI
Hexachlorodibenzofuran, 1,2,3,6,7,8-		1.2E-09 U	NA	NA	NA	NA	NA	1.6E-09 U	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		1.6E-09 U	NA	NA	NA	NA	NA	**3.3E-09**	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		**6.9E-09** B	NA	NA	NA	NA	NA	**5.1E-09** B	NA	NA	NA	NA
Hexachlorodibenzofurans, total		**1.05E-08** B	NA	NA	NA	NA	NA	**1.08E-08** B	NA	NA	NA	NA
Octachlorodibenzofuran		**6.8E-09** B	NA	NA	NA	NA	NA	**5.2E-09**	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		1.2E-09 U	NA	NA	NA	NA	NA	1.9E-09 U	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		1.2E-09 U	NA	NA	NA	NA	NA	1.9E-09 U	NA	NA	NA	NA
Pentachlorodibenzofurans, total		1.2E-09 U	NA	NA	NA	NA	NA	1.9E-09 U	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-		**9.4E-09** B	NA	NA	NA	NA	NA	**6.4E-09** B	NA	NA	NA	NA
Tetrachlorodibenzofurans, total		**6.6E-09** B	NA	NA	NA	NA	NA	**4.7E-09** B	NA	NA	NA	NA
TCDD-TEQ	3E-08	**8.91768E-09**	NA	NA	NA	NA	NA	**4.6702E-09**	NA	NA	NA	NA
TCDD-TEQ; Dissolved	3E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/L)												
Aluminum		**11**	**0.12** J	0.2 U	0.03 U	0.2 U	NA	**0.14**	**0.99**	**0.044** J	**0.11** J	0.1 U
Arsenic	0.01	**0.005**	0.02 U	0.02 U	0.02 U	0.02 U	**0.0189** JL	**0.008**	**0.015** J	**0.011** J	**0.013** J	**0.011** J
Arsenic, dissolved	0.01	0.005 U	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA	NA
Barium	2	**0.18**	**0.11**	**0.11**	**0.094**	**0.1**	**0.88**	**0.57**	**0.62**	**0.59**	**0.59**	**0.59**
Barium, dissolved	2	**0.09**	NA	NA	NA	NA	NA	**0.46**	NA	NA	NA	NA
Beryllium	0.004	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	NA	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U
Cadmium	0.005	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0035 U	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U
Calcium		**220**	**210**	**220**	**220**	**220**	NA	**82**	**99**	**86**	**89**	**84** J
Calcium, dissolved		**160**	NA	NA	NA	NA	NA	**70**	NA	NA	NA	NA
Chromium, total	0.1	**0.02**	0.01 U	0.01 U	0.0023 U	0.01 U	**0.0265**	0.01 U	**0.0064** J	0.01 U	**0.0031** J	**0.0027** J
Cobalt		**0.01**	0.01 U	0.01 U	0.0012 U	0.01 U	NA	0.01 U	**0.0024** J	0.01 U	0.01 U	0.01 U
Copper	1.3	**0.04**	**0.0025** J	0.01 U	0.01 U	0.0046 U	NA	**0.05**	**0.015**	0.01 U	0.01 U	0.01 U
Copper, dissolved	1.3	0.02 U	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA
Iron		**24**	**0.056** J	0.2 U	0.21 U	0.2 U	**45.8**	**1.6**	**4.5**	**1.5** J	**1.7**	**1.5**
Iron, dissolved		0.1 U	NA	NA	NA	NA	NA	**0.13**	NA	NA	NA	NA
Lead	0.015	**0.013**	0.0075 U	0.0075 U	0.0075 U	0.0075 U	**0.0348** JH	0.005 U	**0.0062** J	0.0075 U	0.0075 U	0.0075 U
Magnesium		**72**	**56**	**57**	**56**	**57**	NA	**27**	**32**	**29**	**29**	**28**
Magnesium, dissolved		**43**	NA	NA	NA	NA	NA	**28**	NA	NA	NA	NA
Manganese		**0.31**	**0.025**	**0.061**	**0.006** J	**0.013**	**1** JL	**0.03**	**0.093**	**0.027**	**0.03**	**0.029**
Manganese, dissolved		**0.1**	NA	NA	NA	NA	NA	**0.01**	NA	NA	NA	NA
Mercury	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0001 U	0.0002 U	0.0004 U	0.0002 U	0.0002 U	0.0002 U
Nickel		0.04 U	0.01 U	0.01 U	**0.0025** J	0.01 U	NA	0.04 U	**0.0052** J	0.01 U	0.01 U	0.01 U
Potassium		5 U	**0.48** J	0.48 U	0.43 U	0.34 U	NA	5 U	**2.4**	**2**	**2.1**	**1.9**
Potassium, dissolved		5 U	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
Selenium	0.05	0.005 U	0.015 U	0.015 U	0.015 U	0.015 U	0.0012 U	0.005 UJ	**0.0056** J	0.015 U	0.015 U	0.015 U
Sodium		**3.8**	**7.4**	**8.1**	**5.1**	**5.1**	**12.3**	**10**	**13**	**13**	**13**	**13**
Sodium, dissolved		**4.3**	NA	NA	NA	NA	NA	**11**	NA	NA	NA	NA
Thallium	0.002	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U
Vanadium		**0.03**	0.01 U	0.01 U	0.0032 U	0.01 U	NA	0.01 U	**0.0037** J	0.01 U	0.01 U	0.01 U
Zinc		**0.1**	0.04 U	**0.011** J	0.04 U	0.04 U	NA	**0.03**	**0.017** J	0.04 U	0.04 U	0.04 U

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	UWBZ Site LCKMW-4[2] 6/7/1995 Phase I	UWBZ Site LCKMW-4 9/16/1997 Phase II	UWBZ Site LCKMW-4 8/12/2003 RI	UWBZ Site LCKMW-4 11/12/2003 RI	UWBZ Site LCKMW-4 2/26/2004 RI	UWBZ Site LCKMW-4 5/19/2004 RI	IDA Site LCKMW-5[3] 6/6/1995 Phase I	IDA Site LCKMW-5 9/16/1997 Phase II	IDA Site LCKMW-5 DUP 9/16/1997 Phase II	IDA Site LCKMW-5 8/13/2003 RI	IDA Site LCKMW-5 11/12/2003 RI
Volatile Organic Compounds (mg/L)												
Acetone		0.01 U	0.01 U	0.01 U	0.01 U	**0.0099** J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide		0.005 U	0.001 U	0.002 U	0.002 UJ	0.002 U*	0.002 U	0.005 U	0.001 U	0.001 U	0.002 U	0.002 UJ
Methylene chloride		0.005 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	**0.001** JB	0.001 U	0.001 U	0.002 U	0.002 U
Toluene	1	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.012 U	0.01 U	0.0011 U	**0.00026** J	0.0011 U	0.0011 U	0.011 U	0.01 U	0.01 U	0.001 U	0.001 U
Benz(a)anthracene		0.012 U	0.01 U	0.00022 U	0.00021 U	0.00021 U	0.00022 U	0.011 U	0.01 U	0.01 U	0.0002 U	0.0002 U
Benzo(a)pyrene	0.0002	0.012 U	0.01 U	0.00022 U	0.00021 U	**0.00022**	0.00022 U	0.011 U	0.01 U	0.01 U	0.0002 U	0.0002 U
Benzo(b)fluoranthene		0.012 U	0.01 U	0.00022 U	0.00021 U	0.00021 U	0.00022 U	0.011 U	0.01 U	0.01 U	0.0002 U	0.0002 U
Benzo(ghi)perylene		0.012 U	0.01 U	0.0011 U	0.001 U	**0.00039** J	0.0011 U	0.011 U	0.01 U	0.01 U	0.001 U	0.001 U
Benzo(k)fluoranthene		0.012 U	0.01 U	0.00022 U	0.00021 U	0.00021 UJ	0.00022 U	0.011 U	0.01 U	0.01 U	0.0002 U	0.0002 U
Chrysene		0.012 U	0.01 U	0.00055 U	0.00052 U	0.00053 U	0.00054 U	0.011 U	0.01 U	0.01 U	0.00051 U	0.0005 U
Dibenz(ah)anthracene		0.012 U	0.01 U	0.00022 U	0.00021 U	**0.00036**	0.00022 U	0.011 U	0.01 U	0.01 U	0.0002 U	0.00069 U
Indeno(1,2,3-cd)pyrene		0.012 U	0.01 U	0.00022 U	0.00021 U	**0.00035**	0.00022 U	0.011 U	0.01 U	0.01 U	0.0002 U	0.00045 U
Naphthalene		0.012 U	0.01 U	0.0011 U	0.001 U	0.0011 U	0.0011 U	0.011 U	0.01 U	0.01 U	0.001 U	0.001 U
Bis(2-ethylhexyl) phthalate	0.006	0.012 U	0.01 U	0.0055 U	0.0052 U*	0.011 U	0.011 U	0.011 U	0.01 U	0.01 U	0.0051 U	**0.0071** *
Butylbenzyl phthalate		0.012 U	0.01 U	0.0022 U	0.0021 U	0.0021 U	0.0022 U	0.011 U	0.01 U	0.01 U	0.002 U	0.002 U
Diethyl phthalate		0.012 U	0.01 U	0.0022 U	0.0021 U	0.0021 U	0.0022 U	0.011 U	0.01 U	0.01 U	0.002 U	0.002 U
Di-n-octyl phthalate		0.012 U	0.01 U	0.011 U	0.01 U	0.011 U	0.011 U	0.011 U	0.01 U	0.01 U	0.01 U	0.01 U
Phenol		0.012 U	0.01 U	0.0055 U	0.0052 U	0.0053 U	0.0054 U	0.011 U	0.01 U	0.01 U	0.0051 U	0.005 U
Trichlorobenzene, 1,2,3-		NA	NA	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	NA	0.001 U	0.001 U
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		NA	**5.2E-09**	2.9E-09 U	NA	NA	NA	NA	2.7E-09 U	2.2E-09 U	NA	NA
Heptachlorodibenzo-p-dioxins, total		NA	**5.2E-09**	2.9E-09 U	NA	NA	NA	NA	2.7E-09 U	2.2E-09 U	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		NA	2.5E-09 U	4.7E-09 U	NA	NA	NA	NA	3.9E-09 U	2.2E-09 U	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		NA	2.1E-09 U	4.5E-09 U	NA	NA	NA	NA	3.3E-09 U	1.8E-09 U	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		NA	2.2E-09 U	4.4E-09 U	NA	NA	NA	NA	3.4E-09 U	1.9E-09 U	NA	NA
Hexachlorodibenzo-p-dioxins, total		NA	2.3E-09 U	4.7E-09 U	NA	NA	NA	NA	3.5E-09 U	2E-09 U	NA	NA
Octachlorodibenzo-p-dioxin		NA	**0.00000014**	**0.000000062 J**	NA	NA	NA	NA	**2.1E-08** J	**1.47E-08** J	NA	NA
Octachlorodibenzo-p-dioxin; Dissolved		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		NA	2.2E-09 U	4.9E-09 U	NA	NA	NA	NA	2.1E-09 U	1.9E-09 U	NA	NA
Pentachlorodibenzo-p-dioxins, total		NA	2.2E-09 U	4.9E-09 U	NA	NA	NA	NA	2.1E-09 U	1.9E-09 U	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		NA	1.7E-09 U	3.8E-09 U	NA	NA	NA	NA	1.5E-09 U	1.4E-09 U	NA	NA
Tetrachlorodibenzo-p-dioxins, total		NA	1.7E-09 U	3.8E-09 U	NA	NA	NA	NA	1.5E-09 U	1.4E-09 U	NA	NA
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		NA	0.000000002 U	2.8E-09 U	NA	NA	NA	NA	2.5E-09 U	1.7E-09 U	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		NA	2.6E-09 U	3.2E-09 U	NA	NA	NA	NA	3.3E-09 U	2.2E-09 U	NA	NA
Heptachlorodibenzofurans, total		NA	2.2E-09 U	3.2E-09 U	NA	NA	NA	NA	2.8E-09 U	1.9E-09 U	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		NA	1.8E-09 U	4.2E-09 U	NA	NA	NA	NA	2.2E-09 U	1.4E-09 U	NA	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	IDA	IDA	IDA	IDA	IDA
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
		LCKMW-4[2]	LCKMW-4	LCKMW-4	LCKMW-4	LCKMW-4	LCKMW-4	LCKMW-5[3]	LCKMW-5	LCKMW-5	LCKMW-5	LCKMW-5
										DUP		
		6/7/1995	9/16/1997	8/12/2003	11/12/2003	2/26/2004	5/19/2004	6/6/1995	9/16/1997	9/16/1997	8/13/2003	11/12/2003
PARAMETER_NAME	**MCLs**	**Phase I**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase I**	**Phase II**	**Phase II**	**RI**	**RI**
Hexachlorodibenzofuran, 1,2,3,6,7,8-		NA	1.4E-09 U	0.000000004 U	NA	NA	NA	NA	1.7E-09 U	1E-09 U	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		NA	1.9E-09 U	4.8E-09 U	NA	NA	NA	NA	2.4E-09 U	1.5E-09 U	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		NA	**6.5E-09**	4.4E-09 U	NA	NA	NA	NA	2.1E-09 U	**4.4E-09** J	NA	NA
Hexachlorodibenzofurans, total		NA	**6.5E-09**	4.8E-09 U	NA	NA	NA	NA	2E-09 U	**4.4E-09** J	NA	NA
Octachlorodibenzofuran		NA	2.7E-09 U	4.7E-09 U	NA	NA	NA	NA	3E-09 U	2.7E-09 U	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		NA	1.8E-09 U	2.8E-09 U	NA	NA	NA	NA	1.8E-09 U	1.3E-09 U	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		NA	1.8E-09 U	2.8E-09 U	NA	NA	NA	NA	1.7E-09 U	1.3E-09 U	NA	NA
Pentachlorodibenzofurans, total		NA	1.8E-09 U	3.1E-09 U	NA	NA	NA	NA	1.7E-09 U	1.3E-09 U	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-		NA	**4.9E-09** B	1.7E-09 U	NA	NA	NA	NA	**7E-09** B	**3E-09** B	NA	NA
Tetrachlorodibenzofurans, total		NA	**5.8E-09** BJ	1.7E-09 U	NA	NA	NA	NA	**1.22E-08** BJ	**5.4E-09** BJ	NA	NA
TCDD-TEQ	3E-08	NA	**4.26914E-09**	**6.80594E-09**	NA	NA	NA	NA	**3.9648E-09**	**3.2696E-09**	NA	NA
TCDD-TEQ; Dissolved	3E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/L)												
Aluminum		NA	**8.3** J	**1.1**	0.2 U	0.11 U	0.2 U	NA	**0.27** J	**0.22** J	**0.06** J	**0.2** U
Arsenic	0.01	**0.084**	**0.05** J	**0.073**	**0.013** J	**0.028**	**0.013** J	**0.0102**	**0.017** J	**0.005**	**0.019** J	0.019 J
Arsenic, dissolved	0.01	NA	**0.008** J	NA	NA	NA	NA	NA	**0.016** J	**0.015** J	**NA**	NA
Barium	2	**0.372**	**0.17** J	**0.16**	**0.11**	**0.1**	**0.098**	**0.317**	**0.51** J	**0.51** J	**0.52**	**0.52**
Barium, dissolved	2	NA	**0.11**	**NA**	NA	NA	NA	NA	**0.47**	**0.48**	**NA**	NA
Beryllium	0.004	NA	0.005 U	**0.00019** J	0.004 U	0.004 U	0.004 U	NA	0.005 U	0.005 U	0.004 U	0.004 U
Cadmium	0.005	**0.0063**	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0035 U	0.005 U	0.005 U	0.002 U	0.002 U
Calcium		NA	**210**	**170**	**160**	**150**	**150**	NA	**95**	**95**	**95**	**97**
Calcium, dissolved		NA	**140**	NA	NA	NA	NA	NA	**89**	**90**	NA	NA
Chromium, total	0.1	**0.0627**	**0.02** J	0.01 U	0.01 U	0.01 U	0.01 U	**0.0042**	0.01 U	0.01 U	0.01 U	0.01 U
Cobalt		NA	**0.01**	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U
Copper	1.3	NA	**0.03**	**0.0051** J	0.01 U	0.002 U	0.0031 U	NA	0.02 U	0.02 U	**0.0026** J	0.01 U
Copper, dissolved	1.3	NA	0.02 U	NA	NA	NA	NA	NA	0.02 U	0.02 U	NA	NA
Iron		**143**	**27** J	**22**	**5.2** J	**7.5**	**5.9**	**2.69**	**1.9** J	**1.8** J	**1.7**	**1.8** J
Iron, dissolved		NA	**1.5**	NA	NA	NA	NA	NA	**1.2**	**1.1**	NA	NA
Lead	0.015	**0.124**	**0.011**	**0.0048** J	0.0075 U	0.0075 U	0.0075 U	**0.0152**	0.005 U	0.005 U	0.0075 U	**0.038** J
Magnesium		NA	**64**	**54**	**53**	**49**	**51**	NA	**31**	**31**	**32**	**33**
Magnesium, dissolved		NA	**48**	NA	NA	NA	NA	NA	**30**	**31**	NA	NA
Manganese		**2.47**	**0.36** J	**0.038**	**0.035**	**0.026**	**0.029**	**0.0655**	**0.06** J	**0.06** J	**0.045**	**0.046**
Manganese, dissolved		NA	**0.03**	NA	NA	NA	NA	NA	**0.05**	**0.04**	NA	NA
Mercury	0.002	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.000055 U	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel		NA	0.04 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.04 U	0.04 U	0.01 U	0.01 U
Potassium		NA	5 U	**2.5**	**2.2**	**2**	**2.1**	NA	5 U	5 U	**1.6**	**1.6**
Potassium, dissolved		NA	5 U	NA	NA	NA	NA	NA	5 U	5 U	NA	NA
Selenium	0.05	0.0012 U	0.005 U	0.015 U	0.015 U	0.015 UJ	0.015 U	0.0012 U	0.005 U	0.005 U	0.015 U	0.015 U
Sodium		**59.1**	**44**	**48**	**49**	**43**	**47**	**5.55** JB	**7.7**	**7.6**	**8.4**	**8.8**
Sodium, dissolved		NA	**52**	NA	NA	NA	NA	NA	**7.2**	**7.4**	NA	NA
Thallium	0.002	NA	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	0.005 U	0.005 U	0.025 U	0.025 U
Vanadium		NA	**0.02** J	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U
Zinc		NA	**0.07** J	**0.011** J	0.04 U	0.04 U	0.04 U	NA	0.02 U	0.02 U	0.04 U	**0.015** J

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
		LCKMW-5	LCKMW-5	LCKMW-6[2]	LCKMW-6[2]	LCKMW-6	LCKMW-6	LCKMW-6	LCKMW-6	LCKMW-6	LCKMW-7[3]	LCKMW-7
					DUP							
		2/25/2004	5/20/2004	6/5/1995	6/5/1995	9/19/1997	8/13/2003	11/12/2003	2/25/2004	5/20/2004	6/7/1995	9/19/1997
PARAMETER_NAME	**MCLs**	**RI**	**RI**	**Phase I**	**Phase I**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase I**	**Phase II**
Volatile Organic Compounds (mg/L)												
Acetone		0.01 U	**0.01**	0.01 U	0.01 U	0.01 U	0.01 U	**0.008** J	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide		0.002 U*	**0.002**	0.005 U	0.005 U	0.001 U	0.002 U	0.002 UJ	0.002 U*	0.002 U*	0.005 U	0.001 U
Methylene chloride		0.002 U	**0.002**	**0.001** JB	**0.006** JB	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 U	0.001 U
Toluene	1	0.001 U	0.001 U	0.005 U	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.00099 U	0.00099 U	0.01 U	0.011 U	0.01 U	0.001 U	**0.00017** J	0.00097 U	0.001 U	0.01 U	0.01 U
Benz(a)anthracene		0.0002 U	0.0002 U	0.01 U	0.011 U	0.01 U	0.0002 U	0.00022 U	0.00019 U	0.0002 U	0.01 U	0.01 U
Benzo(a)pyrene	0.0002	0.0002 U	0.0002 U	0.01 U	0.011 U	0.01 U	0.0002 U	0.00022 U	0.00019 U	0.0002 U	0.01 U	0.01 U
Benzo(b)fluoranthene		0.0002 U	0.0002 U	0.01 U	0.011 U	0.01 U	0.0002 U	0.00022 U	0.00019 U	0.0002 U	0.01 U	0.01 U
Benzo(ghi)perylene		0.00099 U	0.00099 U	0.01 U	0.011 U	0.01 U	0.001 U	0.0011 U	0.00097 U	0.001 U	0.01 U	0.01 U
Benzo(k)fluoranthene		0.0002 UJ	0.0002 U	0.01 U	0.011 U	0.01 U	0.0002 U	0.00022 U	0.00019 UJ	0.0002 U	0.01 U	0.01 U
Chrysene		0.0005 U	0.0005 U	0.01 U	0.011 U	0.01 U	0.00051 U	0.00054 U	0.00049 U	0.0005 U	0.01 U	0.01 U
Dibenz(ah)anthracene		0.0002 U	0.0002 U	0.01 U	0.011 U	0.01 U	0.0002 U	**0.00069**	0.00019 U	0.0002 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene		0.0002 U	0.0002 U	0.01 U	0.011 U	0.01 U	0.0002 U	**0.00044**	0.00019 U	0.0002 U	0.01 U	0.01 U
Naphthalene		0.00099 U	**0.00056**	0.01 U	0.011 U	0.01 U	0.001 U	0.0011 U	**0.00016** J	0.001 U	0.01 U	0.01 U
Bis(2-ethylhexyl) phthalate	0.006	0.0099 U	0.0099 U	**0.003** JB	**0.002** JB	0.01 U	0.0051 U	0.0054 U*	0.0097 U	0.01 U	0.01 U	0.01 U
Butylbenzyl phthalate		0.002 U	0.002 U	0.01 U	**0.002** JL	0.01 U	0.002 U	0.0022 U	0.0019 U	0.002 U	0.01 U	0.01 U
Diethyl phthalate		0.002 U	0.002 U	**0.002** JB	**0.004** JB	0.01 U	0.002 U	0.0022 U	0.0019 U	0.002 U	0.01 U	0.01 U
Di-n-octyl phthalate		0.0099 U	0.0099 U	**0.001** JB	**0.002** JB	0.01 U	0.01 U	0.011 U	0.0097 U	0.01 U	0.01 U	0.01 U
Phenol		0.005 U	0.005 U	**0.002** JB	**0.003** JB	0.01 U	0.0051 U	0.0054 U	0.0049 U	0.005 U	0.01 U	0.01 U
Trichlorobenzene, 1,2,3-		0.001 U	0.001 U	NA	NA	NA	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		NA	NA	NA	NA	5.4E-09 U	NA	NA	NA	NA	NA	1.05E-08 U
Heptachlorodibenzo-p-dioxins, total		NA	NA	NA	NA	5.4E-09 U	NA	NA	NA	NA	NA	1.05E-08 U
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		NA	NA	NA	NA	5E-09 U	NA	NA	NA	NA	NA	8.3E-09 U
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		NA	NA	NA	NA	3.9E-09 U	NA	NA	NA	NA	NA	6.6E-09 U
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		NA	NA	NA	NA	4.5E-09 U	NA	NA	NA	NA	NA	7.5E-09 U
Hexachlorodibenzo-p-dioxins, total		NA	NA	NA	NA	4.4E-09 U	NA	NA	NA	NA	NA	7.4E-09 U
Octachlorodibenzo-p-dioxin		NA	NA	NA	NA	**6.89E-08**	NA	NA	NA	NA	NA	**3.26E-08**
Octachlorodibenzo-p-dioxin; Dissolved		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		NA	NA	NA	NA	3.6E-09 U	NA	NA	NA	NA	NA	5.4E-09 U
Pentachlorodibenzo-p-dioxins, total		NA	NA	NA	NA	3.6E-09 U	NA	NA	NA	NA	NA	5.4E-09 U
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		NA	NA	NA	NA	**1.6E-09** J	NA	NA	NA	NA	NA	3.3E-09 U
Tetrachlorodibenzo-p-dioxins, total		NA	NA	NA	NA	**1.6E-09** J	NA	NA	NA	NA	NA	3.3E-09 U
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		NA	NA	NA	NA	4E-09 U	NA	NA	NA	NA	NA	7.5E-09 U
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		NA	NA	NA	NA	5.5E-09 U	NA	NA	NA	NA	NA	1.04E-08 U
Heptachlorodibenzofurans, total		NA	NA	NA	NA	4.6E-09 U	NA	NA	NA	NA	NA	8.7E-09 U
Hexachlorodibenzofuran, 1,2,3,4,7,8-		NA	NA	NA	NA	3.3E-09 U	NA	NA	NA	NA	NA	5E-09 U

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
		LCKMW-5	LCKMW-5	LCKMW-6[2]	LCKMW-6[2]	LCKMW-6	LCKMW-6	LCKMW-6	LCKMW-6	LCKMW-6	LCKMW-7[3]	LCKMW-7
					DUP							
		2/25/2004	5/20/2004	6/5/1995	6/5/1995	9/19/1997	8/13/2003	11/12/2003	2/25/2004	5/20/2004	6/7/1995	9/19/1997
PARAMETER_NAME	**MCLs**	**RI**	**RI**	**Phase I**	**Phase I**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase I**	**Phase II**
Hexachlorodibenzofuran, 1,2,3,6,7,8-		NA	NA	NA	NA	2.4E-09 U	NA	NA	NA	NA	NA	3.8E-09 U
Hexachlorodibenzofuran, 1,2,3,7,8,9-		NA	NA	NA	NA	4E-09 U	NA	NA	NA	NA	NA	6.2E-09 U
Hexachlorodibenzofuran, 2,3,4,6,7,8-		NA	NA	NA	NA	**3.2E-09** J	NA	NA	NA	NA	NA	**8.6E-09**
Hexachlorodibenzofurans, total		NA	NA	NA	NA	**3.2E-09** J	NA	NA	NA	NA	NA	**8.6E-09**
Octachlorodibenzofuran		NA	NA	NA	NA	6.5E-09 U	NA	NA	NA	NA	NA	1.2E-08 U
Pentachlorodibenzofuran, 1,2,3,7,8-		NA	NA	NA	NA	2.8E-09 U	NA	NA	NA	NA	NA	4.1E-09 U
Pentachlorodibenzofuran, 2,3,4,7,8-		NA	NA	NA	NA	2.8E-09 U	NA	NA	NA	NA	NA	4.1E-09 U
Pentachlorodibenzofurans, total		NA	NA	NA	NA	2.8E-09 U	NA	NA	NA	NA	NA	4.1E-09 U
Tetrachlorodibenzofuran, 2,3,7,8-		NA	NA	NA	NA	**5.3E-09**	NA	NA	NA	NA	NA	**9.8E-09**
Tetrachlorodibenzofurans, total		NA	NA	NA	NA	**1.06E-08**	NA	NA	NA	NA	NA	**9.8E-09**
TCDD-TEQ	3E-08	NA	NA	NA	NA	**6.2567E-09**	NA	NA	NA	NA	NA	**9.3334E-09**
TCDD-TEQ; Dissolved	3E-08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/L)												
Aluminum		0.2 U	0.028 U	NA	NA	**11**	**0.078** J	**0.031** J	**0.069** J	0.067 U	NA	0.1 U
Arsenic	0.01	**0.02** J	**0.016** J	**0.0104** JL	0.0058 JL	0.005 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.0035** JB	0.005 U
Arsenic, dissolved	0.01	NA	NA	NA	NA	0.005 U	NA	NA	NA	NA	NA	0.005 U
Barium	2	**0.52**	**0.51**	**0.442**	**0.393**	**0.24**	**0.16**	**0.19**	**0.16**	**0.19**	**0.256**	**0.27**
Barium, dissolved	2	NA	NA	NA	NA	**0.17**	NA	NA	NA	NA	NA	**0.19**
Beryllium	0.004	0.004 U	0.004 U	NA	NA	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	NA	0.005 U
Cadmium	0.005	0.002 U	0.002 U	0.0035 U	0.0035 U	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0035 U	0.005 U
Calcium		**98**	**93** J	NA	NA	**320**	**180**	**200**	**190**	**180** J	NA	**80**
Calcium, dissolved		NA	NA	NA	NA	**170**	NA	NA	NA	NA	NA	**70**
Chromium, total	0.1	0.01 U	0.01 U	**0.0384**	**0.0238**	**0.02**	0.01 U	0.01 U	**0.0034** J	**0.0028** J	0.0042 U	0.01 U
Cobalt		0.01 U	0.01 U	NA	NA	**0.02**	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U
Copper	1.3	0.0022 U	0.01 U	NA	NA	**0.06**	**0.0038** J	0.01 U	0.0048 U	**0.0081** J	NA	**0.02**
Copper, dissolved	1.3	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA	NA	0.02 U
Iron		**1.7**	**1.7**	**109**	**72.5**	**44**	0.2 U	**0.086** J	**0.44**	**0.11** J	**4.53**	**1**
Iron, dissolved		NA	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	**0.12**
Lead	0.015	0.0075 U	0.0075 U	**0.0835** J	0.0544 J	**0.033**	0.0075 U	0.0075 U	0.0075 U	0.0075 U	**0.0151**	0.005 U
Magnesium		**33**	**31**	NA	NA	**140**	**81**	**89**	**81**	**74**	NA	**24**
Magnesium, dissolved		NA	NA	NA	NA	**75**		NA	NA	NA	NA	**22**
Manganese		**0.046**	**0.045**	**2.94**	**2.48**	**1.2**	**0.0059** J	**0.017**	**0.019**	**0.019**	**0.168**	**0.2**
Manganese, dissolved		NA	NA	NA	NA	**0.25**	NA	NA	NA	NA	NA	**0.04**
Mercury	0.002	0.0002 U	0.0002 U	**0.00045** J	0.00014 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0001 U	0.0002 U
Nickel		0.01 U	0.01 U	NA	NA	**0.06**	**0.0035** J	**0.0068** J	**0.0061** J	**0.0049** J	NA	0.04 U
Potassium		**1.4**	**1.5**	NA	NA	**12**	**7.6**	**9.6**	**5.4**	**10**	NA	5 U
Potassium, dissolved		NA	NA	NA	NA	**8.5**		NA	NA	NA	NA	5 U
Selenium	0.05	0.015 U	0.015 U	0.0012 U	0.0012 U	0.005 U	0.015 U	0.015 U	0.015 U	0.015 U	0.0012 U	0.005 U
Sodium		**8.9**	**8.6**	**16.6**	**17.3**	**16**	**14**	**19**	**11**	**12**	**9.76**	**11**
Sodium, dissolved		NA	NA	NA	NA	**16**	NA	NA	NA	NA	NA	**13**
Thallium	0.002	0.025 U	0.025 U	NA	NA	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	0.005 U
Vanadium		0.01 U	0.01 U	NA	NA	**0.04**	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U
Zinc		0.04 U	0.04 U	NA	NA	**0.18**	0.04 U	0.04 U	0.04 U	0.04 U	NA	**0.04**

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	UWBZ Site LCKMW-7 11/11/1998 Phase II	UWBZ Site LCKMW-7 DUP 11/11/1998 Phase II	UWBZ Site LCKMW-7 8/13/2003 RI	UWBZ Site LCKMW-7 11/13/2003 RI	UWBZ Site LCKMW-7 2/24/2004 RI	UWBZ Site LCKMW-7 DUP 2/24/2004 RI	UWBZ Site LCKMW-7 5/20/2004 RI	IDA Background LCKMW-8 9/23/1997 Phase II	IDA Background LCKMW-8 8/11/2003 RI	IDA Background LCKMW-8 11/13/2003 RI	IDA Background LCKMW-8 2/26/2004 RI
Volatile Organic Compounds (mg/L)												
Acetone		NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	**0.015**	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide		NA	NA	0.002 U	0.002 UJ	0.002 U*	0.002 U*	0.002 U*	**0.0048**	0.002 U	0.002 UJ	0.002 U*
Methylene chloride		NA	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.002 U	0.002 U	0.002 U
Toluene	1	NA	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		NA	NA	0.001 U	0.00098 U	0.001 U	0.001 U	0.00098 U	0.01 U	0.0011 U	0.001 U	0.001 U
Benz(a)anthracene		NA	NA	0.0002 U	0.0002 U	0.0002 U	**0.00015** J	0.0002 U	0.01 U	0.00022 U	0.0002 U	0.00021 U
Benzo(a)pyrene	0.0002	NA	NA	0.0002 U	0.0002 U	0.0002 U	**0.00031**	0.0002 U	0.01 U	0.00022 U	0.0002 U	0.00021 U
Benzo(b)fluoranthene		NA	NA	0.0002 U	0.0002 U	0.0002 U	**0.00032** H	0.0002 U	0.01 U	0.00022 U	0.0002 U	0.00021 U
Benzo(ghi)perylene		NA	NA	0.001 U	0.00098 U	0.001 U	0.001 U	0.00098 U	0.01 U	0.0011 U	0.001 U	**0.00026** J
Benzo(k)fluoranthene		NA	NA	0.0002 U	0.0002 UJ	0.0002 UJ	0.00029 UJ	0.0002 U	0.01 U	0.00022 U	0.0002 UJ	0.00021 UJ
Chrysene		NA	NA	0.00051 U	0.00049 U	0.00051 U	0.00051 U	0.00049 U	0.01 U	0.00054 U	0.0005 U	0.00052 U
Dibenz(ah)anthracene		NA	NA	0.0002 U	0.0002 U	0.0002 U	**0.0003**	0.0002 U	0.01 U	0.00022 U	0.0002 U	**0.00028**
Indeno(1,2,3-cd)pyrene		NA	NA	0.0002 U	0.0002 U	0.0002 U	**0.00032**	0.0002 U	0.01 U	0.00022 U	0.0002 U	**0.00025**
Naphthalene		NA	NA	0.001 U	0.00098 U	0.001 U	0.001 U	0.00098 U	0.01 U	0.0011 U	0.001 U	0.001 U
Bis(2-ethylhexyl) phthalate	0.006	NA	NA	0.0051 U	0.0049 U	0.02 U	0.028 U	0.0098 U	0.01 U	0.0054 U	0.005 U	0.01 U
Butylbenzyl phthalate		NA	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01 U	0.0022 U	0.002 U	0.0021 U
Diethyl phthalate		NA	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01 U	0.0022 U	0.002 U	0.0021 U
Di-n-octyl phthalate		NA	NA	0.01 U	0.0098 U	0.01 U	0.01 U	0.0098 U	0.01 U	0.011 U	0.01 U	0.01 U
Phenol		NA	NA	0.0051 U	0.0049 U	0.0051 U	0.0051 U	0.0049 U	0.01 U	0.0054 U	0.005 U	0.0052 U
Trichlorobenzene, 1,2,3-		NA	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		4.8E-09 U	4.8E-09 U	7.4E-09 U	NA	NA	NA	NA	**3.4E-09** B	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total		4.8E-09 U	4.8E-09 U	7.4E-09 U	NA	NA	NA	NA	**3.4E-09** BJ	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		3.4E-09 U	3.4E-09 U	4.2E-09 U	NA	NA	NA	NA	1.9E-09 U	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		3.2E-09 U	3.1E-09 U	4E-09 U	NA	NA	NA	NA	**2.4E-09** B	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		3.6E-09 U	3.5E-09 U	3.9E-09 U	NA	NA	NA	NA	**3.2E-09** B	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total		3.4E-09 U	3.3E-09 U	4.2E-09 U	NA	NA	NA	NA	**3.2E-09** B	NA	NA	NA
Octachlorodibenzo-p-dioxin		7.5E-09 U	9.4E-09 U	4.1E-08 U	NA	NA	NA	NA	**1.71E-08** B	NA	NA	NA
Octachlorodibenzo-p-dioxin; Dissolved		4.5E-09 U	7.5E-09 U	5.5E-09 U	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		3.9E-09 U	4.4E-09 U	5.5E-09 U	NA	NA	NA	NA	1.6E-09 U	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total		3.9E-09 U	4.4E-09 U	5.5E-09 U	NA	NA	NA	NA	1.6E-09 U	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		3.1E-09 U	3.5E-09 U	4.9E-09 U	NA	NA	NA	NA	1.2E-09 U	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total		3.1E-09 U	3.5E-09 U	4.9E-09 U	NA	NA	NA	NA	1.2E-09 U	NA	NA	NA
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		3.4E-09 U	3.4E-09 U	6.8E-09 U	NA	NA	NA	NA	1.2E-09 U	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		5.1E-09 U	5.2E-09 U	3.1E-09 U	NA	NA	NA	NA	**3E-09** B	NA	NA	NA
Heptachlorodibenzofurans, total		4.1E-09 U	4.1E-09 U	6.8E-09 U	NA	NA	NA	NA	**3E-09** BJ	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		**4.1E-09** J	2.5E-09 U	4.2E-09 U	NA	NA	NA	NA	**3.2E-09** B	NA	NA	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	UWBZ Site LCKMW-7 11/11/1998 Phase II	UWBZ Site LCKMW-7 DUP 11/11/1998 Phase II	UWBZ Site LCKMW-7 8/13/2003 RI	UWBZ Site LCKMW-7 11/13/2003 RI	UWBZ Site LCKMW-7 2/24/2004 RI	UWBZ Site LCKMW-7 DUP 2/24/2004 RI	UWBZ Site LCKMW-7 5/20/2004 RI	IDA Background LCKMW-8 9/23/1997 Phase II	IDA Background LCKMW-8 8/11/2003 RI	IDA Background LCKMW-8 11/13/2003 RI	IDA Background LCKMW-8 2/26/2004 RI
Hexachlorodibenzofuran, 1,2,3,6,7,8-		**3.2E-09** J	2.3E-09 U	4E-09 U	NA	NA	NA	NA	1.1E-09 U	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		3E-09 U	3E-09 U	4.8E-09 U	NA	NA	NA	NA	**3E-09** B	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		2.6E-09 U	2.5E-09 U	4.4E-09 U	NA	NA	NA	NA	**6.1E-09** B	NA	NA	NA
Hexachlorodibenzofurans, total		**7.3E-09** J	2.6E-09 U	4.8E-09 U	NA	NA	NA	NA	**6.1E-09** B	NA	NA	NA
Octachlorodibenzofuran		6E-09 U	7.6E-09 U	6E-09 U	NA	NA	NA	NA	**9.8E-09** B	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		2.8E-09 U	3E-09 U	3.8E-09 U	NA	NA	NA	NA	**2.1E-09** B	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		2.7E-09 U	2.9E-09 U	3.7E-09 U	NA	NA	NA	NA	**2.6E-09** B	NA	NA	NA
Pentachlorodibenzofurans, total		2.8E-09 U	2.9E-09 U	5E-09 U	NA	NA	NA	NA	**2.6E-09** B	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-		2.7E-09 U	2.7E-09 U	2.7E-09 U	NA	NA	NA	NA	**3.6E-09** B	NA	NA	NA
Tetrachlorodibenzofurans, total		2.7E-09 U	2.7E-09 U	2.7E-09 U	NA	NA	NA	NA	**3.6E-09** B	NA	NA	NA
TCDD-TEQ	3E-08	**5.9672E-09**	**5.9439E-09**	**7.9189E-09**	NA	NA	NA	NA	**5.1777E-09**	NA	NA	NA
TCDD-TEQ; Dissolved	3E-08	**3.2184E-09**	**5.8896E-09**	**2.2794E-09**	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/L)												
Aluminum		NA	NA	**0.078** J	0.2 U	**0.031** J	**0.035** J	0.06 U	**0.12**	**0.07** J	0.2 U	0.2 U
Arsenic	0.01	NA	NA	**0.0092** J	**0.0078** J	**0.0097** J	**0.01** J	**0.0093** J	**0.014**	**0.02**	**0.021**	**0.015** J
Arsenic, dissolved	0.01	NA	NA	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Barium	2	NA	NA	**0.44**	**0.46**	**0.42**	**0.42**	**0.45**	**0.46**	**0.53**	**0.52**	**0.5**
Barium, dissolved	2	NA	NA	NA	NA	NA	NA	NA	**0.13**	NA	NA	NA
Beryllium	0.004	NA	NA	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	0.004 U	0.004 U	0.004 U
Cadmium	0.005	NA	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 U	0.002 U	0.002 U	0.002 U
Calcium		NA	NA	**84**	**88**	**86**	**85**	**82** J	**84**	**89**	**93**	**90**
Calcium, dissolved		NA	NA	NA	NA	NA	NA	NA	**13**	NA	NA	NA
Chromium, total	0.1	NA	NA	0.01 U	0.01 U	0.003 U	0.003 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.0015** J
Cobalt		NA	NA	0.01 U	0.01 U	0.0018 U	0.002 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Copper	1.3	NA	NA	**0.0028** J	0.01 U	0.01 U	0.01 U	0.01 U	**0.06**	**0.0026** J	0.01 U	0.01 U
Copper, dissolved	1.3	NA	NA	NA	NA	NA	NA	NA	0.02 U	NA	NA	NA
Iron		NA	NA	**1.2**	**1.3** J	**1.5** J	**1.5** J	**1.4**	**1.7**	**2**	**1.6** J	**1.5**
Iron, dissolved		NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Lead	0.015	NA	NA	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.005 U	0.0075 U	0.0075 U	0.003 U
Magnesium		NA	NA	**25**	**27**	**26**	**25**	**25**	**29**	**30**	**32**	**30**
Magnesium, dissolved		NA	NA	NA	NA	NA	NA	NA	**17**	NA	NA	NA
Manganese		NA	NA	**0.079**	**0.081**	**0.098**	**0.098**	**0.12**	**0.04**	**0.017**	**0.017**	**0.017**
Manganese, dissolved		NA	NA	NA	NA	NA	NA	NA	0.01 U	NA	NA	NA
Mercury	0.002	NA	NA	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel		NA	NA	0.01 U	0.01 U	0.0024 U	0.0024 U	0.01 U	0.04 U	0.01 U	0.01 U	0.01 U
Potassium		NA	NA	**1.3**	**1.3**	**1.3**	**1.3**	**1.2**	5 U	**1.8**	**1.6**	**1.6**
Potassium, dissolved		NA	NA	NA	NA	NA	NA	NA	**37**	NA	NA	NA
Selenium	0.05	NA	NA	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.005 U	0.015 U	0.015 U	0.015 U
Sodium		NA	NA	**6.2**	**6.1**	**5.9**	**5.8**	**5.6**	**8.9**	**10**	**10**	**9.7**
Sodium, dissolved		NA	NA	NA	NA	NA	NA	NA	**20**	NA	NA	NA
Thallium	0.002	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.005 U	0.025 U	0.025 U	0.025 U
Vanadium		NA	NA	0.01 U	0.01 U	0.0028 U	0.0028 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Zinc		NA	NA	0.04 U	**0.013** J	0.04 U	0.04 U	0.04 U	0.02 U	0.04 U	0.04 U	0.04 U

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	IDA	IDA	IDA	IDA	IDA
		Background	Background	Background	Background	Background	Background	Site	Site	Site	Site	Site
		LCKMW-8	LCKMW-9	LCKMW-9	LCKMW-9	LCKMW-9	LCKMW-9	LCKMW-10	LCKMW-10	LCKMW-10	LCKMW-10	LCKMW-10
		5/18/2004	9/23/1997	8/11/2003	11/13/2003	2/26/2004	5/18/2004	9/22/1997	11/12/1998	8/14/2003	11/11/2003	2/24/2004
PARAMETER_NAME	**MCLs**	**RI**	**Phase II**		**RI**	**RI**	**RI**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**
Volatile Organic Compounds (mg/L)												
Acetone		**0.015** J	0.01 U	0.01 U	0.01 U	**0.039** J	**0.14** J	0.01 U	NA	0.01 U	0.01 U	0.01 U
Carbon disulfide		0.002 UJ	0.001 U	0.002 U	0.002 UJ	0.002 U*	0.002 UJ	**0.0032**	NA	0.002 U	0.002 UJ	0.002 U*
Methylene chloride		0.002 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	NA	0.002 U	0.002 U	0.002 U
Toluene	1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	**0.0011**	NA	0.001 U	0.001 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.00099 U	0.01 U	0.001 U	0.001 U	0.00099 U	0.00098 U	0.01 U	NA	0.00098 U	0.001 U	0.001 U
Benz(a)anthracene		0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.01 U	NA	0.0002 U	0.0002 U	**0.00028**
Benzo(a)pyrene	0.0002	0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.01 U	NA	0.0002 U	0.0002 U	**0.00079**
Benzo(b)fluoranthene		0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.01 U	NA	0.0002 U	0.0002 U	**0.00075** H
Benzo(ghi)perylene		0.00099 U	0.01 U	0.001 U	0.001 U	0.00099 U	0.00098 U	0.01 U	NA	0.00098 U	0.001 U	0.001 U
Benzo(k)fluoranthene		0.0002 U	0.01 U	0.0002 U	0.0002 UJ	0.0002 UJ	0.0002 U	0.01 U	NA	0.0002 U	0.0002 U	0.00075 UJ
Chrysene		0.0005 U	0.01 U	0.0005 U	0.0005 U	0.0005 U	0.00049 U	0.01 U	NA	0.00049 U	0.0005 U	0.00052 U
Dibenz(ah)anthracene		0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.01 U	NA	0.0002 U	0.0002 U	**0.001**
Indeno(1,2,3-cd)pyrene		0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.01 U	NA	0.0002 U	0.0002 U	**0.00091**
Naphthalene		0.00099 U	0.01 U	0.001 U	0.001 U	0.00099 U	0.00098 U	0.01 U	NA	0.00098 U	0.001 U	0.001 U
Bis(2-ethylhexyl) phthalate	0.006	0.0099 U	0.01 U	0.005 U	0.005 U	**0.0054** J	0.0098 U	0.01 U	NA	0.0049 U	0.005 U	0.046 U
Butylbenzyl phthalate		0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01 U	NA	0.002 U	0.002 U	0.0021 U
Diethyl phthalate		0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01 U	NA	0.002 U	0.002 U	0.0021 U
Di-n-octyl phthalate		0.0099 U	0.01 U	0.01 U	0.01 U	0.0099 U	0.0098 U	0.01 U	NA	0.0098 U	0.01 U	0.01 U
Phenol		0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.0049 U	0.01 U	NA	0.0049 U	0.005 U	0.0052 U
Trichlorobenzene, 1,2,3-		0.001 U		0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	0.001 U	0.001 U	0.001 U
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		NA	**6E-09** B	NA	NA	NA	NA	3.6E-09 U	1.8E-09 U	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total		NA	**5.2E-09** B	NA	NA	NA	NA	3.6E-09 U	1.8E-09 U	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		NA	2.1E-09 U	NA	NA	NA	NA	3.9E-09 U	1E-09 U	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		NA	1.9E-09 U	NA	NA	NA	NA	3.3E-09 U	9E-10 U	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		NA	1.9E-09 U	NA	NA	NA	NA	3.2E-09 U	1.1E-09 U	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total		NA	**1.16E-08** BJ	NA	NA	NA	NA	3.4E-09 U	1E-09 U	NA	NA	NA
Octachlorodibenzo-p-dioxin		NA	**8.36E-08** B	NA	NA	NA	NA	**1.11E-08** J	**6.2E-09** JC	NA	NA	NA
Octachlorodibenzo-p-dioxin; Dissolved		NA	NA	NA	NA	NA	NA	NA	4.1E-09 U	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		NA	1.7E-09 U	NA	NA	NA	NA	2.9E-09 U	8E-10 U	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total		NA	1.7E-09 U	NA	NA	NA	NA	2.9E-09 U	8E-10 U	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		NA	1.4E-09 U	NA	NA	NA	NA	2.5E-09 U	1E-09 U	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total		NA	1.4E-09 U	NA	NA	NA	NA	2.5E-09 U	1E-09 U	NA	NA	NA
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		NA	**3.8E-09** B	NA	NA	NA	NA	2.9E-09 U	1.2E-09 U	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		NA	2.2E-09 U	NA	NA	NA	NA	3.3E-09 U	1.9E-09 U	NA	NA	NA
Heptachlorodibenzofurans, total		NA	**6E-09** BJ	NA	NA	NA	NA	3.1E-09 U	1.5E-09 U	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		NA	1.5E-09 U	NA	NA	NA	NA	2.8E-09 U	8E-10 U	NA	NA	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	IDA	IDA	IDA	IDA	IDA
		Background	Background	Background	Background	Background	Background	Site	Site	Site	Site	Site
		LCKMW-8	LCKMW-9	LCKMW-9	LCKMW-9	LCKMW-9	LCKMW-9	LCKMW-10	LCKMW-10	LCKMW-10	LCKMW-10	LCKMW-10
		5/18/2004	9/23/1997	8/11/2003	11/13/2003	2/26/2004	5/18/2004	9/22/1997	11/12/1998	8/14/2003	11/11/2003	2/24/2004
PARAMETER_NAME	**MCLs**	**RI**	**Phase II**		**RI**	**RI**	**RI**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**
Hexachlorodibenzofuran, 1,2,3,6,7,8-		NA	1.2E-09 U	NA	NA	NA	NA	2.3E-09 U	7E-10 U	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		NA	1.7E-09 U	NA	NA	NA	NA	2.9E-09 U	9E-10 U	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		NA	**6.1E-09** B	NA	NA	NA	NA	**4.2E-09** B	8E-10 U	NA	NA	NA
Hexachlorodibenzofurans, total		NA	**6.1E-09** B	NA	NA	NA	NA	**4.2E-09** B	8E-10 U	NA	NA	NA
Octachlorodibenzofuran		NA	**1.11E-08** B	NA	NA	NA	NA	3.1E-09 U	3.8E-09 U	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		NA	1.3E-09 U	NA	NA	NA	NA	2.3E-09 U	7E-10 U	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		NA	1.3E-09 U	NA	NA	NA	NA	2.3E-09 U	7E-10 U	NA	NA	NA
Pentachlorodibenzofurans, total		NA	1.3E-09 U	NA	NA	NA	NA	2.3E-09 U	7E-10 U	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-		NA	**4.5E-09** B	NA	NA	NA	NA	2.1E-09 U	7E-10 U	NA	NA	NA
Tetrachlorodibenzofurans, total		NA	**5.8E-09** B	NA	NA	NA	NA	2.1E-09 U	7E-10 U	NA	NA	NA
TCDD-TEQ	3E-08	NA	**3.601E-09**	NA	NA	NA	NA	**4.8278E-09**	**1.4628E-09**	NA	NA	NA
TCDD-TEQ; Dissolved	3E-08	NA	NA	NA	NA	NA	NA	NA	**2.0418E-09**	NA	NA	NA
Metals (mg/L)												
Aluminum		0.23 U	**22**	**0.14** J	**0.12** J	0.2 U	0.047 U	**0.11**	NA	**0.23**	**0.044** J	**0.086** J
Arsenic	0.01	**0.022**	**0.006**	0.02 U	0.02 U	0.02 U	0.02 U	0.005 U	NA	**0.0066** J	**0.0065** J	**0.009** J
Arsenic, dissolved	0.01	NA	0.005 U	NA	NA	NA	NA	0.005 U	NA	NA	NA	NA
Barium	2	**0.51**	**0.24**	**0.048**	**0.039**	**0.032**	**0.04**	**0.42**	NA	**0.38**	**0.41**	**0.39**
Barium, dissolved	2	NA	**0.1**	NA	NA	NA	NA	**0.34**	NA	NA	NA	NA
Beryllium	0.004	0.004 U	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	NA	0.004 U	0.004 U	0.004 U
Cadmium	0.005	0.002 U	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 U	NA	0.002 U	0.002 U	0.002 U
Calcium		**95**	**230**	**89**	**93**	**90**	**99**	**79**	NA	**90**	**87**	**85**
Calcium, dissolved		NA	**99**	NA	NA	NA	NA	**72**	NA	NA	NA	NA
Chromium, total	0.1	**0.0039** J	**0.04**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	**0.0036** J	0.01 U	0.0046 U
Cobalt		0.01 U	**0.03**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	**0.0022** J	**0.0029** J	0.0059 U
Copper	1.3	0.0029 U	**0.09**	**0.004** J	**0.023**	0.0024 U	0.0038 U	0.02 U	NA	0.01 U	0.01 U	**0.0016** J
Copper, dissolved	1.3	NA	0.02 U	NA	NA	NA	NA	0.02 U	NA	NA	NA	NA
Iron		**2.2**	**49**	**0.19** J	**0.15** J	0.2 U	0.057 U	**3**	NA	**4.1**	**2.9** J	**2.9** J
Iron, dissolved		NA	0.1 U	NA	NA	NA	NA	**0.39**	NA	NA	NA	NA
Lead	0.015	0.0075 U	**0.027**	0.0075 U	0.0054 U	0.0036 U	0.0075 U	0.005 U	NA	0.0075 U	0.0075 U	0.0075 U
Magnesium		**32**	**78**	**25**	**28**	**28**	**30**	**26**	NA	**27**	**28**	**27**
Magnesium, dissolved		NA	**28**	NA	NA	NA	NA	**26**	NA	NA	NA	NA
Manganese		**0.027**	**1.3**	**0.08**	**0.028**	0.0041 U	**0.12**	**0.22**	NA	**0.12**	**0.13**	**0.12**
Manganese, dissolved		NA	**0.3**	NA	NA	NA	NA	**0.19**	NA	NA	NA	NA
Mercury	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NA	0.0002 U	0.0002 U	0.0002 U
Nickel		0.01 U	**0.08**	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	NA	0.01 U	0.01 U	0.0032 U
Potassium		**1.8**	**7.8**	**0.48** J	0.41 U	0.28 U	0.33 U	5 U	NA	**1.3**	**1.3**	**1.4**
Potassium, dissolved		NA	5 U	NA	NA	NA	NA	**5.6**	NA	NA	NA	NA
Selenium	0.05	0.015 U	0.005 U	0.015 U	0.015 U	0.015 U	0.015 U	0.005 U	NA	0.015 U	0.015 U	0.015 U
Sodium		**11**	**6.3**	**4.6**	**3.7**	**2.7**	**2.6**	**8.1**	NA	**9.8**	**8.6**	**8.8**
Sodium, dissolved		NA	**4.1**	NA	NA	NA	NA	**8.8**	NA	NA	NA	NA
Thallium	0.002	0.025 U	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U	0.005 U	NA	0.025 U	0.025 U	0.025 U
Vanadium		0.01 U	**0.06**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.003 U
Zinc		0.04 U	**0.19**	0.04 U	**0.012** J	0.04 U	0.04 U	0.02 U	NA	**0.013** J	0.04 U	0.04 U

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

PARAMETER_NAME	MCLs	IDA Site LCKMW-10 5/19/2004 RI	UWBZ Site LCKMW-11 9/22/1997 Phase II	UWBZ Site LCKMW-11 11/12/1998 Phase II	UWBZ Site MW-11 8/14/2003 RI	UWBZ Site LCKMW-11 11/11/2003 RI	UWBZ Site LCKMW-11 2/24/2004 RI	UWBZ Site LCKMW-11 5/19/2004 RI	IDA Site LCKMW-12A[4] 9/17/1997 Phase II	IDA Site LCKMW-12A[5] DUP 9/17/1997 Phase II	IDA Site LCKMW-12A[6] 11/12/1998 Phase II	IDA Site LCKMW-12A[7] 8/14/2003 RI
Volatile Organic Compounds (mg/L)												
Acetone		0.01 U	0.01 U	NA	0.01 U	0.01 U	0.013 U	0.01 U	0.01 U	0.01 U	NA	**0.0024** J
Carbon disulfide		0.002 U	0.001 U	NA	0.002 U	0.002 UJ	0.002 U*	0.002 U	**0.0013**	**0.0012**	NA	0.002 U
Methylene chloride		0.002 U	0.001 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	NA	0.002 U
Toluene	1	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.00099 U	0.01 U	NA	0.00095 U	0.001 U	0.0011 U	0.00099 U	0.01 U	0.01 U	NA	0.001 U
Benz(a)anthracene		0.0002 U	0.01 U	NA	0.00019 U	0.0002 U	**0.00015** J	0.0002 U	0.01 U	0.01 U	NA	0.0002 U
Benzo(a)pyrene	0.0002	0.0002 U	0.01 U	NA	0.00019 U	0.0002 U	**0.00063**	0.0002 U	0.01 U	0.01 U	NA	0.0002 U
Benzo(b)fluoranthene		0.0002 U	0.01 U	NA	0.00019 U	0.0002 U	**0.00046** H	0.0002 U	0.01 U	0.01 U	NA	0.0002 U
Benzo(ghi)perylene		**0.00024** J	0.01 U	NA	0.00095 U	0.001 U	0.0011 U	0.00099 U	0.01 U	0.01 U	NA	0.001 U
Benzo(k)fluoranthene		0.0002 U	0.01 U	NA	0.00019 U	0.0002 U	0.00059 UJ	0.0002 U	0.01 U	0.01 U	NA	0.0002 U
Chrysene		0.0005 U	0.01 U	NA	0.00048 U	0.0005 U	0.00053 U	0.0005 U	0.01 U	0.01 U	NA	0.0005 U
Dibenz(ah)anthracene		0.0002 U	0.01 U	NA	0.00019 U	0.0002 U	**0.001**	0.0002 U	0.01 U	0.01 U	NA	0.0002 U
Indeno(1,2,3-cd)pyrene		0.0002 U	0.01 U	NA	0.00019 U	0.0002 U	**0.001**	0.0002 U	0.01 U	0.01 U	NA	0.0002 U
Naphthalene		0.00099 U	0.01 U	NA	0.00095 U	0.001 U	0.0011 U	**0.00029** J	0.01 U	0.01 U	NA	0.001 U
Bis(2-ethylhexyl) phthalate	0.006	0.0099 U	0.01 U	NA	0.0048 U	0.005 U	0.011 U	0.0099 U	0.01 U	0.01 U	NA	0.005 U
Butylbenzyl phthalate		0.002 U	0.01 U	NA	0.0019 U	0.002 U	0.0021 U	0.002 U	0.01 U	0.01 U	NA	0.002 U
Diethyl phthalate		0.002 U	0.01 U	NA	0.0019 U	0.002 U	0.0021 U	0.002 U	0.01 U	0.01 U	NA	0.002 U
Di-n-octyl phthalate		0.0099 U	0.01 U	NA	0.0095 U	0.01 U	0.011 U	0.0099 U	0.01 U	0.01 U	NA	0.01 U
Phenol		0.005 U	0.01 U	NA	0.0048 U	0.005 U	0.0053 U	0.005 U	0.01 U	0.01 U	NA	0.005 U
Trichlorobenzene, 1,2,3-		0.001 U	NA	NA	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	NA	0.001 U
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		NA	**1.78E-08**	1.8E-09 U	NA	NA	NA	NA	0.000000004 U	**7.3E-09** J	2.3E-09 U	NA
Heptachlorodibenzo-p-dioxins, total		NA	**2.44E-08**	1.8E-09 U	NA	NA	NA	NA	0.000000004 U	**1.34E-08** BJ	2.3E-09 U	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		NA	**9.4E-09**	1E-09 U	NA	NA	NA	NA	3.6E-09 U	3.8E-09 U	1.3E-09 U	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		NA	**9.7E-09**	9E-10 U	NA	NA	NA	NA	3.3E-09 U	3.2E-09 U	1.3E-09 U	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		NA	**1.96E-08**	1E-09 U	NA	NA	NA	NA	3.2E-09 U	3.2E-09 U	1.3E-09 U	NA
Hexachlorodibenzo-p-dioxins, total		NA	**3.87E-08**	1E-09 U	NA	NA	NA	NA	3.4E-09 U	3.4E-09 U	1.3E-09 U	NA
Octachlorodibenzo-p-dioxin		NA	**1.21E-07**	4.6E-09 U	NA	NA	NA	NA	**2.96E-08** J	**8.55E-08** J	5.7E-09 U	NA
Octachlorodibenzo-p-dioxin; Dissolved		NA		3.2E-09 U	NA	NA	NA	NA	NA	NA	**0.000000006** JC	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		NA	**1.21E-08**	8E-10 U	NA	NA	NA	NA	2.7E-09 U	0.000000003 U	1.2E-09 U	NA
Pentachlorodibenzo-p-dioxins, total		NA	**1.21E-08**	8E-10 U	NA	NA	NA	NA	2.7E-09 U	0.000000003 U	1.2E-09 U	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		NA	**8.5E-09**	1E-09 U	NA	NA	NA	NA	2.2E-09 U	2.4E-09 U	1.6E-09 U	NA
Tetrachlorodibenzo-p-dioxins, total		NA	**8.5E-09**	**1.1E-09** C	NA	NA	NA	NA	2.2E-09 U	2.4E-09 U	1.6E-09 U	NA
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		NA	**9.7E-09** J	1.1E-09 U	NA	NA	NA	NA	2.5E-09 U	**4.1E-09** J	1.6E-09 U	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		NA	**1.83E-08**	1.8E-09 U	NA	NA	NA	NA	3.9E-09 U	3.6E-09 U	2.6E-09 U	NA
Heptachlorodibenzofurans, total		NA	**1.83E-08**	1.4E-09 U	NA	NA	NA	NA	0.000000003 U	**4.1E-09** J	0.000000002 U	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		NA	**1.05E-08** B	8E-10 U	NA	NA	NA	NA	**4.5E-09** B	**3.8E-09** B	0.000000001 U	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	IDA	IDA	IDA	IDA
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
		LCKMW-10	LCKMW-11	LCKMW-11	MW-11	LCKMW-11	LCKMW-11	LCKMW-11	LCKMW-12A[4]	LCKMW-12A[5]	LCKMW-12A[6]	LCKMW-12A[7]
										DUP		
		5/19/2004	9/22/1997	11/12/1998	8/14/2003	11/11/2003	2/24/2004	5/19/2004	9/17/1997	9/17/1997	11/12/1998	8/14/2003
PARAMETER_NAME	**MCLs**	**RI**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase II**	**Phase II**	**Phase II**	**RI**
Hexachlorodibenzofuran, 1,2,3,6,7,8-		NA	**8.8E-09**	6E-10 U	NA	NA	NA	NA	**2.4E-09** J	2.3E-09 U	0.000000001 U	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		NA	**2.12E-08**	9E-10 U	NA	NA	NA	NA	**4.4E-09** J	2.9E-09 U	1.2E-09 U	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		NA	**1.05E-08** B	7E-10 U	NA	NA	NA	NA	**4.7E-09** B	**7.6E-09** B	0.000000001 U	NA
Hexachlorodibenzofurans, total		NA	**5.1E-08**	7E-10 U	NA	NA	NA	NA	**6.9E-09** BJ	**1.14E-08** BJ	0.000000001 U	NA
Octachlorodibenzofuran		NA	**2.85E-08**	3.7E-09 U	NA	NA	NA	NA	4.4E-09 U	0.000000004 U	4.6E-09 U	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		NA	**1.23E-08**	7E-10 U	NA	NA	NA	NA	2.2E-09 U	2.5E-09 U	1.1E-09 U	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		NA	**6.2E-09** J	7E-10 U	NA	NA	NA	NA	2.2E-09 U	2.5E-09 U	1.1E-09 U	NA
Pentachlorodibenzofurans, total		NA	**1.23E-08**	7E-10 U	NA	NA	NA	NA	**1.36E-08** J	2.5E-09 U	1.1E-09 U	NA
Tetrachlorodibenzofuran, 2,3,7,8-		NA	**5.7E-09** B	8E-10 U	NA	NA	NA	NA	**4.46E-08** J	**5.5E-09** B	1.2E-09 U	NA
Tetrachlorodibenzofurans, total		NA	**5.7E-09** BJ	8E-10 U	NA	NA	NA	NA	**8.89E-08** J	**1.02E-08** BJ	1.2E-09 U	NA
TCDD-TEQ	3E-08	NA	**3.4328E-08**	**1.4514E-09**	NA	NA	NA	NA	**9.67518E-09**	**5.98825E-09**	**2.08552E-09**	NA
TCDD-TEQ; Dissolved	3E-08	NA	NA	**1.9153E-09**	NA	NA	NA	NA	NA	NA	**1.86421E-09**	NA
Metals (mg/L)												
Aluminum		0.026 U	**23**	NA	**0.03** J	0.2 U	0.2 U	0.2 U	**2.1** J	**7.7** J	NA	**0.53**
Arsenic	0.01	**0.0063** J	**0.012**	NA	0.02 U	0.02 U	0.02 U	0.02 U	**0.017** J	**0.009** J	NA	**0.009** J
Arsenic, dissolved	0.01	NA	0.005 U	NA	NA	NA	NA	NA	0.005 U	**0.005** U	NA	**NA**
Barium	2	**0.41**	**0.25**	NA	**0.061**	**0.077**	**0.057**	**0.067**	**0.09** J	**0.13** J	NA	**0.086**
Barium, dissolved	2	NA	**0.08**	NA	NA	NA	NA	NA	**0.07**	**0.07**	NA	NA
Beryllium	0.004	0.004 U	0.005 U	NA	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	NA	0.004 U
Cadmium	0.005	0.002 U	0.005 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.005 U	0.005 U	NA	0.002 U
Calcium		**84**	**250**	NA	**99**	**100**	**99**	**96**	**150**	**170**	NA	**180**
Calcium, dissolved		NA	**110**	NA	NA	NA	NA	NA	**140**	**140**	NA	NA
Chromium, total	0.1	0.01 U	**0.03**	NA	0.01 U	0.01 U	0.0033 U	0.01 U	0.01 U	**0.02** J	NA	**0.018**
Cobalt		**0.0029** J	**0.03**	NA	**0.0011** J	**0.0011** J	0.0032 U	0.01 U	0.01 U	0.01 U	NA	**0.0026** J
Copper	1.3	0.0022 U	**0.08**	NA	0.01 U	0.01 U	0.01 U	0.0024 U	0.02 U	0.02 U	NA	**0.0041** J
Copper, dissolved	1.3	NA	0.02 U	NA	NA	NA	NA	NA	0.02 U	0.02 U	NA	NA
Iron		**2.4**	**72**	NA	**0.5**	**0.48** J	**0.48**	**0.43**	**7.6** J	**18** J	NA	**4.7**
Iron, dissolved		NA	0.1 U	NA	NA	NA	NA	NA	**2.6**	**2.7**	NA	NA
Lead	0.015	0.0075 U	**0.043**	NA	**0.0032** J	0.0075 U	0.0075 U	0.0075 U	0.005 U	**0.006**	NA	**0.004** J
Magnesium		**28**	**93**	NA	**29**	**30**	**29**	**29**	**56**	**60**	NA	**62**
Magnesium, dissolved		NA	**33**	NA	NA	NA	NA	NA	**53**	**54**	NA	NA
Manganese		**0.13**	**1.4**	NA	**0.28**	**0.6**	**0.35**	**0.48**	**0.43** J	**0.58** J	NA	**0.41**
Manganese, dissolved		NA	**0.23**	NA	NA	NA	NA	NA	**0.34**	**0.36**	NA	NA
Mercury	0.002	0.000065 U	0.0002 U	NA	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NA	0.0002 U
Nickel		0.01 U	**0.09**	NA	0.01 U	**0.0027** J	0.0044 U	**0.0023** J	0.04 U	0.04 U	NA	**0.012**
Potassium		**1.3**	**7.6**	NA	**0.47** J	0.34 U	0.44 U	**0.4** J	5 U	5 U	NA	**2.6**
Potassium, dissolved		NA	5 U	NA	NA	NA	NA	NA	5 U	5 U	NA	NA
Selenium	0.05	0.015 U	0.005 U	NA	0.015 U	0.015 U	0.015 U	0.015 U	**0.005**	0.005 U	NA	0.015 U
Sodium		**8.8**	**11**	NA	**5.8**	**4.1**	**5.2**	**5.7**	**5.6**	**5.2**	NA	**9.5**
Sodium, dissolved		NA	**10**	NA	NA	NA	NA	NA	**5.8**	**5.8**	NA	NA
Thallium	0.002	0.025 U	0.005 U	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.005 U	0.005 U	NA	0.025 U
Vanadium		0.01 U	**0.06**	NA	0.01 U	0.01 U	0.0033 U	0.01 U	0.01 U	**0.02** J	NA	0.01 U
Zinc		0.04 U	**0.23**	NA	**0.012** J	0.04 U	0.04 U	0.04 U	**0.03** J	**0.05** J	NA	**0.017** J

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	IDA	IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Background
		LCKMW-12A[8]	LCKMW-12A[9]	LCKMW-12A[10]	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	14MW1
						DUP						
		11/11/2003	2/25/2004	5/17/2004	9/17/1997	9/17/1997	11/12/1998	8/14/2003	11/11/2003	2/25/2004	5/17/2004	11/13/1998
PARAMETER_NAME	**MCLs**	**RI**	**RI**	**RI**	**Phase II**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase II**
Volatile Organic Compounds (mg/L)												
Acetone		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	**0.0018** J	0.01 U	**0.04** J	**0.019**	NA
Carbon disulfide		0.002 UJ	0.002 U*	0.002 U	0.001 U	0.001 U	NA	0.002 U	0.002 UJ	0.002 U*	0.002 U	NA
Methylene chloride		0.002 U	0.002 U	0.002 U	0.001 U	0.001 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA
Toluene	1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U	0.001 U	NA
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.0012 U	0.00096 U	NA	0.01 U	0.01 U	NA	0.001 U	0.001 U	0.00096 U	NA	NA
Benz(a)anthracene		0.00025 U	0.00019 U	NA	0.01 U	0.01 U	NA	**0.00015** J	0.0002 U	0.00019 U	NA	NA
Benzo(a)pyrene	0.0002	0.00025 U	0.00019 U	NA	0.01 U	0.01 U	NA	**0.00022**	0.0002 U	**0.00011** J	NA	NA
Benzo(b)fluoranthene		0.00025 U	0.00019 U	NA	0.01 U	0.01 U	NA	**0.00018** J	0.0002 U	**0.000098** J	NA	NA
Benzo(ghi)perylene		0.0012 U	0.00096 U	NA	0.01 U	0.01 U	NA	**0.00031** J	0.001 U	**0.00053** J	NA	NA
Benzo(k)fluoranthene		0.00025 U	0.00019 UJ	NA	0.01 U	0.01 U	NA	**0.00022**	0.0002 U	**0.000097** J	NA	NA
Chrysene		0.00062 U	0.00048 U	NA	0.01 U	0.01 U	NA	**0.00017** J	0.0005 U	0.00048 U	NA	NA
Dibenz(ah)anthracene		0.00025 U	0.00019 U	NA	0.01 U	0.01 U	NA	**0.00026**	0.0002 U	**0.00047**	NA	NA
Indeno(1,2,3-cd)pyrene		0.00025 U	0.00019 U	NA	0.01 U	0.01 U	NA	**0.00017** J	0.0002 U	**0.00049**	NA	NA
Naphthalene		0.0012 U	0.00096 U	NA	0.01 U	0.01 U	NA	0.001 U	0.001 U	0.00096 U	NA	NA
Bis(2-ethylhexyl) phthalate	0.006	0.0062 U	0.0096 U	NA	0.01 U	0.01 U	NA	0.0051 U	0.005 U	0.0096 U	NA	NA
Butylbenzyl phthalate		0.0025 U	0.0019 U	NA	0.01 U	0.01 U	NA	0.002 U	0.002 U	0.0019 U	NA	NA
Diethyl phthalate		0.0025 U	0.0019 U	NA	0.01 U	0.01 U	NA	0.002 U	0.002 U	0.0019 U	NA	NA
Di-n-octyl phthalate		0.012 U	0.0096 U	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.0096 U	NA	NA
Phenol		0.0062 U	0.0048 U	NA	0.01 U	0.01 U	NA	0.0051 U	0.005 U	0.0048 U	NA	NA
Trichlorobenzene, 1,2,3-		0.001 U	0.001 U	0.001 U	NA	NA	NA	0.001 U	0.001 U	0.001 U	0.001 U	NA
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		NA	NA	NA	**2.55E-08** J	**6.43E-08**	1.3E-09 U	6.4E-09 U	NA	NA	NA	6.8E-09 U
Heptachlorodibenzo-p-dioxins, total		NA	NA	NA	**3.27E-08**	**1.12E-07**	1.3E-09 U	6.4E-09 U	NA	NA	NA	6.8E-09 U
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		NA	NA	NA	9E-09 U	3.4E-09 U	6E-10 U	3.6E-09 U	NA	NA	NA	2.6E-09 U
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		NA	NA	NA	8.2E-09 U	**5.5E-09**	6E-10 U	3.5E-09 U	NA	NA	NA	2.6E-09 U
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		NA	NA	NA	7.9E-09 U	**4.6E-09**	6E-10 U	4.4E-09 U	NA	NA	NA	2.7E-09 U
Hexachlorodibenzo-p-dioxins, total		NA	NA	NA	8.3E-09 U	**2.7E-08**	6E-10 U	4.4E-09 U	NA	NA	NA	2.7E-09 U
Octachlorodibenzo-p-dioxin		NA	NA	NA	**2.53E-07**	**0.00000054**	**7.4E-09** JC	2.6E-08 U	NA	NA	NA	1.57E-08 U
Octachlorodibenzo-p-dioxin; Dissolved		NA	NA	NA	NA	NA	**5.7E-09** J	6.3E-09 U	NA	NA	NA	8.1E-09 U
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		NA	NA	NA	6.5E-09 U	2.5E-09 U	6E-10 U	4E-09 U	NA	NA	NA	4.7E-09 U
Pentachlorodibenzo-p-dioxins, total		NA	NA	NA	6.5E-09 U	**3.1E-09** J	6E-10 U	4E-09 U	NA	NA	NA	4.7E-09 U
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		NA	NA	NA	3.6E-09 U	2E-09 U	8E-10 U	2.7E-09 U	NA	NA	NA	3.4E-09 U
Tetrachlorodibenzo-p-dioxins, total		NA	NA	NA	3.6E-09 U	2E-09 U	8E-10 U	2.7E-09 U	NA	NA	NA	3.4E-09 U
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		NA	NA	NA	**7.3E-09**	**1.65E-08**	8E-10 U	7.4E-09 U	NA	NA	NA	0.000000004 U
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		NA	NA	NA	1.07E-08 U	2.9E-09 U	1.2E-09 U	5.4E-09 U	NA	NA	NA	5.6E-09 U
Heptachlorodibenzofurans, total		NA	NA	NA	**2.02E-08**	**3.83E-08**	1E-09 U	7.4E-09 U	NA	NA	NA	4.6E-09 U
Hexachlorodibenzofuran, 1,2,3,4,7,8-		NA	NA	NA	6.1E-09 U	**4E-09** B	5E-10 U	4E-09 U	NA	NA	NA	1.8E-09 U

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	IDA	IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Background
		LCKMW-12A[8]	LCKMW-12A[9]	LCKMW-12A[10]	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	LCKMW-13	14MW1
						DUP						
		11/11/2003	2/25/2004	5/17/2004	9/17/1997	9/17/1997	11/12/1998	8/14/2003	11/11/2003	2/25/2004	5/17/2004	11/13/1998
PARAMETER_NAME	**MCLs**	**RI**	**RI**	**RI**	**Phase II**	**Phase II**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase II**
Hexachlorodibenzofuran, 1,2,3,6,7,8-		NA	NA	NA	4.9E-09 U	1.8E-09 U	4E-10 U	3.6E-09 U	NA	NA	NA	1.7E-09 U
Hexachlorodibenzofuran, 1,2,3,7,8,9-		NA	NA	NA	6.7E-09 U	2.4E-09 U	6E-10 U	5.4E-09 U	NA	NA	NA	0.000000002 U
Hexachlorodibenzofuran, 2,3,4,6,7,8-		NA	NA	NA	6E-09 U	**6E-09** B	5E-10 U	5.4E-09 U	NA	NA	NA	1.8E-09 U
Hexachlorodibenzofurans, total		NA	NA	NA	5.8E-09 U	**1.42E-08** B	5E-10 U	5.4E-09 U	NA	NA	NA	1.8E-09 U
Octachlorodibenzofuran		NA	NA	NA	1.97E-08 U	**3.04E-08**	2.2E-09 U	9.8E-09 U	NA	NA	NA	1.23E-08 U
Pentachlorodibenzofuran, 1,2,3,7,8-		NA	NA	NA	4.2E-09 U	2E-09 U	5E-10 U	2.6E-09 U	NA	NA	NA	2.8E-09 U
Pentachlorodibenzofuran, 2,3,4,7,8-		NA	NA	NA	4.1E-09 U	2E-09 U	6E-10 U	3.3E-09 U	NA	NA	NA	2.8E-09 U
Pentachlorodibenzofurans, total		NA	NA	NA	4.1E-09 U	**4.2E-09**	5E-10 U	3.3E-09 U	NA	NA	NA	2.8E-09 U
Tetrachlorodibenzofuran, 2,3,7,8-		NA	NA	NA	**1.52E-08** B	**2.96E-08** B	6E-10 U	1.6E-09 U	NA	NA	NA	2.6E-09 U
Tetrachlorodibenzofurans, total		NA	NA	NA	**2.73E-08** B	**7.22E-08**	6E-10 U	1.6E-09 U	NA	NA	NA	2.6E-09 U
TCDD-TEQ	3E-08	NA	NA	NA	**1.0548E-08**	**9.0295E-09**	**1.0999E-09**	**5.9128E-09**	NA	NA	NA	**5.7934E-09**
TCDD-TEQ; Dissolved	3E-08	NA	NA	NA	NA	NA	**1.4962E-09**	**2.2295E-09**	NA	NA	NA	**3.36073E-09**
Metals (mg/L)												
Aluminum		**0.047** J	0.2 U	0.055 U	**13** J	**7.1** J	NA	**0.11** J	**0.035** J	0.2 U	0.054 U	NA
Arsenic	0.01	**0.0092** J	**0.01** J	**0.0079** J	**0.013** J	**0.007** J	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA
Arsenic, dissolved	0.01	NA	NA	NA	0.005 U	0.005 U	NA	NA	NA	NA	NA	NA
Barium	2	**0.053**	**0.052**	**0.058**	**0.21** J	**0.16** J	NA	**0.14**	**0.16**	**0.088**	**0.099**	NA
Barium, dissolved	2	NA	NA	NA	**0.1**	**0.1**	NA	NA	NA	NA	NA	NA
Beryllium	0.004	0.004 U	0.004 U	0.004 U	0.005 U	0.005 U	NA	0.004 U	0.004 U	0.004 U	0.004 U	NA
Cadmium	0.005	0.002 U	0.002 U	0.002 U	0.005 U	0.005 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA
Calcium		**180**	**180**	**180**	**280**	**250**	NA	**270**	**230**	**390**	**350**	NA
Calcium, dissolved		NA	NA	NA	**220**	**210**	NA	NA	NA	NA	NA	NA
Chromium, total	0.1	0.0026 U	**0.0061** J	**0.0034** J	**0.03** J	**0.02** J	NA	**0.0026** J	**0.015**	0.01 U	**0.015**	NA
Cobalt		0.01 U	0.01 U	**0.0012** J	**0.02**	0.01 U	NA	0.01 U	0.01 U	0.01 U	**0.0025** J	NA
Copper	1.3	0.01 U	0.0017 U	0.01 U	**0.04**	0.02 U	NA	**0.0029** J	**0.019**	0.0029 U	0.0083 U	NA
Copper, dissolved	1.3	NA	NA	NA	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA
Iron		**3.3** J	**3.3**	**3.4**	**38** J	**24** J	NA	**15**	**4.8** J	**2**	**20**	NA
Iron, dissolved		NA	NA	NA	**8.4**	**7.9**	NA	NA	NA	NA	NA	NA
Lead	0.015	0.0075 U	0.0075 U	0.0075 U	**0.022**	**0.008**	NA	**0.0036** J	**0.0076**	0.0075 U	0.0075 U	NA
Magnesium		**64**	**64**	**65**	**130**	**120**	NA	**110**	**110**	**140**	**150**	NA
Magnesium, dissolved		NA	NA	NA	**100**	**100**	NA	NA	NA	NA	NA	NA
Manganese		**0.19**	**0.15**	**0.22**	**0.84** J	**0.58** J	NA	**0.48**	**0.44**	**0.71**	**0.7**	NA
Manganese, dissolved		NA	NA	NA	**0.38**	**0.33**	NA	NA	NA	NA	NA	NA
Mercury	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NA	0.0002 U	0.0002 U	0.0002 U	**0.000067** J	NA
Nickel		0.01 U	**0.004** J	**0.0022** J	0.04 U	0.04 U	NA	0.01 U	**0.014**	**0.0027** J	**0.014**	NA
Potassium		**1.9**	**1.6**	**2.2**	**26**	**26**	NA	**27**	**24**	**29**	**28**	NA
Potassium, dissolved		NA	NA	NA	**21**	**20**	NA	NA	NA	NA	NA	NA
Selenium	0.05	0.015 U	0.015 U	0.015 U	0.005 U	0.005 U	NA	0.015 U	0.015 U	0.015 U	**0.0051** J	NA
Sodium		**8**	**7.6**	**8.7**	**51**	**51**	NA	**61**	**61**	**55**	**50**	NA
Sodium, dissolved		NA	NA	NA	**50**	**50**	NA	NA	NA	NA	NA	NA
Thallium	0.002	0.025 U	0.025 U	0.025 U	0.005 U	0.005 U	NA	0.025 U	0.025 U	0.025 U	0.025 U	NA
Vanadium		0.01 U	0.01 U	0.01 U	**0.03** J	**0.02** J	NA	0.01 U	0.01 U	0.01 U	0.01 U	NA
Zinc		0.04 U	0.04 U	**0.012** J	**0.13** J	**0.07** J	NA	**0.017** J	0.025 U	0.04 U	**0.045**	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	IDA	IDA	IDA	IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
							Site	Site	Site	Site	Site	Site
		LCKMW-14	LCKMW-14	LCKMW-14	LCKMW-14	LCKMW-14	LCKMW-15	LCKMW-15	LCKMW-15	LCKMW-15	LCKMW-15	LCKMW-15
							DUP		DUP			DUP
		9/16/1997	8/14/2003	11/12/2003	2/26/2004	5/19/2004	8/12/2003	11/10/2003	11/10/2003	2/24/2004	5/18/2004	5/18/2004
PARAMETER_NAME	**MCLs**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**
Volatile Organic Compounds (mg/L)												
Acetone		0.01 UJ	**0.0016** J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.013**	0.01 UJ	0.01 U	0.01 U
Carbon disulfide		0.001 U	0.002 U	0.002 UJ	0.002 U*	0.002 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U*	0.002 UJ	0.002 UJ
Methylene chloride		0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Toluene	1	0.001 U	0.001 U	**0.0011**	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)												
Acenaphthylene		0.01 U	0.0011 U	**0.00022** J	0.0011 U	0.00099 U	0.00099 U	0.001 U	0.001 U	0.0011 U	0.001 U	0.001 U
Benz(a)anthracene		0.01 U	0.00022 U	0.00019 U	0.00022 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00023 U	0.00021 U	0.00021 U
Benzo(a)pyrene	0.0002	0.01 U	0.00022 U	0.00019 U	**0.00016** J	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00023 U	0.00021 U	0.00021 U
Benzo(b)fluoranthene		0.01 U	0.00022 U	0.00019 U	**0.00012** J	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00023 U	0.00021 U	0.00021 U
Benzo(ghi)perylene		0.01 U	0.0011 U	0.00097 U	**0.00041** J	0.00099 U	0.00099 U	0.001 U	0.001 U	0.0011 U	0.001 U	0.001 U
Benzo(k)fluoranthene		0.01 U	0.00022 U	0.00019 U	**0.00014** J	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00023 UJ	0.00021 U	0.00021 U
Chrysene		0.01 U	0.00054 U	0.00049 U	0.00054 U	0.0005 U	0.0005 U	0.00051 U	0.00051 U	0.00057 U	0.00052 U	0.00052 U
Dibenz(ah)anthracene		0.01 U	0.00022 U	0.00019 U	**0.0004**	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00023 U	0.00021 U	0.00021 U
Indeno(1,2,3-cd)pyrene		0.01 U	0.00022 U	0.00019 U	**0.00036**	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00023 U	0.00021 U	0.00021 U
Naphthalene		0.01 U	0.0011 U	0.00097 U	0.0011 U	0.00099 U	0.00099 U	0.001 U	0.001 U	0.0011 U	0.001 U	0.001 U
Bis(2-ethylhexyl) phthalate	0.006	0.01 U	0.0054 U	0.0049 U*	0.011 U	0.0099 U	0.005 U	0.0051 U	**0.01**	0.067 U	0.01 U	**0.018**
Butylbenzyl phthalate		0.01 U	0.0022 U	0.0019 U	0.0022 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0023 U	0.0021 U	0.0021 U
Diethyl phthalate		0.01 U	0.0022 U	0.0019 U	0.0022 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0023 U	0.0021 U	0.0021 U
Di-n-octyl phthalate		0.01 U	0.011 U	0.0097 U	0.011 U	0.0099 U	0.0099 U	0.01 U	0.01 U	0.011 U	0.01 U	0.01 U
Phenol		0.01 U	0.0054 U	0.0049 U	0.0054 U	0.005 U	0.005 U	0.0051 U	0.0051 U	0.0057 U	0.0052 U	0.0052 U
Trichlorobenzene, 1,2,3-		NA	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dioxins / Furans (mg/L)												
Dioxins												
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		2.6E-09 U	NA	NA	NA	NA	4.1E-09 U	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxins, total		2.6E-09 U	NA	NA	NA	NA	4.1E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		2.7E-09 U	NA	NA	NA	NA	4.6E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		2.3E-09 U	NA	NA	NA	NA	4.4E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		2.3E-09 U	NA	NA	NA	NA	4.2E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxins, total		2.4E-09 U	NA	NA	NA	NA	4.6E-09 U	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin		**1.49E-08** J	NA	NA	NA	NA	6E-09 U	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin; Dissolved		NA	NA	NA	NA	NA	5.3E-09 U	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		2.2E-09 U	NA	NA	NA	NA	5.3E-09 U	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxins, total		2.2E-09 U	NA	NA	NA	NA	5.3E-09 U	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		1.7E-09 U	NA	NA	NA	NA	3.3E-09 U	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxins, total		1.7E-09 U	NA	NA	NA	NA	3.3E-09 U	NA	NA	NA	NA	NA
Furans												
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		2.1E-09 U	NA	NA	NA	NA	3.2E-09 U	NA	NA	NA	NA	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		2.7E-09 U	NA	NA	NA	NA	3.7E-09 U	NA	NA	NA	NA	NA
Heptachlorodibenzofurans, total		2.4E-09 U	NA	NA	NA	NA	3.7E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		1.9E-09 U	NA	NA	NA	NA	4E-09 U	NA	NA	NA	NA	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		IDA	IDA	IDA	IDA	IDA	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
							Site	Site	Site	Site	Site	Site
		LCKMW-14	LCKMW-14	LCKMW-14	LCKMW-14	LCKMW-14	LCKMW-15	LCKMW-15	LCKMW-15	LCKMW-15	LCKMW-15	LCKMW-15
							DUP		DUP			DUP
		9/16/1997	8/14/2003	11/12/2003	2/26/2004	5/19/2004	8/12/2003	11/10/2003	11/10/2003	2/24/2004	5/18/2004	5/18/2004
PARAMETER_NAME	**MCLs**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**	**RI**
Hexachlorodibenzofuran, 1,2,3,6,7,8-		1.5E-09 U	NA	NA	NA	NA	3.8E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		2.1E-09 U	NA	NA	NA	NA	4.6E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		**5.3E-09**	NA	NA	NA	NA	4.3E-09 U	NA	NA	NA	NA	NA
Hexachlorodibenzofurans, total		**5.3E-09**	NA	NA	NA	NA	4.6E-09 U	NA	NA	NA	NA	NA
Octachlorodibenzofuran		3.2E-09 U	NA	NA	NA	NA	5.5E-09 U	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		1.8E-09 U	NA	NA	NA	NA	3.2E-09 U	NA	NA	NA	NA	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		1.8E-09 U	NA	NA	NA	NA	3.1E-09 U	NA	NA	NA	NA	NA
Pentachlorodibenzofurans, total		1.8E-09 U	NA	NA	NA	NA	4.1E-09 U	NA	NA	NA	NA	NA
Tetrachlorodibenzofuran, 2,3,7,8-		4.5E-09 B	NA	NA	NA	NA	1.8E-09 U	NA	NA	NA	NA	NA
Tetrachlorodibenzofurans, total		7.8E-09 BJ	NA	NA	NA	NA	1.8E-09 U	NA	NA	NA	NA	NA
TCDD-TEQ	3E-08	**4.1037E-09**	NA	NA	NA	NA	**6.7956E-09**	NA	NA	NA	NA	NA
TCDD-TEQ; Dissolved	3E-08	NA	NA	NA	NA	NA	**1.3423E-09**	NA	NA	NA	NA	NA
Metals (mg/L)												
Aluminum		**0.1** J	**0.58**	**0.06** J	0.055 U	0.04 U	**0.99**	0.11 U	0.2 U	**0.031** J	0.2 U	0.028 U
Arsenic	0.01	**0.007** J	**0.012** J	**0.014** J	**0.01** J	**0.013** J	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Arsenic, dissolved	0.01	**0.008** J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2	**0.3** J	**0.32**	**0.32**	**0.31**	**0.31**	**0.16**	**0.13**	**0.13**	**0.089**	**0.084**	**0.085**
Barium, dissolved	2	**0.28**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.004	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Cadmium	0.005	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Calcium		**81**	**90**	**85**	**80**	**86**	**140**	**120**	**120**	**100**	**96**	**99**
Calcium, dissolved		**78**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, total	0.1	0.01 U	**0.013**	**0.0018** J	**0.0027** J	0.01 U	**0.002** J	0.01 U	0.01 U	0.0021 U	0.01 U	**0.0016** J
Cobalt		0.01 U	**0.0011** J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Copper	1.3	**0.03**	**0.017**	**0.0051** J	0.01 U	0.0028 U	**0.0068** J	**0.005** J	0.01 U	0.01 U	0.0026 U	0.0028 U
Copper, dissolved	1.3	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
Iron		**1.4** J	**3.1**	**1.4** J	**1.3**	**1.3**	**3.1**	**0.33** J	0.2 U	0.19 U	0.2 U	0.2 U
Iron, dissolved		**0.87**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.015	0.005 U	**0.0053** J	0.0075 U	0.003 U	0.0075 U	**0.0036** J	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U
Magnesium		**28**	**30**	**29**	**27**	**29**	**42**	**34**	**33**	**28**	**27**	**28**
Magnesium, dissolved		**27**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese		**0.19** J	**0.098**	**0.057**	**0.054**	**0.055**	**0.13**	**0.059**	**0.039**	0.0034 U	0.0015 U	0.0015 U
Manganese, dissolved		**0.16**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.000094 U	0.0002 U	**0.000052** J	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel		0.04 U	**0.0086** J	0.01 U	0.01 U	0.01 U	**0.0043** J	0.01 U	0.01 U	0.01 U	**0.0021** J	0.01 U
Potassium		5 U	**2.3**	**2.1**	**2.1**	**2.2**	**2.4**	**1.7**	**1.7**	**1.1**	**1**	**1.2**
Potassium, dissolved		5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.05	0.005 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Sodium		**13**	**13**	**14**	**13**	**14**	**31**	**26**	**26**	**6**	**5.6**	**6**
Sodium, dissolved		**12**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.002	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Vanadium		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.0029** J	0.01 U	0.01 U	0.0025 U	0.01 U	0.01 U
Zinc		0.02 U	**0.02** J	**0.013** J	0.04 U	0.04 U	**0.01** J	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
		LCKMW-15	LCKMW-16	LCKMW-16	LCKMW-16	LCKMW-16	RB25-MW7	RB25-MW7	RB25-MW7	RB25-MW7	RB25-MW7	RB25MW-9	RB25MW-9
													DUP
		8/12/2003	11/14/2003	2/27/2004	5/19/2004	8/12/2003	9/18/1997	8/11/2003	11/12/2003	2/27/2004	5/20/2004	9/17/1997	9/17/1997
PARAMETER_NAME	**MCLs**	**RI**	**RI**	**RI**	**RI**	**RI**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase II**	**Phase II**
Volatile Organic Compounds (mg/L)													
Acetone		0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon disulfide		0.002 UJ	0.002 UJ	0.002 U*	0.002 U	0.002 U	0.001 U	0.002 U	0.002 UJ	0.002 U*	0.002 U*	0.001 U	0.001 U
Methylene chloride		0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.002 U	0.002 U	0.002 U	0.002 U	0.001 U	0.001 U
Toluene	1	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Semi-Volatile Organic Compounds (mg/L)													
Acenaphthylene		0.00099 U	0.00098 U	0.0011 U	0.001 U	0.001 U	0.01 U	0.001 U	**0.00015** J	0.001 U	0.00096 U	0.01 U	NA
Benz(a)anthracene		0.0002 U	0.0002 U	0.00021 U	0.0002 U	0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 U	0.00019 U	0.01 U	NA
Benzo(a)pyrene	0.0002	0.0002 U	0.0002 U	0.00021 U	0.0002 U	0.0002 U	0.01 U	0.0002 U	0.0002 U	**0.00015** J	0.00019 U	0.01 U	NA
Benzo(b)fluoranthene		0.0002 U	0.0002 U	0.00021 U	0.0002 U	0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 U	0.00019 U	0.01 U	NA
Benzo(ghi)perylene		0.00099 U	0.00098 U	0.0011 U	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U	**0.0004** J	0.00096 U	0.01 U	NA
Benzo(k)fluoranthene		0.0002 U	0.0002 UJ	0.00021 UJ	0.0002 U	0.0002 U	0.01 U	0.0002 U	0.0002 U	0.0002 UJ	0.00019 U	0.01 U	NA
Chrysene		0.0005 U	0.00049 U	0.00053 U	0.0005 U	0.0005 U	0.01 U	0.0005 U	0.00051 U	0.0005 U	0.00048 U	0.01 U	NA
Dibenz(ah)anthracene		0.0002 U	0.0002 U	0.00021 U	0.0002 U	0.0002 U	0.01 U	0.0002 U	0.0002 U	**0.00034**	0.00019 U	0.01 U	NA
Indeno(1,2,3-cd)pyrene		0.0002 U	0.0002 U	0.00021 U	0.0002 U	0.0002 U	0.01 U	0.0002 U	**0.00041**	**0.00037**	0.00019 U	0.01 U	NA
Naphthalene		0.00099 U	0.00098 U	0.0011 U	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U	0.001 U	0.00096 U	0.01 U	NA
Bis(2-ethylhexyl) phthalate	0.006	0.005 U	0.0049 U	0.011 U	0.01 U	0.005 U	0.01 U	0.005 U	0.0051 U*	0.01 U	0.0096 U	0.01 U	NA
Butylbenzyl phthalate		0.002 U	0.002 U	0.0021 U	0.002 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.0019 U	0.01 U	NA
Diethyl phthalate		0.002 U	0.002 U	0.0021 U	0.002 U	0.002 U	0.01 U	0.002 U	0.002 U	0.002 U	0.0019 U	0.01 U	NA
Di-n-octyl phthalate		0.0099 U	0.0098 U	0.011 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0096 U	0.01 U	NA
Phenol		0.005 U	0.0049 U	0.0053 U	0.005 U	0.005 U	0.01 U	0.005 U	0.0051 U	0.005 U	0.0048 U	0.01 U	NA
Trichlorobenzene, 1,2,3-		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U	0.001 U	0.001 U	0.001 U		NA
Dioxins / Furans (mg/L)													
Dioxins													
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-		9.1E-09 U	NA	NA	NA	3.2E-09 U	4.3E-09 U	NA	NA	NA	NA	**3.2E-09**	NA
Heptachlorodibenzo-p-dioxins, total		9.1E-09 U	NA	NA	NA	3.2E-09 U	4.3E-09 U	NA	NA	NA	NA	**3.2E-09**	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-		3.4E-09 U	NA	NA	NA	3.2E-09 U	4.4E-09 U	NA	NA	NA	NA	3.2E-09 U	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-		3.3E-09 U	NA	NA	NA	3.1E-09 U	3.7E-09 U	NA	NA	NA	NA	2.9E-09 U	NA
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-		3.7E-09 U	NA	NA	NA	3E-09 U	3.7E-09 U	NA	NA	NA	NA	2.8E-09 U	NA
Hexachlorodibenzo-p-dioxins, total		7.2E-09 U	NA	NA	NA	3.2E-09 U	**4.1E-09** B	NA	NA	NA	NA	**2.9E-09** BJ	NA
Octachlorodibenzo-p-dioxin		0.000000033 U	NA	NA	NA	6.1E-09 U	**1.47E-08**	NA	NA	NA	NA	**8.43E-08**	NA
Octachlorodibenzo-p-dioxin; Dissolved		7.9E-09 U	NA	NA	NA	4.9E-09 U	NA	NA	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-		4.2E-09 U	NA	NA	NA	4.1E-09 U	3.2E-09 U	NA	NA	NA	NA	2.5E-09 U	NA
Pentachlorodibenzo-p-dioxins, total		4.2E-09 U	NA	NA	NA	4.1E-09 U	3.2E-09 U	NA	NA	NA	NA	2.5E-09 U	NA
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-		**0.000000045**	NA	NA	NA	**6.4E-09** J	2.9E-09 U	NA	NA	NA	NA	1.9E-09 U	NA
Tetrachlorodibenzo-p-dioxins, total		**0.000000045**	NA	NA	NA	**6.4E-09**	2.9E-09 U	NA	NA	NA	NA	1.9E-09 U	NA
Furans													
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-		2.2E-09 U	NA	NA	NA	2.1E-09 U	3.4E-09 U	NA	NA	NA	NA	2.1E-09 U	NA
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-		2.6E-09 U	NA	NA	NA	2.4E-09 U	3.8E-09 U	NA	NA	NA	NA	3.3E-09 U	NA
Heptachlorodibenzofurans, total		2.6E-09 U	NA	NA	NA	2.4E-09 U	3.6E-09 U	NA	NA	NA	NA	2.6E-09 U	NA
Hexachlorodibenzofuran, 1,2,3,4,7,8-		3.9E-09 U	NA	NA	NA	2.7E-09 U	3.2E-09 U	NA	NA	NA	NA	2.6E-09 U	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

		UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ	UWBZ
		Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
		LCKMW-15	LCKMW-16	LCKMW-16	LCKMW-16	LCKMW-16	RB25-MW7	RB25-MW7	RB25-MW7	RB25-MW7	RB25-MW7	RB25MW-9	RB25MW-9
													DUP
		8/12/2003	11/14/2003	2/27/2004	5/19/2004	8/12/2003	9/18/1997	8/11/2003	11/12/2003	2/27/2004	5/20/2004	9/17/1997	9/17/1997
PARAMETER_NAME	**MCLs**	**RI**	**RI**	**RI**	**RI**	**RI**	**Phase II**	**RI**	**RI**	**RI**	**RI**	**Phase II**	**Phase II**
Hexachlorodibenzofuran, 1,2,3,6,7,8-		3.7E-09 U	NA	NA	NA	2.6E-09 U	2.5E-09 U	NA	NA	NA	NA	2.1E-09 U	NA
Hexachlorodibenzofuran, 1,2,3,7,8,9-		4.5E-09 U	NA	NA	NA	3.1E-09 U	3.2E-09 U	NA	NA	NA	NA	2.8E-09 U	NA
Hexachlorodibenzofuran, 2,3,4,6,7,8-		4.1E-09 U	NA	NA	NA	2.9E-09 U	**4.5E-09** B	NA	NA	NA	NA	**3.2E-09** B	NA
Hexachlorodibenzofurans, total		4.5E-09 U	NA	NA	NA	3.1E-09 U	**4.5E-09** BJ	NA	NA	NA	NA	**3.2E-09** BJ	NA
Octachlorodibenzofuran		3.7E-09 U	NA	NA	NA	4.7E-09 U	4E-09 U	NA	NA	NA	NA	3.5E-09 U	NA
Pentachlorodibenzofuran, 1,2,3,7,8-		2.5E-09 U	NA	NA	NA	2.2E-09 U	2.8E-09 U	NA	NA	NA	NA	2E-09 U	NA
Pentachlorodibenzofuran, 2,3,4,7,8-		2.5E-09 U	NA	NA	NA	2.2E-09 U	2.9E-09 U	NA	NA	NA	NA	1.9E-09 U	NA
Pentachlorodibenzofurans, total		7.3E-09 U	NA	NA	NA	3.1E-09 U	2.9E-09 U	NA	NA	NA	NA	1.9E-09 U	NA
Tetrachlorodibenzofuran, 2,3,7,8-		0.000000002 U	NA	NA	NA	1.5E-09 U	**7.6E-09** B	NA	NA	NA	NA	**8.7E-09** B	NA
Tetrachlorodibenzofurans, total		2.3E-09 U	NA	NA	NA	1.5E-09 U	**1.4E-08**	NA	NA	NA	NA	**1.36E-08** B	NA
TCDD-TEQ	3E-08	**4.92888E-08**	NA	NA	NA	**1.0199E-08**	**6.1492E-09**	NA	NA	NA	NA	**4.8026E-09**	NA
TCDD-TEQ; Dissolved	3E-08	**1.3627E-09**	NA	NA	NA	**1.265E-09**	NA	NA	NA	NA	NA	NA	NA
Metals (mg/L)													
Aluminum		**0.15** J	**0.69**	**0.059** J	0.14 U	**0.44**	**3**	**0.083** J	0.2 U	0.2 U	0.2 U	**46** J	NA
Arsenic	0.01	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.006**	0.02 U	0.02 U	0.02 U	0.02 U	**0.039** J	NA
Arsenic, dissolved	0.01	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA	NA	0.005 U	NA
Barium	2	**0.13**	**0.057**	**0.033**	**0.036**	**0.054**	**0.32**	**0.29**	**0.27**	**0.23**	**0.28**	**0.33** J	NA
Barium, dissolved	2	NA	NA	NA	NA	NA	**0.29**	NA	NA	NA	NA	**0.08**	NA
Beryllium	0.004	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	0.004 U	0.004 U	0.004 U	0.004 U	0.005 U	NA
Cadmium	0.005	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.005 U	NA
Calcium		**130** J	**200**	**160**	**180**	**190**	**140**	**160**	**150**	**140**	**160** J	**230**	NA
Calcium, dissolved		NA	NA	NA	NA	NA	**120**	NA	NA	NA	NA	**100**	NA
Chromium, total	0.1	0.01 U	**0.0018** J	0.01 U	0.01 U	0.01 U	**0.01**	0.01 U	0.01 U	0.01 U	0.01 U	**0.1** J	NA
Cobalt		0.01 U	0.003 U	**0.0016** J	**0.0013** J	**0.0014** J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.04**	NA
Copper	1.3	**0.0054** J	0.0034 U	**0.0018** J	0.0037 U	**0.0036** J	**0.08**	**0.17**	**0.053**	**0.0074** J	**0.009** J	**0.09**	NA
Copper, dissolved	1.3	NA	NA	NA	NA	NA	**0.02**	NA	NA	NA	NA	0.02 U	NA
Iron		**0.16** J	**2.9** J	**1.1**	**1.3**	**1.6**	**15**	**0.17** J	0.2 U	0.13 U	0.2 U	**120** J	NA
Iron, dissolved		NA	NA	NA	NA	NA	**0.22**	NA	NA	NA	NA	0.1 U	NA
Lead	0.015	0.0075 U	0.0075 U	0.0075 U	0.0075 U	**0.003** J	**0.01**	**0.0096**	0.0067 U	0.0075 U	0.0075 U	**0.054**	NA
Magnesium		**37**	**53**	**70**	**72**	**53**	**81**	**83**	**86**	**85**	**91**	**91**	NA
Magnesium, dissolved		NA	NA	NA	NA	NA	**75**	NA	NA	NA	NA	**32**	NA
Manganese		**0.03**	**0.12**	**0.044**	**0.047**	**0.093**	**0.34**	**0.14**	**0.094**	**0.11**	**0.12**	**1.8** J	NA
Manganese, dissolved		NA	NA	NA	NA	NA	**0.1**	NA	NA	NA	NA	**0.23**	NA
Mercury	0.002	0.0002 U	0.0002 U	0.0002 U	0.00011 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NA
Nickel		0.01 U	0.0072 U	**0.0058** J	**0.0056** J	**0.0048** J	0.04 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.11**	NA
Potassium		**1.7**	**1.3**	0.55 U	**0.53** J	**1.1**	**39**	**37**	**35**	**30**	**34**	**13**	NA
Potassium, dissolved		NA	NA	NA	NA	NA	**38**	NA	NA	NA	NA	5 U	NA
Selenium	0.05	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.005 U	0.015 U	0.015 U	0.015 U	0.015 U	**0.007**	NA
Sodium		**26**	**9.9**	**8.7**	**8.3**	**8.3**	**25**	**25**	**25**	**19**	**22**	**3**	NA
Sodium, dissolved		NA	NA	NA	NA	NA	**25**	NA	NA	NA	NA	**1.9**	NA
Thallium	0.002	0.025 U	0.025 U	0.025 U	0.025 U	**0.0087** J	0.005 U	0.025 U	0.025 U	0.025 U	0.025 U	0.005 U	NA
Vanadium		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.01**	0.01 U	0.01 U	0.01 U	0.01 U	**0.11** J	NA
Zinc		0.04 U	**0.013** J	0.04 U	0.04 U	0.04 U	**0.05**	**0.012** J	0.04 U	0.04 U	0.04 U	**0.28** J	NA

TABLE 4-7
Concentrations of Detected Analytes in Groundwater
Samples Collected During Phase I, Phase II, and Remedial Investigations
Former Lockbourne Air Force Base, Lockbourne, Ohio

Notes:
1. Investigation phase indicates in which phase the samples were collected
   Phase I - Samples collected during Phase I Site Investigation (LAW, 1995).
   Phase II - Samples collected during Phase II Site Investigation (Program Management Company, 2000)
   RI - Samples collected as part of the Remedial Investigation field investigation conducted by Ellis Environmental.
2. The designation LCK-GW1 and LCKMW-1 are both samples from the same well. The term GW was used in the Phase I assessment. The MW was used in all subsequent assessments.
3. LCKMW-12 was never completed. LCKMW-12A was located adjacent to LCKMW-12 and sampled during the Phase II and the RI.
4. TCDD-TEQ is a calculated number used for risk assessment purposes

Legend:
NA - not analyzed
Bold - Indicates analyte detected
A - Concentration exceeds the instrument calibration range
a - Concentration is below the reporting limit
B - Organics: The constituent was detected in associated field or laboratory blank samples
Inorganics: Reported value is less than the contract required detection limit but above the instrument detection limit
C - Confirmed by gas chromatography / mass spectrometry (GC/MS)
CON - Confirmation analysis for dioxins / furans
D or I - The original sample was diluted and re-analyzed because detected concentrations were outside the instrument detection range
DUP - Duplicate
E - Organics:The reported concentration exceeds the calibration range of the GC/MS instrument
Inorganics:The value is estimated due to matrix interferences
H - Possibly biased high based upon QC data (Phase I SI)
Alternate peak selection upon analytical review (RI)
J - While the identity of the constituent is positive, the reported concentration is estimated
L - Possibly biased low or a false negative based upon QC data
M - Result was manually integrated
N - Spiked sample recovery not within control limits
PR - Value is underestimated due to the presence of poorly resolved GC peaks
Q - Quantitative interference in sample (Phase II SI)
Detected below the practical quantitation limit (Phase I SI)
R - Data rejected based upon QC data
RE - Reanalyzed
U - The constituent was not detected above RLs
* - Batch QC exceeds the upper or lower control limits

TABLE 5-1
Physical-Chemical Properties of the Organic Constituents
Former Lockbourne Air Force Base, Lockbourne, Ohio

Organic Constituent	MW (g/mol)	S (mg/L @ 25 ºC)	H (atm-m^3/mol)	Koc (L/kg)
Dioxans/Furans				
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	322	1.90E-05 [e]	3.98E-05 [f]	2.45E+07 [e]
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	356	1.18E-04 [e]	2.54E-06 [e]	
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	391	4.42E-06 [e]	4.46E-05 [e]	
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	425	2.40E-06 [e]	2.18E-05 [e]	
Octachlorodibenzo-p-dioxin	460	2.27E-09 [e]	6.74E-06 [e]	7.94E+07 [d]
Tetrachlorodibenzofuran, 2,3,7,8-	306	4.20E-04 [j]	1.48E-05 [j]	4.07E+05 [i]
Pentachlorodibenzofuran, 1,2,3,7,8-	340		2.63E-05 [j]	
Pentachlorodibenzofuran, 2,3,4,7,8-	340	2.40E-04 [j]	2.63E-05 [j]	
Hexachlorodibenzofuran, 1,2,3,4,7,8-	375	8.00E-06 [j]	2.78E-05 [j]	
Hexachlorodibenzofuran, 1,2,3,6,7,8-	375	1.80E-05 [j]	2.78E-05 [j]	
Hexachlorodibenzofuran, 1,2,3,7,8,9-	375		2.78E-05 [j]	
Hexachlorodibenzofuran, 2,3,4,6,7,8-	375		2.78E-05 [j]	
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	409	1.40E-05 [j]	4.10E-06 [j]	
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	409		4.10E-06 [j]	
Octachlorodibenzofuran	444	1.20E-06 [j]	1.70E-06 [j]	1.58E+08 [j]
Polycyclic Aromatic Hydrocarbons (PAHs)				
Benz(a)anthracene	228	9.40E-03 [a]	3.34E-06 [a]	3.58E+05 [a]
Benzo(a)pyrene	252	1.62E-03 [a]	1.13E-06 [a]	9.69E+05 [a]
Benzo(b)fluoranthene	252	1.50E-03 [a]	1.11E-04 [a]	1.23E+06 [a]
Benzo(ghi)perylene	276	2.30E-04 [b]	1.40E-07 [b]	3.08E+06 [j]
Benzo(k)fluoranthene	252	8.00E-04 [a]	8.29E-07 [a]	1.23E+06 [a]
Chrysene	228	1.60E-03 [a]	9.46E-05 [a]	3.98E+05 [a]
Dibenz(ah)anthracene	278	2.49E-03 [a]	1.47E-08 [a]	1.79E+06 [a]
Fluoranthene	202	2.06E-01 [a]	1.61E-05 [a]	4.91E+04 [a]
Indeno(1,2,3-cd)pyrene	276	2.20E-05 [a]	1.60E-06 [a]	3.47E+06 [a]
Pyrene	202	1.35E-01 [a]	1.10E-05 [a]	6.80E+04 [a]
Methylnaphthalene, 2-	142	2.46E+01 [b]	5.17E-04 [b]	2.45E+03 [g]
Polychlorinated Biphenyls (PCBs)				
PCB 1242	267	3.40E-01 [c]	5.20E-04 [c]	1.23E+04 [h]
PCB 1248	300	5.40E-02 [c]	2.80E-03 [c]	4.37E+05 [h]
PCB 1254	328	1.20E-02 [c]	2.00E-03 [c]	4.07E+05 [h]
PCB 1260	376	2.70E-03 [c]	4.61E-03 [c]	2.63E+06 [h]
Volatile Organics				
Acetone	58	1.00E+06 [a]	3.88E-05 [a]	5.75E-01 [a]
Carbon Disulfide	76	1.19E+03 [a]	3.03E-02 [a]	9.25E+01 [j]
Chloroethane	65	6.00E+03 [k]	1.11E-02 [l]	3.70E+01 [m]
Dichloropropene, 1,3-	111	2.80E+03 [a]	1.77E-02 [a]	9.25E+01 [a]
Methyl ethyl ketone	72	2.20E+05 [b]	5.60E-05 [b]	1.93E+00 [j]
Methylene chloride	85	1.30E+04 [a]	2.19E-03 [a]	1.00E+01 [a]
Trichloroethane, 1,1,2-	133	4.42E+03 [a]	9.12E-04 [a]	7.50E+01 [a]
Trichloroethene	131	1.10E+03 [a]	1.03E-02 [a]	9.43E+01 [a]
Trichlorofluoromethane	137	4.34E+04 [b]	9.10E-04 [b]	9.25E+01 [j]
Toluene	92	5.26E+02 [a]	6.64E-03 [a]	1.40E+02 [a]
Vinyl Chloride	63	2.76E+03 [a]	2.70E-02 [a]	2.98E+01 [j]
Xylene	106	1.10E+02 [b]	6.60E-03 [b]	1.40E+03 [j]
Misc. Semivolatile Organics				
Acenaphthene	154	4.24E+00 [a]	1.55E-04 [a]	4.89E+03 [a]
Acenapthylene	152	1.60E+01 [b]	1.10E-04 [b]	1.07E+04 [j]
Anthracene	178	4.34E-02 [a]	6.50E-05 [a]	2.35E+04 [a]
Benzoic Acid	123	3.50E+03 [a]	1.54E-06 [a]	1.84E+00 [j]

TABLE 5-1
Physical-Chemical Properties of the Organic Constituents
Former Lockbourne Air Force Base, Lockbourne, Ohio

Organic Constituent	MW (g/mol)	S (mg/L @ 25 ºC)	H (atm-m^3/mol)	Koc (L/kg)
Bis(2-ethylhexyl) phthalate	391	3.40E-01 [a]	1.02E-07 [a]	1.11E+05 [a]
Butylbenzyl phthalate	312	2.69E+00 [a]	1.26E-06 [a]	4.73E+04 [j]
Carbazole	167	7.48E+00 [a]	1.53E-08 [a]	3.38E+03 [j]
Di-n-butyl phthalate	278	1.12E+01 [a]	9.38E-10 [a]	1.57E+03 [a]
Di-n-octyl-phthalate	390	2.00E-02 [b]	6.7-05 [b]	3.38E+03 [j]
Dibenzofuran	168	3.10E+00 [b]	1.30E-05 [b]	1.07E+04 [j]
Diethyl phthalate	168	1.08E+03 [a]	4.50E-07 [a]	8.20E-01 [a]
Fluorene	166	1.98E+00 [a]	6.63E-05 [a]	7.71E+03 [a]
Naphthalene	128	3.10E-01 [a]	4.83E-04 [a]	1.19E+03 [a]
Phenanthrene	178	1.10E+00 [b]	2.80E-05 [b]	2.65E+04 [j]
Phenol	94	8.28E+04 [a]	3.97E-07 [a]	2.85E+01 [j]
Pesticides				
DDD, p,p'-	320	9.00E-02 [a]	4.00E-06 [a]	4.58E+04 [a]
DDE, p,p'-	318	1.20E-01 [a]	2.10E-05 [a]	8.64E+04 [a]
DDT, p,p'-	354	2.50E-02 [a]	8.10E-06 [a]	6.78E+05 [a]

Key:
S = Water solubility
H = Henry's Law constant
K_{oc} = Organic carbon partition coefficient

Notes:
a = USEPA 1996: Soil Screening Guidance: Technnical Background Document; EPA/540/R-95/128; NTIS No. PB96-963502; Office of Emergency and Remedial Response, Washington, DC.
b = USEPA 1996: Superfund Chemical Data Matrix; Office of Emergency and Remedial Response, Washington, DC.
c = ATSDR 2000: Toxicological Profile for Polychlorinated Biphenyls (PCBs); Prepared by Syracuse Research Corp. for U.S. Public Health Service, Atlanta, GA.
d = Hazardous Substances Data Bank, 2004.
e = ATSDR 1998: Toxicological Profile for Chlorinated Dibenzo-p-dioxins; Prepared by Research Triangle Institute for U.S. Public Health Service, Atlanta, GA.
f = USEPA 1994: CHEMDAT8; EPA-453/C-94-080B; Office of Air Quality Planning and Standards, Research Triangle Park, NC.
g = ATSDR 1995: Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene; Prepared by Sciences International, Inc. for U.S. Public Health Service, Atlanta, GA.
h = Pennsylvania Dept. of Environmental Resources (PADER) 1993: User's Manual for Criteria Estimation (CREST) Modeling System, Interim; Scientific Services Section, Division of Remediation, Bureau of Waste Management, Pittsburgh, PA.
i = values were calculated using the following formula:
. log Koc = 0.00028+(0.983 x log Kow)
j = ATSDR 1994: Toxicological Profile for Chlorodibenzofurans; Prepared by Syracuse Research Corp. for U.S. Public Health Service, Atlanta, GA.
k = http://en.wikipedia.org/wiki/Chloroethane
l = http://www.atsdr.cdc.gov/toxprofiles/tp105.pdf
m = http://www.dec.ny.gov/regulations/36324.html

TABLE 5-2

Physical-Chemical Properties of the Inorganic Constituents

Former Lockbourne Air Force Base, Lockbourne, Ohio

Inorganic COPC	Atomic Weight (g/mol)	Water Solubility (a) (mg/L @ 25 °C)	K_d (b) (L/kg)	Boiling Point (a) (degC)	Melting Point (a) (degC)
Arsenic	75	neg	200	615 c	817 d
Aluminum	27	neg	1,500	2,327	660,727
Barium	137	neg	60	1,897	1,287
Calcium	40	neg	4	1,484	1,900
Chromium	52	neg	856	2,642	1,800
Cobalt	59	neg	45	2,927	1,495
Copper	64	neg	35	2,570	1,080
Iron	56	neg	25	3,000	1,540
Lead	207	neg	900	1,740	328
Magnesium	24	neg	5	1,100	651
Manganese	55	neg	65	2,061	1,246
Mercury	201	neg	10	357	-39
Nickel	59	neg	150	2,730	1,455
Potassium	39	neg	6	759	64
Selenium	80	neg	300	685	221
Sodium	23	neg	100	881	98
Thallium	204	neg	1,500	1,473	304
Vanadium	51	neg	1,000	3,407	1,910
Zinc	65	neg	40	907	420

Key:

K_d = Soil-water distribution coefficient.

na = Not located in available literature.

neg = Negligible for elemental metal. Solubility is dependent on the speciation reactions in water.

Notes:

a = Unless otherwise specified, all values from National Library of Medicine (NLM) 2004: Hazardous Substances Data Bank (HSDB), Toxicology Data Network (TOXNET), National Institutes of Health, Dept. of Health and Human Services, Bethesda, MD; Revised March 4, 2004.

b = All values are rough estimates and are not meant to be used as exact measurements of coefficient values (Baes, C.F. III, R.D. Sharp, A.L. Sjoreen, and R.W. Shor, 1984: A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture ; ORNL-5786, Sept. 1984; Prepared for U.S. Dept. of Energy by Health and Safety Research Division, Oak Ridge National Laboratory, Oak Ridge, TN.

c = Arsenic sublimes without melting (NLM HSDB 2004).

d = Arsenic melts @ 36 atmospheres (NLM HSDB 2004).

TABLE 6-1
Summary of Data Used in Baseline Human Health Risk Assessment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Medium / Phase	***Sample Location***	**SampleID**	**Date of Sampling**	**Parameters**
Surface Soil - AOC 1				
1	LCK-SO10A	LCK-SO10A	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO12A	LCK-SO12A	25-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO1A	LCK-SO1A	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO2A	LCK-SO2A	24-May-95	EXPLO, HERB, METALS, PEST/PCB, VOC
1	LCK-SO2A	LCK-SO2A-RE *	24-May-95	SVOC
1	LCK-SO6A	LCK-SO6A-RE *	23-May-95	VOC
1	LCK-SO6A	LCK-SO6A	23-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC
1	LCK-SO7A	LCK-SO7A	23-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO8A	LCK-SO8A	23-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC
1	LCK-SO8A	LCK-SO8A-RE *	23-May-95	VOC
1	LCK-SO9A	LCK-SO9A	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-12	LCKSB-12 0-0.5'	25-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-13	LCKSB-13 0-0.5'	24-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-13	LCKSB-16 0-0.5' **	24-Jul-97	METALS, PEST/PCB
2	LCKSB-14	LCKSB-14 0-0.5'	30-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSO-1	LCKSO-1 0-1'	28-Jul-97	DIOXIN, METALS
2	LCKSO-6	LCKSO-6 0-1'	24-Jul-97	DIOXIN, METALS
2	LCKSO-7	LCKSO-7 0-1'	28-Jul-97	DIOXIN, METALS
2	LCKSO-7	LCKSO-11 0-1' **	28-Jul-97	DIOXIN, METALS
2	LCKSO-7	LCKSO-9 0-1' **	28-Jul-97	DIOXIN, METALS
2	LCKSO-8	LCKSO-8 0-1'	28-Jul-97	DIOXIN, METALS
3	EEGLKB-SS01	EEGLKB-SS01	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC
3	EEGLKB-SS01	EEGLKB-SS01	30-Jul-03	SVOC, VOC
3	EEGLKB-SS02	EEGLKB-SS02	29-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS03	EEGLKB-SS03	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS04	EEGLKB-SS04	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS05	EEGLKB-SS05	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS06	EEGLKB-SS06	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS07	EEGLKB-SS07	30-Jul-03	SVOC, VOC
3	EEGLKB-SS07	EEGLKB-SS07	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC
3	EEGLKB-SS08	EEGLKB-SS08	28-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS08	EEGLKB-SS08 Dup02 **	28-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS09	EEGLKB-SS09	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS09	EEGLKB-SS09 Dup03 **	29-Jul-03	METALS, SVOC, VOC
3	EEGLKB-SS10	EEGLKB-SS10	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS11	EEGLKB-SS11	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS12	EEGLKB-SS12	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS13	EEGLKB-SS13	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS14	EEGLKB-SS14	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS15	EEGLKB-SS15	29-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS16	EEGLKB-SS16	28-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS17	EEGLKB-SS17	28-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS18	EEGLKB-SS18	28-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS19	EEGLKB-SS19	28-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS24	EEGLKB-SS24	28-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
Subsurface Soil - AOC 1				
1	LCK-SO10B	LCK-SO10B	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO12B	LCK-SO12B	25-May-95	EXPLO, HERB, METALS, PEST/PCB, VOC
1	LCK-SO12B	LCK-SO12B-RE *	25-May-95	SVOC
1	LCK-SO12B	LCK-SODUP3 **	25-May-95	METALS, SVOC, VOC
1	LCK-SO1B	LCK-SO1B	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO2B	LCK-SO2B	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO6B	LCK-SO6B	23-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC
1	LCK-SO6B	LCK-SO6B-RE *	23-May-95	VOC
1	LCK-SO7B	LCK-SO7B-RE *	23-May-95	VOC
1	LCK-SO7B	LCK-SO7B	23-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC
1	LCK-SO8B	LCK-SO8B	23-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC
1	LCK-SO8B	LCK-SO8B-RE *	23-May-95	VOC
1	LCK-SO8B	LCK-SODUP2 **	23-May-95	METALS, PEST/PCB, SVOC
1	LCK-SO8B	LCK-SODUP2-RE **	23-May-95	VOC
1	LCK-SO9B	LCK-SO9B	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC

TABLE 6-1
Summary of Data Used in Baseline Human Health Risk Assessment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Medium / Phase	***Sample Location***	**SampleID**	**Date of Sampling**	**Parameters**
2	LCKSB-12	LCKSB-12 8-10'	25-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-13	LCKSB-13 8-10'	24-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-14	LCKSB-14 2-4'	30-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSO-1	LCKSO-1 2-3'	28-Jul-97	DIOXIN, METALS
2	LCKSO-6	LCKSO-6 2-3'	24-Jul-97	DIOXIN, METALS
2	LCKSO-7	LCKSO-7 2-3'	28-Jul-97	DIOXIN, METALS
2	LCKSO-8	LCKSO-8 2-3'	28-Jul-97	DIOXIN, METALS
3	LCKMW-15	LCKMW-15-4-6	05-Aug-03	SVOC, VOC
3	LCKMW-15	LCKMW-15	05-Aug-03	EXPLO, METALS, PEST/PCB, SVOC
3	LCKMW-16	LCKMW-16	06-Aug-03	EXPLO, METALS, PEST/PCB, SVOC
3	LCKMW-16	LCKMW-16-8-10	06-Aug-03	SVOC, VOC
Surface Soil - AOC 2				
1	LCK-SO11A	LCK-SO11A	25-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO3A	LCK-SO3A	25-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO4A	LCK-SO4A	25-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO5A	LCK-SO5A	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-10	LCKSB-10 0-0.5'	21-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-11	LCKSB-11 0-0.5'	21-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-11	LCKSB-15 0-0.5' **	21-Jul-97	DIOXIN, METALS
2	LCKSB-11	LCKSB-18 0-0.5' **	21-Jul-97	DIOXIN, METALS
3	EEGLKB-SS20	EEGLKB-SS20	28-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS20	EEGLKB-SS20 Dup01 **	28-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS21	EEGLKB-SS21	28-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS22	EEGLKB-SS22	28-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SS23	EEGLKB-SS23	28-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
Subsurface Soil - AOC 2				
1	LCK-SO11B	LCK-SO11B	25-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO3B	LCK-SO3B	25-May-95	HERB, METALS, PEST/PCB, SVOC
1	LCK-SO3B	LCK-SODUP1 **	25-May-95	EXPLO, METALS, PEST/PCB, SVOC, VOC
1	LCK-SO4B	LCK-SO4B	25-May-95	EXPLO, HERB, PEST/PCB, SVOC, VOC
1	LCK-SO4B	LCK-SO4B	24-May-95	METALS
1	LCK-SO5B	LCK-SO5B	24-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-10	LCKSB-10 2-4'	21-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSB-11	LCKSB-11 2-4'	21-Jul-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
Sediment - East Ditch				
2	LCKSD-2	LCKSD-2	25-Aug-97	EXPLO, METALS, PEST/PCB, SVOC, VOC
Sediment - West Ditch				
1	LCK-SE1	LCK-SE1	26-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC
1	LCK-SE1	LCK-SE1-RE *	26-May-95	EXPLO, DIOXIN, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SE2	LCK-SE2-RE *	26-May-95	VOC
1	LCK-SE2	LCK-SE2	26-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC
1	LCK-SE3	LCK-SE3	26-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SE3	LCK-SEDUP1 **	26-May-95	METALS, PEST/PCB, SVOC
1	LCK-SE3	LCK-SEDUP1-RE **	26-May-95	VOC
2	LCKSD-4	LCKSD-4	25-Aug-97	EXPLO, METALS, PEST/PCB, SVOC, VOC
2	LCKSD-5	LCKSD-5	25-Aug-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKSD-5	LCKSD-6 **	25-Aug-97	DIOXIN, METALS, PEST/PCB, VOC
2	LCKSD-5	LCKSD-8 **	25-Aug-97	METALS
3	EEGLKB-SD01	EEGLKB-SD01	30-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SD02	EEGLKB-SD02	31-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SD02	EEGLKB-SD02 Dup04 **	31-Jul-03	METALS, PEST/PCB, SVOC
3	EEGLKB-SD03	EEGLKB-SD03	31-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	EEGLKB-SD04	EEGLKB-SD04	31-Jul-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
Surface Water - East Ditch				
2	LCKSW-2	LCKSW-2	25-Aug-97	EXPLO, METALS, PEST/PCB, SVOC, VOC
Surface Water - West Ditch				
1	LCK-SW1	LCK-SW1	26-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-SW2	LCK-SW2	26-May-95	EXPLO, HERB, METALS, PEST/PCB, VOC
1	LCK-SW2	LCK-SW2-RE *	26-May-95	SVOC
1	LCK-SW3	LCK-SW3	26-May-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
2	LCKSW-4	LCKSW-4	25-Aug-97	EXPLO, METALS, PEST/PCB, SVOC, VOC
2	LCKSW-5	LCKSW-5	25-Aug-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC

TABLE 6-1
Summary of Data Used in Baseline Human Health Risk Assessment
Former Lockbourne Air Force Base, Lockbourne, Ohio

***Medium /* Phase**	***Sample Location***	**SampleID**	**Date of Sampling**	**Parameters**
2	LCKSW-5	LCKSW-6 **	25-Aug-97	DIOXIN, METALS
2	LCKSW-5	LCKSW-7 **	25-Aug-97	DIOXIN, METALS
3	EEGLKB-SW01	EEGLKB-SW01	30-Jul-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC
3	EEGLKB-SW02	EEGLKB-SW02	31-Jul-03	EXPLO, METALS, SVOC
3	EEGLKB-SW02	EEGLKB-SW02 Dup04 **	31-Jul-03	EXPLO, METALS, PEST/PCB, SVOC
3	EEGLKB-SW03	EEGLKB-SW03	31-Jul-03	DIOXIN, METALS, PEST/PCB, SVOC
Groundwater - Off-Landfill (IDA)				
1	LCK-GW7	LCK-GW7	07-Jun-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-7	LCKMW-7	19-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-7	LCKMW-7	11-Nov-98	DIOXIN
2	LCKMW-7	LCKMW-30 **	11-Nov-98	DIOXIN
3	LCKMW-7	LCKMW-7	13-Aug-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-7	LCKMW7	13-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-7	LCKMW-7	24-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-7	LCKMW-7Dup **	24-Feb-04	METALS, SVOC
3	LCKMW-7	LCKMW-7	20-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
Groundwater - AOC 1 (UWBZ)				
1	LCK-GW6	LCK-GW6	05-Jun-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-GW6	LCK-DUP1 **	05-Jun-95	METALS, PEST/PCB, SVOC, VOC
1	LCK-GW4	LCK-GW4	07-Jun-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-4	LCKMW-4	16-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-13	LCKMW-13	17-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-13	LCKMW-17 **	17-Sep-97	DIOXIN
2	RB25MW-9	RB25MW-9	17-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC
2	RB25MW-9	LCKMW-20 **	17-Sep-97	VOC
2	RB25MW-7	RB25MW-7	18-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-6	LCKMW-6	19-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-13	LCKMW-13	12-Nov-98	DIOXIN
3	RB25-MW7	RB25-MW7	11-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-15	LCKMW-15	12-Aug-03	DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-15	LCKMW-15 Dup02 **	12-Aug-03	EXPLO, DIOXIN, METALS, SVOC, VOC
3	LCKMW-16	LCKMW-16	12-Aug-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-4	LCKMW-4	12-Aug-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-6	LCKMW-6	13-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-13	LCKMW-13	14-Aug-03	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-15	LCKMW-15	10-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-15Dup	LCKMW-15Dup **	10-Nov-03	PEST/PCB, SVOC, VOC
3	LCKMW-13	LCKMW13	11-Nov-03	METALS, PEST/PCB, SVOC, VOC
3	LCKMW4	LCKMW4	12-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-6	LCKMW6	12-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	RB25-MW7	MWRB25MW7	12-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-16	LCKMW16	14-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-15	LCKMW-15	24-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-13	LCKMW-13	25-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-6	LCKMW-6	25-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-4	LCKMW-4	26-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-16	LCKMW16	27-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	RB25-MW7	RB25-MW7	27-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-13	LCKMW13	17-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-15	LCKMW-15	18-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-15Dup	LCKMW-15Dup **	18-May-04	METALS, VOC
3	LCKMW-16	LCKMW-16	19-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-4	LCKMW-4	19-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-6	LCKMW-6	20-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	RB25-MW7	RB25-MW7	20-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
Groundwater - AOC 1 (IDA)				
1	LCK-GW5	LCK-GW5	06-Jun-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
1	LCK-GW3	LCK-GW3	07-Jun-95	EXPLO, HERB, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-14	LCKMW-14	16-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-5	LCKMW-5	16-Sep-97	DIOXIN, METALS
2	LCKMW-5	LCKMW-15 **	16-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-12A	LCKMW-12A	17-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC

TABLE 6-1
Summary of Data Used in Baseline Human Health Risk Assessment
Former Lockbourne Air Force Base, Lockbourne, Ohio

***Medium /* Phase**	***Sample Location***	**SampleID**	**Date of Sampling**	**Parameters**
2	LCKMW-12A	LCKMW-16 **	17-Sep-97	DIOXIN, METALS
2	LCKMW-3	LCKMW-3	18-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-12A	LCKMW-12A	12-Nov-98	DIOXIN
3	LCKMW-3	LCKMW-3	13-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-5	LCKMW-5	13-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-12A	LCKMW-12A	14-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-14	LCKMW-14	14-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-12A	LCKMW12A	11-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-14	LCKMW14	12-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-5	LCKMW5	12-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-3	LCKMW3	13-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-12A	LCKMW-12A	25-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-5	LCKMW-5	25-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-14	LCKMW-14	26-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-3	LCKMW3	27-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-12A	LCKMW12A	17-May-04	METALS, PEST/PCB, SVOC, VOC
3	LCKMW-14	LCKMW-14	19-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-3	LCKMW-3	20-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-5	LCKMW-5	20-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
Groundwater - AOC 2 (UWBZ)				
2	LCKMW-11	LCKMW-11	22-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-11	LCKMW-11	12-Nov-98	DIOXIN
3	LCKMW-11	LCKMW-11	14-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-11	LCKMW11	11-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-11	LCKMW-11	24-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-11	LCKMW-11	19-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
Groundwater - AOC 2 (IDA)				
2	LCKMW-10	LCKMW-10	22-Sep-97	EXPLO, DIOXIN, METALS, PEST/PCB, SVOC, VOC
2	LCKMW-10	LCKMW-10	12-Nov-98	DIOXIN
3	LCKMW-10	LCKMW-10	14-Aug-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-10	LCKMW10	11-Nov-03	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-10	LCKMW-10	24-Feb-04	EXPLO, METALS, PEST/PCB, SVOC, VOC
3	LCKMW-10	LCKMW-10	19-May-04	EXPLO, METALS, PEST/PCB, SVOC, VOC

Notes:
* - reanalyzed sample
** - Duplicate sample
HERB - Herbicides
EXPLO - Explosives
Pest/PCBs - Pesticides/Polychlorinated Biphenyls
SVOCs - Semivolatile Organic Compounds
VOCs - Volatile Organic Compounds

TABLE 6-2

Conceptual Site Model - Potentially Complete Human Health Exposure Pathways Evaluated in the Human Health Risk Assessment

Former Lockbourne Air Force Base, Lockbourne, Ohio

Potentially Exposed Populations	Contaminated Media	Exposure Route (Human Health)	Rationale
Current/Future Industrial Land Use			
Maintenance Worker	Surface Soil (AOC 1 and AOC 2)	Ingestion, dermal contact, and inhalation	Maintenance worker could contact soil while at the site.
Trespassers/Visitors - Youth	Surface Soil (AOC 1 and AOC 2)	Ingestion, dermal contact, and inhalation	Trespassers/Visitors could contact soil while at the site.
Off-Site Industrial Worker	Surface Soil (AOC 1 and AOC 2)	Inhalation	Off-Site Industrial could inhale particulates/volatile emissions that are dispersed off-site.
Trespassers/Visitors - Youth	Sediment (East Ditch and West Ditch)	Ingestion and dermal contact	The East and West Ditches could be used for wading by trespasser/visitors
Trespassers/Visitors - Youth	Surface Water (East Ditch and West Ditch)	Ingestion and dermal contact	The East and West Ditches could be used for wading by trespasser/visitors
Future Industrial Land Use			
On-Site Facility Worker	Surface Soil (AOC 2)	Ingestion, dermal contact, and inhalation	If AOC 2 is developed for future industrial use, on-site facility workers could contact soil.
On-Site Facility Worker	Indoor Air (Vapor Intrusion from AOC 2 - Total Soil)	Inhalation	If AOC 2 is developed for future industrial use, on-site facility workers could inhale volatiles in indoor air.
Construction Worker	Total Soil (AOC 1 and AOC 2)	Ingestion, dermal contact, and inhalation	Construction worker could contact soil while performing construction/piping/excavation activities.
Construction Worker	Groundwater - UWBZ (AOC 1 and AOC 2)	Dermal contact and inhalation	Construction worker may contact and/or inhale vapors from groundwater during excavation activities.
Construction Worker	Sediment (East Ditch and West Ditch)	Ingestion and dermal contact	Construction workers may contact media in the ditches during construction/piping/excavation activities.
Construction Worker	Surface Water (East Ditch and West Ditch)	Ingestion and dermal contact	Construction workers may contact media in the ditches during construction/piping/excavation activities.
Off-Site Residents - Adults and Children	Groundwater - UWBZ and IDA (Off-Landfill Well and AOC 1 wells)	Ingestion, dermal contact, and inhalation	Groundwater is not currently used at the site as a water supply and the site will not be developed for residential use; however, the residential scenario (including inhalation of volatiles while showering) is evaluated for off-site residents downgradient of the site that may use private drinking wells.

TABLE 6-3
Calculation of Soil Gas Screening Levels for Vapor Intrusion Screening (Industrial Scenario)
Former Lockbourne Air Force Base, Lockbourne, Ohio

CAS #	Volatile Organic Compounds	RSL Industrial Air[1] µg/m^3		Infinite Source Indoor Attenuation Coefficient[2] (unitless)	Soil Gas Screening Level[3] µg/m^3
83-32-9	Acenaphthene	NA		0.1	NA
67-64-1	Acetone	1.40E+05	n	0.1	1.40E+06
132-64-9	Dibenzofuran	NA		0.1	NA
10061-02-6	Dichloropropene, 1,3-, trans-	3.10E+00	c*	0.1	3.10E+01
75-09-2	Methylene chloride	2.60E+01	c	0.1	2.60E+02
91-57-6	Methylnaphthalene, 2-	NA		0.1	NA
91-20-3	Naphthalene	3.60E-01	c*	0.1	3.60E+00
129-00-0	Pyrene	NA		0.1	NA
75-69-4	Trichlorofluoromethane	3.10E+03	n	0.1	3.10E+04

[1] Industrial air Regional Screening Levels (RSLs), at a HI=1 or Risk = 1E-06 (USEPA, 2008).
RSL for 1,3-dichloropropene used as a surrogate for tran-1,2-dichloropropene.
c = Carcinogenic
n = Noncarcinogenic
c* (where: n RSL < 100X c RSL)
[2] Attenuation factor for shallow soil gas (< 6 feet) recommended in Draft Vapor Intrusion Guidance (USEPA, 2002).
[3] Soil gas screening levels are based on the industrial air RSLs, at a HI=0.1 or Risk = 1E-06, adjusted using USEPA's (2002) soil gas-to-indoor air attenuation factor (1E-01).

TABLE 6-4

Calculation of Target Groundwater Concentrations for Vapor Intrusion Screening[1]

Former Lockbourne Air Force Base, Lockbourne, Ohio

Constituent	Unit Risk Factor (URF) $(ug/m^3)^{-1}$	Reference Concentration (RfC) mg/m^3	Target Indoor Air Concentration, carcinogen (C_{Cancer}) ug/m^3	Target Indoor Air Concentration, non-carcinogen ($C_{non\text{-}Cancer}$) ug/m^3	Target Indoor Air Concentration ($C_{target,ia}$) ug/m^3	Henry's Law Constant Dimensionless	Target Groundwater Concentration (C_{gw}) ug/L
Acetone		3.10E+01	NA	3.10E+03	3.10E+03	1.59E-03	1.95E+06
Carbon disulfide		7.00E-01	NA	7.00E+01	7.00E+01	1.24E+00	5.65E+01
Methylene chloride	4.70E-07	1.10E+00	5.18E+00	1.10E+02	5.18E+00	8.98E-02	5.77E+01
Naphthalene	3.40E-05	3.00E-03	7.16E-02	3.00E-01	7.16E-02	1.98E-02	3.61E+00
Toluene		5.00E+00	N/A	5.00E+02	5.00E+02	2.72E-01	1.84E+03

Notes:

[1] Due to change in toxicity value(s), the vapor intrusion screening level [i.e., target groundwater concentration from Table 2c, Subsurface Vapor Intrusion Guidance (EPA, 2002)] for this constituent was updated using the methodology presented in Appendix D.

URF and RfCs obtained from EPA's Integrated Risk Information System (IRIS) Database. [Online at http://www.epa.gov/iris/index.html], EPA's HEAST, or EPA's PPRTV.

Henry's Law Constants (dimensionless) were obtained from Appendix D, USEPA 2002.

Variables	Units	Value
C_{Cancer} = Target indoor air conc., cancer	ug/m^3	Solved by Eq. 1
$C_{non\text{-}Cancer}$ = Target indoor air conc., non-cancer	ug/m^3	Solved by Eq. 2
$C_{target,ia}$ = Target indoor air conc., minimum	ug/m^3	Solved by Eq. 3
C_{gw} = Target groundwater conc.	ug/L	Solved by Eq. 4
TCR = Target Cancer Risk	unitless	1.00E-06
THQ = Target Hazard Quotient	unitless	0.1
URF = Unit Risk Factor	$(ug/m^3)^{-1}$	Chemical-specific
RfC = Reference Concentration	mg/m^3	Chemical-specific
ATc = Averaging Time, carcinogens	days	25,550
EF = Exposure Frequency	days/year	350
ED = Exposure Duration	years	30
CF = Conversion Factor	ug/mg	1000
H = Dimensionless Henry's Law Constant	unitless	Chemical-specific
alpha (α) = Attenuation Factor	unitless	0.001

Equation 1:	C_{cancer} =	[(TCR x ATc)/(EF x ED x URF)]
Equation 2:	$C_{non\text{-}cancer}$ =	(THQ x RfC x CF)
Equation 3:	$C_{target,ia}$ =	Minimum(C_{cancer}, $C_{non\text{-}cancer}$)
Equation 4:	Cgw =	$C_{target,ia}$ x 10^{-3} m^3/L * 1/H * 1/α

TABLE 6-5

Summary of Chemicals of Potential Concern for the HHRA

Former Lockbourne Air Force Base, Lockbourne, Ohio

COPC	Surface Soil		Subsurface Soil		Indoor Air	Groundwater				Sediment		Surface Water	
	AOC 1	AOC 2	AOC 1	AOC 2	AOC 2 (Total Soil)	Off-Landfill -	AOC 1 - UWBZ	AOC 1 - IDA	AOC 2 - UWBZ	East Ditch	West Ditch	East Ditch	West Ditch
Aluminum			X				X	X	X		X		
Arsenic				X			X		X		X		X
Barium													
Benz(a)anthracene	X	X	X	X		X	X		X				
Benzo(a)pyrene	X	X	X	X		X	X	X	X		X		
Benzo(b)fluoranthene	X	X	X	X		X	X	X	X		X		
Benzo(k)fluoranthene	X		X										
Bis(2-ethylhexyl) phthalate							X	X					X
Cadmium							X						
Carbazole	O		O										
Chromium, total							X	X					
Chrysene	X		X										
Cobalt		X		X			X	X	X		X		
Copper							X						
Dibenz(ah)anthracene	X	X	X	X		X	X	X	X				
Dibenzofuran	X		X										
trans-1,3-Dichloropropene					X								
Fluoranthene	X		X										
Indeno(1,2,3-cd)pyrene	X		X			X	X	X	X				
Iron						X	X	X	X		X		
Lead	X		X			X	X	X	X				X
Manganese		X		X		X	X	X	X	X	X		
Mercury			X				X						
Methylene chloride					X		X						X
Naphthalene	X		X		X		X	X					
Nickel							X		X				
PCB 1242	X		X										
PCB 1248	X		X										
PCB 1254			X										
PCB 1260	X		X										
Pyrene	X		X										
Silver	X		X										
TCDD-TEQ	X	X	X	X		X	X	X	X				X
Thallium	X	X	X	X			X				X	X	X
Vanadium							X		X				
Zinc													

Key:

AOC 1 = Area of Concern 1; AOC 2 = Area of Concern 2; HHRA = Human Health Risk Assessment; IDA = Intermediate depth aquifer; RSL = Regional Screening Level; UWBZ = Upper water-bearing zone

X = This constituent is included as a COPC and evaluated further in the HHRA because the maximum detected concentration exceeded a risk-based screening level and backgrou concentration, if available.

O = No RSL was available for this constituent; therefore it was considered a COPC and evaluated further in the HHRA.

TABLE 6-6
Soil to Indoor Air Parameters Used in the Johnson and Ettinger Model, Industrial Scenario
Former Lockbourne Air Force Base, Lockbourne, Ohio

Symbol	Parameter	Description	Selected Value	Units	Sources
T_S	Average Soil/Groundwater Temperature		13.7	°C	Assumed soil temperature equal to groundwater temperature. Site-specific average from AOC 2 UWBZ; 4 quarterly
L_F	Depth Below Grade to Bottom of Enclosed Space Floor	This is the depth from soil surface to the bottom of the floor in contact with soil	15	cm	Default value in User's Guide for slab-on-grade construction. Represents 6 inch thick concrete slab. (USEAP, 2004). Ohio EPA default.
L_T	Depth Below Grade to Top of Contamination		30.5	cm	Surface soil depth at 0 -1 ft. The majority of constituents were detected in surface soil.
h_A	Thickness of Soil Stratum A		30.5	cm	Soil stratum is modeled as a single soil type.
h_B	Thickness of Soil Stratum B		NA	cm	Not Used
h_C	Thickness of Soil Stratum C		NA	cm	Not Used
	Soil Stratum Directly Above Water Table		A	unitless	Consistent with the deepest stratum with a specified thickness (h_A).
	SCS Soil Type Above Water Table		S	unitless	Ohio EPA default, sand
	Soil Stratum A SCS Soil Type	Used to estimate soil vapor permeability	S	unitless	Ohio EPA default, sand
k_v	User-defined Soil Vapor Permeability	A parameter associated with convective transport of vapors within the zone of influence of a building. It is related to the size and shape of connected soil pores	NA	cm^2	Not Used
r_b^A	Stratum A Soil Dry Bulk Density		1.66	g/cm^3	Model default value.
n^A	Stratum A Total Soil Porosity	Used with water-filled porosity to calculate air-filled porosity (see below)	0.375	unitless	Model default value.

TABLE 6-6
Soil to Indoor Air Parameters Used in the Johnson and Ettinger Model, Industrial Scenario
Former Lockbourne Air Force Base, Lockbourne, Ohio

Symbol	Parameter	Description	Selected Value	Units	Sources
q_w^A	Stratum A Soil Water-filled porosity	Used with total porosity to calculate air-filled porosity (see below)	0.054	cm^3/cm^3	Model default value.
r_b^B	Stratum B Soil Dry Bulk Density		NA	g/cm^3	Not Used
n^B	Stratum B Total Soil Porosity	Used with water-filled porosity to calculate air-filled porosity (see below)	NA	unitless	Not Used
q_w^B	Stratum B Soil Water-filled porosity	Used with total porosity to calculate air-filled porosity (see below)	NA	cm^3/cm^3	Not Used
r_b^C	Stratum C Soil Dry Bulk Density		NA	g/cm^3	Not Used
n^C	Stratum C Total Soil Porosity	Used with water-filled porosity to calculate air-filled porosity (see below)	NA	unitless	Not Used
$q_{w\backslash}^C$	Stratum C Soil Water-filled porosity	Used with total porosity to calculate air-filled porosity (see below)	NA	cm^3/cm^3	Not Used
L_{crack}	Enclosed Space Floor Thickness		10	cm	Ohio EPA default
D_P	Soil-Building Pressure Differential		40	$g/cm\text{-}s^2$	Ohio EPA default
L_B	Enclosed Space Floor Length		2200	cm	Median warehouse/storage building size for the U.S. (based on Table B-2, DOE, 2003) is 5,200 square feet.
W_B	Enclosed Space Floor Width		2200	cm	same as L_B
H_B	Enclosed Space Height		304.8	cm	Ohio EPA default; typical average ceiling

TABLE 6-6
Soil to Indoor Air Parameters Used in the Johnson and Ettinger Model, Industrial Scenario
Former Lockbourne Air Force Base, Lockbourne, Ohio

Symbol	Parameter	Description	Selected Value	Units	Sources
w	Floor-Wall Seam Crack Width	Represents a gap assumed to exist at the junction between the floor and the foundation perimeter. This gap is due to building design or concrete shrinkage. It represents the only route for soil gas intrusion into a building	0.1	cm	Ohio EPA mimimum value
ER	Indoor air exchange rate	Building ventilation rate, expressed in units of air changes per hour (ACH)	1	(1/h)	Ohio EPA value for commercial/industrial land use
Qsoil	Average vapror flow rate into building		calculated	(L/m)	calculated by model
AT_C	Averaging Time for Carcinogens		70	yrs	default (USEAP, 2004)
AT_{NC}	Averaging Time for Noncarcinogens		25	yrs	EPA, 1991
ED	Exposure Duration		25	yrs	EPA, 1991
EF	Exposure Frequency		250	days/yr	EPA, 1991
TR	Target Risk for Carcinogens	Used to calculate risk-based groundwater concentration	1×10^{-6}	unitless	not used (model used to calculate indoor air concentrations)
THQ	Target Hazard Quotient for Noncarcinogens	Used to calculate risk-based groundwater concentration	1	days/yr	not used (model used to calculate indoor air concentrations)

ASHRAE. 2001. Standard 62-2001, Ventilation for Acceptable Indoor Air Quality
DOE, 2003. Commercial Building Energy Consumption Survey (CBECS). Energy Information Administration.
USEPA, 1991. U.S. Environmental Protection Agency. Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part B, Development of Risk-
USEPA, 2004. User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings. Office of Emergency and Remedial Response. February 2004.

TABLE 6-7
Summary of RME Cancer Risks and Hazard Indices
Former Lockbourne Air Force Base, Lockbourne, Ohio

Receptor	Media	Exposure Route	Cancer Risk	COPCs with Cancer Risks >10^{-4}	COPCs with Cancer Risks >10^{-5} and <10^{-4}	COPCs with Cancer Risks >10^{-6} and <10^{-5}	Hazard Index	COPCs with HI > 1
Current/Future	Surface Soil (AOC 1)	Ingestion	1.0E-04		Benzo(a)pyrene	Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, PCB-1248	0.012	
Maintenance Worker Adult		Dermal Contact	8.6E-05		Benzo(a)pyrene	Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, PCB-1248	0.0042	
		Inhalation	3.4E-08				0.00069	
		Total	**1.9E-04**	**Benzo(a)pyrene**	**Benz(a)anthracene, Benzo(b)fluorathene**	**Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, PCB-1248**	**0.017**	
	Surface Soil (AOC 2)	Ingestion	1.2E-07				0.016	
		Dermal Contact	8.1E-08				0.00039	
		Inhalation	5.0E-09				0.0017	
		Total	**2.0E-07**				**0.018**	
Current/Future	Surface Soil (AOC 1)	Ingestion	6.9E-05		Benzo(a)pyrene	Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, PCB-1248	0.021	
Trespasser/Visitor Youth		Dermal Contact	3.7E-05		Benzo(a)pyrene	Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene	0.0045	
		Inhalation	6.9E-09				0.00036	
		Total	**1.1E-04**		**Benzo(a)pyrene**	**Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, PCB-1248**	**0.025**	
	Surface Soil (AOC 2)	Ingestion	8.0E-08				0.028	
		Dermal Contact	3.4E-08				0.00041	
		Inhalation	1.0E-09				0.00087	
		Total	**1.2E-07**				**0.029**	
	Sediment (East Ditch)	Ingestion	0.0E+00				0.00064	
		Dermal Contact	0.0E+00				0.000080	
		Inhalation	NA				NA	
		Total	**0.0E+00**				**0.00072**	
	Surface Water (East Ditch)	Ingestion	0.0E+00				0.013	
		Dermal Contact	0.0E+00				0.0013	
		Inhalation	NA				NA	
		Total	**0.0E+00**				**0.014**	
	Sediment (West Ditch)	Ingestion	2.6E-06			Arsenic	0.041	
		Dermal Contact	4.5E-07				0.0022	
		Inhalation	NA				NA	
		Total	**3.1E-06**			**Arsenic**	**0.043**	
	Surface Water (West Ditch)	Ingestion	1.5E-07				0.015	
		Dermal Contact	2.6E-06			TCDD-TEQ	0.14	
		Inhalation	NA				NA	
		Total	**2.7E-06**			**TCDD-TEQ**	**0.15**	
		Receptor Total (1)	**1.1E-04**		**Benzo(a)pyrene**	**Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, PCB-1248, Arsenic, TCDD-TEQ**	**0.22**	
Current/Future	Surface Soil (AOC 1)	Ingestion	NA				NA	
Off-Site Industrial Worker		Dermal Contact	NA				NA	
Adult		Inhalation	2.4E-07				0.0049	
		Total	**2.4E-07**				**0.0049**	
	Surface Soil (AOC 2)	Ingestion	NA				NA	
		Dermal Contact	NA				NA	
		Inhalation	3.6E-08				0.012	
		Total	**3.6E-08**				**0.012**	
Future	Surface Soil (AOC 2)	Ingestion	8.3E-07				0.016	
Facility Worker		Dermal Contact	5.8E-07				0.0028	
Adult		Inhalation	3.6E-08				0.012	
		Total	**1.4E-06**				**0.031**	
	Total Soil (2) (AOC 2)	Inhalation (Indoor Air)	7.2E-06			trans-1,3-dichloropropene, methylene chloride, naphthalene	0.21	
		Total	**7.2E-06**			trans-1,3-dichloropropene, methylene chloride, naphthalene	**0.21**	
		Receptor Total (1)	**8.6E-06**			**trans-1,3-dichloropropene, methylene chloride, naphthalene**	**0.24**	

TABLE 6-7
Summary of RME Cancer Risks and Hazard Indices
Former Lockbourne Air Force Base, Lockbourne, Ohio

Receptor	Media	Exposure Route	Cancer Risk	COPCs with Cancer Risks >10^{-4}	COPCs with Cancer Risks >10^{-5} and <10^{-4}	COPCs with Cancer Risks >10^{-6} and <10^{-5}	Hazard Index	COPCs with HI > 1
Future	Total Soil (2) (AOC 1)	Ingestion	7.4E-05		Benzo(a)pyrene	Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, PCB-1248	0.33	
Construction Worker Adult		Dermal Contact	2.9E-05		Benzo(a)pyrene	Benz(a)anthracene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene	0.057	
		Inhalation	7.2E-09				0.0046	
		Total	**1.0E-04**		**Benzo(a)pyrene, Dibenz(a,h)anthracene**	**Benz(a)anthracene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, PCB-1248**	**0.39**	
	Groundwater (AOC 1 - UWBZ)	Ingestion	NA				NA	
		Dermal Contact	1.4E-05			Benzo(a)pyrene, Dibenz(a,h)anthracene, TCDD-TEQ	2.5	TCDD-TEQ
		Inhalation	4.0E-10				0.00016	
		Total	**1.4E-05**			**Benzo(a)pyrene, Dibenz(a,h)anthracene, TCDD-TEQ**	**2.5**	**TCDD-TEQ**
	Total Soil (2) (AOC 2)	Ingestion	1.0E-06				0.30	
		Dermal Contact	1.2E-07				0.016	
		Inhalation	1.7E-09				0.0091	
		Total	**1.1E-06**			**Arsenic**	**0.33**	
	Groundwater (AOC 2 - UWBZ)	Ingestion	NA				NA	
		Dermal Contact	3.0E-05		Dibenz(a,h)anthracene	Benz(a)pyrene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ	3.1	TCDD-TEQ
		Inhalation	--				--	--
		Total	**3.0E-05**		**Dibenz(a,h)anthracene**	**Benz(a)pyrene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ**	**3.1**	**TCDD-TEQ**
	Sediment (East Ditch)	Ingestion	0.0E+00				0.00035	
		Dermal Contact	0.0E+00				0.000053	
		Inhalation	NA				NA	
		Total	**0.0E+00**				**0.00040**	
	Surface Water (East Ditch)	Ingestion	0.0E+00				0.0084	
		Dermal Contact	0.0E+00				0.0022	
		Inhalation	NA				NA	
		Total	**0.0E+00**				**0.011**	
	Sediment (West Ditch)	Ingestion	4.8E-08				0.018	
		Dermal Contact	1.0E-08				0.0014	
		Inhalation	NA				NA	
		Total	**5.8E-08**				**0.019**	
	Surface Water (West Ditch)	Ingestion	9.8E-09				0.010	
		Dermal Contact	3.2E-07				0.17	
		Inhalation	NA				NA	
		Total	**3.3E-07**				**0.18**	
		Receptor Total (1)	**1.3E-04**		**Benzo(a)pryene, Dibenz(a,h)anthracene**	**Arsenic, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, PCB 1248, TCDD-TEQ**	**3.7**	**TCDD-TEQ**
Future Off-Site Resident Adult	Groundwater (Off-Site - IDA)	Ingestion	NA				0.61	
		Dermal Contact	NA				5.1	TCDD-TEQ
		Inhalation	NA				--	
		Total	**NA**				**5.7**	**TCDD-TEQ**
	Groundwater (AOC 1 - UWBZ)	Ingestion	NA				12	Arsenic, Iron, Manganese, Thallium
		Dermal Contact	NA				15	TCDD-TEQ
		Inhalation	NA				0.47	
		Total	**NA**				**28**	**Arsenic, Iron, Manganese, Thallium, TCDD-TEQ**
	Groundwater (AOC 1 - IDA)	Ingestion	NA				1.9	
		Dermal Contact	NA				4.3	TCDD-TEQ
		Inhalation	NA				1.5	Naphthalene
		Total	**NA**				**7.7**	**TCDD-TEQ, Naphthalene**
Future Off-Site Resident Child	Groundwater (Off-Site - IDA)	Ingestion	NA				1.4	
		Dermal Contact	NA				12	TCDD-TEQ
		Inhalation	NA				--	
		Total	**NA**				**13**	**TCDD-TEQ**
	Groundwater (AOC 1 - UWBZ)	Ingestion	NA				28	Arsenic, Cobalt, Iron, Manganese, TCDD-TEQ, Thallium
		Dermal Contact	NA				34	TCDD-TEQ
		Inhalation	NA				0.83	
		Total	**NA**				**63**	**Arsenic, Cobalt, Iron, Manganese, TCDD-TEQ, Thallium**
	Groundwater (AOC 1 - IDA)	Ingestion	NA				4.4	Iron, Manganese
		Dermal Contact	NA				9.8	TCDD-TEQ
		Inhalation	NA				2.6	Naphthalene
		Total	**NA**				**17**	**Iron, Managanese, TCDD-TEQ, Naphthalene**

TABLE 6-7
Summary of RME Cancer Risks and Hazard Indices
Former Lockbourne Air Force Base, Lockbourne, Ohio

Receptor	Media	Exposure Route	Cancer Risk	COPCs with Cancer Risks >10^{-4}	COPCs with Cancer Risks >10^{-5} and <10^{-4}	COPCs with Cancer Risks >10^{-6} and <10^{-5}	Hazard Index	COPCs with HI > 1
Future	Groundwater (Off-Site - IDA)	Ingestion	3.7E-04	Benzo(a)pyrene, Dibenz(a,h)anthracene	Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ	Benz(a)anthracene	NA	
Off-Site Resident Child/Adult		Dermal Contact	7.3E-03	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ	Benz(a)anthracene		NA	
		Inhalation	--				NA	
		Total	**7.6E-03**	**Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ**	**Benzo(a)anthracene**		**NA**	
	Groundwater (AOC 1 - UWBZ)	Ingestion	9.6E-04	Arsenic, Benzo(a)pyrene, Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene, TCDD-TEQ	Benzo(a)anthracene, Benzo(b)fluoranthene, Bis(2-ethylhexyl) phthalate	NA	
		Dermal Contact	8.2E-03	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ	Arsenic, Benz(a)anthracene	Bis(2-ethylhexyl) phthalate	NA	
		Inhalation	3.2E-05		Methylene chloride, Naphthalene		NA	
		Total	**9.2E-03**	**Arsenic, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ**	**Benz(a)anthracene, Methylene chloride, Naphthalene**	**Bis(2-ethylhexyl) phthalate**	NA	
	Groundwater (AOC 1 - IDA)	Ingestion	3.3E-04	Dibenz(a,h)anthracene	Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ	Benzo(b)fluoranthene, Bis(2-ethylhexyl) phthalate	NA	
		Dermal Contact	7.2E-03	Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ		Bis(2-ethylhexyl) phthalate	NA	
		Inhalation	7.5E-05		Naphthalene		NA	
		Total	**7.6E-03**	**Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, TCDD-TEQ**	**Naphthalene**	**Bis(2-ethylhexyl) phthalate**	**NA**	

(1) For receptors evaluated for more than one exposure unit per medium (e.g., soil from AOC 1 and soil from AOC 2), the Receptor Totals are calculated using the maximum risk/hazard estimate for each medium so that exposures are not over estimated.
(2) Surface soil and subsurface soil combined.
Blank cells beneath the specified target risk columns (i.e., COPCs with Cancer Risks >10-4, COPCs with HI > 1) mean there were no COPCs meeting the specified target risk.
NA = Not Applicable. This pathway was not evaluated.
-- = Volatile COPCs were not present, therefore inhalation pathway was not evaluated.
0.0E+00 = COPCs were present, however no carcinogenic slope factors available to risk.

TABLE 7-1

Background Comparison-- AOC 1 Soil

Former Lockbourne Air Force Base, Lockbourne, Ohio

Inorganic Chemical Detected in AOC 1 Surface Soil	Maximum Detected Concentration (mg/kg)	Site-Specific Background Concentration* (mg/kg)	Ration of Maximum Detected Concentration to Background
Aluminum	26,000	1.90E+04	**1.4**
Antimony	1.40	na	**--**
Arsenic	21.0	2.20E+01	1.0
Barium	490	1.90E+02	**2.6**
Beryllium	3.32	1.20E+00	**2.8**
Cadmium	6.30	9.90E-01	**6.4**
Calcium	280,000	4.70E+04	**6.0**
Chromium, total	35.5	2.30E+01	**1.5**
Cobalt	12.0	2.00E+01	0.6
Copper	140	3.90E+01	**3.6**
Iron	38,000	4.10E+04	0.9
Lead	9,340	2.90E+01	**322**
Magnesium	39,000	1.50E+04	**2.6**
Manganese	900	1.10E+03	0.8
Mercury	0.79	na	**--**
Nickel	32.0	6.70E+01	0.5
Potassium	4,200	2.00E+03	**2.1**
Selenium	3.50	na	--
Silver	190	1.30E+00	**146**
Sodium	980	na	--
Thallium	2.80	na	--
Vanadium	36.0	4.50E+01	0.8
Zinc	1,650	1.20E+02	**13.8**

*Lesser of the maximum concentration and upper 95% tolerance limit (Table 3-3, Phase II Site Investigation, PMC, 2000).

Notes:

na = not available.

-- = no background comparison performed, constituent was retained.

Value in Bold = maximum detected site concentration > background concentration; constituent retained.

TABLE 7-2

Background Comparison--AOC 2Soil

Former Lockbourne Air Force Base, Lockbourne, Ohio

Inorganic Chemical Detected in AOC 2 Surface Soil	Maximum Detected Concentration (mg/kg)	Site-Specific Background Concentration* (mg/kg)	Ration of Maximum Detected Concentration to Background
Aluminum	16,000	1.90E+04	0.8
Antimony	nd	na	--
Arsenic	25.1	2.20E+01	**1.1**
Barium	200	1.90E+02	**1.1**
Beryllium	2.40	1.20E+00	**2.0**
Cadmium	0.67	9.90E-01	0.7
Calcium	100,000	4.70E+04	**2.1**
Chromium, total	22.0	2.30E+01	0.96
Cobalt	26.0	2.00E+01	**1.3**
Copper	23.0	3.90E+01	0.6
Iron	33,000	4.10E+04	0.8
Lead	40.2	2.90E+01	**1.4**
Magnesium	48,000	1.50E+04	**3.2**
Manganese	1,600	1.10E+03	**1.5**
Mercury	0.080	na	--
Nickel	30.0	6.70E+01	0.4
Potassium	3,300	2.00E+03	**1.7**
Selenium	0.60	na	--
Silver	0.64	1.30E+00	0.5
Sodium	210	na	--
Thallium	2.20	na	--
Vanadium	44.0	4.50E+01	0.98
Zinc	125	1.20E+02	**1.04**

*Lesser of the maximum concentration and upper 95% tolerance limit (Table 3-3, Phase II Site Investigation, PMC, 2000).

Notes:

na = not available.

-- = no background comparison performed, constituent was retained.

Value in Bold = maximum detected site concentration > background concentration; constituent retained.

TABLE 7-3

Background Comparison--West Ditch Sediment

Former Lockbourne Air Force Base, Lockbourne, Ohio

Parameter	West Ditch Maximum Concentration (MG/KG)	OEPA SRV[1]	Site Max to OEPA SRV	LCKSD03 Background	Site Max to Background Ration	Retained As COPEC
Aluminum	12,000	3.90E+04	0.3	--	--	No
Arsenic	22.0	1.80E+01	**1.2**	6.35	**2.8**	**Yes**
Barium	110	2.40E+02	0.5	--	--	No
Beryllium	0.56	8.00E-01 [2]	0.7	--	--	No
Cadmium	1.30	9.00E-01	**1.4**	1.6	0.6	No
Calcium [2]	160,000	1.20E+05	**1.3**	83000	**1.4**	**Yes**
Chromium, to	16.0	4.00E+01	0.4	--	--	No
Cobalt	16.0	1.20E+01 [2]	**1.3**	6.7	**1.8**	**Yes**
Copper	26.0	3.40E+01	0.8	--	--	No
Iron	28,000	3.30E+04	0.8	--	--	No
Lead	51.0	4.70E+01 [2]	**1.1**	20.2	**2.3**	**Yes**
Magnesium [2]	44,000	3.50E+04	**1.3**	21000	**1.7**	**Yes**
Manganese	420	7.80E+02	0.5	--	--	No
Mercury	0.042	1.20E-01 [2]	0.4	--	--	No
Nickel	36.0	4.20E+01	0.9	--	--	No
Potassium [2]	2,100	1.10E+04	0.2	--	--	No
Selenium	0.70	2.30E+00	0.3	--	--	No
Sodium [2]	230	NSV	NSV	ND	**--**[3]	**Yes**
Thallium	2.00	4.70E+00 [2]	0.4	--	--	No
Vanadium	29.0	4.00E+01 [2]	0.7	--	--	No
Zinc	120	1.60E+02	0.8	--	--	No

[1]Ohio EPA Sediment Reference Values (SRV), 2003; Region-specific value (ECBP) used unless otherwise noted

[2]State-wide value used

[3]Constituent retained as COPEC due not being detected in background sample

Notes:

ND = Not detected

NSV = No screening value available

OEPA = Ohio Environemental Protection Agency

TABLE 7-4

Background Comparison--East Ditch Sediment

Former Lockbourne Air Force Base, Lockbourne, Ohio

Parameter	East Ditch Maximum Concentration (MG/KG)	OEPA SRV[1]	Site Max to OEPA SRV	LCKSD01 Background	Site Max to Background Ration	Retained as COPEC?
Aluminum	4400	3.90E+04	0.1	--	--	No
Arsenic	10.1	1.80E+01	0.6	--	--	No
Calcium	130000	1.20E+05	**1.1**	110000	**1.2**	**Yes**
Chromium	9.6	4.00E+01	0.2	--	--	No
Cobalt	6.2	1.20E+01	0.5	--	--	No
Copper	18	3.40E+01	0.5	--	--	No
Iron	18000	3.30E+04	0.5	--	--	No
Lead	12.4	4.70E+01 [2]	0.3	--	--	No
Magnesium	46000	3.50E+04	**1.3**	43000	**1.1**	**Yes**
Manganese	380	7.80E+02	0.5	--	--	No
Nickel	19	4.20E+01	0.5	--	--	No
Selenium	0.704	--	**NSV**	4.03	0.2	No
Vanadium	15	4.00E+01 [2]	0.4	--	--	No
Zinc	73	1.60E+02	0.5	--	--	No

[1]Ohio EPA Sediment Reference Values (SRV), 2003; Region-specific value (ECBP) used unless otherwise noted

[2]State-wide value used

Notes:

NSV = No screening value available

OEPA = Ohio Environemental Protection Agency

TABLE 7-5

Background Comparison--East Ditch and West Ditch Surface Water

Former Lockbourne Air Force Base, Lockbourne, Ohio

	Inorganic Chemical Detected in Surface water	Maximum Detected Concentration (mg/L)	Site-Specific Background Concentration* (mg/L)	Ration of Maximum Detected Concentration to Background
East Ditch	Barium	0.080	0.070	**1.14**
	Calcium	110	0.005	**22000**
	Iron	0.42	0.640	0.66
	Magnesium	34	33.000	**1.03**
	Manganese	0.030	0.090	0.33
	Potassium	5.40	ND	--
	Sodium	6.50	9.300	0.70
	Thallium	0.0070	ND	--
	Arsenic, dissolved	0.02	ND	**--**
	Barium, dissolved	0.08	0.08	1.00
	Calcium, dissolved	110	110	1.00
	Magnesium, dissolved	34	33	**1.03**
	Manganese, dissolved	0.03	0.09	0.33
	Sodium, dissolved	6.60	9.3	0.71
	Thallium, dissolved	0.01	0.005	**1.60**
West Ditch	Aluminum	0.18	ND	--
	Arsenic	0.0050	ND	--
	Barium	0.081	0.08	**1.01**
	Calcium	98.0	95	**1.03**
	Copper	0.0036	ND	--
	Iron	0.78	0.29	**2.69**
	Lead	0.052	ND	--
	Magnesium	32.0	30	**1.07**
	Manganese	0.063	0.04	**1.58**
	Potassium	11.0	6.2	**1.77**
	Selenium	0.0015	ND	--
	Sodium	9.30	4	**2.33**
	Thallium	0.0070	0.006	**1.17**
	Zinc	0.092	ND	--
	Barium, dissolved	0.080	0.08	1.00
	Calcium, dissolved	96.0	97	0.99
	Magnesium, dissolved	31.0	31	1.00
	Manganese, dissolved	0.050	0.04	**1.25**
	Potassium, dissolved	7.70	ND	--
	Sodium, dissolved	7.10	4.2	**1.69**
	Thallium, dissolved	0.0060	0.005	**1.20**

Notes:

-- = no background comparison performed, constituent was retained.

Value in Bold = maximum detected site concentration > background concentration; constituent retained.

TABLE 7-6
Soil Screening Values--Direct Exposure
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Inorganics (MG/KG)		
Aluminum	50.0	Efroymson et al., 1997b; microbe benchmark
Antimony	78.0	USEPA 2005d
Arsenic	18.0	USEPA 2005e
Barium	330	USEPA 2005f
Beryllium	40.0	USEPA 2005g
Cadmium	32.0	USEPA 2005h
Calcium 2	NSV	--
Chromium, total	0.40	Efroymson et al. 1997b
Cobalt	13.0	USEPA 2005i
Copper	70.0	USEPA 2007d
Lead	120	USEPA 2005j
Magnesium 2	NSV	--
Manganese	220	USEPA 2007e
Mercury	0.10	Efroymson et al. 1997b
Potassium 2	NSV	--
Selenium	0.52	USEPA 2007f
Silver	560	USEPA 2006a
Sodium 2	NSV	--
Thallium	1.00	Efroymson et al. 1997b
Zinc	120	USEPA 2007g
Pesticide/Polychlorinated Biphenyls (MG/KG)		
Aldrin	0.0033	USEPA Region 5, 2003c; ESL based on masked shrew
Chlordane, alpha-	0.22	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
Chlordane, gamma-	0.22	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
Chlordane, technical-	NSV	--
DDD, p,p'-	0.76	USEPA Region 5, 2003c; ESL based on masked shrew
DDE, p,p'-	0.60	USEPA Region 5, 2003c; ESL based on masked shrew
DDT, p,p'-	0.0035	USEPA Region 5, 2003c; ESL based on masked shrew
Dieldrin	0.0024	USEPA Region 5, 2003c; ESL based on masked shrew
Endosulfan A	0.12	USEPA Region 5, 2003c; ESL based on masked shrew
Endosulfan B	0.12	USEPA Region 5, 2003c; ESL based on masked shrew
Endosulfan sulfate	0.036	USEPA Region 5, 2003c; ESL based on masked shrew
Endrin	0.010	USEPA Region 5, 2003c; ESL based on masked shrew
Endrin aldehyde	0.011	USEPA Region 5, 2003c; ESL based on masked shrew
Endrin ketone	NSV	--
Heptachlor	0.0060	USEPA Region 5, 2003c; ESL based on masked shrew
Heptachlor epoxide	0.15	USEPA Region 5, 2003c; ESL based on masked shrew
Hexachlorocyclohexane, alpha-	NSV	--
Hexachlorocyclohexane, beta-	NSV	--
Hexachlorocyclohexane, delta-	NSV	--
Hexachlorocyclohexane, gamma- (Lindane)	NSV	--
Methoxychlor	0.020	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1016	0.037	Efroymson et al., 1997a; shrew NOAEL-based PRG for total PCBs
PCB 1221	0.037	Efroymson et al., 1997a; shrew NOAEL-based PRG for total PCBs
PCB 1232	0.037	Efroymson et al., 1997a; shrew NOAEL-based PRG for total PCBs
PCB 1242	0.037	Efroymson et al., 1997a; shrew NOAEL-based PRG for total PCBs
PCB 1248	0.037	Efroymson et al., 1997a; shrew NOAEL-based PRG for total PCBs
PCB 1254	0.037	Efroymson et al., 1997a; shrew NOAEL-based PRG for total PCBs
PCB 1260	0.037	Efroymson et al., 1997a; shrew NOAEL-based PRG for total PCBs
Toxaphene	0.12	USEPA Region 5, 2003c; ESL based on masked shrew
Herbicides (MG/KG)		
2,4,5-T	NSV	--
2,4,5-TP	NSV	--
2,4-D	0.027	USEPA Region 5, 2003c; ESL based on masked shrew

TABLE 7-6
Soil Screening Values--Direct Exposure
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Semivolatile Organic Compounds (MG/KG)		
Acenaphthene	20.0	Efroymson et al., 1997c; plant benchmark
Acenaphthylene	682	USEPA Region 5, 2003c; ESL based on masked shrew
Anthracene	1,480	USEPA Region 5, 2003c; ESL based on masked shrew
Benz(a)anthracene	5.21	USEPA Region 5, 2003c; ESL based on masked shrew
Benzidine	NSV	--
Benzo(a)pyrene	1.52	USEPA Region 5, 2003c; ESL based on masked shrew
Benzo(b)fluoranthene	59.8	USEPA Region 5, 2003c; ESL based on masked shrew
Benzo(ghi)perylene	119	USEPA Region 5, 2003c; ESL based on masked shrew
Benzo(k)fluoranthene	148	USEPA Region 5, 2003c; ESL based on masked shrew
Benzoic acid	NSV	--
Benzyl alcohol	NSV	--
Bis(2-chloroethoxy) methane	0.30	USEPA Region 5, 2003c; ESL based on masked shrew
Bis(2-chloroethyl) ether	23.7	USEPA Region 5, 2003c; ESL based on masked shrew
Bis(2-chloroisopropyl) ether	NSV	
Bis(2-ethylhexyl) phthalate	0.93	USEPA Region 5, 2003c; ESL based on masked shrew
Bis(chloroisopropyl) ether	19.4	USEPA Region 5, 2003c; ESL based on masked shrew
Bromophenyl phenyl ether, 4-	NSV	--
Butylbenzyl phthalate	NSV	--
Carbazole	NSV	--
Chloroaniline, 4-	20.0	Efroymson et al., 1997c; Plant PRG for 3-Chloroaniline
Chloronaphthalene, 2-	NSV	--
Chlorophenol, 2-	7.00	Efroymson et al., 1997c; Earthworm PRG for 2-chlorophenol
Chlorophenyl phenyl ether, 4-	NSV	--
Chrysene	4.73	USEPA Region 5, 2003c; ESL based on masked shrew
Dibenz(ah)anthracene	18.4	USEPA Region 5, 2003c; ESL based on masked shrew
Dibenzofuran	NSV	--
Dichlorobenzene, 1,2-	20.0	Efroymson et al., 1997a; Earthworm PRG for 1,4-dichlorobenzene
Dichlorobenzene, 1,3-	20.0	Efroymson et al., 1997a; Earthworm PRG for 1,4-dichlorobenzene
Dichlorobenzene, 1,4-	20.0	Efroymson et al., 1997a; Earthworm PRG for 1,4-dichlorobenzene
Dichlorobenzidine, 3,3'-	0.65	--
Dichlorophenol, 2,4-	20.0	Efroymson et al., 1997a; Earthworm, plant PRG for 3,4-dichlorophenol
Diethyl phthalate	100	Efroymson et al., 1997a; Plant PRG
Dimethyl phthalate	734	USEPA Region 5, 2003c; ESL based on masked shrew
Dimethylphenol, 2,4-	0.010	USEPA Region 5, 2003c; ESL based on masked shrew
Di-n-butyl phthalate	0.15	USEPA Region 5, 2003c; ESL based on masked shrew
Dinitro-2-methylphenol, 4,6-	NSV	--
Dinitrophenol, 2,4-	20.0	Efroymson et al., 1997a; Plant PRG
Di-n-octyl phthalate	NSV	--
Fluoranthene	122	USEPA Region 5, 2003c; ESL based on masked shrew
Fluorene	30.0	Efroymson et al., 1997b; earthworm benchmark
Hexachlorobenzene	NSV	--
Hexachlorobutadiene	NSV	--
Hexachlorocyclopentadiene	NSV	--
Hexachloroethane	NSV	--
Indeno(1,2,3-cd)pyrene	109	USEPA Region 5, 2003c; ESL based on masked shrew
Isophorone	NSV	--
Methylnaphthalene, 2-	3.24	USEPA Region 5, 2003c; ESL based on masked shrew
Methylphenol, 2-	NSV	--
Methylphenol, 3- and/or 4-	NSV	--
Methylphenol, 4-	NSV	--
Methylphenol, 4-chloro-3-	NSV	--
Naphthalene	0.099	USEPA Region 5, 2003c; ESL based on masked shrew
Nitroaniline, 2-	74.1	USEPA Region 5, 2003c; ESL based on masked shrew
Nitroaniline, 3-	3.16	USEPA Region 5, 2003c; ESL based on masked shrew
Nitroaniline, 4-	21.9	USEPA Region 5, 2003c; ESL based on masked shrew
Nitrophenol, 2-	1.60	USEPA Region 5, 2003c; ESL based on masked shrew

TABLE 7-6
Soil Screening Values--Direct Exposure
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Nitrophenol, 4-	7.00	Efroymson et al., 1997a; Earthworm PRG
Nitrosodi-N-propylamine, N-	NSV	--
Nitrosodiphenylamine, N-	0.55	USEPA Region 5, 2003c; ESL based on masked shrew
Pentachlorophenol	3.00	Efroymson et al., 1997a; Plant PRG
Phenanthrene	45.7	USEPA Region 5, 2003c; ESL based on masked shrew
Phenol	30.0	Efroymson et al., 1997a; Earthworm PRG
Pyrene	45.7	USEPA Region 5, 2003c; ESL based on masked shrew
Trichlorobenzene, 1,2,3-	20.0	Efroymson et al., 1997a; Earthworm PRG
Trichlorobenzene, 1,2,4-	20.0	Efroymson et al., 1997a; Earthworm PRG
Trichlorophenol, 2,4,5-	9.00	Efroymson et al., 1997a; Earthworm PRG
Trichlorophenol, 2,4,6-	4.00	Efroymson et al., 1997a; Plant PRG
Total Low Molecular Weight PAHs	29	USEPA 2007h
Total High Molecular Weight PAHs	18	USEPA 2007h
Explosives (MG/KG)		
Amino-2,6-dinitrotoluene, 4-	NSV	--
Amino-4,6-dinitrotoluene, 2-	NSV	--
Aminodinitrotoluenes, total	NSV	--
Dinitrobenzene, 1,3-	NSV	--
Dinitrotoluene, 2,4-	1.28	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
Dinitrotoluene, 2,6-	0.033	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
HMX	NSV	--
Nitrobenzene	1.31	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
Nitrotoluene, 2-	NSV	--
Nitrotoluene, 3-	NSV	--
Nitrotoluene, 4-	NSV	--
RDX	NSV	--
Tetryl	NSV	--
Trinitrobenzene, 1,3,5-	4.30	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
Trinitrotoluene, 2,4,6-	NSV	--
Volatile Organic Compounds (MG/KG)		
Acetone	2.50	USEPA Region 5, 2003c; ESL based on masked shrew
Benzene	0.26	USEPA Region 5, 2003c; ESL based on masked shrew
Bromobenzene	NSV	--
Bromochloromethane	NSV	--
Bromodichloromethane	0.54	USEPA Region 5, 2003c; ESL based on masked shrew
Bromoform	15.9	USEPA Region 5, 2003c; ESL based on masked shrew
Bromomethane	NSV	--
Butylbenzene, 1-	NSV	--
Butylbenzene, sec-	NSV	--
Butylbenzene, tert-	NSV	--
Carbon disulfide	0.094	USEPA Region 5, 2003c; ESL based on masked shrew
Carbon tetrachloride	2.98	USEPA Region 5, 2003c; ESL based on masked shrew
Chlorobenzene	40.0	Efroymson et al., 1997a; Earthworm PRG
Chloroethane	NSV	--
Chloroform	1.19	USEPA Region 5, 2003c; ESL based on masked shrew
Chloromethane	NSV	--
Chlorotoluene, 2-	NSV	--
Chlorotoluene, 4-	NSV	--
Dibromochloromethane	2.05	USEPA Region 5, 2003c; ESL based on masked shrew
Dibromochloropropane	0.035	USEPA Region 5, 2003c; ESL based on masked shrew
Dichlorodifluoromethane	39.5	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethane, 1,1-	20.1	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethane, 1,2-	21.2	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethene, 1,1-	8.28	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethene, 1,2-, cis-	0.78	USEPA Region 5, 2003c; ESL based on masked shrew (1,2-Dichloroethene (trans) used as surrogate)
Dichloroethene, 1,2-, trans-	0.78	USEPA Region 5, 2003c; ESL based on masked shrew

TABLE 7-6
Soil Screening Values--Direct Exposure
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Dichloroethenes, 1,2-, total	NSV	--
Dichloropropane, 1,2-	32.7	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropane, 1,3-	32.7	USEPA Region 5, 2003c; ESL based on masked shrew (1,2-Dichloropropane) used as surrogate)
Dichloropropane, 2,2-	32.7	USEPA Region 5, 2003c; ESL based on masked shrew (1,2-Dichloropropane) used as surrogate)
Dichloropropene, 1,1-	0.40	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropene, 1,3-, cis-	0.40	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropene, 1,3-, trans-	0.40	USEPA Region 5, 2003c; ESL based on masked shrew
Ethylbenzene	5.16	USEPA Region 5, 2003c; ESL based on masked shrew
Ethylene dibromide	NSV	--
Isopropylbenzene	NSV	--
Isopropyltoluene, 4-	NSV	--
Methyl ethyl ketone	89.6	USEPA Region 5, 2003c; ESL based on masked shrew
Methyl isobutyl ketone	NSV	--
Methyl n-butyl ketone	NSV	--
Methyl tert-butyl ether	NSV	--
Methylene bromide	65.0	USEPA Region 5, 2003c; ESL based on masked shrew
Methylene chloride	4.05	USEPA Region 5, 2003c; ESL based on masked shrew
Propylbenzene, 1-	NSV	--
Styrene	4.69	USEPA Region 5, 2003c; ESL based on masked shrew
Tetrachloroethane, 1,1,1,2-	0.13	USEPA Region 5, 2003c; ESL based on masked shrew
Tetrachloroethane, 1,1,2,2-	0.13	USEPA Region 5, 2003c; ESL based on masked shrew
Tetrachloroethene	9.92	USEPA Region 5, 2003c; ESL based on masked shrew
Toluene	5.45	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloroethane, 1,1,1-	29.8	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloroethane, 1,1,2-	28.6	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloroethene	12.4	USEPA Region 5, 2003c; ESL based on masked shrew
Trichlorofluoromethane	16.4	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloropropane, 1,2,3-	3.36	USEPA Region 5, 2003c; ESL based on masked shrew
Trimethylbenzene, 1,2,4-	NSV	--
Trimethylbenzene, 1,3,5-	NSV	--
Vinyl chloride	0.65	USEPA Region 5, 2003c; ESL based on masked shrew
Xylene, 1,2-	NSV	--
Xylene, 1,3- and/or 1,4-	NSV	--
Xylenes, total	10.0	USEPA Region 5, 2003c; ESL based on masked shrew
Dioxin/Furans (MG/KG)		
TCDD-TEQ	3.15E-07	Efroymson et al., 1997a; shrew NOAEL-based PRG

Notes:
[1] - See Section 9 of Text for Complete Reference

TABLE 7-7
Sediment Screening Values
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Screening Value	Reference[1]
Inorganics (MG/KG)		
Arsenic	9.79	MacDonald et al. 2000
Calcium 2	NSV	
Cobalt	5.00E+01	USEPA Region 5 ESL, 2003c
Lead	35.8	MacDonald et al. 2000
Magnesium 2	NSV	
Sodium 2	NSV	
Pesticide/Polychlorinated Biphenyls (MG/KG)		
Aldrin	0.0032	USEPA Region 5 ESL, 2003c
Chlordane, alpha-	3.24E-03	USEPA Region 5 ESL, 2003c
Chlordane, gamma-	3.24E-03	USEPA Region 5 ESL, 2003c
Chlordane, technical-	NSV	
DDD, p,p'-	0.0049	MacDonald et al. 2000
DDE, p,p'-	0.0032	MacDonald et al. 2000
DDT, p,p'-	0.0042	MacDonald et al. 2000
Dieldrin	0.0019	USEPA Region 5 ESL, 2003c
Endosulfan A	0.0033	USEPA Region 5 ESL, 2003c
Endosulfan B	0.0019	USEPA Region 5 ESL, 2003c
Endosulfan sulfate	0.035	USEPA Region 5 ESL, 2003c
Endrin	0.0022	USEPA Region 5 ESL, 2003c
Endrin aldehyde	0.48	USEPA Region 5 ESL, 2003c
Endrin ketone	NSV	
Heptachlor	6.00E-04	USEPA Region 5 ESL, 2003c
Heptachlor epoxide	0.0025	USEPA Region 5 ESL, 2003c
Hexachlorocyclohexane, alpha-	NSV	
Hexachlorocyclohexane, beta-	NSV	
Hexachlorocyclohexane, delta-	NSV	
Hexachlorocyclohexane, gamma- (Lindane)	NSV	
Methoxychlor	0.014	USEPA Region 5 ESL, 2003c
PCB 1016	5.98E-02	MacDonald et al. 2000
PCB 1221	5.98E-02	MacDonald et al. 2000
PCB 1232	5.98E-02	MacDonald et al. 2000
PCB 1242	5.98E-02	MacDonald et al. 2000
PCB 1248	5.98E-02	MacDonald et al. 2000
PCB 1254	5.98E-02	MacDonald et al. 2000
PCB 1260	5.98E-02	MacDonald et al. 2000
Total PCBs	5.98E-02	MacDonald et al. 2000
Toxaphene	7.70E-05	
Herbicides (MG/KG)		
2,4,5-T		
2,4,5-TP		
2,4-D	1.27E+00	USEPA Region 5 ESL, 2003c
Dioxin/Furans (MG/KG)		
TCDD-TEQ	1.20E-07	USEPA Region 5 ESL, 2003c
Semivolatile Organic Compounds (MG/KG)		
Acenaphthene	0.0067	USEPA Region 5 ESL, 2003c
Acenaphthylene	0.0059	USEPA Region 5 ESL, 2003c
Anthracene	0.057	MacDonald et al. 2000
Benz(a)anthracene	0.11	MacDonald et al. 2000

TABLE 7-7
Sediment Screening Values
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Screening Value	Reference[1]
Benzo(a)pyrene	0.15	MacDonald et al. 2000
Benzo(b)fluoranthene	10.4	USEPA Region 5 ESL, 2003c
Benzo(ghi)perylene	0.17	USEPA Region 5 ESL, 2003c
Benzo(k)fluoranthene	0.24	USEPA Region 5 ESL, 2003c
Bis(2-chloroethoxy) methane	NSV	
Bis(2-chloroethyl) ether	3.52	USEPA Region 5 ESL, 2003c
Bis(2-ethylhexyl) phthalate	0.182	USEPA Region 5 ESL, 2003c
Bis(chloroisopropyl) ether	NSV	
Bromophenyl phenyl ether, 4-	NSV	
Butylbenzyl phthalate	1.97	USEPA Region 5 ESL, 2003c
Carbazole	NSV	
Chloroaniline, 4-	0.15	USEPA Region 5 ESL, 2003c
Chloronaphthalene, 2-	0.42	USEPA Region 5 ESL, 2003c
Chlorophenol, 2-	0.032	USEPA Region 5 ESL, 2003c
Chlorophenyl phenyl ether, 4-	NSV	
Chrysene	0.17	MacDonald et al. 2000
Dibenz(ah)anthracene	0.033	MacDonald et al. 2000
Dibenzofuran	0.45	USEPA Region 5 ESL, 2003c
Dichlorobenzene, 1,2-	0.29	USEPA Region 5 ESL, 2003c
Dichlorobenzene, 1,3-	1.32	USEPA Region 5 ESL, 2003c
Dichlorobenzene, 1,4-	0.32	USEPA Region 5 ESL, 2003c
Dichlorobenzidine, 3,3'-	0.13	USEPA Region 5 ESL, 2003c
Dichlorophenol, 2,4-	0.082	USEPA Region 5 ESL, 2003c
Diethyl phthalate	0.30	USEPA Region 5 ESL, 2003c
Dimethyl phthalate	NSV	USEPA Region 5 ESL, 2003c
Dimethylphenol, 2,4-	0.30	USEPA Region 5 ESL, 2003c
Di-n-butyl phthalate	1.11	USEPA Region 5 ESL, 2003c
Dinitro-2-methylphenol, 4,6-	NSV	USEPA Region 5 ESL, 2003c
Dinitrophenol, 2,4-	0.0062	USEPA Region 5 ESL, 2003c
Di-n-octyl phthalate	40.6	USEPA Region 5 ESL, 2003c
Fluoranthene	0.42	MacDonald et al. 2000
Fluorene	0.077	USEPA Region 5 ESL, 2003c
Hexachlorobenzene	0.020	USEPA Region 5 ESL, 2003c
Hexachlorobutadiene	0.027	USEPA Region 5 ESL, 2003c
Hexachlorocyclopentadiene	0.90	USEPA Region 5 ESL, 2003c
Hexachloroethane	0.58	USEPA Region 5 ESL, 2003c
Indeno(1,2,3-cd)pyrene	0.20	USEPA Region 5 ESL, 2003c
Isophorone	NSV	
Methylnaphthalene, 2-	0.020	USEPA Region 5 ESL, 2003c
Methylphenol, 2-	NSV	
Methylphenol, 4-	NSV	
Methylphenol, 4-chloro-3-	NSV	
Naphthalene	0.18	MacDonald et al. 2000
Nitroaniline, 2-	NSV	
Nitroaniline, 3-	NSV	
Nitroaniline, 4-	NSV	
Nitrophenol, 2-	0.013	USEPA Region 5 ESL, 2003c, used 2-Nitrophenol as surrogate
Nitrophenol, 4-	0.013	USEPA Region 5 ESL, 2003c

TABLE 7-7
Sediment Screening Values
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Screening Value	Reference[1]
Nitrosodi-N-propylamine, N-	NSV	
Nitrosodiphenylamine, N-	NSV	
Pentachlorophenol	NSV	
Phenanthrene	NSV	
Phenol	NSV	
Pyrene	0.20	MacDonald et al. 2000
Trichlorobenzene, 1,2,4-	5.06	USEPA Region 5 ESL, 2003c
Trichlorophenol, 2,4,5-	0.21	USEPA Region 5 ESL, 2003c
Trichlorophenol, 2,4,6-	0.21	USEPA Region 5 ESL, 2003c, used Trichlorophenol, 2,4,6-, as surrogate
Total Low Molecular Weight PAHs	NSV	USEPA Region 3 BTAG, 2006b
Total High Molecular Weight PAHs	NSV	USEPA Region 3 BTAG, 2006b
Total PAHs	NSV	MacDonald et al. 2000
Explosives (MG/KG)		
Amino-2,6-dinitrotoluene, 4-	NSV	
Amino-4,6-dinitrotoluene, 2-	NSV	
Dinitrobenzene, 1,3-	0.0086	USEPA Region 5 ESL, 2003c
Dinitrotoluene, 2,4-	0.014	USEPA Region 5 ESL, 2003c
Dinitrotoluene, 2,6-	0.040	USEPA Region 5 ESL, 2003c
HMX	NSV	
Nitrobenzene	0.15	USEPA Region 5 ESL, 2003c
Nitrotoluene, 2-	NSV	
Nitrotoluene, 3-	NSV	
Nitrotoluene, 4-	NSV	
RDX	NSV	
Tetryl	NSV	
Trinitrobenzene, 1,3,5-	NSV	
Trinitrotoluene, 2,4,6-	NSV	
Volatile Organic Compounds (MG/KG)		
Acetone	0.0099	USEPA Region 5 ESL, 2003c
Benzene	0.14	USEPA Region 5 ESL, 2003c
Bromodichloromethane	NSV	
Bromoform	0.49	USEPA Region 5 ESL, 2003c
Bromomethane	NSV	
Carbon disulfide	0.024	USEPA Region 5 ESL, 2003c
Carbon tetrachloride	1.45	USEPA Region 5 ESL, 2003c
Chlorobenzene	0.29	USEPA Region 5 ESL, 2003c
Chloroethane	NSV	
Chloroform	0.12	USEPA Region 5 ESL, 2003c
Chloromethane	NSV	
Dibromochloromethane	NSV	
Dichloroethane, 1,1-	5.75E-04	USEPA Region 5 ESL, 2003c
Dichloroethane, 1,2-	0.26	USEPA Region 5 ESL, 2003c
Dichloroethene, 1,1-	0.019	USEPA Region 5 ESL, 2003c
Dichloroethenes, 1,2-, total	NSV	
Dichloropropane, 1,2-	0.33	USEPA Region 5 ESL, 2003c
Dichloropropene, 1,3-, cis-	0.33	USEPA Region 5 ESL, 2003c
Dichloropropene, 1,3-, trans-	0.33	USEPA Region 5 ESL, 2003c
Ethylbenzene	0.18	USEPA Region 5 ESL, 2003c

TABLE 7-7
Sediment Screening Values
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Screening Value	Reference[1]
Methyl ethyl ketone	0.042	USEPA Region 5 ESL, 2003c
Methyl isobutyl ketone	0.025	USEPA Region 5 ESL, 2003c
Methyl n-butyl ketone	NSV	
Methylene chloride	0.16	USEPA Region 5 ESL, 2003c
Styrene	0.25	USEPA Region 5 ESL, 2003c
Tetrachloroethane, 1,1,2,2-	0.85	USEPA Region 5 ESL, 2003c
Tetrachloroethene	0.99	USEPA Region 5 ESL, 2003c
Toluene	1.22	USEPA Region 5 ESL, 2003c
Trichloroethane, 1,1,1-	0.21	USEPA Region 5 ESL, 2003c
Trichloroethane, 1,1,2-	0.52	USEPA Region 5 ESL, 2003c
Trichloroethene	0.11	USEPA Region 5 ESL, 2003c
Vinyl chloride	0.20	USEPA Region 5 ESL, 2003c
Xylenes, total	0.43	USEPA Region 5 ESL, 2003c

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-8

Surface Water Screening Values

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Inorganics (MG/L)		
Aluminum	NSV	
Antimony	0.90	OEPA 2008b
Arsenic	0.34	OEPA 2008b
Barium	2.00	OEPA 2008b
Beryllium	0.093	OEPA 2008b
Cadmium	0.0045	OEPA 2008b
Calcium 2	NSV	
Chromium, total	1.80	OEPA 2008b
Cobalt	0.22	OEPA 2008b
Copper	0.014	OEPA 2008b
Iron	NSV	
Lead	0.12	OEPA 2008b
Magnesium 2	NSV	
Manganese	NSV	
Mercury	0.0017	OEPA 2008b
Nickel	0.47	OEPA 2008b
Potassium 2	NSV	
Selenium	0.0050	OEPA 2008b (OMZA used)
Silver	0.0016	OEPA 2008b
Sodium 2	NSV	
Thallium	0.079	OEPA 2008b
Vanadium	0.15	OEPA 2008b
Zinc	0.12	OEPA 2008b
Dissolved Metals (MG/L)		
Aluminum	NSV	
Antimony	9.00E-01	OEPA 2008b, Total SV Used
Arsenic	3.40E-01	OEPA 2008b
Barium	2.00E+00	OEPA 2008b, Total SV Used
Beryllium	9.30E-02	OEPA 2008b, Total SV Used
Cadmium	4.30E-03	OEPA 2008b
Calcium 2		
Chromium	5.70E-01	OEPA 2008b
Cobalt	2.20E-01	OEPA 2008b, Total SV Used
Copper	1.30E-02	OEPA 2008b
Iron		
Lead	9.70E-02	OEPA 2008b
Magnesium 2		
Manganese		
Mercury	1.40E-03	OEPA 2008b
Nickel	4.70E-01	OEPA 2008b
Potassium 2		
Selenium	4.60E-03	OEPA 2008b (OMZA used)
Silver	1.40E-03	OEPA 2008b
Sodium 2		
Thallium	7.90E-02	OEPA 2008b, Total SV Used
Vanadium	1.50E-01	OEPA 2008b, Total SV Used
Zinc	1.20E-01	OEPA 2008b

TABLE 7-8
Surface Water Screening Values
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Pesticide/Polychlorinated Biphenyls (MG/L)		
Aldrin	1.70E-05	USEPA Region 5 ESL, 2003c
Chlordane, technical-	4.30E-05	USEPA Region 5 ESL, 2003c
DDD, p,p'-	NSV	
DDE, p,p'-	4.51E-12	USEPA Region 5 ESL, 2003c
DDT, p,p'-	1.10E-08	USEPA Region 5 ESL, 2003c
Dieldrin	2.40E-04	OEPA 2008b
Endosulfan A	5.60E-05	USEPA Region 5 ESL, 2003c
Endosulfan B	5.60E-05	USEPA Region 5 ESL, 2003c
Endosulfan sulfate	0.0022	USEPA Region 5 ESL, 2003c
Endrin	8.60E-05	OEPA 2008b
Endrin aldehyde	1.50E-04	USEPA Region 5 ESL, 2003c
Endrin ketone	NSV	
Heptachlor	3.80E-06	USEPA Region 5 ESL, 2003c
Heptachlor epoxide	3.80E-06	USEPA Region 5 ESL, 2003c
Hexachlorocyclohexane, alpha-	NSV	
Hexachlorocyclohexane, beta-	NSV	
Hexachlorocyclohexane, delta-	NSV	
Hexachlorocyclohexane, gamma- (Lindane)	9.50E-04	OEPA 2008b
Methoxychlor	NSV	
PCB 1016	1.20E-07	USEPA Region 5 ESL, 2003c (Used total PCBs)
PCB 1221	1.20E-07	USEPA Region 5 ESL, 2003c (Used total PCBs)
PCB 1232	1.20E-07	USEPA Region 5 ESL, 2003c (Used total PCBs)
PCB 1242	1.20E-07	USEPA Region 5 ESL, 2003c (Used total PCBs)
PCB 1248	1.20E-07	USEPA Region 5 ESL, 2003c (Used total PCBs)
PCB 1254	1.20E-07	USEPA Region 5 ESL, 2003c (Used total PCBs)
PCB 1260	1.20E-07	USEPA Region 5 ESL, 2003c (Used total PCBs)
Toxaphene	1.40E-07	USEPA Region 5 ESL, 2003c
Semivolatile Organic Compounds (MG/L)		
Acenaphthene	0.019	OEPA 2008b
Acenaphthylene	4.84	USEPA Region 5 ESL, 2003c
Anthracene	1.80E-04	OEPA 2008b
Benz(a)anthracene	2.50E-05	USEPA Region 5 ESL, 2003c
Benzo(a)pyrene	1.40E-05	USEPA Region 5 ESL, 2003c
Benzo(b)fluoranthene	0.0091	USEPA Region 5 ESL, 2003c
Benzo(ghi)perylene	0.0076	USEPA Region 5 ESL, 2003c
Benzo(k)fluoranthene	NSV	
Bis(2-chloroethoxy) methane	NSV	
Bis(2-chloroethyl) ether	19.0	USEPA Region 5 ESL, 2003c
Bis(2-ethylhexyl) phthalate	1.10	OEPA 2008b
Bis(chloroisopropyl) ether	NSV	
Bromophenyl phenyl ether, 4-	NSV	
Butylbenzyl phthalate	0.023	USEPA Region 5 ESL, 2003c
Carbazole	NSV	
Chloroaniline, 4-	0.23	USEPA Region 5 ESL, 2003c
Chloronaphthalene, 2-	3.96E-04	USEPA Region 5 ESL, 2003c
Chlorophenol, 2-	0.29	OEPA 2008b
Chlorophenyl phenyl ether, 4-	NSV	
Chrysene	NSV	
Dibenz(ah)anthracene	NSV	

TABLE 7-8
Surface Water Screening Values
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Dibenzofuran	0.036	OEPA 2008b
Dichlorobenzene, 1,2-	0.13	OEPA 2008b
Dichlorobenzene, 1,3-	0.079	OEPA 2008b
Dichlorobenzene, 1,4-	0.057	OEPA 2008b
Dichlorobenzidine, 3,3'-	NSV	
Dichlorophenol, 2,4-	0.11	OEPA 2008b
Diethyl phthalate	9.80	OEPA 2008b
Dimethyl phthalate	3.20	OEPA 2008b
Dimethylphenol, 2,4-	0.14	OEPA 2008b
Di-n-butyl phthalate	0.0097	
Dinitro-2-methylphenol, 4,6-	NSV	
Dinitrophenol, 2,4-	0.019	USEPA Region 5 ESL, 2003c
Di-n-octyl phthalate	0.030	USEPA Region 5 ESL, 2003c
Fluoranthene	0.0037	OEPA 2008b
Fluorene	0.11	OEPA 2008b
Hexachlorobenzene	3.00E-07	USEPA Region 5 ESL, 2003c
Hexachlorobutadiene	5.30E-05	USEPA Region 5 ESL, 2003c
Hexachlorocyclopentadiene	0.077	USEPA Region 5 ESL, 2003c
Hexachloroethane	0.0080	USEPA Region 5 ESL, 2003c
Indeno(1,2,3-cd)pyrene	0.0043	USEPA Region 5 ESL, 2003c
Isophorone	0.92	USEPA Region 5 ESL, 2003c
Methylnaphthalene, 2-	0.33	USEPA Region 5 ESL, 2003c
Methylphenol, 2-	0.60	OEPA 2008b
Methylphenol, 4-	0.48	OEPA 2008b
Methylphenol, 4-chloro-3-	NSV	
Naphthalene	0.17	OEPA 2008b
Nitroaniline, 2-	NSV	
Nitroaniline, 3-	NSV	
Nitroaniline, 4-	NSV	
Nitrophenol, 2-	0.65	OEPA 2008b
Nitrophenol, 4-	0.65	OEPA 2008b, 2-Nitrophenol used as surrogate
Nitrosodi-N-propylamine, N-	NSV	
Nitrosodiphenylamine, N-	0.77	USEPA Region 5 ESL, 2003c
Pentachlorophenol	0.0040	USEPA Region 5 ESL, 2003c
Phenanthrene	0.031	OEPA 2008b
Phenol	4.70	OEPA 2008b
Pyrene	0.042	OEPA 2008b
Trichlorobenzene, 1,2,4-	0.030	USEPA Region 5 ESL, 2003c
Trichlorophenol, 2,4,5-	0.039	OEPA 2008b, 2,4,6--Trichlorophenol used as surrogate
Trichlorophenol, 2,4,6-	0.039	OEPA 2008b
Volatile Organic Compounds (MG/L)		
Acetone	1.70	USEPA Region 5 ESL, 2003c
Benzene	0.70	OEPA 2008b
Bromodichloromethane	NSV	
Bromoform	1.10	OEPA 2008b
Bromomethane	0.038	OEPA 2008b
Carbon disulfide	0.13	OEPA 2008b
Carbon tetrachloride	2.20	OEPA 2008b
Chlorobenzene	0.42	OEPA 2008b

TABLE 7-8

Surface Water Screening Values

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Chloroethane	NSV	
Chloroform	1.30	OEPA 2008b
Chloromethane	NSV	
Dibromochloromethane	NSV	
Dichloroethane, 1,1-	0.047	USEPA Region 5 ESL, 2003c
Dichloroethane, 1,2-	9.60	OEPA 2008b
Dichloroethene, 1,1-	1.90	OEPA 2008b
Dichloroethenes, 1,2-, total	8.80	OEPA 2008b
Dichloropropane, 1,2-	3.30	OEPA 2008b
Dichloropropene, 1,3-, cis-	0.015	OEPA 2008b
Dichloropropene, 1,3-, trans-	0.015	OEPA 2008b
Ethylbenzene	0.55	OEPA 2008b
Methyl ethyl ketone	200	OEPA 2008b
Methyl isobutyl ketone	NSV	
Methyl n-butyl ketone	NSV	
Methylene chloride	11.0	OEPA 2008b
Styrene	0.032	USEPA Region 5 ESL, 2003c
Tetrachloroethane, 1,1,2,2-	0.91	OEPA 2008b
Tetrachloroethene	0.43	OEPA 2008b
Toluene	0.56	OEPA 2008b
Trichloroethane, 1,1,1-	0.69	OEPA 2008b
Trichloroethane, 1,1,2-	3.30	OEPA 2008b
Trichloroethene	2.00	OEPA 2008b
Vinyl chloride	8.40	OEPA 2008b
Xylenes, total	0.24	OEPA 2008b
Explosives (MG/L)		
Amino-2,6-dinitrotoluene, 4-	0.098	OEPA 2008b
Amino-4,6-dinitrotoluene, 2-	0.16	OEPA 2008b
Dinitrobenzene, 1,3-	0.10	OEPA 2008b
Dinitrotoluene, 2,4-	0.39	OEPA 2008b
Dinitrotoluene, 2,6-	0.73	OEPA 2008b
HMX	1.20	OEPA 2008b
Nitrobenzene	2.00	OEPA 2008b
Nitrotoluene, 2-	0.64	OEPA 2008b
Nitrotoluene, 3-	0.38	OEPA 2008b
Nitrotoluene, 4-	0.41	OEPA 2008b
RDX	0.52	OEPA 2008b
Tetryl	NSV	
Trinitrobenzene, 1,3,5-	NSV	
Trinitrotoluene, 2,4,6-	NSV	
Dioxin/Furans (MG/KG)		
TCDD-TEQ	3.00E-12	OEPA 2008b

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-9
Soil Screening Values -- Food Web Exposures
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Inorganics (MG/KG)		
Aluminum	NSV	
Antimony	0.27	USEPA 2005d
Arsenic	18.0	USEPA 2005e
Barium	2,000	USEPA 2005f
Beryllium	21.0	USEPA 2005g
Cadmium	0.36	USEPA 2005h
Calcium 2	NSV	
Chromium, total	26.0	USEPA 2008c
Cobalt	120	USEPA 2005i
Copper	28.0	USEPA 2007d
Lead	11.0	USEPA 2005j
Magnesium 2	NSV	
Manganese	4,000	USEPA 2007e
Mercury	0.10	USEPA Region 5, 2003c; ESL
Potassium 2	NSV	
Selenium	0.63	USEPA 2007f
Silver	4.20	USEPA 2006a
Sodium 2	NSV	
Thallium	0.057	USEPA Region 5, 2003c; ESL
Zinc	46.0	USEPA 2007e
Pesticide/Polychlorinated Biphenyls (MG/KG)		
Aldrin	0.0033	USEPA Region 5, 2003c; ESL
Chlordane, alpha-	0.22	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
Chlordane, gamma-	0.22	USEPA Region 5, 2003c; ESL for total chlordane based on plant exposure
Chlordane, technical-	NSV	USEPA Region 5, 2003c; ESL based on masked shrew
DDD, p,p'-	0.76	USEPA Region 5, 2003c; ESL based on masked shrew
DDE, p,p'-	0.60	USEPA Region 5, 2003c; ESL based on masked shrew
DDT, p,p'-	0.0035	USEPA Region 5, 2003c; ESL based on masked shrew
Dieldrin	0.0024	USEPA Region 5, 2003c; ESL based on masked shrew
Endosulfan A	0.12	USEPA Region 5, 2003c; ESL based on masked shrew
Endosulfan B	0.12	USEPA Region 5, 2003c; ESL based on masked shrew
Endosulfan sulfate	0.036	USEPA Region 5, 2003c; ESL based on masked shrew
Endrin	0.010	USEPA Region 5, 2003c; ESL based on masked shrew
Endrin aldehyde	0.011	USEPA Region 5, 2003c; ESL based on masked shrew
Endrin ketone	NSV	
Heptachlor	0.0060	USEPA Region 5, 2003c; ESL based on masked shrew
Heptachlor epoxide	0.15	
Hexachlorocyclohexane, alpha-	NSV	
Hexachlorocyclohexane, beta-	NSV	
Hexachlorocyclohexane, delta-	NSV	
Hexachlorocyclohexane, gamma- (	NSV	
Methoxychlor	0.020	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1016	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1221	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1232	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1242	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1248	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1254	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
PCB 1260	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
Total PCBs	0.00033	USEPA Region 5, 2003c; ESL based on masked shrew
Toxaphene	0.12	USEPA Region 5, 2003c; ESL based on masked shrew

TABLE 7-9
Soil Screening Values -- Food Web Exposures
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Herbicides (MG/KG)		
2,4,5-T	NSV	
2,4,5-TP	NSV	
2,4-D	0.027	USEPA Region 5, 2003c; ESL based on masked shrew
Semivolatile Organic Compounds (MG/KG)		
Acenaphthene	682	USEPA Region 5, 2003c; ESL based on masked shrew
Acenaphthylene	682	USEPA Region 5, 2003c; ESL based on masked shrew
Anthracene	1,480	USEPA Region 5, 2003c; ESL based on masked shrew
Benz(a)anthracene	5.21	USEPA Region 5, 2003c; ESL based on masked shrew
Benzidine	NSV	
Benzo(a)pyrene	1.52	USEPA Region 5, 2003c; ESL based on masked shrew
Benzo(b)fluoranthene	59.8	USEPA Region 5, 2003c; ESL based on masked shrew
Benzo(ghi)perylene	119	USEPA Region 5, 2003c; ESL based on masked shrew
Benzo(k)fluoranthene	148	USEPA Region 5, 2003c; ESL based on masked shrew
Benzoic acid	NSV	
Benzyl alcohol	NSV	
Bis(2-chloroethoxy) methane	0.30	USEPA Region 5, 2003c; ESL based on masked shrew
Bis(2-chloroethyl) ether	23.7	USEPA Region 5, 2003c; ESL based on masked shrew
Bis(2-chloroisopropyl) ether	NSV	
Bis(2-ethylhexyl) phthalate	0.93	USEPA Region 5, 2003c; ESL based on masked shrew
Bis(chloroisopropyl) ether	19.4	USEPA Region 5, 2003c; ESL based on masked shrew
Bromophenyl phenyl ether, 4-	NSV	
Butylbenzyl phthalate	NSV	
Carbazole	NSV	
Chloroaniline, 4-	1.10	USEPA Region 5, 2003c; ESL based on masked shrew
Chloronaphthalene, 2-	0.012	USEPA Region 5, 2003c; ESL based on masked shrew
Chlorophenol, 2-	0.24	USEPA Region 5, 2003c; ESL based on masked shrew
Chlorophenyl phenyl ether, 4-	NSV	
Chrysene	4.73	USEPA Region 5, 2003c; ESL based on masked shrew
Dibenz(ah)anthracene	18.4	USEPA Region 5, 2003c; ESL based on masked shrew
Dibenzofuran	NSV	
Dichlorobenzene, 1,2-	2.96	USEPA Region 5, 2003c; ESL based on masked shrew
Dichlorobenzene, 1,3-	37.7	USEPA Region 5, 2003c; ESL based on masked shrew
Dichlorobenzene, 1,4-	0.55	USEPA Region 5, 2003c; ESL based on masked shrew
Dichlorobenzidine, 3,3'-	0.65	USEPA Region 5, 2003c; ESL based on masked shrew
Dichlorophenol, 2,4-	87.5	USEPA Region 5, 2003c; ESL based on masked shrew
Diethyl phthalate	24.8	USEPA Region 5, 2003c; ESL based on masked shrew
Dimethyl phthalate	734	USEPA Region 5, 2003c; ESL based on masked shrew
Dimethylphenol, 2,4-	0.010	USEPA Region 5, 2003c; ESL based on masked shrew
Di-n-butyl phthalate	0.15	USEPA Region 5, 2003c; ESL based on masked shrew
Dinitro-2-methylphenol, 4,6-	NSV	
Dinitrophenol, 2,4-	0.069	USEPA Region 5, 2003c; ESL based on masked shrew
Di-n-octyl phthalate	NSV	
Fluoranthene	122	USEPA Region 5, 2003c; ESL based on masked shrew
Fluorene	122	USEPA Region 5, 2003c; ESL based on masked shrew
Hexachlorobenzene	0.20	USEPA Region 5, 2003c; ESL based on masked shrew
Hexachlorobutadiene	NSV	
Hexachlorocyclopentadiene	NSV	
Hexachloroethane	NSV	
Indeno(1,2,3-cd)pyrene	109	USEPA Region 5, 2003c; ESL based on masked shrew
Isophorone	NSV	
Methylnaphthalene, 2-	3.24	USEPA Region 5, 2003c; ESL based on masked shrew
Methylphenol, 2-	NSV	

TABLE 7-9
Soil Screening Values -- Food Web Exposures
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Methylphenol, 3- and/or 4-	NSV	
Methylphenol, 4-	NSV	
Methylphenol, 4-chloro-3-	NSV	
Naphthalene	0.099	USEPA Region 5, 2003c; ESL based on masked shrew
Nitroaniline, 2-	74.1	USEPA Region 5, 2003c; ESL based on masked shrew
Nitroaniline, 3-	3.16	USEPA Region 5, 2003c; ESL based on masked shrew
Nitroaniline, 4-	21.9	USEPA Region 5, 2003c; ESL based on masked shrew
Nitrophenol, 2-	1.60	USEPA Region 5, 2003c; ESL based on masked shrew (2-nitrophenol used as surrogate)
Nitrophenol, 4-	1.60	USEPA Region 5, 2003c; ESL based on masked shrew
Nitrosodi-N-propylamine, N-	NSV	
Nitrosodiphenylamine, N-	0.55	USEPA Region 5, 2003c; ESL based on masked shrew
Pentachlorophenol	0.12	USEPA Region 5, 2003c; ESL based on masked shrew
Phenanthrene	45.7	USEPA Region 5, 2003c; ESL based on masked shrew
Phenol	1,200	USEPA Region 5, 2003c; ESL based on masked shrew
Pyrene	45.7	USEPA Region 5, 2003c; ESL based on masked shrew
Trichlorobenzene, 1,2,3-	11.1	USEPA Region 5, 2003c; ESL based on masked shrew (1,2,4-Trichlorobenzene used as surrogate
Trichlorobenzene, 1,2,4-	11.1	USEPA Region 5, 2003c; ESL based on masked shrew
Trichlorophenol, 2,4,5-	14.1	USEPA Region 5, 2003c; ESL based on masked shrew
Trichlorophenol, 2,4,6-	9.94	USEPA Region 5, 2003c; ESL based on masked shrew
Total Low Molecular Weight PAHs	100	USEPA 2007h
Total High Molecular Weight PAHs	1.1	USEPA 2007h
Explosives (MG/KG)		
Amino-2,6-dinitrotoluene, 4-	NSV	
Amino-4,6-dinitrotoluene, 2-	NSV	
Aminodinitrotoluenes, total	NSV	
Dinitrobenzene, 1,3-	NSV	
Dinitrotoluene, 2,4-	1.28	USEPA Region 5, 2003c; ESL based on masked shrew
Dinitrotoluene, 2,6-	0.033	USEPA Region 5, 2003c; ESL based on masked shrew
HMX	NSV	
Nitrobenzene	1.31	USEPA Region 5, 2003c; ESL based on masked shrew
Nitrotoluene, 2-	NSV	
Nitrotoluene, 3-	NSV	
Nitrotoluene, 4-	NSV	
RDX	NSV	
Tetryl	NSV	
Trinitrobenzene, 1,3,5-	4.30	USEPA Region 5, 2003c; ESL based on masked shrew
Trinitrotoluene, 2,4,6-	NSV	

TABLE 7-9
Soil Screening Values -- Food Web Exposures
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Volatile Organic Compounds (MG/KG)		
Acetone	2.50	USEPA Region 5, 2003c; ESL based on masked shrew
Benzene	0.26	USEPA Region 5, 2003c; ESL based on masked shrew
Bromobenzene	NSV	
Bromochloromethane	NSV	
Bromodichloromethane	0.54	USEPA Region 5, 2003c; ESL based on masked shrew
Bromoform	15.9	USEPA Region 5, 2003c; ESL based on masked shrew
Bromomethane	NSV	
Butylbenzene, 1-	NSV	
Butylbenzene, sec-	NSV	
Butylbenzene, tert-	NSV	
Carbon disulfide	0.094	USEPA Region 5, 2003c; ESL based on masked shrew
Carbon tetrachloride	2.98	USEPA Region 5, 2003c; ESL based on masked shrew
Chlorobenzene	13.1	USEPA Region 5, 2003c; ESL based on masked shrew
Chloroethane	NSV	
Chloroform	1.19	USEPA Region 5, 2003c; ESL based on masked shrew
Chloromethane	NSV	
Chlorotoluene, 2-	NSV	
Chlorotoluene, 4-	NSV	
Dibromochloromethane	2.05	USEPA Region 5, 2003c; ESL based on masked shrew
Dibromochloropropane	0.035	USEPA Region 5, 2003c; ESL based on masked shrew
Dichlorodifluoromethane	39.5	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethane, 1,1-	20.1	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethane, 1,2-	21.2	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethene, 1,1-	8.28	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethene, 1,2-, cis-	0.78	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethene, 1,2-, trans-	0.78	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloroethenes, 1,2-, total	NSV	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropane, 1,2-	32.7	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropane, 1,3-	32.7	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropane, 2,2-	32.7	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropene, 1,1-	0.40	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropene, 1,3-, cis-	0.40	USEPA Region 5, 2003c; ESL based on masked shrew
Dichloropropene, 1,3-, trans-	0.40	USEPA Region 5, 2003c; ESL based on masked shrew
Ethylbenzene	5.16	USEPA Region 5, 2003c; ESL based on masked shrew
Ethylene dibromide	NSV	
Isopropylbenzene	NSV	
Isopropyltoluene, 4-	NSV	
Methyl ethyl ketone	89.6	USEPA Region 5, 2003c; ESL based on masked shrew
Methyl isobutyl ketone	NSV	
Methyl n-butyl ketone	NSV	
Methyl tert-butyl ether	NSV	
Methylene bromide	65.0	USEPA Region 5, 2003c; ESL based on masked shrew
Methylene chloride	4.05	USEPA Region 5, 2003c; ESL based on masked shrew
Propylbenzene, 1-	NSV	
Styrene	4.69	USEPA Region 5, 2003c; ESL based on masked shrew
Tetrachloroethane, 1,1,1,2-	0.13	USEPA Region 5, 2003c; ESL based on masked shrew
Tetrachloroethane, 1,1,2,2-	0.13	USEPA Region 5, 2003c; ESL based on masked shrew
Tetrachloroethene	9.92	USEPA Region 5, 2003c; ESL based on masked shrew
Toluene	5.45	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloroethane, 1,1,1-	29.8	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloroethane, 1,1,2-	28.6	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloroethene	12.4	USEPA Region 5, 2003c; ESL based on masked shrew

TABLE 7-9

Soil Screening Values -- Food Web Exposures

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Screening Value	Reference[1]
Trichlorofluoromethane	16.4	USEPA Region 5, 2003c; ESL based on masked shrew
Trichloropropane, 1,2,3-	3.36	USEPA Region 5, 2003c; ESL based on masked shrew
Trimethylbenzene, 1,2,4-	NSV	
Trimethylbenzene, 1,3,5-	NSV	
Vinyl chloride	0.65	USEPA Region 5, 2003c; ESL based on masked shrew
Xylene, 1,2-	NSV	
Xylene, 1,3- and/or 1,4-	NSV	
Xylenes, total	10.0	USEPA Region 5, 2003c; ESL based on masked shrew
Dioxin/Furans (MG/KG)		
TCDD-TEQ	3.15E-07	USEPA Region 5, 2003c; ESL based on masked shrew

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-10

Sediment Bioaccumulation Factors For Benthic Invertebrates and Fish--Step 2

Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Sediment-Invertebrate BAF (dry weight)		Sediment-Fish BAF (dry weight)	
	Value	Reference	Value	Reference[1]
Inorganics				
Arsenic	0.690	Bechtel Jacobs 1998b	0.126	Pascoe et al. 1996
Cobalt	0.020	Baes et al. 1984	1.000	--
Lead	0.468	Bechtel Jacobs 1998a	0.070	Krantzberg and Boyd 1992
Pesticides/PCBs				
4,4'-DDD	0.350	Oliver and Niimi 1988	2.250	Oliver and Niimi 1988
4,4'-DDE	3.360	Oliver and Niimi 1988	26.20	Oliver and Niimi 1988
4,4'-DDT	2.280	Oliver and Niimi 1988	8.800	Oliver and Niimi 1988
Aroclor-1260	21.89	Bechtel Jacobs 1998b	12.94	Oliver and Niimi 1988
PCBs (total)	21.89	Bechtel Jacobs 1998b	12.94	Oliver and Niimi 1988
Semivolatile Organics				
2-Methylnaphthalene	1.000	--	1.000	--
Acenaphthene	2.040	Maruya et al. 1997	1.000	--
Anthracene	0.271	Maruya et al. 1997	1.000	--
Benzo(a)anthracene	1.400	Maruya et al. 1997	1.000	--
Benzo(a)pyrene	0.191	Maruya et al. 1997	1.000	--
Benzo(b)fluoranthene	0.160	Maruya et al. 1997	1.000	--
Benzo(g,h,i)perylene	0.295	Maruya et al. 1997	1.000	--
Benzo(k)fluoranthene	0.421	Maruya et al. 1997	1.000	--
bis(2-Ethylhexyl)phthalate	1.000	--	1.000	--
Chrysene	0.335	Maruya et al. 1997	1.000	--
Dibenzofuran	1.000	--	1.000	--
Fluoranthene	0.312	Maruya et al. 1997	1.000	--
Fluorene	1.130	Maruya et al. 1997	1.000	--
Indeno(1,2,3-cd)pyrene	0.355	Maruya et al. 1997	1.000	--
Naphthalene	1.000	--	1.000	--
Phenanthrene	0.652	Maruya et al. 1997	1.000	--
Pyrene	0.803	Maruya et al. 1997	1.000	--
Dioxin/Furans				
Dioxin/furan (TEQ) - Mammal (total)	0.360	USEPA 1993d	0.630	USEPA 1997a
Dioxin/furan (TEQ) - Bird (total)	0.360	USEPA 1993d	0.630	USEPA 1997a

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-11

Sediment Bioaccumulation Factors For Aquatic Plants and Frogs - Step 2

Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Sediment-Plant BCF (dry weight)		Sediment-Frog BAF (dry weight)	
	Value	Reference	Value	Reference[1]
Inorganics				
Arsenic	1.103	Bechtel Jacobs 1998a	0.126	Pascoe et al. 1996
Cobalt	0.020	Baes et al. 1984	1.000	--
Lead	0.468	Bechtel Jacobs 1998a	0.070	Krantzberg and Boyd 1992
Pesticides/PCBs				
4,4'-DDD	0.0151	Travis and Arms 1988	2.250	Oliver and Niimi 1988
4,4'-DDE	0.0216	Travis and Arms 1988	26.20	Oliver and Niimi 1988
4,4'-DDT	0.0237	Travis and Arms 1988	8.800	Oliver and Niimi 1988
Aroclor-1260	0.0045	Travis and Arms 1988	12.94	Oliver and Niimi 1988
PCBs (total)	0.0068	Travis and Arms 1988	12.94	Oliver and Niimi 1988
Semivolatile Organics				
2-Methylnaphthalene	0.2157	Travis and Arms 1988	1.000	--
Acenaphthene	0.2564	Travis and Arms 1988	1.000	--
Anthracene	0.1051	Travis and Arms 1988	1.000	--
Benzo(a)anthracene	0.0222	Travis and Arms 1988	1.000	--
Benzo(a)pyrene	0.0135	Travis and Arms 1988	1.000	--
Benzo(b)fluoranthene	0.0174	Travis and Arms 1988	1.000	--
Benzo(g,h,i)perylene	0.0061	Travis and Arms 1988	1.000	--
Benzo(k)fluoranthene	0.0112	Travis and Arms 1988	1.000	--
bis(2-Ethylhexyl)phthalate	0.0029	Travis and Arms 1988	1.000	--
Chrysene	0.0289	Travis and Arms 1988	1.000	--
Dibenzofuran	0.1447	Travis and Arms 1988	1.000	--
Fluoranthene	0.0617	Travis and Arms 1988	1.000	--
Fluorene	0.1790	Travis and Arms 1988	1.000	--
Indeno(1,2,3-cd)pyrene	0.0061	Travis and Arms 1988	1.000	--
Naphthalene	0.5261	Travis and Arms 1988	1.000	--
Phenanthrene	0.1154	Travis and Arms 1988	1.000	--
Pyrene	0.0687	Travis and Arms 1988	1.000	--
Dioxin/Furans				
Dioxin/furan (TEQ) - Mammal (total)	0.0075	Travis and Arms 1988	0.630	USEPA 1997c
Dioxin/furan (TEQ) - Bird (total)	0.0075	Travis and Arms 1988	0.630	USEPA 1997c

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-12

Exposure Parameters for Upper Trophic Level Ecological Receptors - Step 2

Former Lockbourne Air Force Base, Lockbourne, Ohio

Receptor	Body Weight (kg)		Water Ingestion Rate (L/day)		Food Ingestion Rate (kg/day - dry)	
	Value	Reference[1]	Value	Reference[1]	Value	Reference[1]
Birds						
Belted kingfisher	0.125	Dunning 1993	0.0211	allometric equation	0.0262	USEPA 1993d
Mallard	0.612	Bellrose 1980	0.0850	allometric equation	0.0830	allometric equation
Marsh wren	0.010	Dunning 1993	0.0033	allometric equation	0.0030	USEPA 1993a
Mammals						
Mink	0.726	Silva and Downing 1995	0.0286	USEPA 1993a	0.0345	USEPA 1993d
Muskrat	0.750	USEPA 1993	0.1426	allometric equation	0.0765	USEPA 1993d
White-tailed deer	52.1	Silva and Downing 1995	3.5636	allometric equation	0.2610	Sample and Suter 1994

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-12

Exposure Parameters for Upper Trophic Level Ecological Receptors - Step 2

Former Lockbourne Air Force Base, Lockbourne, Ohio

Receptor	Dietary Composition (percent)							Soil/ Sediment Ingestion (percent)	
	Terr. Plants	Soil Invert.	Small Mammals	Fish/ Frogs	Aquatic Plants	Benthic Invert.	Reference[1]	Value	Reference[1]
Birds									
Belted kingfisher	0	0	0	84.0	0	16.0	USEPA 1993d	0	Sample and Suter 1994
Mallard	0	0	0	0	86.7	10.0	Palmer 1976	3.3	Beyer et al. 1994
Marsh wren	0	0	0	0	0	95.0	USEPA 1993d	5.0	Assumed based on diet
Mammals									
Mink	0	0	0	94.0	1.0	5.0	USEPA 1993d	0	Sample and Suter 1994
Muskrat	0	0	0	0	90.6	0	USEPA 1993d	9.4	Beyer et al. 1994 (raccoon)
White-tailed deer	98.0	0	0	0	0	0	Sample and Suter 1994	2.0	Beyer et al. 1994

TABLE 7-13

Uncertainty Factors Applied to Ingestion-Based Screening Values

Former Lockbourne Air Force Base, Lockbourne, Ohio

Convert From	Convert To	Uncertainty Factor
Chronic NOAEL	Chronic NOAEL	1
Subchornic LOAEL	Chronic LOAEL	4
Chronic LOAEL	Chronic NOAEL	5
Subchronic NOAEL	Chronic NOAEL	10
Subchronic LOAEL	Chronic NOAEL	20
Acute NOAEL	Chronic NOAEL	30
Acute LOAEL	Chronic NOAEL	50
LD50	Chronic NOAEL	100

Notes:

Uncertainty factors from: Wentsel. R.S. et al. 1996.

Durations are defined as follows (USEPA, August 1999; Sample et al. 1996 [see report text for complete references]):

- Acute: <14 days
- Subchronic: 14 - 90 days
- Chronic: >90 days or during critical life stage

TABLE 7-14
Ingestion Screening Values for Mammals
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor	
									Mink	Muskrat
Inorganics										
Aluminum	mouse	0.03	3 generations (390 days)	oral in water/diet	reproduction	245	49.0	ATSDR 2008	X	X
Arsenic	mouse	0.03	3 generations	oral in water	reproduction	1.26	0.25	Sample et al. 1996		X
Arsenic	dog	10	2 years	oral in diet	systemic	6	1.20	ATSDR 2000a	X	
Barium	rat	0.435	16 months	oral in water	growth/hypertension	19.8	5.10	Sample et al. 1996	X	X
Cobalt	rat	0.35	69 days	oral in diet	reproduction	20.0	5.00	ATSDR 2004c	X	X
Copper	mouse	0.03	1 month + GD 0-19	oral in diet	developmental	104	78.0	ATSDR 2004d		X
Copper	mink	1.00	357 days	oral in diet	reproduction	15.1	11.7	Sample et al. 1996	X	
Lead	rat	0.35	3 generations	oral in diet	reproduction	80.0	8.00	Sample et al. 1996	X	X
Manganese	rat	0.35	224 days	oral in diet	reproduction	284	88.0	Sample et al. 1996	X	X
Selenium	rat	0.35	1 year	oral in water	reproduction	0.33	0.20	Sample et al. 1996	X	X
Thallium	rat	0.365	60 days	oral in water	reproduction	0.185	0.037	Sample et al. 1996	X	X
Zinc	rat	0.35	GD 1-16	oral in diet	reproduction	320	160	Sample et al. 1996		X
Zinc	mink	1.00	25 weeks	oral	reproduction	104	20.8	ATSDR 2005	X	
Pesticides/PCBs										
4,4'-DDD	rat	0.35	2 years	oral in diet	reproduction	4.00	0.80	Sample et al. 1996		X
4,4'-DDD	dog	10.0	2 generations	oral in diet	reproduction	5.00	1.00	ATSDR 2002b	X	
4,4'-DDE	rat	0.35	2 years	oral in diet	reproduction	4.00	0.80	Sample et al. 1996		X
4,4'-DDE	dog	10.0	2 generations	oral in diet	reproduction	5.00	1.00	ATSDR 2002b	X	
4,4'-DDT	rat	0.35	2 years	oral in diet	reproduction	4.00	0.80	Sample et al. 1996		X
4,4'-DDT	dog	10.0	2 generations	oral in diet	reproduction	5.00	1.00	ATSDR 2002b	X	
Aroclor-1260	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.68	0.14	Sample et al. 1996		X
Aroclor-1260	mink	1.00	4.5 months	oral in diet	reproduction	0.69	0.14	Sample et al. 1996	X	
PCBs (total)	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.037	0.00	Sample et al. 1996		X
PCBs (total)	mink	1.00	4.5 months	oral in diet	reproduction	0.037	0.0037	Sample et al. 1996	X	
Semivolatile Organics										
2-Methylnaphthalene	--	--	--	--	--	NA	NA	--	X	X
Acenaphthene	mouse	0.03	13 weeks	oral (gavage)	reproduction	700	350	ATSDR 1995	X	X
Anthracene	mouse	0.03	13 weeks	oral (gavage)	reproduction	5,000	1,000	ATSDR 1995	X	X
Benzo(a)anthracene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
Benzo(a)pyrene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
Benzo(b)fluoranthene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
Benzo(g,h,i)perylene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
Benzo(k)fluoranthene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
bis(2-Ethylhexyl)phthalate	mouse	0.03	105 days	oral in diet	reproduction	183	18.3	Sample et al. 1996	X	X
Chrysene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
Dibenz(a,h)anthracene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X

TABLE 7-14
Ingestion Screening Values for Mammals
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor	
									Mink	Muskrat
Dibenzofuran	--	--	--	--	--	NA	NA	--	X	X
Fluoranthene	mouse	0.03	13 weeks	oral (gavage)	reproduction	2,500	500	ATSDR 1995	X	X
Fluorene	mouse	0.03	13 weeks	oral (gavage)	reproduction	2,500	500	ATSDR 1995	X	X
Indeno(1,2,3-cd)pyrene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
Naphthalene	mouse	0.03	13 weeks	oral (gavage)	reproduction	1,000	200	ATSDR 1995	X	X
Phenanthrene	mouse	0.03	13 weeks	oral (gavage)	reproduction	2,500	500	ATSDR 1995	X	X
Pyrene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X
Volatile Organics										
Acetone	rat	0.35	90 days	oral (gavage)	liver/kidney	500	100	Sample et al. 1996	X	X
Dioxins/Furans										
Dioxin/furan (TEQ) - Mammal (total)	rat	0.35	3 generations	oral in diet	reproduction	0.00001	0.000001	Sample et al. 1996	X	X

Notes:
[1] - See Section 9 of Text for Complete Reference

TABLE 7-15

Ingestion Screening Values for Birds

Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor		
									Belted Kingfisher	Mallard Duck	Marsh Wren
Inorganics											
Aluminum	ringed dove	0.155	4 months	oral in diet	reproduction	549	110	Sample et al. 1996	X	X	X
Arsenic	brown-headed cowbird	0.049	7 months	oral in diet	survival	7.38	2.46	Sample et al. 1996			X
Arsenic	mallard	1.00	128 days	oral in diet	survival	12.8	5.14	Sample et al. 1996	X	X	
Barium	chicken (chicks)	0.121	4 weeks	oral in diet	survival	41.7	20.8	Sample et al. 1996	X	X	X
Cobalt	--	--	--	--	--	NA	NA	--	X	X	X
Copper	chicken (chicks)	0.534	10 weeks	oral in diet	growth/survival	61.7	47.0	Sample et al. 1996	X	X	X
Lead	Japanese quail	0.15	12 weeks	oral in diet	reproduction	11.3	1.13	Sample et al. 1996		X	
Lead	American kestrel	0.13	7 months	oral in diet	reproduction	19.3	3.85	Sample et al. 1996	X		X
Manganese	Japanese quail	0.072	75 days	oral in diet	growth/behavior	4,885	977	Sample et al. 1996	X	X	X
Selenium	black-crowned night-heron	0.88	94 days	oral in diet	reproduction	9.00	1.80	Sample et al. 1996	X		
Selenium	mallard	1.00	100 days	oral in diet	reproduction	0.80	0.40	Sample et al. 1996		X	X
Thallium	European starling	0.082	acute	oral	survival	1.75	0.35	USEPA 1999	X	X	X
Zinc	chicken	1.94	44 weeks	oral in diet	reproduction	131	14.5	Sample et al. 1996	X	X	X
Pesticides/PCBs											
4,4'-DDD	mallard	1.00	2 years	oral in diet	reproduction	0.60	0.12	USEPA 1995a		X	X
4,4'-DDD	bald eagle	4.74	112 days	oral in diet	survival	3.00	0.30	USEPA 1995a	X		
4,4'-DDE	Japanese quail	0.11	3 generations	oral in diet	reproduction	5.00	0.50	USEPA 1995a			
4,4'-DDE	mallard	1.00	2 years	oral in diet	reproduction	0.60	0.12	USEPA 1995a		X	X
4,4'-DDE	bald eagle	4.74	112 days	oral in diet	survival	3.00	0.30	USEPA 1995a	X		
4,4'-DDT	mallard	1.00	2 years	oral in diet	reproduction	1.50	0.60	USEPA 1995a		X	X
4,4'-DDT	bald eagle	4.74	112 days	oral in diet	survival	3.00	0.30	USEPA 1995a	X		
Aroclor-1260	mallard	1.00	1 month	oral in diet	reproduction	7.50	1.50	USEPA 1995a	X	X	X
PCBs (total)	mallard	1.00	1 month	oral in diet	reproduction	7.50	1.50	USEPA 1995a	X	X	X
Semivolatile Organics											
2-Methylnaphthalene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Acenaphthene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Anthracene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(a)anthracene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(a)pyrene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(b)fluoranthene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(g,h,i)perylene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(k)fluoranthene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
bis(2-Ethylhexyl)phthalate	ringed dove	0.155	4 weeks	oral in diet	reproduction	5.55	1.11	Sample et al. 1996	X	X	X
Chrysene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X

TABLE 7-15

Ingestion Screening Values for Birds

Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor		
									Belted Kingfisher	Mallard Duck	Marsh Wren
Dibenz(a,h)anthracene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Dibenzofuran	--	--	--	--	--	NA	NA	--	X	X	X
Fluoranthene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Fluorene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Indeno(1,2,3-cd)pyrene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Naphthalene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Phenanthrene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Pyrene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Volatile Organics											
Acetone*	--	--	--	--	--	NA	NA	--	X	X	X
Dioxins/Furans											
Dioxin/furan (TEQ) - Mammal (total)	ring-necked pheasant	1.00	10 weeks	injection	reproduction	0.00014	0.000014	Sample et al. 1996	X	X	X
Dioxin/furan (TEQ) - Bird (total)	ring-necked pheasant	1.00	10 weeks	injection	reproduction	0.00014	0.000014	Sample et al. 1996	X	X	X

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-16
Screening Statistics for Direct Exposures--AOC 1 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[3]
Detected Constituents							
Inorganics (MG/KG)							
Aluminum	-- - --	32 / 32	26,000	LCKSO-6 2-3	50.0	32 / 32	**520**
Antimony	5.20 - 66.0	2 / 32	1.40	EEGLKB-SS10	78	0 / 32	< 1
Barium	-- - --	48 / 48	490	EEGLKB-SS01	330	2 / 48	**1.5**
Beryllium	0.51 - 6.00	22 / 32	3.32	LCKSO-7 2-3	40	0 / 32	< 1
Cadmium	0.42 - 6.00	20 / 48	6.30	LCK-SO9B	32	0 / 48	< 1
Calcium [2]	-- - --	32 / 32	280,000	EEGLKB-SS01	NSV	-- / --	NSV
Chromium, total	11.0 - 11.0	47 / 48	35.5	LCK-SO6B	0.40	47 / 48	**89**
Copper	21.0 - 23.0	29 / 32	140	LCKSO-8 0-1	70	1 / 32	**2.0**
Lead	-- - --	48 / 48	9,340	LCKSO-8 0-1	120	4 / 48	**78**
Magnesium [2]	-- - --	32 / 32	39,000	EEGLKB-SS16	NSV	-- / --	NSV
Mercury	2.00E-05 - 0.33	22 / 48	0.79	LCK-SO6B	0.10	6 / 48	**7.9**
Potassium [2]	3,300 - 5,500	30 / 32	4,200	LCKSB-13 0-0.5	NSV	-- / --	NSV
Selenium	0.14 - 11.0	19 / 48	3.50	EEGLKB-SS02	0.52	16 / 48	**6.7**
Silver	0.42 - 11.0	4 / 48	190	EEGLKB-SS14	560	0 / 48	< 1
Sodium [2]	104 - 1,800	17 / 32	980	LCKSO-6 2-3	NSV	-- / --	NSV
Thallium	0.51 - 18.0	17 / 32	2.80	EEGLKB-SS02	1	17 / 32	**2.8**
Zinc	-- - --	48 / 48	1,650	LCK-SO6B	120	7 / 48	**14**
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Chlordane, alpha-	0.0019 - 0.22	2 / 36	0.16	EEGLKB-SS12	0.22	0 / 36	< 1
Chlordane, gamma-	0.0019 - 0.22	3 / 36	0.44	EEGLKB-SS05	0.22	2 / 36	**2.0**
DDD, p,p'-	0.0020 - 0.22	6 / 40	0.36	EEGLKB-SS11	0.76	0 / 40	< 1
DDE, p,p'-	0.0020 - 0.22	8 / 40	0.20	EEGLKB-SS11	0.60	0 / 40	< 1
DDT, p,p'-	0.0020 - 0.22	11 / 40	0.42	EEGLKB-SS11	0.0035	11 / 40	**120**
PCB 1242	0.019 - 2.00	2 / 40	0.23	EEGLKB-SS05	0.371	0 / 40	< 1
PCB 1248	0.019 - 0.77	1 / 40	16.0	EEGLKB-SS10	0.371	1 / 40	**43**
PCB 1254	0.019 - 2.00	5 / 40	0.81	LCK-SODUP2	0.371	1 / 40	**2.2**
PCB 1260	0.019 - 2.00	3 / 40	0.26	EEGLKB-SS18	0.371	0 / 40	< 1
Total PCBs	-- - --	5 / 40	22	EEGLKB-SS10	0.371	5 / 40	**59**
Semivolatile Organic Compounds (MG/KG)							
Acenaphthene	0.038 - 8.10	19 / 41	85.0	EEGLKB-SS06	20.0	4 / 41	**4.3**
Acenaphthylene	0.038 - 8.10	9 / 41	1.90	EEGLKB-SS08	682	0 / 41	< 1
Anthracene	0.039 - 3.50	27 / 41	160	EEGLKB-SS05	1,480	0 / 41	< 1
Benz(a)anthracene	0.039 - 3.50	33 / 41	450	EEGLKB-SS05	5.21	9 / 41	**86**
Benzo(a)pyrene	0.039 - 3.50	32 / 41	380	EEGLKB-SS05	1.52	15 / 41	**250**

TABLE 7-16
Screening Statistics for Direct Exposures--AOC 1 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[3]
Benzo(b)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	59.8	6 / 41	**6**
Benzo(ghi)perylene	0.039 - 3.50	31 / 41	110	EEGLKB-SS05	119	0 / 41	< 1
Benzo(k)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	148	5 / 41	**2.3**
Benzoic acid	0.77 - 19.0	3 / 20	4.80	EEGLKB-SS02	NSV	-- / --	NSV
Bis(2-ethylhexyl) phthalate	0.19 - 4.70	8 / 41	16.0	LCKSB-12 0-0.5	0.93	3 / 41	**17.3**
Butylbenzyl phthalate	0.074 - 8.10	1 / 41	0.73	LCK-SO6B	NSV	-- / --	NSV
Carbazole	0.19 - 4.00	17 / 41	88.0	EEGLKB-SS06	NSV	-- / --	NSV
Chrysene	0.35 - 3.50	35 / 41	470	EEGLKB-SS05	4.73	10 / 41	**99**
Dibenz(ah)anthracene	0.038 - 3.50	22 / 41	71.0	EEGLKB-SS05	18.4	4 / 41	**3.9**
Dibenzofuran	0.077 - 8.10	16 / 41	42.0	EEGLKB-SS06	NSV	-- / --	NSV
Diethyl phthalate	0.074 - 8.10	1 / 41	1.30	LCK-SO6B	100	0 / 41	< 1
Di-n-butyl phthalate	0.040 - 8.10	1 / 41	2.60	LCK-SO6B	0.15	1 / 41	**17**
Di-n-octyl phthalate	0.35 - 9.20	1 / 41	15.0	LCKSB-12 0-0.5	NSV	-- / --	NSV
Fluoranthene	0.35 - 3.50	35 / 41	1,100	EEGLKB-SS05	122	5 / 41	**9.0**
Fluorene	0.038 - 8.10	17 / 41	67.0	EEGLKB-SS06	30.0	3 / 41	**2.2**
Indeno(1,2,3-cd)pyrene	0.039 - 3.50	30 / 41	130	EEGLKB-SS05	109	2 / 41	**1.2**
Methylnaphthalene, 2-	0.039 - 8.10	13 / 41	14.0	EEGLKB-SS06	3.24	6 / 41	**4.3**
Methylphenol, 3- and/or 4-	0.074 - 1.90	2 / 20	0.25	EEGLKB-SS05	NSV	-- / --	NSV
Naphthalene	0.039 - 8.10	11 / 41	13.0	EEGLKB-SS06	0.099	9 / 41	**131**
Phenanthrene	0.039 - 0.44	34 / 41	600	EEGLKB-SS06	45.7	6 / 41	**13**
Phenol	0.19 - 8.10	3 / 41	0.88	LCK-SO1A	30.0	0 / 41	< 1
Pyrene	0.040 - 3.50	33 / 41	870	EEGLKB-SS05	45.7	6 / 41	**19**
Total Low Molecular Weight PAHs	- - -	34 / 41	910	EEGLKB-SS06	28	8 / 41	**33**
Total High Molecular Weight PAHs	- - -	35 / 41	4,261	EEGLKB-SS05	18	14 / 41	**237**
Explosives (MG/KG)							
Trichlorobenzene, 1,2,4-	0.19 - 8.10	1 / 41	2.10	LCK-SO6B	20.0	0 / 41	< 1
Trinitrobenzene, 1,3,5-	7.00E-04 - 2.50	1 / 23	1.60	EEGLKB-SS02	4.30	0 / 23	< 1
Trinitrotoluene, 2,4,6-	5.00E-04 - 0.25	2 / 23	5.30	EEGLKB-SS08 Dup02	NSV	-- / --	NSV
Volatile Organic Compounds (MG/KG)							
Acetone	0.0090 - 0.029	20 / 41	34.0	EEGLKB-SS18	2.50	5 / 41	**14**
Ethylbenzene	0.0050 - 0.0083	1 / 40	0.026	LCK-SO6B-RE	5.16	0 / 40	< 1
Methylene chloride	0.0030 - 0.037	1 / 41	0.16	LCK-SO6B-RE	4.05	0 / 41	< 1
Toluene	0.0015 - 0.0083	10 / 40	0.014	LCK-SO6B-RE	5.45	0 / 40	< 1
Trichlorofluoromethane	0.0047 - 0.0083	14 / 20	0.0082	EEGLKB-SS03	16.4	0 / 20	< 1
Xylenes, total	0.0052 - 0.0070	1 / 20	0.033	LCK-SO6B-RE	10.0	0 / 20	< 1
Dioxin/Furans (MG/KG)							

TABLE 7-16
Screening Statistics for Direct Exposures--AOC 1 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[3]
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	5.00E-07 - 2.10E-06	13 / 15	3.17E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	7.00E-07 - 3.90E-06	4 / 15	1.52E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzofurans, total	6.00E-07 - 2.30E-06	13 / 15	0.0014	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	-- - --	15 / 15	0.0012	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxins, total	-- - --	15 / 15	0.0021	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,4,7,8-	4.00E-07 - 2.60E-06	6 / 12	5.00E-06	LCKSO-8 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,6,7,8-	4.00E-07 - 1.00E-06	7 / 15	7.70E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,7,8,9-	1.20E-07 - 2.00E-06	2 / 15	2.50E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 2,3,4,6,7,8-	3.00E-07 - 2.30E-06	4 / 11	2.90E-06	LCKSB-12 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzofurans, total	5.40E-07 - 1.50E-05	12 / 15	3.19E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	2.80E-07 - 2.90E-06	6 / 15	3.60E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	4.00E-07 - 7.70E-06	9 / 15	1.18E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	6.00E-07 - 5.10E-06	4 / 9	8.00E-06	LCKSB-13 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxins, total	2.10E-06 - 4.00E-06	12 / 15	5.53E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Octachlorodibenzofuran	8.00E-07 - 8.30E-06	13 / 15	0.0013	LCKSO-7 2-3	NSV	-- / --	NSV
Octachlorodibenzo-p-dioxin	-- - --	15 / 15	0.016	EEGLKB-SS16	NSV	-- / --	NSV
Pentachlorodibenzofuran, 1,2,3,7,8-	1.20E-07 - 1.00E-06	3 / 15	7.60E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Pentachlorodibenzofuran, 2,3,4,7,8-	4.00E-07 - 9.00E-07	4 / 15	7.80E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Pentachlorodibenzofurans, total	4.00E-07 - 1.60E-06	12 / 15	1.11E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	4.10E-07 - 1.50E-06	4 / 15	1.58E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxins, total	4.70E-07 - 3.40E-06	9 / 15	6.98E-05	LCKSO-7 2-3	NSV	-- / --	NSV
TCDD-TEQ	-- - --	15 / 15	6.60E-05	LCKSO-7 2-3	3.15E-07	15 / 15	**210**
Tetrachlorodibenzofuran, 2,3,7,8-	4.60E-07 - 3.30E-06	7 / 15	1.63E-05	LCKSO-6 2-3	NSV	-- / --	NSV
Tetrachlorodibenzofurans, total	2.00E-07 - 4.00E-06	11 / 15	9.57E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	1.80E-07 - 1.00E-06	6 / 15	4.80E-06	LCKSO-9 0-1	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxins, total	2.90E-07 - 1.00E-06	11 / 15	4.86E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Non-Detected Constituents							
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Aldrin	0.0017 - 0.22	0 / 40	--	--	0.0033	-- / --	**66**
Chlordane, technical-	0.035 - 0.041	0 / 4	--	--	NSV	-- / --	NSV
Dieldrin	0.0020 - 0.40	0 / 40	--	--	0.0024	-- / --	**168**
Endosulfan A	0.0017 - 0.22	0 / 40	--	--	0.12	-- / --	**1.8**
Endosulfan B	0.0020 - 0.40	0 / 40	--	--	0.12	-- / --	**3.4**
Endosulfan sulfate	0.0020 - 0.22	0 / 40	--	--	0.036	-- / --	**6.1**
Endrin	0.0020 - 0.40	0 / 40	--	--	0.010	-- / --	**40**
Endrin aldehyde	0.0020 - 0.40	0 / 40	--	--	0.011	-- / --	**38**

TABLE 7-16
Screening Statistics for Direct Exposures--AOC 1 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[3]
Endrin ketone	0.0020 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Heptachlor	0.0017 - 0.22	0 / 40	--	--	0.0060	-- / --	**37**
Heptachlor epoxide	0.0017 - 0.22	0 / 40	--	--	0.15	-- / --	**1.4**
Hexachlorocyclohexane, alpha-	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, beta-	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, delta-	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane)	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Methoxychlor	0.0096 - 2.00	0 / 40	--	--	0.020	-- / --	**101**
PCB 1016	0.019 - 2.00	0 / 40	--	--	NSV	-- / --	NSV
PCB 1221	0.019 - 2.00	0 / 40	--	--	NSV	-- / --	NSV
PCB 1232	0.019 - 2.00	0 / 40	--	--	NSV	-- / --	NSV
Toxaphene	0.019 - 3.90	0 / 40	--	--	0.12	-- / --	**33**
Herbicides (MG/KG)							
2,4,5-T	0.012 - 0.026	0 / 16	--	--	NSV	-- / --	NSV
2,4,5-TP	0.012 - 0.026	0 / 16	--	--	NSV	-- / --	NSV
2,4-D	0.023 - 0.052	0 / 16	--	--	0.027	-- / --	**1.9**
Semivolatile Organic Compounds (MG/KG)							
Benzidine	3.70 - 92.0	0 / 20	--	--	NSV	-- / --	NSV
Benzyl alcohol	0.74 - 19.0	0 / 20	--	--	NSV	-- / --	NSV
Bis(2-chloroethoxy) methane	0.074 - 8.10	0 / 41	--	--	0.30	-- / --	**27**
Bis(2-chloroethyl) ether	0.074 - 8.10	0 / 41	--	--	23.7	-- / --	< 1
Bis(2-chloroisopropyl) ether	0.38 - 3.50	0 / 17	--	--	NSV	-- / --	NSV
Bis(chloroisopropyl) ether	0.19 - 8.10	0 / 24	--	--	19.4	-- / --	< 1
Bromophenyl phenyl ether, 4-	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.35 - 19.0	0 / 41	--	--	20.0	-- / --	< 1
Chloronaphthalene, 2-	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Chlorophenol, 2-	0.19 - 8.10	0 / 41	--	--	7.00	-- / --	**1.2**
Chlorophenyl phenyl ether, 4-	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Dichlorobenzene, 1,2-	0.19 - 8.10	0 / 41	--	--	20.0	-- / --	< 1
Dichlorobenzene, 1,3-	0.19 - 8.10	0 / 41	--	--	20.0	-- / --	< 1
Dichlorobenzene, 1,4-	0.19 - 8.10	0 / 41	--	--	20.0	-- / --	< 1
Dichlorobenzidine, 3,3'-	0.19 - 8.10	0 / 41	--	--	0.65	-- / --	**13**
Dichlorophenol, 2,4-	0.35 - 9.20	0 / 41	--	--	20.0	-- / --	< 1
Dimethyl phthalate	0.074 - 8.10	0 / 41	--	--	734	-- / --	< 1
Dimethylphenol, 2,4-	0.35 - 9.20	0 / 41	--	--	0.010	-- / --	**920**
Dinitro-2-methylphenol, 4,6-	0.74 - 20.0	0 / 41	--	--	NSV	-- / --	NSV

TABLE 7-16
Screening Statistics for Direct Exposures--AOC 1 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[3]
Dinitrophenol, 2,4-	0.74 - 20.0	0 / 41	--	--	20.0	-- / --	< 1
Hexachlorobenzene	0.037 - 8.10	0 / 41	--	--	0.199	-- / --	**41**
Hexachlorobutadiene	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Hexachlorocyclopentadiene	0.35 - 19.0	0 / 41	--	--	NSV	-- / --	NSV
Hexachloroethane	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Isophorone	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Methylphenol, 2-	0.074 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Methylphenol, 4-	0.35 - 8.10	0 / 21	--	--	NSV	-- / --	NSV
Methylphenol, 4-chloro-3-	0.35 - 9.20	0 / 41	--	--	NSV	-- / --	NSV
Nitroaniline, 2-	0.19 - 20.0	0 / 41	--	--	74.1	-- / --	< 1
Nitroaniline, 3-	0.74 - 20.0	0 / 41	--	--	3.16	-- / --	**6.3**
Nitroaniline, 4-	0.74 - 20.0	0 / 41	--	--	21.9	-- / --	< 1
Nitrophenol, 2-	0.35 - 9.20	0 / 41	--	--	1.60	-- / --	**5.8**
Nitrophenol, 4-	0.74 - 20.0	0 / 41	--	--	7.00	-- / --	**2.9**
Nitrosodi-N-propylamine, N-	0.037 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Nitrosodiphenylamine, N-	0.037 - 8.10	0 / 41	--	--	0.55	-- / --	**14.9**
Pentachlorophenol	0.37 - 20.0	0 / 41	--	--	3.00	-- / --	**6.7**
Trichlorobenzene, 1,2,3-	0.0050 - 0.0083	0 / 20	--	--	20.0	-- / --	< 1
Trichlorophenol, 2,4,5-	0.37 - 20.0	0 / 41	--	--	9.00	-- / --	**2.22**
Trichlorophenol, 2,4,6-	0.19 - 8.10	0 / 41	--	--	4.00	-- / --	**2.03**
Explosives (MG/KG)							
Amino-2,6-dinitrotoluene, 4-	0.0011 - 5.00	0 / 7	--	--	NSV	-- / --	NSV
Amino-4,6-dinitrotoluene, 2-	9.00E-04 - 5.00	0 / 7	--	--	NSV	-- / --	NSV
Aminodinitrotoluenes, total	0.44 - 0.50	0 / 16	--	--	NSV	-- / --	NSV
Dinitrobenzene, 1,3-	5.00E-04 - 2.50	0 / 23	--	--	NSV	-- / --	NSV
Dinitrotoluene, 2,4-	5.00E-04 - 2.50	0 / 40	--	--	1.28	-- / --	**2.0**
Dinitrotoluene, 2,6-	5.00E-04 - 5.00	0 / 40	--	--	0.033	-- / --	**152**
HMX	9.00E-04 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
Nitrobenzene	6.00E-04 - 2.50	0 / 40	--	--	1.31	-- / --	**1.9**
Nitrotoluene, 2-	9.00E-04 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
Nitrotoluene, 3-	9.00E-04 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
Nitrotoluene, 4-	0.0011 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
RDX	5.00E-04 - 2.50	0 / 23	--	--	NSV	-- / --	NSV
Tetryl	0.0019 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
Volatile Organic Compounds (MG/KG)							
Benzene	0.0050 - 0.044	0 / 41	--	--	0.26	-- / --	< 1

TABLE 7-16
Screening Statistics for Direct Exposures--AOC 1 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[3]
Bromobenzene	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Bromochloromethane	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Bromodichloromethane	0.0050 - 0.044	0 / 41	--	--	0.54	-- / --	< 1
Bromoform	0.0050 - 0.044	0 / 41	--	--	15.9	-- / --	< 1
Bromomethane	0.0052 - 0.088	0 / 41	--	--	NSV	-- / --	NSV
Butylbenzene, 1-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Butylbenzene, sec-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Butylbenzene, tert-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Carbon disulfide	0.0052 - 0.044	0 / 41	--	--	0.094	-- / --	< 1
Carbon tetrachloride	0.0050 - 0.044	0 / 41	--	--	2.98	-- / --	< 1
Chlorobenzene	0.0050 - 0.044	0 / 40	--	--	40.0	-- / --	< 1
Chloroethane	0.0050 - 0.088	0 / 41	--	--	NSV	-- / --	NSV
Chloroform	0.0050 - 0.044	0 / 41	--	--	1.19	-- / --	< 1
Chloromethane	0.0050 - 0.088	0 / 41	--	--	NSV	-- / --	NSV
Chlorotoluene, 2-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Chlorotoluene, 4-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0050 - 0.044	0 / 41	--	--	2.05	-- / --	< 1
Dibromochloropropane	0.0050 - 0.0083	0 / 20	--	--	0.035	-- / --	< 1
Dichlorodifluoromethane	0.0050 - 0.0083	0 / 20	--	--	39.5	-- / --	< 1
Dichloroethane, 1,1-	0.0050 - 0.044	0 / 41	--	--	20.1	-- / --	< 1
Dichloroethane, 1,2-	0.0050 - 0.044	0 / 41	--	--	21.2	-- / --	< 1
Dichloroethene, 1,1-	0.0050 - 0.044	0 / 41	--	--	8.28	-- / --	< 1
Dichloroethene, 1,2-, cis-	0.0050 - 0.0083	0 / 20	--	--	0.78	-- / --	< 1
Dichloroethene, 1,2-, trans-	0.0050 - 0.0083	0 / 20	--	--	0.78	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0052 - 0.044	0 / 21	--	--	NSV	-- / --	NSV
Dichloropropane, 1,2-	0.0050 - 0.044	0 / 41	--	--	32.7	-- / --	< 1
Dichloropropane, 1,3-	0.0050 - 0.0083	0 / 20	--	--	32.7	-- / --	< 1
Dichloropropane, 2,2-	0.0050 - 0.0083	0 / 20	--	--	32.7	-- / --	< 1
Dichloropropene, 1,1-	0.0050 - 0.0083	0 / 20	--	--	0.40	-- / --	< 1
Dichloropropene, 1,3-, cis-	0.0050 - 0.044	0 / 41	--	--	0.40	-- / --	< 1
Dichloropropene, 1,3-, trans-	0.0050 - 0.044	0 / 41	--	--	0.40	-- / --	< 1
Ethylene dibromide	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Isopropylbenzene	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Isopropyltoluene, 4-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Methyl ethyl ketone	0.010 - 0.088	0 / 41	--	--	89.6	-- / --	< 1
Methyl isobutyl ketone	0.010 - 0.088	0 / 40	--	--	NSV	-- / --	NSV

TABLE 7-16

Screening Statistics for Direct Exposures--AOC 1 Soil

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[3]
Methyl n-butyl ketone	0.010 - 0.088	0 / 40	--	--	NSV	-- / --	NSV
Methyl tert-butyl ether	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Methylene bromide	0.0050 - 0.0083	0 / 20	--	--	65.0	-- / --	< 1
Propylbenzene, 1-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Styrene	0.0050 - 0.044	0 / 40	--	--	4.69	-- / --	< 1
Tetrachloroethane, 1,1,1,2-	0.0050 - 0.0083	0 / 20	--	--	0.13	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0050 - 0.044	0 / 40	--	--	0.13	-- / --	< 1
Tetrachloroethene	0.0050 - 0.044	0 / 40	--	--	9.92	-- / --	< 1
Trichloroethane, 1,1,1-	0.0050 - 0.044	0 / 41	--	--	29.8	-- / --	< 1
Trichloroethane, 1,1,2-	0.0050 - 0.044	0 / 41	--	--	28.6	-- / --	< 1
Trichloroethene	0.0050 - 0.044	0 / 41	--	--	12.4	-- / --	< 1
Trichloropropane, 1,2,3-	0.0050 - 0.0083	0 / 20	--	--	3.36	-- / --	< 1
Trimethylbenzene, 1,2,4-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Trimethylbenzene, 1,3,5-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Vinyl chloride	0.0050 - 0.088	0 / 41	--	--	0.65	-- / --	< 1
Xylene, 1,2-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Xylene, 1,3- and/or 1,4-	0.0099 - 0.017	0 / 20	--	--	NSV	-- / --	NSV

[1]Shaded cells indicate hazard quotient based on reporting limits

[2]Macronutrient: Not considered to be a COPC

[3]HQs greater than 1 are in bold

Notes:

NSV = No Screening Value

TABLE 7-17
Screening Statistics for Direct Exposures--AOC 2 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Detected Constituents							
Inorganics (MG/KG)							
Arsenic	-- - --	16 / 16	25.1	LCK-SO3B	18	1 / 16	**1.4**
Barium	-- - --	16 / 16	200	LCKSB-11[3]	330	0 / 16	< 1
Beryllium	0.57 - 1.00	6 / 8	2.40	EEGLKB-SS21	40	0 / 8	< 1
Calcium [2]	-- - --	8 / 8	100,000	LCKSB-11 2-4	NSV	-- / --	NSV
Cobalt	-- - --	8 / 8	26.0	LCKSB-11[3]	13	1 / 8	**2.0**
Lead	-- - --	16 / 16	40.2	LCKSB-11[3]	120	0 / 16	< 1
Magnesium [2]	-- - --	8 / 8	48,000	LCKSB-11 2-4	NSV	-- / --	NSV
Manganese	990 - 990	7 / 8	1,600	LCKSB-11[3]	220	5 / 8	**7.3**
Mercury	0.061 - 0.13	5 / 16	0.080	LCK-SO3A	0.10	0 / 16	< 1
Potassium [2]	-- - --	8 / 8	3,300	LCKSB-11[3]	NSV	-- / --	NSV
Selenium	0.15 - 1.80	7 / 16	0.60	EEGLKB-SS21	0.52	3 / 16	**1.2**
Sodium [2]	110 - 320	3 / 8	210	EEGLKB-SS20 Dup01	NSV	-- / --	NSV
Thallium	0.57 - 1.00	4 / 8	2.20	EEGLKB-SS21	1	4 / 8	**2.2**
Zinc	-- - --	16 / 16	125	LCK-SO5B	120	1 / 16	**1.0**
Pesticide/Polychlorinated Biphenyls (MG/KG)							
DDD, p,p'-	0.0023 - 0.012	1 / 16	0.017	LCK-SO4A	0.76	0 / 16	< 1
DDE, p,p'-	0.0023 - 0.012	3 / 16	0.81	LCK-SO4A	0.60	1 / 16	**1.4**
DDT, p,p'-	0.0023 - 0.012	3 / 16	0.46	LCK-SO4A	0.0035	3 / 16	**131**
Semivolatile Organic Compounds (MG/KG)							
Acenaphthene	0.039 - 0.44	2 / 16	0.014	EEGLKB-SS21	20.0	0 / 16	< 1
Anthracene	0.039 - 0.44	2 / 16	0.045	EEGLKB-SS21	1,480	0 / 16	< 1
Benz(a)anthracene	0.044 - 0.44	4 / 16	0.17	EEGLKB-SS21	5.21	0 / 16	< 1
Benzo(a)pyrene	0.044 - 0.44	4 / 16	0.17	EEGLKB-SS21	1.52	0 / 16	< 1
Benzo(b)fluoranthene	0.38 - 0.44	5 / 16	0.16	EEGLKB-SS21	59.8	0 / 16	< 1
Benzo(ghi)perylene	0.38 - 0.44	5 / 16	0.11	EEGLKB-SS21	119	0 / 16	< 1
Benzo(k)fluoranthene	0.38 - 0.44	5 / 16	0.18	EEGLKB-SS21	148	0 / 16	< 1
Benzoic acid	0.79 - 0.89	1 / 4	1.10	EEGLKB-SS21	NSV	-- / --	NSV
Chrysene	0.38 - 0.44	5 / 16	0.22	EEGLKB-SS21	4.73	0 / 16	< 1
Dibenz(ah)anthracene	0.039 - 0.44	2 / 16	0.044	EEGLKB-SS21	18.4	0 / 16	< 1
Dibenzofuran	0.079 - 0.44	2 / 16	0.070	EEGLKB-SS21	NSV	-- / --	NSV
Di-n-butyl phthalate	0.038 - 0.44	1 / 16	0.041	LCK-SO4A	0.15	0 / 16	< 1
Fluoranthene	0.38 - 0.44	7 / 16	0.32	LCK-SO4A	122	0 / 16	< 1
Indeno(1,2,3-cd)pyrene	0.039 - 0.44	3 / 16	0.095	LCK-SO4A	109	0 / 16	< 1
Methylnaphthalene, 2-	0.039 - 0.44	2 / 16	0.28	EEGLKB-SS21	3.24	0 / 16	< 1

TABLE 7-17
Screening Statistics for Direct Exposures--AOC 2 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Naphthalene	0.044 - 0.44	4 / 16	0.12	EEGLKB-SS21	0.099	1 / 16	**1.2**
Nitrosodiphenylamine, N-	0.042 - 0.44	1 / 16	0.026	EEGLKB-SS20	0.55	0 / 16	< 1
Phenanthrene	0.38 - 0.44	5 / 16	0.36	EEGLKB-SS22	45.7	0 / 16	< 1
Pyrene	0.039 - 0.44	5 / 16	0.27	EEGLKB-SS21	45.7	0 / 16	< 1
Total Low Molecular Weight PAHs	- - -	5 / 16	0.9	EEGLKB-SS21	29	0 / 16	< 1
Total High Molecular Weight PAHs	- - -	7 / 16	1.7	LCK-SO4A	18	0 / 16	< 1
Volatile Organic Compounds (MG/KG)							
Trichlorofluoromethane	0.0052 - 0.0063	1 / 4	0.0049	EEGLKB-SS22	16.4	0 / 4	< 1
Dichloropropene, 1,3-, trans-	0.0052 - 0.0072	2 / 16	0.0050	LCK-SO5B	0.40	0 / 16	< 1
Methylene chloride	0.0050 - 0.023	4 / 16	0.012	LCK-SODUP1	4.05	0 / 16	< 1
Acetone	0.0050 - 0.024	5 / 16	40.0	EEGLKB-SS22	2.50	2 / 16	**16**
Dioxin/Furans (MG/KG)							
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	6.00E-07 - 2.10E-06	3 / 5	2.70E-06	LCKSB-11[3]	NSV	-- / --	NSV
Heptachlorodibenzofurans, total	7.00E-07 - 2.10E-06	3 / 5	5.40E-06	LCKSB-11[3]	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	-- - --	5 / 5	7.20E-06	EEGLKB-SS20 Dup01	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxins, total	-- - --	5 / 5	1.50E-05	EEGLKB-SS20 Dup01	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,4,7,8-	3.10E-07 - 5.00E-07	2 / 5	1.20E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,6,7,8-	3.00E-07 - 4.50E-07	1 / 5	5.90E-07	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzofuran, 2,3,4,6,7,8-	4.00E-07 - 5.00E-07	2 / 5	1.00E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzofurans, total	5.00E-07 - 1.30E-06	3 / 5	4.90E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	3.00E-07 - 5.00E-07	2 / 5	5.90E-07	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	4.00E-07 - 5.00E-07	2 / 5	1.20E-06	LCKSB-11[3]	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxins, total	1.30E-06 - 4.60E-06	1 / 5	2.40E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Octachlorodibenzofuran	5.00E-07 - 1.40E-06	3 / 5	5.60E-06	LCKSB-11 0-0.5	NSV	-- / --	NSV
Octachlorodibenzo-p-dioxin	2.50E-06 - 2.50E-06	4 / 5	4.20E-04	EEGLKB-SS20	NSV	-- / --	NSV
Pentachlorodibenzofurans, total	5.00E-07 - 5.00E-07	4 / 5	6.30E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxins, total	5.00E-07 - 1.10E-06	1 / 5	8.70E-07	LCKSB-10 0-0.5	NSV	-- / --	NSV
TCDD-TEQ	-- - --	5 / 5	4.63E-06	EEGLKB-SS20	3.15E-07	5 / 5	**15**
Tetrachlorodibenzofuran, 2,3,7,8-	2.70E-07 - 4.00E-07	3 / 5	8.20E-07	LCKSB-18 0-0.5	NSV	-- / --	NSV
Tetrachlorodibenzofurans, total	4.00E-07 - 4.00E-07	4 / 5	2.90E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	3.00E-07 - 5.00E-07	2 / 5	3.90E-06	EEGLKB-SS20	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxins, total	8.90E-07 - 1.40E-06	3 / 5	3.90E-06	EEGLKB-SS20	NSV	-- / --	NSV

TABLE 7-17
Screening Statistics for Direct Exposures--AOC 2 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Non-Detected Constituents							
Inorganics (MG/KG)							
Antimony	5.40 - 13.0	0 / 8	--	--	78.0	-- / --	< 1
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Aldrin	0.0019 - 0.012	0 / 16	--	--	0.0033	-- / --	**3.6**
Chlordane, alpha-	0.0020 - 0.012	0 / 12	--	--	0.22	-- / --	< 1
Chlordane, gamma-	0.0020 - 0.012	0 / 12	--	--	0.22	-- / --	< 1
Chlordane, technical-	0.038 - 0.039	0 / 4	--	--	NSV	-- / --	NSV
Dieldrin	0.0023 - 0.012	0 / 16	--	--	0.0024	-- / --	**5.0**
Endosulfan A	0.0019 - 0.012	0 / 16	--	--	0.12	-- / --	< 1
Endosulfan B	0.0023 - 0.012	0 / 16	--	--	0.12	-- / --	< 1
Endosulfan sulfate	0.0023 - 0.012	0 / 16	--	--	0.036	-- / --	< 1
Endrin	0.0023 - 0.012	0 / 16	--	--	0.010	-- / --	**1.2**
Endrin aldehyde	0.0023 - 0.012	0 / 16	--	--	0.011	-- / --	**1.1**
Endrin ketone	0.0023 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Heptachlor	0.0019 - 0.012	0 / 16	--	--	0.0060	-- / --	**2.0**
Heptachlor epoxide	0.0019 - 0.012	0 / 16	--	--	0.15	-- / --	< 1
Hexachlorocyclohexane, alpha-	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, beta-	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, delta-	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane)	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Methoxychlor	0.011 - 0.056	0 / 16	--	--	0.020	-- / --	**2.8**
PCB 1016	0.020 - 0.045	0 / 16	--	--	NSV	-- / --	NSV
PCB 1221	0.020 - 0.089	0 / 16	--	--	NSV	-- / --	NSV
PCB 1232	0.020 - 0.045	0 / 16	--	--	NSV	-- / --	NSV
PCB 1242	0.020 - 0.045	0 / 16	--	--	NSV	-- / --	NSV
PCB 1248	0.020 - 0.045	0 / 16	--	--	NSV	-- / --	NSV
PCB 1254	0.020 - 0.045	0 / 16	--	--	NSV	-- / --	NSV
PCB 1260	0.020 - 0.045	0 / 16	--	--	NSV	-- / --	NSV
Toxaphene	0.023 - 0.22	0 / 16	--	--	0.12	-- / --	**1.8**

TABLE 7-17
Screening Statistics for Direct Exposures--AOC 2 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Semivolatile Organic Compounds (MG/KG)							
Acenaphthylene	0.039 - 0.44	0 / 16	--	--	682	-- / --	< 1
Benzidine	3.90 - 4.40	0 / 4	--	--	NSV	-- / --	NSV
Benzyl alcohol	0.79 - 0.89	0 / 4	--	--	NSV	-- / --	NSV
Bis(2-chloroethoxy) methane	0.079 - 0.44	0 / 16	--	--	0.30	-- / --	**1.5**
Bis(2-chloroethyl) ether	0.079 - 0.44	0 / 16	--	--	23.7	-- / --	< 1
Bis(2-chloroisopropyl) ether	0.40 - 0.44	0 / 8	--	--	NSV	-- / --	NSV
Bis(2-ethylhexyl) phthalate	0.20 - 0.44	0 / 16	--	--	0.93	-- / --	< 1
Bis(chloroisopropyl) ether	0.20 - 0.39	0 / 8	--	--	19.4	-- / --	< 1
Bromophenyl phenyl ether, 4-	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Butylbenzyl phthalate	0.079 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Carbazole	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.38 - 0.89	0 / 16	--	--	20.0	-- / --	< 1
Chloronaphthalene, 2-	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Chlorophenol, 2-	0.20 - 0.44	0 / 16	--	--	7.00	-- / --	< 1
Chlorophenyl phenyl ether, 4-	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Dichlorobenzene, 1,2-	0.20 - 0.44	0 / 16	--	--	20.0	-- / --	< 1
Dichlorobenzene, 1,3-	0.20 - 0.44	0 / 16	--	--	20.0	-- / --	< 1
Dichlorobenzene, 1,4-	0.20 - 0.44	0 / 16	--	--	20.0	-- / --	< 1
Dichlorobenzidine, 3,3'-	0.20 - 0.88	0 / 16	--	--	0.65	-- / --	**1.4**
Dichlorophenol, 2,4-	0.38 - 0.44	0 / 16	--	--	20.0	-- / --	< 1
Diethyl phthalate	0.079 - 0.44	0 / 16	--	--	100	-- / --	< 1
Dimethyl phthalate	0.079 - 0.44	0 / 16	--	--	734	-- / --	< 1
Dimethylphenol, 2,4-	0.38 - 0.44	0 / 16	--	--	0.010	-- / --	**44**
Dinitro-2-methylphenol, 4,6-	0.79 - 2.20	0 / 16	--	--	NSV	-- / --	NSV
Dinitrophenol, 2,4-	0.79 - 2.20	0 / 16	--	--	20.0	-- / --	< 1
Di-n-octyl phthalate	0.38 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Fluorene	0.039 - 0.44	0 / 16	--	--	30.0	-- / --	< 1
Hexachlorobenzene	0.039 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorobutadiene	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclopentadiene	0.38 - 0.89	0 / 16	--	--	NSV	-- / --	NSV
Hexachloroethane	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Isophorone	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Methylphenol, 2-	0.079 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Methylphenol, 3- and/or 4-	0.079 - 0.089	0 / 4	--	--	NSV	-- / --	NSV
Methylphenol, 4-	0.38 - 0.44	0 / 12	--	--	NSV	-- / --	NSV

TABLE 7-17
Screening Statistics for Direct Exposures--AOC 2 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Methylphenol, 4-chloro-3-	0.38 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Nitroaniline, 2-	0.20 - 2.20	0 / 16	--	--	74.1	-- / --	< 1
Nitroaniline, 3-	0.79 - 2.20	0 / 16	--	--	3.16	-- / --	< 1
Nitroaniline, 4-	0.79 - 2.20	0 / 16	--	--	21.9	-- / --	< 1
Nitrophenol, 2-	0.38 - 0.44	0 / 16	--	--	1.60	-- / --	< 1
Nitrophenol, 4-	0.79 - 2.20	0 / 16	--	--	7.00	-- / --	< 1
Nitrosodi-N-propylamine, N-	0.039 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Pentachlorophenol	0.39 - 2.20	0 / 16	--	--	3.00	-- / --	< 1
Phenol	0.20 - 0.44	0 / 16	--	--	30.0	-- / --	< 1
Trichlorobenzene, 1,2,3-	0.0052 - 0.0072	0 / 4	--	--	20.0	-- / --	< 1
Trichlorobenzene, 1,2,4-	0.20 - 0.44	0 / 16	--	--	20.0	-- / --	< 1
Trichlorophenol, 2,4,5-	0.39 - 2.20	0 / 16	--	--	9.00	-- / --	< 1
Trichlorophenol, 2,4,6-	0.20 - 0.44	0 / 16	--	--	4.00	-- / --	< 1
Volatile Organic Compounds (MG/KG)							
Benzene	0.0052 - 0.0072	0 / 16	--	--	0.26	-- / --	< 1
Bromobenzene	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Bromochloromethane	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Bromodichloromethane	0.0052 - 0.0072	0 / 16	--	--	0.54	-- / --	< 1
Bromoform	0.0052 - 0.0072	0 / 16	--	--	15.9	-- / --	< 1
Bromomethane	0.0055 - 0.014	0 / 16	--	--	NSV	-- / --	NSV
Butylbenzene, 1-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Butylbenzene, sec-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Butylbenzene, tert-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Carbon disulfide	0.0055 - 0.014	0 / 16	--	--	0.094	-- / --	< 1
Carbon tetrachloride	0.0052 - 0.0072	0 / 16	--	--	2.98	-- / --	< 1
Chlorobenzene	0.0052 - 0.0072	0 / 16	--	--	40.0	-- / --	< 1
Chloroethane	0.0052 - 0.014	0 / 16	--	--	NSV	-- / --	NSV
Chloroform	0.0052 - 0.0072	0 / 16	--	--	1.19	-- / --	< 1
Chloromethane	0.0052 - 0.014	0 / 16	--	--	NSV	-- / --	NSV
Chlorotoluene, 2-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Chlorotoluene, 4-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0052 - 0.0072	0 / 16	--	--	2.05	-- / --	< 1
Dibromochloropropane	0.0052 - 0.0072	0 / 4	--	--	0.035	-- / --	< 1
Dichlorodifluoromethane	0.0052 - 0.0072	0 / 4	--	--	39.5	-- / --	< 1
Dichloroethane, 1,1-	0.0052 - 0.0072	0 / 16	--	--	20.1	-- / --	< 1
Dichloroethane, 1,2-	0.0052 - 0.0072	0 / 16	--	--	21.2	-- / --	< 1

TABLE 7-17
Screening Statistics for Direct Exposures--AOC 2 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dichloroethene, 1,1-	0.0052 - 0.0072	0 / 16	--	--	8.28	-- / --	< 1
Dichloroethene, 1,2-, cis-	0.0052 - 0.0072	0 / 4	--	--	0.78	-- / --	< 1
Dichloroethene, 1,2-, trans-	0.0052 - 0.0072	0 / 4	--	--	0.78	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0055 - 0.0070	0 / 12	--	--	NSV	-- / --	NSV
Dichloropropane, 1,2-	0.0052 - 0.0072	0 / 16	--	--	32.7	-- / --	< 1
Dichloropropane, 1,3-	0.0052 - 0.0072	0 / 4	--	--	32.7	-- / --	< 1
Dichloropropane, 2,2-	0.0052 - 0.0072	0 / 4	--	--	32.7	-- / --	< 1
Dichloropropene, 1,1-	0.0052 - 0.0072	0 / 4	--	--	0.40	-- / --	< 1
Dichloropropene, 1,3-, cis-	0.0052 - 0.0072	0 / 16	--	--	0.40	-- / --	< 1
Ethylbenzene	0.0052 - 0.0072	0 / 16	--	--	5.16	-- / --	< 1
Ethylene dibromide	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Isopropylbenzene	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Isopropyltoluene, 4-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Methyl ethyl ketone	0.011 - 0.029	0 / 16	--	--	89.6	-- / --	< 1
Methyl isobutyl ketone	0.011 - 0.029	0 / 16	--	--	NSV	-- / --	NSV
Methyl n-butyl ketone	0.011 - 0.029	0 / 16	--	--	NSV	-- / --	NSV
Methyl tert-butyl ether	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Methylene bromide	0.0052 - 0.0072	0 / 4	--	--	65.0	-- / --	< 1
Propylbenzene, 1-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Styrene	0.0052 - 0.0072	0 / 16	--	--	4.69	-- / --	< 1
Tetrachloroethane, 1,1,1,2-	0.0052 - 0.0072	0 / 4	--	--	0.13	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0052 - 0.0072	0 / 16	--	--	0.13	-- / --	< 1
Tetrachloroethene	0.0052 - 0.0072	0 / 16	--	--	9.92	-- / --	< 1
Toluene	0.0052 - 0.0072	0 / 16	--	--	5.45	-- / --	< 1
Trichloroethane, 1,1,1-	0.0052 - 0.0072	0 / 16	--	--	29.8	-- / --	< 1
Trichloroethane, 1,1,2-	0.0052 - 0.0072	0 / 16	--	--	28.6	-- / --	< 1
Trichloroethene	0.0052 - 0.0072	0 / 16	--	--	12.4	-- / --	< 1
Trichloropropane, 1,2,3-	0.0052 - 0.0072	0 / 4	--	--	3.36	-- / --	< 1
Trimethylbenzene, 1,2,4-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Trimethylbenzene, 1,3,5-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Vinyl chloride	0.0052 - 0.014	0 / 16	--	--	0.65	-- / --	< 1
Xylene, 1,2-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Xylene, 1,3- and/or 1,4-	0.010 - 0.014	0 / 4	--	--	NSV	-- / --	NSV
Xylenes, total	0.0055 - 0.0070	0 / 12	--	--	10.0	-- / --	< 1
Vinyl chloride	0.0052 - 0.013	0 / 12	--	--	0.65	-- / --	< 1
Xylenes, total	0.0052 - 0.0061	0 / 12	--	--	10.0	-- / --	< 1

TABLE 7-17
Screening Statistics for Direct Exposures--AOC 2 Soil
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dioxin/Furans (MG/KG)							
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	4.80E-07 - 8.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,7,8,9-	3.30E-07 - 6.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	4.00E-07 - 6.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 1,2,3,7,8-	3.00E-07 - 5.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 2,3,4,7,8-	3.00E-07 - 5.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	5.00E-07 - 8.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Explosives (MG/KG)							
Amino-2,6-dinitrotoluene, 4-	0.0011 - 0.49	0 / 5	--	--	NSV	-- / --	NSV
Amino-4,6-dinitrotoluene, 2-	9.00E-04 - 0.49	0 / 5	--	--	NSV	-- / --	NSV
Aminodinitrotoluenes, total	0.45 - 0.50	0 / 8	--	--	NSV	-- / --	NSV
Dinitrobenzene, 1,3-	5.00E-04 - 0.25	0 / 13	--	--	NSV	-- / --	NSV
Dinitrotoluene, 2,4-	5.00E-04 - 0.25	0 / 16	--	--	1.28	-- / --	< 1
Dinitrotoluene, 2,6-	5.00E-04 - 0.49	0 / 16	--	--	0.033	-- / --	< 1
HMX	9.00E-04 - 2.20	0 / 13	--	--	NSV	-- / --	NSV
Nitrobenzene	6.00E-04 - 0.26	0 / 16	--	--	1.31	-- / --	< 1
Nitrotoluene, 2-	9.00E-04 - 1.00	0 / 13	--	--	NSV	-- / --	NSV
Nitrotoluene, 3-	9.00E-04 - 1.00	0 / 13	--	--	NSV	-- / --	NSV
Nitrotoluene, 4-	0.0011 - 3.00	0 / 13	--	--	NSV	-- / --	NSV
RDX	5.00E-04 - 1.10	0 / 13	--	--	NSV	-- / --	NSV
Tetryl	0.0019 - 0.75	0 / 13	--	--	NSV	-- / --	NSV
Trinitrobenzene, 1,3,5-	7.00E-04 - 0.25	0 / 13	--	--	4.30	-- / --	< 1
Trinitrotoluene, 2,4,6-	5.00E-04 - 0.25	0 / 13	--	--	NSV	-- / --	NSV
2,4,5-T	0.012 - 0.025	0 / 8	--	--	NSV	-- / --	NSV
2,4,5-TP	0.012 - 0.025	0 / 8	--	--	NSV	-- / --	NSV
2,4-D	0.024 - 0.050	0 / 8	--	--	0.027	-- / --	**1.8**

[1]Shaded cells indicate hazard quotient based on reporting limits
[2]Macronutrient: Not considered to be a COPC
NSV = No Screening Value
[3] - Result from Duplicate Sample: LCKSB-15 0-0.5

TABLE 7-18
Screening Statistics for Direct Exposures--West Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Detected Constituents							
Inorganics (MG/KG)							
Arsenic	-- - --	9 / 9	22.0	EEGLKB-SD02	9.79	8 / 9	**2.2**
Calcium [2]	-- - --	6 / 6	160,000	LCKSD-4	NSV	-- / --	NSV
Cobalt	-- - --	6 / 6	16.0	LCKSD-4	NSV	-- / --	NSV
Lead	-- - --	9 / 9	51.0	EEGLKB-SD04	35.8	1 / 9	**1.4**
Magnesium [2]	-- - --	6 / 6	44,000	LCKSD-4	NSV	-- / --	NSV
Sodium [2]	235 - 438	4 / 6	230	EEGLKB-SD03	NSV	-- / --	NSV
Pesticide/Polychlorinated Biphenyls (MG/KG)							
DDD, p,p'-	0.0038 - 0.011	6 / 9	0.077	EEGLKB-SD03	0.0049	6 / 9	**16**
DDE, p,p'-	0.0025 - 0.011	2 / 9	0.0091	EEGLKB-SD03	0.0032	2 / 9	**2.9**
DDT, p,p'-	0.0038 - 0.011	5 / 9	0.019	EEGLKB-SD03	0.0042	5 / 9	**4.6**
PCB 1260	0.019 - 0.073	1 / 9	0.023	EEGLKB-SD01	0.810	-- / --	NSV
Total PCBs		1 / 9	0.089	EEGLKB-SD01	0.0598	1 / 9	**1.5**
Semivolatile Organic Compounds (MG/KG)							
Acenaphthene	0.043 - 0.73	2 / 9	0.038	EEGLKB-SD02	0.0067	2 / 9	**5.7**
Anthracene	0.043 - 0.73	2 / 9	0.050	EEGLKB-SD02	0.057	0 / 9	< 1
Benz(a)anthracene	0.043 - 0.73	4 / 9	0.13	EEGLKB-SD02	0.11	1 / 9	**1.2**
Benzo(a)pyrene	0.043 - 0.73	4 / 9	0.17	LCK-SE1	0.15	1 / 9	**1.1**
Benzo(b)fluoranthene	0.043 - 0.39	5 / 9	0.47	LCKSD-4	10.4	0 / 9	< 1
Benzo(ghi)perylene	0.043 - 0.73	4 / 9	0.16	LCK-SE1	0.17	0 / 9	< 1
Benzo(k)fluoranthene	0.043 - 0.73	4 / 9	0.20	LCK-SE1	0.24	0 / 9	< 1
Bis(2-ethylhexyl) phthalate	0.22 - 0.73	4 / 9	0.15	EEGLKB-SD02	0.182	0 / 9	< 1
Chrysene	0.39 - 0.39	6 / 9	0.37	LCKSD-4	0.17	4 / 9	**2.2**
Dibenzofuran	0.079 - 0.73	1 / 9	0.020	EEGLKB-SD02 Dup04	0.45	0 / 9	< 1
Fluoranthene	0.39 - 0.39	7 / 9	0.71	LCKSD-4	0.42	3 / 9	**1.7**
Fluorene	0.039 - 0.73	2 / 9	0.050	LCK-SE1	0.077	0 / 9	< 1
Indeno(1,2,3-cd)pyrene	0.043 - 0.73	3 / 9	0.14	LCK-SE1	0.20	0 / 9	< 1
Methylnaphthalene, 2-	0.043 - 0.73	2 / 9	0.048	EEGLKB-SD03	0.020	2 / 9	**2.4**
Naphthalene	0.039 - 0.73	1 / 9	0.032	EEGLKB-SD02	0.18	0 / 9	< 1
Phenanthrene	0.043 - 0.73	3 / 9	0.21	EEGLKB-SD03	0.204	1 / 9	**1.03**
Pyrene	0.043 - 0.39	6 / 9	0.63	LCKSD-4	0.195	4 / 9	**3.2**
Total Low Molecular Weight PAHs	-- - --	3 9	2.56	LCKSD-4	0.076	3 / 9	**34**
Total High Molecualr Weight PAHs	-- - --	7 9	4.37	LCKSD-4	0.19	7 / 9	**23**
Total PAHs	-- - --	7 9	6.93	LCKSD-4	1.61	7 / 9	**4.3**

TABLE 7-18
Screening Statistics for Direct Exposures--West Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Volatile Organic Compounds (MG/KG)							
Acetone	0.0040 - 0.033	6 / 9	9.80	EEGLKB-SD02	0.0099	6 / 9	**990**
Chloroethane	0.0049 - 0.097	1 / 9	0.0048	EEGLKB-SD04	NSV	-- / --	NSV
Methyl ethyl ketone	0.011 - 0.097	1 / 9	0.036	LCKSD-4	0.042	0 / 9	< 1
Methylene chloride	0.0059 - 0.097	1 / 8	0.024	LCK-SE1-RE	0.16	0 / 8	< 1
Toluene	0.0049 - 0.024	3 / 9	0.0024	EEGLKB-SD04	1.22	0 / 9	< 1
Trichlorofluoromethane	0.0022 - 0.097	2 / 4	0.0038	EEGLKB-SD01	NSV	-- / --	NSV
Dioxin/Furans (MG/KG)							
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	1.70E-06 - 1.70E-06	1 / 2	1.00E-06	LCKSD-5	NSV	-- / --	NSV
Heptachlorodibenzofurans, total	1.70E-06 - 1.70E-06	1 / 2	2.00E-06	LCKSD-6	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	-- - --	2 / 2	2.10E-05	EEGLKB-SD01	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxins, total	-- - --	2 / 2	4.60E-05	EEGLKB-SD01	NSV	-- / --	NSV
Hexachlorodibenzofurans, total	1.50E-06 - 1.50E-06	1 / 2	9.20E-07	LCKSD-6	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxins, total	2.70E-06 - 2.70E-06	1 / 2	6.70E-06	LCKSD-5	NSV	-- / --	NSV
Octachlorodibenzofuran	2.80E-06 - 2.80E-06	1 / 2	1.50E-06	LCKSD-6	NSV	-- / --	NSV
Octachlorodibenzo-p-dioxin	-- - --	2 / 2	0.0013	EEGLKB-SD01	NSV	-- / --	NSV
Pentachlorodibenzofurans, total	1.50E-06 - 1.50E-06	1 / 2	1.20E-06	LCKSD-6	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxins, total	1.00E-06 - 1.00E-06	1 / 2	2.30E-06	LCKSD-5	NSV	-- / --	NSV
TCDD-TEQ	-- - --	2 / 2	4.06E-06	LCKSD-6	1.20E-07	2 / 2	**34**
Tetrachlorodibenzofurans, total	2.00E-07 - 2.00E-07	1 / 2	7.40E-07	EEGLKB-SD01	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	5.80E-07 - 5.80E-07	1 / 2	3.50E-06	LCKSD-6	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxins, total	-- - --	2 / 2	3.50E-06	LCKSD-6	NSV	-- / --	NSV
Non-Detected Constituents							
Inorganics (MG/KG)							
Antimony	5.40 - 265	0 / 6	--	--	NSV	-- / --	NSV
Silver	0.41 - 4.30	0 / 9	--	--	0.50	-- / --	**8.6**
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Aldrin	0.0019 - 0.011	0 / 9	--	--	0.0032	-- / --	**3.4**
Chlordane, alpha-	0.0019 - 0.011	0 / 7	--	--	0.0032	-- / --	**3.4**
Chlordane, gamma-	0.0019 - 0.011	0 / 7	--	--	0.0032	-- / --	**3.4**
Chlordane, technical-	0.039 - 0.073	0 / 2	--	--	NSV	-- / --	NSV
Dieldrin	0.0019 - 0.011	0 / 9	--	--	0.0019	-- / --	**5.8**
Endosulfan A	0.0019 - 0.011	0 / 9	--	--	0.0033	-- / --	**3.4**
Endosulfan B	0.0019 - 0.011	0 / 9	--	--	0.0019	-- / --	**5.7**
Endosulfan sulfate	0.0019 - 0.011	0 / 9	--	--	0.035	-- / --	< 1

TABLE 7-18
Screening Statistics for Direct Exposures--West Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Endrin	0.0019 - 0.011	0 / 9	--	--	0.0022	-- / --	**5.0**
Endrin aldehyde	0.0019 - 0.011	0 / 9	--	--	0.48	-- / --	< 1
Endrin ketone	0.0019 - 0.011	0 / 9	--	--	NSV	-- / --	NSV
Heptachlor	0.0019 - 0.011	0 / 9	--	--	6.00E-04	-- / --	**18**
Heptachlor epoxide	0.0019 - 0.011	0 / 9	--	--	0.0025	-- / --	**4.5**
Hexachlorocyclohexane, alpha-	0.0019 - 0.011	0 / 9	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, beta-	0.0019 - 0.011	0 / 9	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, delta-	0.0019 - 0.011	0 / 9	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane)	0.0019 - 0.011	0 / 9	--	--	NSV	-- / --	NSV
Methoxychlor	0.0095 - 0.054	0 / 9	--	--	0.014	-- / --	**4.0**
PCB 1016	0.019 - 0.073	0 / 9	--	--	0.120	-- / --	< 1
PCB 1221	0.019 - 0.15	0 / 9	--	--	0.120	-- / --	**1.3**
PCB 1232	0.019 - 0.073	0 / 9	--	--	0.600	-- / --	< 1
PCB 1242	0.019 - 0.073	0 / 9	--	--	0.170	-- / --	< 1
PCB 1248	0.019 - 0.073	0 / 9	--	--	1.000	-- / --	< 1
PCB 1254	0.019 - 0.073	0 / 9	--	--	0.810	-- / --	< 1
Toxaphene	0.019 - 0.36	0 / 9	--	--	7.70E-05	-- / --	**4,675**
Semivolatile Organic Compounds (MG/KG)							
Acenaphthylene	0.036 - 0.73	0 / 9	--	--	0.0059	-- / --	**124**
Benzidine	3.60 - 4.80	0 / 3	--	--	NSV	-- / --	NSV
Benzoic acid	0.74 - 0.97	0 / 3	--	--	NSV	-- / --	NSV
Benzyl alcohol	0.74 - 0.97	0 / 4	--	--	0.0010	-- / --	**933**
Bis(2-chloroethoxy) methane	0.074 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Bis(2-chloroethyl) ether	0.074 - 0.73	0 / 9	--	--	3.52	-- / --	< 1
Bis(2-chloroisopropyl) ether	0.39 - 0.40	0 / 3	--	--	NSV	-- / --	NSV
Bis(chloroisopropyl) ether	0.18 - 0.73	0 / 6	--	--	NSV	-- / --	NSV
Bromophenyl phenyl ether, 4-	0.18 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Butylbenzyl phthalate	0.074 - 0.73	0 / 9	--	--	1.97	-- / --	< 1
Carbazole	0.18 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.39 - 0.97	0 / 9	--	--	0.15	-- / --	**6.64**
Chloronaphthalene, 2-	0.18 - 0.73	0 / 9	--	--	0.42	-- / --	**1.75**
Chlorophenol, 2-	0.18 - 0.73	0 / 9	--	--	0.032	-- / --	**22.9**
Chlorophenyl phenyl ether, 4-	0.18 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Dibenz(ah)anthracene	0.036 - 0.73	0 / 9	--	--	0.033	-- / --	**22.1**
Dichlorobenzene, 1,2-	0.18 - 0.73	0 / 9	--	--	0.29	-- / --	**2.48**

TABLE 7-18
Screening Statistics for Direct Exposures--West Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dichlorobenzene, 1,3-	0.18 - 0.73	0 / 9	--	--	1.32	-- / --	< 1
Dichlorobenzene, 1,4-	0.18 - 0.73	0 / 9	--	--	0.32	-- / --	**2.30**
Dichlorobenzidine, 3,3'-	0.18 - 0.79	0 / 9	--	--	0.13	-- / --	**6.22**
Dichlorophenol, 2,4-	0.36 - 0.73	0 / 9	--	--	0.082	-- / --	**8.94**
Diethyl phthalate	0.074 - 0.73	0 / 9	--	--	0.30	-- / --	**2.47**
Dimethyl phthalate	0.074 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Dimethylphenol, 2,4-	0.36 - 0.73	0 / 9	--	--	0.30	-- / --	**2.40**
Di-n-butyl phthalate	0.065 - 0.73	0 / 9	--	--	1.11	-- / --	< 1
Dinitro-2-methylphenol, 4,6-	0.74 - 2.00	0 / 9	--	--	NSV	-- / --	NSV
Dinitrophenol, 2,4-	0.74 - 2.00	0 / 8	--	--	0.0062	-- / --	**322**
Di-n-octyl phthalate	0.36 - 0.73	0 / 9	--	--	40.6	-- / --	< 1
Hexachlorobenzene	0.036 - 0.73	0 / 9	--	--	0.020	-- / --	**36.5**
Hexachlorobutadiene	0.18 - 0.73	0 / 9	--	--	0.027	-- / --	**27.5**
Hexachlorocyclopentadiene	0.39 - 0.97	0 / 8	--	--	0.90	-- / --	**1.08**
Hexachloroethane	0.18 - 0.73	0 / 9	--	--	0.58	-- / --	**1.25**
Isophorone	0.18 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Methylphenol, 2-	0.074 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Methylphenol, 3- and/or 4-	0.074 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Methylphenol, 4-	0.39 - 0.73	0 / 5	--	--	NSV	-- / --	NSV
Methylphenol, 4-chloro-3-	0.36 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Nitroaniline, 2-	0.18 - 2.00	0 / 9	--	--	NSV	-- / --	NSV
Nitroaniline, 3-	0.74 - 2.00	0 / 9	--	--	NSV	-- / --	NSV
Nitroaniline, 4-	0.74 - 2.00	0 / 9	--	--	NSV	-- / --	NSV
Nitrophenol, 2-	0.36 - 0.73	0 / 9	--	--	0.013	-- / --	**56.2**
Nitrophenol, 4-	0.74 - 2.00	0 / 9	--	--	0.013	-- / --	**154**
Nitrosodi-N-propylamine, N-	0.036 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Nitrosodiphenylamine, N-	0.036 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Pentachlorophenol	0.36 - 2.00	0 / 9	--	--	NSV	-- / --	NSV
Phenol	0.18 - 0.73	0 / 9	--	--	NSV	-- / --	NSV
Trichlorobenzene, 1,2,3-	0.0049 - 0.097	0 / 4	--	--	5.06	-- / --	0.019
Trichlorobenzene, 1,2,4-	0.18 - 0.73	0 / 9	--	--	5.06	-- / --	0.14
Trichlorophenol, 2,4,5-	0.36 - 2.00	0 / 9	--	--	0.21	-- / --	**9.62**
Trichlorophenol, 2,4,6-	0.18 - 0.73	0 / 9	--	--	0.21	-- / --	**3.51**

TABLE 7-18
Screening Statistics for Direct Exposures--West Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Explosives (MG/KG)							
Amino-2,6-dinitrotoluene, 4-	0.50 - 1.10	0 / 4	--	--	NSV	-- / --	NSV
Amino-4,6-dinitrotoluene, 2-	0.50 - 0.90	0 / 4	--	--	NSV	-- / --	NSV
Aminodinitrotoluenes, total	0.46 - 0.49	0 / 3	--	--	NSV	-- / --	NSV
Dinitrobenzene, 1,3-	0.23 - 0.50	0 / 7	--	--	0.0086	-- / --	**58.1**
Dinitrotoluene, 2,4-	0.036 - 0.50	0 / 9	--	--	0.014	-- / --	**34.7**
Dinitrotoluene, 2,6-	0.036 - 0.50	0 / 9	--	--	0.040	-- / --	**12.6**
HMX	0.50 - 2.10	0 / 7	--	--	NSV	-- / --	NSV
Nitrobenzene	0.036 - 0.60	0 / 9	--	--	0.15	-- / --	**4.14**
Nitrotoluene, 2-	0.50 - 0.97	0 / 7	--	--	NSV	-- / --	NSV
Nitrotoluene, 3-	0.50 - 0.97	0 / 7	--	--	NSV	-- / --	NSV
Nitrotoluene, 4-	0.50 - 2.90	0 / 7	--	--	NSV	-- / --	NSV
RDX	0.25 - 1.00	0 / 7	--	--	NSV	-- / --	NSV
Tetryl	0.50 - 1.90	0 / 7	--	--	NSV	-- / --	NSV
Trinitrobenzene, 1,3,5-	0.23 - 0.70	0 / 7	--	--	NSV	-- / --	NSV
Trinitrotoluene, 2,4,6-	0.23 - 0.50	0 / 7	--	--	NSV	-- / --	NSV
2,4,5-T	0.012 - 0.024	0 / 3	--	--	NSV	-- / --	NSV
2,4,5-TP	0.012 - 0.024	0 / 3	--	--	NSV	-- / --	NSV
2,4-D	0.023 - 0.047	0 / 3	--	--	1.27	-- / --	< 1
Volatile Organic Compounds (MG/KG)							
Benzene	0.0049 - 0.024	0 / 9	--	--	0.14	-- / --	< 1
Bromobenzene	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Bromochloromethane	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Bromodichloromethane	0.0049 - 0.097	0 / 9	--	--	NSV	-- / --	NSV
Bromoform	0.0049 - 0.097	0 / 9	--	--	0.49	-- / --	< 1
Bromomethane	0.0059 - 0.097	0 / 9	--	--	NSV	-- / --	NSV
Butylbenzene, 1-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Butylbenzene, sec-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Butylbenzene, tert-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Carbon disulfide	0.0059 - 0.097	0 / 9	--	--	0.024	-- / --	**4.06**
Carbon tetrachloride	0.0049 - 0.097	0 / 9	--	--	1.45	-- / --	< 1
Chlorobenzene	0.0049 - 0.097	0 / 9	--	--	0.29	-- / --	< 1
Chloroform	0.0049 - 0.097	0 / 9	--	--	0.12	-- / --	< 1
Chloromethane	0.0049 - 0.097	0 / 9	--	--	NSV	-- / --	NSV
Chlorotoluene, 2-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV

TABLE 7-18
Screening Statistics for Direct Exposures--West Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Chlorotoluene, 4-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0049 - 0.097	0 / 9	--	--	NSV	-- / --	NSV
Dibromochloropropane	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Dichlorodifluoromethane	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Dichloroethane, 1,1-	0.0049 - 0.097	0 / 9	--	--	5.75E-04	-- / --	**169**
Dichloroethane, 1,2-	0.0049 - 0.097	0 / 9	--	--	0.26	-- / --	< 1
Dichloroethene, 1,1-	0.0049 - 0.097	0 / 9	--	--	0.019	-- / --	**5.00**
Dichloroethene, 1,2-, cis-	0.0049 - 0.097	0 / 4	--	--	0.65	-- / --	< 1
Dichloroethene, 1,2-, trans-	0.0049 - 0.097	0 / 4	--	--	0.65	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0059 - 0.011	0 / 5	--	--	NSV	-- / --	NSV
Dichloropropane, 1,2-	0.0049 - 0.097	0 / 9	--	--	0.33	-- / --	< 1
Dichloropropane, 1,3-	0.0049 - 0.097	0 / 4	--	--	0.33	-- / --	< 1
Dichloropropane, 2,2-	0.0049 - 0.097	0 / 4	--	--	0.33	-- / --	< 1
Dichloropropene, 1,1-	0.0049 - 0.097	0 / 4	--	--	0.33	-- / --	< 1
Dichloropropene, 1,3-, cis-	0.0049 - 0.097	0 / 9	--	--	0.33	-- / --	< 1
Dichloropropene, 1,3-, trans-	0.0049 - 0.097	0 / 9	--	--	0.33	-- / --	< 1
Ethylbenzene	0.0049 - 0.024	0 / 9	--	--	0.18	-- / --	< 1
Ethylene dibromide	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Isopropylbenzene	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Isopropyltoluene, 4-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Methyl isobutyl ketone	0.011 - 0.097	0 / 9	--	--	0.025	-- / --	**3.9**
Methyl n-butyl ketone	0.011 - 0.097	0 / 9	--	--	NSV	-- / --	NSV
Methyl tert-butyl ether	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Methylene bromide	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Propylbenzene, 1-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Styrene	0.0049 - 0.097	0 / 9	--	--	0.25	-- / --	< 1
Tetrachloroethane, 1,1,1,2-	0.0049 - 0.097	0 / 4	--	--	0.85	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0049 - 0.097	0 / 9	--	--	0.85	-- / --	< 1
Tetrachloroethene	0.0049 - 0.097	0 / 9	--	--	0.99	-- / --	< 1
Trichloroethane, 1,1,1-	0.0049 - 0.097	0 / 9	--	--	0.21	-- / --	< 1
Trichloroethane, 1,1,2-	0.0049 - 0.097	0 / 9	--	--	0.52	-- / --	< 1
Trichloroethene	0.0049 - 0.097	0 / 9	--	--	0.11	-- / --	< 1
Trichloropropane, 1,2,3-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Trimethylbenzene, 1,2,4-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV
Trimethylbenzene, 1,3,5-	0.0049 - 0.097	0 / 4	--	--	NSV	-- / --	NSV

TABLE 7-18

Screening Statistics for Direct Exposures--West Ditch Sediment

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Vinyl chloride	0.0049 - 0.097	0 / 9	--	--	0.20	-- / --	< 1
Xylene, 1,2-	0.0049 - 0.024	0 / 4	--	--	NSV	-- / --	NSV
Xylene, 1,3- and/or 1,4-	0.0099 - 0.048	0 / 4	--	--	NSV	-- / --	NSV
Xylenes, total	0.0059 - 0.011	0 / 5	--	--	0.43	-- / --	< 1
Dioxin/Furans (MG/KG)							
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	3.20E-07 - 4.00E-07	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,4,7,8-	3.00E-07 - 9.40E-07	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,6,7,8-	2.00E-07 - 4.90E-07	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,7,8,9-	3.00E-07 - 3.50E-07	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 2,3,4,6,7,8-	4.90E-07 - 6.30E-07	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	4.00E-07 - 6.00E-07	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	4.00E-07 - 1.00E-06	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	4.00E-07 - 1.50E-06	0 / 2	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 1,2,3,7,8-	3.00E-07 - 5.20E-07	0 / 2	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 2,3,4,7,8-	3.00E-07 - 5.10E-07	0 / 2	--	--	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	5.00E-07 - 7.70E-07	0 / 2	--	--	NSV	-- / --	NSV
Tetrachlorodibenzofuran, 2,3,7,8-	2.00E-07 - 4.50E-07	0 / 2	--	--	NSV	-- / --	NSV

[1]Shaded cells indicate hazard quotient based on reporting limits

[2]Macronutrient - Not considered to be a COPC

Note:

NSV = No Screening Value

TABLE 7-19
Screening Statistics for Direct Exposures--East Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient*
Detected Constituents							
Inorganics (MG/KG)							
Calcium [2]	-- - --	1 / 1	130,000	LCKSD-2	NSV	-- / --	NSV
Magnesium [2]	-- - --	1 / 1	46,000	LCKSD-2	NSV	-- / --	NSV
Semivolatile Organic Compounds (MG/KG)							
Fluoranthene	-- - --	1 / 1	0.23	LCKSD-2	0.42	0 / 1	< 1
Pyrene	-- - --	1 / 1	0.22	LCKSD-2	0.20	1 / 1	**1.1**
Total Low Molecular Weight PAHs [1]	-- - --	0 1	1.44	LCKSD-4	0.076	3 / 9	**19**
Total High Molecualr Weight PAHs	-- - --	1 1	2.09	LCKSD-4	0.19	7 / 9	**11**
Total PAHs	-- - --	1 1	3.53	LCKSD-4	1.61	7 / 9	**2.2**
Volatile Organic Compounds (MG/KG)							
Acetone	-- - --	1 / 1	0.028	LCKSD-2	0.0099	1 / 1	**2.8**
Carbon disulfide	-- - --	1 / 1	0.0059	LCKSD-2	0.024	0 / 1	< 1
Methyl ethyl ketone	-- - --	1 / 1	0.0096	LCKSD-2	0.042	0 / 1	< 1
Non-Detected Constituents							
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Aldrin	0.0020 - 0.0020	0 / 1	--	--	0.0032	-- / --	< 1
Chlordane, technical-	0.041 - 0.041	0 / 1	--	--	NSV	-- / --	NSV
DDD, p,p'-	0.0041 - 0.0041	0 / 1	--	--	0.0049	-- / --	< 1
DDE, p,p'-	0.0041 - 0.0041	0 / 1	--	--	0.0032	-- / --	**1.30**
DDT, p,p'-	0.0041 - 0.0041	0 / 1	--	--	0.0042	-- / --	< 1
Dieldrin	0.0041 - 0.0041	0 / 1	--	--	0.0019	-- / --	**2.16**
Endosulfan A	0.0020 - 0.0020	0 / 1	--	--	0.0033	-- / --	< 1
Endosulfan B	0.0041 - 0.0041	0 / 1	--	--	0.0019	-- / --	**2.11**
Endosulfan sulfate	0.0041 - 0.0041	0 / 1	--	--	0.035	-- / --	< 1
Endrin	0.0041 - 0.0041	0 / 1	--	--	0.0022	-- / --	**1.85**
Endrin aldehyde	0.0041 - 0.0041	0 / 1	--	--	0.48	-- / --	< 1
Endrin ketone	0.0041 - 0.0041	0 / 1	--	--	NSV	-- / --	NSV
Heptachlor	0.0020 - 0.0020	0 / 1	--	--	6.00E-04	-- / --	**3.33**
Heptachlor epoxide	0.0020 - 0.0020	0 / 1	--	--	0.0025	-- / --	< 1
Hexachlorocyclohexane, alpha-	0.0020 - 0.0020	0 / 1	--	--	NSV	-- / --	NSV

TABLE 7-19
Screening Statistics for Direct Exposures--East Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient*
Hexachlorocyclohexane, beta-	0.0020 - 0.0020	0 / 1	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, delta-	0.0020 - 0.0020	0 / 1	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane)	0.0020 - 0.0020	0 / 1	--	--	NSV	-- / --	NSV
Methoxychlor	0.021 - 0.021	0 / 1	--	--	0.014	-- / --	**1.54**
PCB 1016	0.041 - 0.041	0 / 1	--	--	0.120	-- / --	< 1
PCB 1221	0.082 - 0.082	0 / 1	--	--	0.120	-- / --	< 1
PCB 1232	0.041 - 0.041	0 / 1	--	--	0.600	-- / --	< 1
PCB 1242	0.041 - 0.041	0 / 1	--	--	0.170	-- / --	< 1
PCB 1248	0.041 - 0.041	0 / 1	--	--	1.000	-- / --	< 1
PCB 1254	0.041 - 0.041	0 / 1	--	--	0.810	-- / --	< 1
PCB 1260	0.041 - 0.041	0 / 1	--	--	0.810	-- / --	< 1
Toxaphene	0.21 - 0.21	0 / 1	--	--	7.70E-05	-- / --	**2,727**
Semivolatile Organic Compounds (MG/KG)							
Acenaphthene	0.41 - 0.41	0 / 1	--	--	0.0067	-- / --	**61.1**
Acenaphthylene	0.41 - 0.41	0 / 1	--	--	0.0059	-- / --	**69.8**
Anthracene	0.41 - 0.41	0 / 1	--	--	0.057	-- / --	**7.17**
Benz(a)anthracene	0.41 - 0.41	0 / 1	--	--	0.11	-- / --	**3.80**
Benzo(a)pyrene	0.41 - 0.41	0 / 1	--	--	0.15	-- / --	**2.73**
Benzo(b)fluoranthene	0.41 - 0.41	0 / 1	--	--	10.4	-- / --	< 1
Benzo(ghi)perylene	0.41 - 0.41	0 / 1	--	--	0.17	-- / --	**2.41**
Benzo(k)fluoranthene	0.41 - 0.41	0 / 1	--	--	0.24	-- / --	**1.71**
Bis(2-chloroethoxy) methane	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Bis(2-chloroethyl) ether	0.41 - 0.41	0 / 1	--	--	3.52	-- / --	< 1
Bis(2-ethylhexyl) phthalate	0.41 - 0.41	0 / 1	--	--	0.182	-- / --	< 1
Bis(chloroisopropyl) ether	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Bromophenyl phenyl ether, 4-	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Butylbenzyl phthalate	0.41 - 0.41	0 / 1	--	--	1.97	-- / --	< 1
Carbazole	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.41 - 0.41	0 / 1	--	--	0.15	-- / --	**2.81**
Chloronaphthalene, 2-	0.41 - 0.41	0 / 1	--	--	0.42	-- / --	< 1
Chlorophenol, 2-	0.41 - 0.41	0 / 1	--	--	0.032	-- / --	**13**
Chlorophenyl phenyl ether, 4-	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV

TABLE 7-19
Screening Statistics for Direct Exposures--East Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient*
Chrysene	0.41 - 0.41	0 / 1	--	--	0.17	-- / --	**2.47**
Dibenz(ah)anthracene	0.41 - 0.41	0 / 1	--	--	0.033	-- / --	**12**
Dibenzofuran	0.41 - 0.41	0 / 1	--	--	0.45	-- / --	< 1
Dichlorobenzene, 1,2-	0.41 - 0.41	0 / 1	--	--	0.29	-- / --	**1.4**
Dichlorobenzene, 1,3-	0.41 - 0.41	0 / 1	--	--	1.32	-- / --	< 1
Dichlorobenzene, 1,4-	0.41 - 0.41	0 / 1	--	--	0.32	-- / --	**1.3**
Dichlorobenzidine, 3,3'-	0.41 - 0.41	0 / 1	--	--	0.13	-- / --	**3.2**
Dichlorophenol, 2,4-	0.41 - 0.41	0 / 1	--	--	0.082	-- / --	**5.0**
Diethyl phthalate	0.41 - 0.41	0 / 1	--	--	0.30	-- / --	**1.4**
Dimethyl phthalate	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Dimethylphenol, 2,4-	0.41 - 0.41	0 / 1	--	--	0.30	-- / --	**1.3**
Di-n-butyl phthalate	0.41 - 0.41	0 / 1	--	--	1.11	-- / --	< 1
Dinitro-2-methylphenol, 4,6-	1.00 - 1.00	0 / 1	--	--	NSV	-- / --	NSV
Dinitrophenol, 2,4-	1.00 - 1.00	0 / 1	--	--	0.0062	-- / --	**161**
Di-n-octyl phthalate	0.41 - 0.41	0 / 1	--	--	40.6	-- / --	< 1
Fluorene	0.41 - 0.41	0 / 1	--	--	0.077	-- / --	**5**
Hexachlorobenzene	0.41 - 0.41	0 / 1	--	--	0.020	-- / --	**21**
Hexachlorobutadiene	0.41 - 0.41	0 / 1	--	--	0.027	-- / --	**15**
Hexachlorocyclopentadiene	0.41 - 0.41	0 / 1	--	--	0.90	-- / --	< 1
Hexachloroethane	0.41 - 0.41	0 / 1	--	--	0.58	-- / --	< 1
Indeno(1,2,3-cd)pyrene	0.41 - 0.41	0 / 1	--	--	0.20	-- / --	**2.1**
Isophorone	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Methylnaphthalene, 2-	0.41 - 0.41	0 / 1	--	--	0.020	-- / --	**20**
Methylphenol, 2-	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Methylphenol, 4-	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Methylphenol, 4-chloro-3-	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Naphthalene	0.41 - 0.41	0 / 1	--	--	0.18	-- / --	**2.3**
Nitroaniline, 2-	1.00 - 1.00	0 / 1	--	--	NSV	-- / --	NSV
Nitroaniline, 3-	1.00 - 1.00	0 / 1	--	--	NSV	-- / --	NSV
Nitroaniline, 4-	1.00 - 1.00	0 / 1	--	--	NSV	-- / --	NSV
Nitrophenol, 2-	0.41 - 0.41	0 / 1	--	--	0.013	-- / --	**32**
Nitrophenol, 4-	1.00 - 1.00	0 / 1	--	--	0.013	-- / --	**77**

TABLE 7-19
Screening Statistics for Direct Exposures--East Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient*
Nitrosodi-N-propylamine, N-	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Nitrosodiphenylamine, N-	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Pentachlorophenol	1.00 - 1.00	0 / 1	--	--	NSV	-- / --	NSV
Phenanthrene	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Phenol	0.41 - 0.41	0 / 1	--	--	NSV	-- / --	NSV
Trichlorobenzene, 1,2,4-	0.41 - 0.41	0 / 1	--	--	5.06	-- / --	< 1
Trichlorophenol, 2,4,5-	1.00 - 1.00	0 / 1	--	--	0.21	-- / --	**4.8**
Trichlorophenol, 2,4,6-	0.41 - 0.41	0 / 1	--	--	0.21	-- / --	**2.0**
Explosives (MG/KG)							
Amino-2,6-dinitrotoluene, 4-	1.10 - 1.10	0 / 1	--	--	NSV	-- / --	NSV
Amino-4,6-dinitrotoluene, 2-	0.90 - 0.90	0 / 1	--	--	NSV	-- / --	NSV
Dinitrobenzene, 1,3-	0.50 - 0.50	0 / 1	--	--	0.0086	-- / --	**58**
Dinitrotoluene, 2,4-	0.50 - 0.50	0 / 1	--	--	0.014	-- / --	**35**
Dinitrotoluene, 2,6-	0.50 - 0.50	0 / 1	--	--	0.040	-- / --	**13**
HMX	0.90 - 0.90	0 / 1	--	--	NSV	-- / --	NSV
Nitrobenzene	0.60 - 0.60	0 / 1	--	--	0.15	-- / --	**4.1**
Nitrotoluene, 2-	0.90 - 0.90	0 / 1	--	--	NSV	-- / --	NSV
Nitrotoluene, 3-	0.90 - 0.90	0 / 1	--	--	NSV	-- / --	NSV
Nitrotoluene, 4-	1.10 - 1.10	0 / 1	--	--	NSV	-- / --	NSV
RDX	0.50 - 0.50	0 / 1	--	--	NSV	-- / --	NSV
Tetryl	1.90 - 1.90	0 / 1	--	--	NSV	-- / --	NSV
Trinitrobenzene, 1,3,5-	0.70 - 0.70	0 / 1	--	--	NSV	-- / --	NSV
Trinitrotoluene, 2,4,6-	0.50 - 0.50	0 / 1	--	--	NSV	-- / --	NSV
Volatile Organic Compounds (MG/KG)							
Benzene	0.0062 - 0.0062	0 / 1	--	--	0.14	-- / --	< 1
Bromodichloromethane	0.0062 - 0.0062	0 / 1	--	--	NSV	-- / --	NSV
Bromoform	0.0062 - 0.0062	0 / 1	--	--	0.49	-- / --	< 1
Bromomethane	0.0062 - 0.0062	0 / 1	--	--	NSV	-- / --	NSV
Carbon tetrachloride	0.0062 - 0.0062	0 / 1	--	--	1.45	-- / --	< 1
Chlorobenzene	0.0062 - 0.0062	0 / 1	--	--	0.29	-- / --	< 1
Chloroethane	0.0062 - 0.0062	0 / 1	--	--	NSV	-- / --	NSV
Chloroform	0.0062 - 0.0062	0 / 1	--	--	0.12	-- / --	< 1

TABLE 7-19
Screening Statistics for Direct Exposures--East Ditch Sediment
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient*
Chloromethane	0.0062 - 0.0062	0 / 1	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0062 - 0.0062	0 / 1	--	--	NSV	-- / --	NSV
Dichloroethane, 1,1-	0.0062 - 0.0062	0 / 1	--	--	5.75E-04	-- / --	**11**
Dichloroethane, 1,2-	0.0062 - 0.0062	0 / 1	--	--	0.26	-- / --	< 1
Dichloroethene, 1,1-	0.0062 - 0.0062	0 / 1	--	--	0.019	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0062 - 0.0062	0 / 1	--	--	NSV	-- / --	NSV
Dichloropropane, 1,2-	0.0062 - 0.0062	0 / 1	--	--	0.33	-- / --	< 1
Dichloropropene, 1,3-, cis-	0.0062 - 0.0062	0 / 1	--	--	0.33	-- / --	< 1
Dichloropropene, 1,3-, trans-	0.0062 - 0.0062	0 / 1	--	--	0.33	-- / --	< 1
Ethylbenzene	0.0062 - 0.0062	0 / 1	--	--	0.18	-- / --	< 1
Methyl isobutyl ketone	0.012 - 0.012	0 / 1	--	--	0.025	-- / --	< 1
Methyl n-butyl ketone	0.012 - 0.012	0 / 1	--	--	NSV	-- / --	NSV
Methylene chloride	0.0062 - 0.0062	0 / 1	--	--	0.16	-- / --	< 1
Styrene	0.0062 - 0.0062	0 / 1	--	--	0.25	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0062 - 0.0062	0 / 1	--	--	0.85	-- / --	< 1
Tetrachloroethene	0.0062 - 0.0062	0 / 1	--	--	0.99	-- / --	< 1
Toluene	0.0062 - 0.0062	0 / 1	--	--	1.22	-- / --	< 1
Trichloroethane, 1,1,1-	0.0062 - 0.0062	0 / 1	--	--	0.21	-- / --	< 1
Trichloroethane, 1,1,2-	0.0062 - 0.0062	0 / 1	--	--	0.52	-- / --	< 1
Trichloroethene	0.0062 - 0.0062	0 / 1	--	--	0.11	-- / --	< 1
Vinyl chloride	0.0062 - 0.0062	0 / 1	--	--	0.20	-- / --	< 1
Xylenes, total	0.0062 - 0.0062	0 / 1	--	--	0.43	-- / --	< 1
Xylenes, total	0.0062 - 0.0062	0 / 1	--	--	0.43	-- / --	0.014

Shaded cells indicate hazard quotient based on reporting limits
Note:
NSV = No Screening Value

TABLE 7-20
Screening Statistics for Direct Exposures-- West Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Detected Constituents							
Inorganics (MG/L)							
Aluminum	0.10 - 0.10	4 / 5	0.18	LCKSW-7	NSV	-- / --	NSV
Arsenic	0.0018 - 0.020	1 / 8	0.0050	LCK-SW1	0.34	0 / 8	< 1
Barium	-- - --	8 / 8	0.081	EEGLKB-SW03	2.00	0 / 8	< 1
Calcium [2]	-- - --	5 / 5	98.0	LCKSW-7	NSV	-- / --	NSV
Copper	0.020 - 0.020	3 / 5	0.0036	EEGLKB-SW01	0.014	0 / 5	< 1
Iron	0.35 - 0.35	4 / 5	0.78	LCKSW-7	NSV	-- / --	NSV
Lead	0.0050 - 0.0075	3 / 8	0.052	LCK-SW1	0.12	0 / 8	< 1
Magnesium [2]	-- - --	5 / 5	32.0	LCKSW-7	NSV	-- / --	NSV
Manganese	-- - --	5 / 5	0.063	EEGLKB-SW03	NSV	-- / --	NSV
Potassium [2]	-- - --	5 / 5	11.0	LCKSW-7	NSV	-- / --	NSV
Selenium	0.0012 - 0.015	2 / 8	0.0015	LCK-SW1	0.0050	0 / 8	< 1
Sodium [2]	-- - --	5 / 5	9.30	EEGLKB-SW03	NSV	-- / --	NSV
Thallium	0.025 - 0.025	2 / 5	0.0070	LCKSW-7	0.079	0 / 5	< 1
Zinc	0.020 - 0.020	6 / 8	0.092	LCK-SW1	0.12	0 / 8	< 1
Dissolved Metals (MG/L)							
Manganese	-- - --	2 / 2	0.050	LCKSW-4	NSV	-- / --	NSV
Potassium [2]	-- - --	2 / 2	7.70	LCKSW-4	NSV	-- / --	NSV
Sodium [2]	-- - --	2 / 2	7.10	LCKSW-7	NSV	-- / --	NSV
Thallium	-- - --	2 / 2	0.0060	LCKSW-5	7.90E-02	-- / --	< 1
Semivolatile Organic Compounds (MG/L)							
Benzoic acid	0.020 - 0.020	1 / 2	0.020	EEGLKB-SW02	NSV	-- / --	NSV
Bis(2-ethylhexyl) phthalate	0.0051 - 0.010	1 / 8	0.028	EEGLKB-SW02 Dup04	1.10	0 / 8	< 1
Diethyl phthalate	0.0020 - 0.010	1 / 8	0.0040	LCK-SW1	9.80	0 / 8	< 1
Di-n-butyl phthalate	0.0051 - 0.010	1 / 8	0.0020	LCK-SW1	0.0097	0 / 8	< 1
Volatile Organic Compounds (MG/L)							
Methylene chloride	0.0010 - 0.0070	1 / 5	0.022	LCK-SW1	11.0	0 / 5	< 1

TABLE 7-20
Screening Statistics for Direct Exposures-- West Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dioxin/Furans (MG/L)							
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	1.60E-09 - 1.60E-09	1 / 2	3.80E-09	LCKSW-6	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxins, total	1.60E-09 - 1.60E-09	1 / 2	3.80E-09	LCKSW-6	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,4,7,8-	7.80E-10 - 7.80E-10	1 / 2	3.10E-09	LCKSW-6	NSV	-- / --	NSV
Hexachlorodibenzofuran, 2,3,4,6,7,8-	8.10E-10 - 8.10E-10	1 / 2	4.50E-09	LCKSW-6	NSV	-- / --	NSV
Hexachlorodibenzofurans, total	1.00E-09 - 1.00E-09	1 / 2	4.50E-09	LCKSW-6	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxins, total	1.00E-09 - 1.00E-09	1 / 2	1.03E-08	LCKSW-5	NSV	-- / --	NSV
Octachlorodibenzo-p-dioxin	5.90E-09 - 5.90E-09	1 / 2	5.02E-08	LCKSW-6	NSV	-- / --	NSV
TCDD-TEQ	-- - --	2 / 2	5.44E-09	LCKSW-5	3.00E-12	2 / 2	**1,814**
Non-Detected Constituents							
Inorganics (MG/L)							
Antimony	0.050 - 0.060	0 / 5	--	--	0.90	-- / --	< 1
Beryllium	0.0040 - 0.0050	0 / 5	--	--	0.093	-- / --	< 1
Cadmium	0.0020 - 0.0050	0 / 8	--	--	0.0045	-- / --	< 1
Chromium, total	0.0042 - 0.010	0 / 8	--	--	1.80	-- / --	< 1
Cobalt	0.010 - 0.010	0 / 5	--	--	0.22	-- / --	< 1
Mercury	1.00E-04 - 2.00E-04	0 / 8	--	--	0.0017	-- / --	< 1
Nickel	0.010 - 0.040	0 / 5	--	--	0.47	-- / --	< 1
Silver	0.0035 - 0.010	0 / 8	--	--	0.0016	-- / --	**6.3**
Vanadium	0.010 - 0.010	0 / 5	--	--	0.15	-- / --	< 1
Dissolved Metals (MG/L)							
Aluminum	0.10 - 0.10	0 / 2	--	--	NSV	-- / --	NSV
Antimony	0.060 - 0.060	0 / 2	--	--	9.00E-01	-- / --	< 1
Arsenic	0.0050 - 0.0050	0 / 2	--	--	3.40E-01	-- / --	< 1
Beryllium	0.0050 - 0.0050	0 / 2	--	--	9.30E-02	-- / --	< 1
Cadmium	0.0050 - 0.0050	0 / 2	--	--	4.30E-03	-- / --	**1.163**
Cobalt	0.010 - 0.010	0 / 2	--	--	2.20E-01	-- / --	< 1
Copper	0.020 - 0.020	0 / 2	--	--	1.30E-02	-- / --	**1.538**
Iron	0.10 - 0.10	0 / 2	--	--	NSV	-- / --	NSV
Lead	0.0050 - 0.0050	0 / 2	--	--	9.70E-02	-- / --	< 1
Mercury	2.00E-04 - 2.00E-04	0 / 2	--	--	1.40E-03	-- / --	< 1
Nickel	0.040 - 0.040	0 / 2	--	--	4.70E-01	-- / --	< 1
Selenium	0.0050 - 0.0050	0 / 2	--	--	4.60E-03	-- / --	**1.087**

TABLE 7-20
Screening Statistics for Direct Exposures-- West Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Silver	0.010 - 0.010	0 / 2	--	--	1.40E-03	-- / --	**7.143**
Vanadium	0.010 - 0.010	0 / 2	--	--	1.50E-01	-- / --	< 1
Zinc	0.020 - 0.020	0 / 2	--	--	1.20E-01	-- / --	< 1
Pesticide/Polychlorinated Biphenyls (MG/L)							
Aldrin	4.90E-05 - 5.10E-05	0 / 8	--	--	1.70E-05	-- / --	**3.0**
Chlordane, alpha-	4.90E-05 - 5.10E-05	0 / 6	--	--	4.30E-05	-- / --	**1.2**
Chlordane, gamma-	4.90E-05 - 5.10E-05	0 / 6	--	--	4.30E-05	-- / --	**1.2**
Chlordane, technical-	0.0010 - 0.0010	0 / 2	--	--	NSV	-- / --	NSV
DDD, p,p'-	4.90E-05 - 1.00E-04	0 / 8	--	--	NSV	-- / --	NSV
DDE, p,p'-	4.90E-05 - 1.00E-04	0 / 8	--	--	4.51E-12	-- / --	**22,172,949**
DDT, p,p'-	4.90E-05 - 1.00E-04	0 / 8	--	--	1.10E-08	-- / --	**9,091**
Dieldrin	4.90E-05 - 1.00E-04	0 / 8	--	--	2.40E-04	-- / --	< 1
Endosulfan A	4.90E-05 - 5.10E-05	0 / 8	--	--	5.60E-05	-- / --	< 1
Endosulfan B	4.90E-05 - 1.00E-04	0 / 8	--	--	5.60E-05	-- / --	**1.8**
Endosulfan sulfate	4.90E-05 - 1.00E-04	0 / 8	--	--	0.0022	-- / --	< 1
Endrin	4.90E-05 - 1.00E-04	0 / 8	--	--	8.60E-05	-- / --	**1.2**
Endrin aldehyde	4.90E-05 - 1.00E-04	0 / 8	--	--	1.50E-04	-- / --	< 1
Endrin ketone	4.90E-05 - 1.00E-04	0 / 8	--	--	NSV	-- / --	NSV
Heptachlor	4.90E-05 - 5.10E-05	0 / 8	--	--	3.80E-06	-- / --	**13**
Heptachlor epoxide	4.90E-05 - 5.10E-05	0 / 8	--	--	3.80E-06	-- / --	**13**
Hexachlorocyclohexane, alpha-	4.90E-05 - 5.10E-05	0 / 8	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, beta-	4.90E-05 - 5.10E-05	0 / 8	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, delta-	4.90E-05 - 5.10E-05	0 / 8	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane)	4.90E-05 - 5.10E-05	0 / 8	--	--	9.50E-04	-- / --	< 1
Methoxychlor	2.40E-04 - 5.00E-04	0 / 8	--	--	NSV	-- / --	NSV
PCB 1016	4.90E-04 - 0.0010	0 / 8	--	--	1.2E-07	-- / --	**8333**
PCB 1221	4.90E-04 - 0.0020	0 / 8	--	--	1.2E-07	-- / --	**16667**
PCB 1232	4.90E-04 - 0.0010	0 / 8	--	--	1.2E-07	-- / --	**8333**
PCB 1242	4.90E-04 - 0.0010	0 / 8	--	--	1.2E-07	-- / --	**8333**
PCB 1248	4.90E-04 - 0.0010	0 / 8	--	--	1.2E-07	-- / --	**8333**
PCB 1254	4.90E-04 - 0.0010	0 / 8	--	--	1.2E-07	-- / --	**8333**
PCB 1260	4.90E-04 - 0.0010	0 / 8	--	--	1.2E-07	-- / --	**8333**
Toxaphene	4.90E-04 - 0.0050	0 / 8	--	--	1.40E-07	-- / --	**35714**

TABLE 7-20
Screening Statistics for Direct Exposures-- West Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Semivolatile Organic Compounds (MG/L)							
Acenaphthene	0.0010 - 0.010	0 / 8	--	--	0.019	-- / --	< 1
Acenaphthylene	0.0010 - 0.010	0 / 8	--	--	4.84	-- / --	< 1
Anthracene	0.0010 - 0.010	0 / 8	--	--	1.80E-04	-- / --	**56**
Benz(a)anthracene	2.00E-04 - 0.010	0 / 8	--	--	2.50E-05	-- / --	**400**
Benzidine	0.10 - 0.10	0 / 2	--	--	NSV	-- / --	NSV
Benzo(a)pyrene	2.00E-04 - 0.010	0 / 8	--	--	1.40E-05	-- / --	**714**
Benzo(b)fluoranthene	2.00E-04 - 0.010	0 / 8	--	--	0.0091	-- / --	**1.1**
Benzo(ghi)perylene	0.0010 - 0.010	0 / 8	--	--	0.0076	-- / --	**1.3**
Benzo(k)fluoranthene	2.00E-04 - 0.010	0 / 8	--	--	NSV	-- / --	NSV
Benzyl alcohol	0.020 - 0.022	0 / 3	--	--	0.0086	-- / --	**2.6**
Bis(2-chloroethoxy) methane	0.0020 - 0.010	0 / 8	--	--	NSV	-- / --	NSV
Bis(2-chloroethyl) ether	0.0020 - 0.010	0 / 8	--	--	19.0	-- / --	< 1
Bis(2-chloroisopropyl) ether	0.010 - 0.010	0 / 3	--	--	3.00E-04	-- / --	**33**
Bis(chloroisopropyl) ether	0.0020 - 0.010	0 / 5	--	--	NSV	-- / --	NSV
Bromophenyl phenyl ether, 4-	0.0051 - 0.010	0 / 8	--	--	NSV	-- / --	NSV
Butylbenzyl phthalate	0.0020 - 0.010	0 / 8	--	--	0.023	-- / --	< 1
Carbazole	0.0051 - 0.010	0 / 7	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.010 - 0.011	0 / 8	--	--	0.23	-- / --	< 1
Chloronaphthalene, 2-	0.0020 - 0.010	0 / 8	--	--	3.96E-04	-- / --	**25**
Chlorophenol, 2-	0.0051 - 0.010	0 / 8	--	--	0.29	-- / --	< 1
Chlorophenyl phenyl ether, 4-	0.0051 - 0.010	0 / 8	--	--	NSV	-- / --	NSV
Chrysene	5.10E-04 - 0.010	0 / 8	--	--	NSV	-- / --	NSV
Dibenz(ah)anthracene	2.00E-04 - 0.010	0 / 8	--	--	NSV	-- / --	NSV
Dibenzofuran	0.0020 - 0.010	0 / 8	--	--	0.036	-- / --	< 1
Dichlorobenzene, 1,2-	0.0020 - 0.010	0 / 8	--	--	0.13	-- / --	< 1
Dichlorobenzene, 1,3-	0.0020 - 0.010	0 / 8	--	--	0.079	-- / --	< 1
Dichlorobenzene, 1,4-	0.0020 - 0.010	0 / 8	--	--	0.057	-- / --	< 1
Dichlorobenzidine, 3,3'-	0.0051 - 0.020	0 / 8	--	--	NSV	-- / --	NSV
Dichlorophenol, 2,4-	0.010 - 0.011	0 / 8	--	--	0.11	-- / --	< 1
Dimethyl phthalate	0.0020 - 0.010	0 / 8	--	--	3.20	-- / --	< 1
Dimethylphenol, 2,4-	0.010 - 0.011	0 / 8	--	--	0.14	-- / --	< 1
Dinitro-2-methylphenol, 4,6-	0.020 - 0.050	0 / 7	--	--	NSV	-- / --	NSV

TABLE 7-20
Screening Statistics for Direct Exposures-- West Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dinitrophenol, 2,4-	0.020 - 0.050	0 / 7	--	--	0.019	-- / --	**2.6**
Di-n-octyl phthalate	0.010 - 0.011	0 / 8	--	--	0.030	-- / --	< 1
Fluoranthene	0.0010 - 0.010	0 / 8	--	--	0.0037	-- / --	**2.7**
Fluorene	0.0010 - 0.010	0 / 8	--	--	0.11	-- / --	< 1
Hexachlorobenzene	5.10E-04 - 0.010	0 / 8	--	--	3.00E-07	-- / --	**33,333**
Hexachlorobutadiene	0.0051 - 0.010	0 / 8	--	--	5.30E-05	-- / --	**189**
Hexachlorocyclopentadiene	0.010 - 0.020	0 / 7	--	--	0.077	-- / --	< 1
Hexachloroethane	0.0051 - 0.010	0 / 8	--	--	0.0080	-- / --	**1.3**
Indeno(1,2,3-cd)pyrene	2.00E-04 - 0.010	0 / 8	--	--	0.0043	-- / --	**2.3**
Isophorone	0.0020 - 0.010	0 / 8	--	--	0.92	-- / --	< 1
Methylnaphthalene, 2-	5.10E-04 - 0.010	0 / 8	--	--	0.33	-- / --	< 1
Methylphenol, 2-	0.0020 - 0.010	0 / 8	--	--	0.60	-- / --	< 1
Methylphenol, 3- and/or 4-	0.0020 - 0.0022	0 / 3	--	--	0.56	-- / --	< 1
Methylphenol, 4-	0.010 - 0.010	0 / 5	--	--	0.48	-- / --	< 1
Methylphenol, 4-chloro-3-	0.010 - 0.011	0 / 8	--	--	NSV	-- / --	NSV
Naphthalene	0.0010 - 0.010	0 / 8	--	--	0.17	-- / --	< 1
Nitroaniline, 2-	0.0051 - 0.050	0 / 8	--	--	NSV	-- / --	NSV
Nitroaniline, 3-	0.010 - 0.050	0 / 8	--	--	NSV	-- / --	NSV
Nitroaniline, 4-	0.010 - 0.050	0 / 7	--	--	NSV	-- / --	NSV
Nitrophenol, 2-	0.010 - 0.011	0 / 8	--	--	0.65	-- / --	< 1
Nitrophenol, 4-	0.020 - 0.050	0 / 8	--	--	0.65	-- / --	< 1
Nitrosodi-N-propylamine, N-	5.10E-04 - 0.010	0 / 8	--	--	NSV	-- / --	NSV
Nitrosodiphenylamine, N-	0.0010 - 0.010	0 / 8	--	--	0.77	-- / --	< 1
Pentachlorophenol	0.010 - 0.050	0 / 8	--	--	0.0040	-- / --	**13**
Phenanthrene	0.0010 - 0.010	0 / 8	--	--	0.031	-- / --	< 1
Phenol	0.0051 - 0.010	0 / 8	--	--	4.70	-- / --	< 1
Pyrene	0.0010 - 0.010	0 / 8	--	--	0.042	-- / --	< 1
Trichlorobenzene, 1,2,4-	0.0020 - 0.010	0 / 8	--	--	0.030	-- / --	< 1
Trichlorophenol, 2,4,5-	0.010 - 0.050	0 / 8	--	--	0.039	-- / --	**1.3**
Trichlorophenol, 2,4,6-	0.0051 - 0.010	0 / 8	--	--	0.039	-- / --	< 1

TABLE 7-20
Screening Statistics for Direct Exposures-- West Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Explosives (MG/L)							
Amino-2,6-dinitrotoluene, 4-	6.00E-04 - 7.80E-04	0 / 3	--	--	0.098	-- / --	< 1
Amino-4,6-dinitrotoluene, 2-	5.00E-04 - 7.80E-04	0 / 3	--	--	0.16	-- / --	< 1
Aminodinitrotoluenes, total	3.90E-04 - 3.90E-04	0 / 3	--	--	NSV	-- / --	NSV
Dinitrobenzene, 1,3-	2.00E-04 - 3.90E-04	0 / 6	--	--	0.10	-- / --	< 1
Dinitrotoluene, 2,4-	2.00E-04 - 0.0011	0 / 8	--	--	0.39	-- / --	< 1
Dinitrotoluene, 2,6-	2.00E-04 - 7.80E-04	0 / 8	--	--	0.73	-- / --	< 1
HMX	4.00E-04 - 0.0017	0 / 6	--	--	1.20	-- / --	< 1
Nitrobenzene	2.00E-04 - 0.0011	0 / 8	--	--	2.00	-- / --	< 1
Nitrotoluene, 2-	6.00E-04 - 7.80E-04	0 / 6	--	--	0.64	-- / --	< 1
Nitrotoluene, 3-	4.00E-04 - 7.80E-04	0 / 6	--	--	0.38	-- / --	< 1
Nitrotoluene, 4-	4.00E-04 - 0.0023	0 / 6	--	--	0.41	-- / --	< 1
RDX	3.90E-04 - 8.70E-04	0 / 6	--	--	0.52	-- / --	< 1
Tetryl	4.00E-04 - 7.80E-04	0 / 6	--	--	NSV	-- / --	NSV
Trinitrobenzene, 1,3,5-	2.00E-04 - 5.00E-04	0 / 6	--	--	NSV	-- / --	NSV
Trinitrotoluene, 2,4,6-	2.00E-04 - 7.00E-04	0 / 6	--	--	NSV	-- / --	NSV
2,4,5-T	5.00E-04 - 5.10E-04	0 / 3	--	--	NSV	-- / --	NSV
2,4,5-TP	5.00E-04 - 5.10E-04	0 / 3	--	--	NSV	-- / --	NSV
2,4-D	0.0010 - 0.0010	0 / 3	--	--	NSV	-- / --	NSV
Volatile Organic Compounds (MG/L)							
Acetone	0.0090 - 0.010	0 / 5	--	--	1.70	-- / --	< 1
Benzene	0.0010 - 0.0050	0 / 5	--	--	0.70	-- / --	< 1
Bromodichloromethane	0.0010 - 0.0050	0 / 5	--	--	NSV	-- / --	NSV
Bromoform	0.0010 - 0.0050	0 / 5	--	--	1.10	-- / --	< 1
Bromomethane	0.0010 - 0.010	0 / 5	--	--	0.038	-- / --	< 1
Carbon disulfide	0.0010 - 0.0050	0 / 5	--	--	0.13	-- / --	< 1
Carbon tetrachloride	0.0010 - 0.0050	0 / 5	--	--	2.20	-- / --	< 1
Chlorobenzene	0.0010 - 0.0050	0 / 5	--	--	0.42	-- / --	< 1
Chloroethane	0.0020 - 0.010	0 / 5	--	--	NSV	-- / --	NSV
Chloroform	0.0010 - 0.0050	0 / 5	--	--	1.30	-- / --	< 1
Chloromethane	0.0020 - 0.010	0 / 5	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0010 - 0.0050	0 / 5	--	--	NSV	-- / --	NSV
Dichloroethane, 1,1-	0.0010 - 0.0050	0 / 5	--	--	0.047	-- / --	< 1

TABLE 7-20
Screening Statistics for Direct Exposures-- West Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dichloroethane, 1,2-	0.0010 - 0.0050	0 / 5	--	--	9.60	-- / --	< 1
Dichloroethene, 1,1-	0.0010 - 0.0050	0 / 5	--	--	1.90	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0010 - 0.0050	0 / 5	--	--	8.80	-- / --	< 1
Dichloropropane, 1,2-	0.0010 - 0.0050	0 / 5	--	--	3.30	-- / --	< 1
Dichloropropene, 1,3-, cis-	0.0010 - 0.0050	0 / 5	--	--	0.015	-- / --	< 1
Dichloropropene, 1,3-, trans-	0.0010 - 0.0050	0 / 5	--	--	0.015	-- / --	< 1
Ethylbenzene	0.0010 - 0.0050	0 / 5	--	--	0.55	-- / --	< 1
Methyl ethyl ketone	0.010 - 0.010	0 / 5	--	--	200	-- / --	< 1
Methyl isobutyl ketone	0.010 - 0.010	0 / 5	--	--	NSV	-- / --	NSV
Methyl n-butyl ketone	0.010 - 0.010	0 / 5	--	--	NSV	-- / --	NSV
Styrene	0.0010 - 0.0050	0 / 5	--	--	0.032	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0010 - 0.0050	0 / 5	--	--	0.91	-- / --	< 1
Tetrachloroethene	0.0010 - 0.0050	0 / 5	--	--	0.43	-- / --	< 1
Toluene	0.0010 - 0.0050	0 / 5	--	--	0.56	-- / --	< 1
Trichloroethane, 1,1,1-	0.0010 - 0.0050	0 / 5	--	--	0.69	-- / --	< 1
Trichloroethane, 1,1,2-	0.0010 - 0.0050	0 / 5	--	--	3.30	-- / --	< 1
Trichloroethene	0.0010 - 0.0050	0 / 5	--	--	2.00	-- / --	< 1
Vinyl chloride	0.0010 - 0.010	0 / 5	--	--	8.40	-- / --	< 1
Xylenes, total	0.0010 - 0.0050	0 / 5	--	--	0.24	-- / --	< 1
Dioxin/Furans (MG/L)							
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	1.40E-09 - 2.30E-09	0 / 2	--	--	NSV	-- / --	NSV
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	9.90E-10 - 3.10E-09	0 / 2	--	--	NSV	-- / --	NSV
Heptachlorodibenzofurans, total	1.40E-09 - 2.70E-09	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,6,7,8-	4.80E-10 - 1.30E-09	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,7,8,9-	1.00E-09 - 1.90E-09	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	9.60E-10 - 2.90E-09	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	7.60E-10 - 2.40E-09	0 / 2	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	1.00E-09 - 2.50E-09	0 / 2	--	--	NSV	-- / --	NSV
Octachlorodibenzofuran	2.10E-09 - 4.60E-09	0 / 2	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 1,2,3,7,8-	4.60E-10 - 1.60E-09	0 / 2	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 2,3,4,7,8-	6.80E-10 - 1.50E-09	0 / 2	--	--	NSV	-- / --	NSV
Pentachlorodibenzofurans, total	6.80E-10 - 1.60E-09	0 / 2	--	--	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	7.40E-10 - 2.30E-09	0 / 2	--	--	NSV	-- / --	NSV

TABLE 7-20

Screening Statistics for Direct Exposures-- West Ditch Surface Water

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Pentachlorodibenzo-p-dioxins, total	7.40E-10 - 2.30E-09	0 / 2	--	--	NSV	-- / --	NSV
Tetrachlorodibenzofuran, 2,3,7,8-	3.80E-10 - 7.00E-09	0 / 2	--	--	NSV	-- / --	NSV
Tetrachlorodibenzofurans, total	3.80E-10 - 7.00E-09	0 / 2	--	--	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	3.80E-10 - 1.60E-09	0 / 2	--	--	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxins, total	3.80E-10 - 1.60E-09	0 / 2	--	--	NSV	-- / --	NSV

[1]Shaded cells indicate hazard quotient based on reporting limits

[2]Macronutrient - Not considered to be a COPC

Note:

NSV - No Screening Value

TABLE 7-21
Screening Statistics-- East Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Detected Constituents							
Inorganics (MG/L)							
Barium	-- - --	1 / 1	0.080	LCKSW-2	2.00	0 / 1	< 1
Calcium [2]	-- - --	1 / 1	110	LCKSW-2	NSV	-- / --	NSV
Magnesium [2]	-- - --	1 / 1	34.0	LCKSW-2	NSV	-- / --	NSV
Potassium [2]	-- - --	1 / 1	5.40	LCKSW-2	NSV	-- / --	NSV
Thallium	-- - --	1 / 1	0.0070	LCKSW-2	0.079	0 / 1	< 1
Dissolved Metals (MG/L)							
Arsenic	-- - --	1 / 1	0.023	LCKSW-2	0.34	-- / --	< 1
Calcium [2]	-- - --	1 / 1	110	LCKSW-2	NSV	-- / --	NSV
Magnesium [2]	-- - --	1 / 1	34.0	LCKSW-2	NSV	-- / --	NSV
Thallium	-- - --	1 / 1	0.0080	LCKSW-2	0.079	-- / --	< 1
Non-Detected Constituents							
Inorganics (MG/L)							
Aluminum	0.10 - 0.10	0 / 1	--	--	NSV	-- / --	NSV
Antimony	0.060 - 0.060	0 / 1	--	--	0.90	-- / --	< 1
Arsenic	0.0050 - 0.0050	0 / 1	--	--	0.34	-- / --	< 1
Beryllium	0.0050 - 0.0050	0 / 1	--	--	0.093	-- / --	< 1
Cadmium	0.0050 - 0.0050	0 / 1	--	--	0.0045	-- / --	**1.1**
Chromium, total	0.010 - 0.010	0 / 1	--	--	1.80	-- / --	< 1
Cobalt	0.010 - 0.010	0 / 1	--	--	0.22	-- / --	< 1
Copper	0.020 - 0.020	0 / 1	--	--	0.014	-- / --	**1.4**
Lead	0.0050 - 0.0050	0 / 1	--	--	0.12	-- / --	< 1
Mercury	2.00E-04 - 2.00E-04	0 / 1	--	--	0.0017	-- / --	< 1
Nickel	0.040 - 0.040	0 / 1	--	--	0.47	-- / --	< 1
Selenium	0.0050 - 0.0050	0 / 1	--	--	0.0050	-- / --	< 1
Silver	0.010 - 0.010	0 / 1	--	--	0.0016	-- / --	**6.3**
Vanadium	0.010 - 0.010	0 / 1	--	--	0.15	-- / --	< 1
Zinc	0.020 - 0.020	0 / 1	--	--	0.12	-- / --	< 1

TABLE 7-21
Screening Statistics-- East Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dissolved Metals (MG/L)							
Aluminum	0.10 - 0.10	0 / 1	--	--	NSV	-- / --	NSV
Antimony	0.060 - 0.060	0 / 1	--	--	9.00E-01	-- / --	< 1
Beryllium	0.0050 - 0.0050	0 / 1	--	--	9.30E-02	-- / --	< 1
Cadmium	0.0050 - 0.0050	0 / 1	--	--	4.30E-03	-- / --	**1.2**
Chromium	0.010 - 0.010	0 / 1	--	--	5.70E-01	-- / --	< 1
Cobalt	0.010 - 0.010	0 / 1	--	--	2.20E-01	-- / --	< 1
Copper	0.020 - 0.020	0 / 1	--	--	1.30E-02	-- / --	**1.5**
Iron	0.10 - 0.10	0 / 1	--	--	NSV	-- / --	NSV
Lead	0.0050 - 0.0050	0 / 1	--	--	9.70E-02	-- / --	< 1
Mercury	2.00E-04 - 2.00E-04	0 / 1	--	--	1.40E-03	-- / --	< 1
Nickel	0.040 - 0.040	0 / 1	--	--	4.70E-01	-- / --	< 1
Potassium [2]	5.00 - 5.00	0 / 1	--	--	NSV	-- / --	NSV
Selenium	0.0050 - 0.0050	0 / 1	--	--	4.60E-03	-- / --	**1.1**
Silver	0.010 - 0.010	0 / 1	--	--	1.40E-03	-- / --	**7.1**
Vanadium	0.010 - 0.010	0 / 1	--	--	1.50E-01	-- / --	< 1
Zinc	0.020 - 0.020	0 / 1	--	--	1.20E-01	-- / --	< 1
Pesticide/Polychlorinated Biphenyls (MG/L)							
Aldrin	5.00E-05 - 5.00E-05	0 / 1	--	--	1.70E-05	-- / --	**2.9**
Chlordane, technical-	0.0010 - 0.0010	0 / 1	--	--	NSV	-- / --	NSV
DDD, p,p'-	1.00E-04 - 1.00E-04	0 / 1	--	--	NSV	-- / --	NSV
DDE, p,p'-	1.00E-04 - 1.00E-04	0 / 1	--	--	4.51E-12	-- / --	**22,172,949**
DDT, p,p'-	1.00E-04 - 1.00E-04	0 / 1	--	--	1.10E-08	-- / --	**9,091**
Dieldrin	1.00E-04 - 1.00E-04	0 / 1	--	--	2.40E-04	-- / --	< 1
Endosulfan A	5.00E-05 - 5.00E-05	0 / 1	--	--	5.60E-05	-- / --	< 1
Endosulfan B	1.00E-04 - 1.00E-04	0 / 1	--	--	5.60E-05	-- / --	**1.8**
Endosulfan sulfate	1.00E-04 - 1.00E-04	0 / 1	--	--	0.0022	-- / --	< 1
Endrin	1.00E-04 - 1.00E-04	0 / 1	--	--	8.60E-05	-- / --	**1.2**
Endrin aldehyde	1.00E-04 - 1.00E-04	0 / 1	--	--	1.50E-04	-- / --	< 1
Endrin ketone	1.00E-04 - 1.00E-04	0 / 1	--	--	NSV	-- / --	NSV
Heptachlor	5.00E-05 - 5.00E-05	0 / 1	--	--	3.80E-06	-- / --	**13**
Heptachlor epoxide	5.00E-05 - 5.00E-05	0 / 1	--	--	3.80E-06	-- / --	**13**
Hexachlorocyclohexane, alpha-	5.00E-05 - 5.00E-05	0 / 1	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, beta-	5.00E-05 - 5.00E-05	0 / 1	--	--	NSV	-- / --	NSV

TABLE 7-21
Screening Statistics-- East Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Hexachlorocyclohexane, delta-	5.00E-05 - 5.00E-05	0 / 1	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane)	5.00E-05 - 5.00E-05	0 / 1	--	--	9.50E-04	-- / --	< 1
Methoxychlor	5.00E-04 - 5.00E-04	0 / 1	--	--	NSV	-- / --	NSV
PCB 1016	0.0010 - 0.0010	0 / 1	--	--	0.00000012	-- / --	**8333**
PCB 1221	0.0020 - 0.0020	0 / 1	--	--	0.00000012	-- / --	**16667**
PCB 1232	0.0010 - 0.0010	0 / 1	--	--	0.00000012	-- / --	**8333**
PCB 1242	0.0010 - 0.0010	0 / 1	--	--	0.00000012	-- / --	**8333**
PCB 1248	0.0010 - 0.0010	0 / 1	--	--	0.00000012	-- / --	**8333**
PCB 1254	0.0010 - 0.0010	0 / 1	--	--	0.00000012	-- / --	**8333**
PCB 1260	0.0010 - 0.0010	0 / 1	--	--	0.00000012	-- / --	**8333**
Toxaphene	0.0050 - 0.0050	0 / 1	--	--	1.40E-07	-- / --	**35714**
Semivolatile Organic Compounds (MG/L)							
Acenaphthene	0.010 - 0.010	0 / 1	--	--	0.019	-- / --	< 1
Acenaphthylene	0.010 - 0.010	0 / 1	--	--	4.84	-- / --	< 1
Anthracene	0.010 - 0.010	0 / 1	--	--	1.80E-04	-- / --	**56**
Benz(a)anthracene	0.010 - 0.010	0 / 1	--	--	2.50E-05	-- / --	**400**
Benzo(a)pyrene	0.010 - 0.010	0 / 1	--	--	1.40E-05	-- / --	**714**
Benzo(b)fluoranthene	0.010 - 0.010	0 / 1	--	--	0.0091	-- / --	**1.1**
Benzo(ghi)perylene	0.010 - 0.010	0 / 1	--	--	0.0076	-- / --	**1.3**
Benzo(k)fluoranthene	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Bis(2-chloroethoxy) methane	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Bis(2-chloroethyl) ether	0.010 - 0.010	0 / 1	--	--	19.0	-- / --	< 1
Bis(2-ethylhexyl) phthalate	0.010 - 0.010	0 / 1	--	--	1.10	-- / --	< 1
Bis(chloroisopropyl) ether	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Bromophenyl phenyl ether, 4-	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Butylbenzyl phthalate	0.010 - 0.010	0 / 1	--	--	0.023	-- / --	< 1
Carbazole	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.010 - 0.010	0 / 1	--	--	0.23	-- / --	< 1
Chloronaphthalene, 2-	0.010 - 0.010	0 / 1	--	--	3.96E-04	-- / --	**25**
Chlorophenol, 2-	0.010 - 0.010	0 / 1	--	--	0.29	-- / --	< 1
Chlorophenyl phenyl ether, 4-	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Chrysene	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Dibenz(ah)anthracene	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Dibenzofuran	0.010 - 0.010	0 / 1	--	--	0.036	-- / --	< 1

TABLE 7-21
Screening Statistics-- East Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dichlorobenzene, 1,2-	0.010 - 0.010	0 / 1	--	--	0.13	-- / --	< 1
Dichlorobenzene, 1,3-	0.010 - 0.010	0 / 1	--	--	0.079	-- / --	< 1
Dichlorobenzene, 1,4-	0.010 - 0.010	0 / 1	--	--	0.057	-- / --	< 1
Dichlorobenzidine, 3,3'-	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Dichlorophenol, 2,4-	0.010 - 0.010	0 / 1	--	--	0.11	-- / --	< 1
Diethyl phthalate	0.010 - 0.010	0 / 1	--	--	9.80	-- / --	< 1
Dimethyl phthalate	0.010 - 0.010	0 / 1	--	--	3.20	-- / --	< 1
Dimethylphenol, 2,4-	0.010 - 0.010	0 / 1	--	--	0.14	-- / --	< 1
Di-n-butyl phthalate	0.010 - 0.010	0 / 1	--	--	0.0097	-- / --	**1.03**
Dinitro-2-methylphenol, 4,6-	0.025 - 0.025	0 / 1	--	--	NSV	-- / --	NSV
Dinitrophenol, 2,4-	0.025 - 0.025	0 / 1	--	--	0.019	-- / --	**1.3**
Di-n-octyl phthalate	0.010 - 0.010	0 / 1	--	--	0.030	-- / --	< 1
Fluoranthene	0.010 - 0.010	0 / 1	--	--	0.0037	-- / --	**2.7**
Fluorene	0.010 - 0.010	0 / 1	--	--	0.11	-- / --	< 1
Hexachlorobenzene	0.010 - 0.010	0 / 1	--	--	3.00E-07	-- / --	**33,333**
Hexachlorobutadiene	0.010 - 0.010	0 / 1	--	--	5.30E-05	-- / --	**189**
Hexachlorocyclopentadiene	0.010 - 0.010	0 / 1	--	--	0.077	-- / --	< 1
Hexachloroethane	0.010 - 0.010	0 / 1	--	--	0.0080	-- / --	**1.3**
Indeno(1,2,3-cd)pyrene	0.010 - 0.010	0 / 1	--	--	0.0043	-- / --	**2.3**
Isophorone	0.010 - 0.010	0 / 1	--	--	0.92	-- / --	< 1
Methylnaphthalene, 2-	0.010 - 0.010	0 / 1	--	--	0.33	-- / --	< 1
Methylphenol, 2-	0.010 - 0.010	0 / 1	--	--	0.60	-- / --	< 1
Methylphenol, 4-	0.010 - 0.010	0 / 1	--	--	0.48	-- / --	< 1
Methylphenol, 4-chloro-3-	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Naphthalene	0.010 - 0.010	0 / 1	--	--	0.17	-- / --	< 1
Nitroaniline, 2-	0.025 - 0.025	0 / 1	--	--	NSV	-- / --	NSV
Nitroaniline, 3-	0.025 - 0.025	0 / 1	--	--	NSV	-- / --	NSV
Nitroaniline, 4-	0.025 - 0.025	0 / 1	--	--	NSV	-- / --	NSV
Nitrophenol, 2-	0.010 - 0.010	0 / 1	--	--	0.65	-- / --	< 1
Nitrophenol, 4-	0.025 - 0.025	0 / 1	--	--	0.65	-- / --	< 1
Nitrosodi-N-propylamine, N-	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Nitrosodiphenylamine, N-	0.010 - 0.010	0 / 1	--	--	0.77	-- / --	< 1
Pentachlorophenol	0.025 - 0.025	0 / 1	--	--	0.0040	-- / --	**6.3**
Phenanthrene	0.010 - 0.010	0 / 1	--	--	0.031	-- / --	< 1

TABLE 7-21
Screening Statistics-- East Ditch Surface Water
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Phenol	0.010 - 0.010	0 / 1	--	--	4.70	-- / --	< 1
Pyrene	0.010 - 0.010	0 / 1	--	--	0.042	-- / --	< 1
Trichlorobenzene, 1,2,4-	0.010 - 0.010	0 / 1	--	--	0.030	-- / --	< 1
Trichlorophenol, 2,4,5-	0.025 - 0.025	0 / 1	--	--	0.039	-- / --	< 1
Trichlorophenol, 2,4,6-	0.010 - 0.010	0 / 1	--	--	0.039	-- / --	< 1
Volatile Organic Compounds (MG/L)							
Acetone	0.010 - 0.010	0 / 1	--	--	1.70	-- / --	< 1
Benzene	0.0010 - 0.0010	0 / 1	--	--	0.70	-- / --	< 1
Bromodichloromethane	0.0010 - 0.0010	0 / 1	--	--	NSV	-- / --	NSV
Bromoform	0.0010 - 0.0010	0 / 1	--	--	1.10	-- / --	< 1
Bromomethane	0.0010 - 0.0010	0 / 1	--	--	0.038	-- / --	< 1
Carbon disulfide	0.0010 - 0.0010	0 / 1	--	--	0.13	-- / --	< 1
Carbon tetrachloride	0.0010 - 0.0010	0 / 1	--	--	2.20	-- / --	< 1
Chlorobenzene	0.0010 - 0.0010	0 / 1	--	--	0.42	-- / --	< 1
Chloroethane	0.0020 - 0.0020	0 / 1	--	--	NSV	-- / --	NSV
Chloroform	0.0010 - 0.0010	0 / 1	--	--	1.30	-- / --	< 1
Chloromethane	0.0020 - 0.0020	0 / 1	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0010 - 0.0010	0 / 1	--	--	NSV	-- / --	NSV
Dichloroethane, 1,1-	0.0010 - 0.0010	0 / 1	--	--	0.047	-- / --	< 1
Dichloroethane, 1,2-	0.0010 - 0.0010	0 / 1	--	--	9.60	-- / --	< 1
Dichloroethene, 1,1-	0.0010 - 0.0010	0 / 1	--	--	1.90	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0010 - 0.0010	0 / 1	--	--	8.80	-- / --	< 1
Dichloropropane, 1,2-	0.0010 - 0.0010	0 / 1	--	--	3.30	-- / --	< 1
Dichloropropene, 1,3-, cis-	0.0010 - 0.0010	0 / 1	--	--	0.015	-- / --	< 1
Dichloropropene, 1,3-, trans-	0.0010 - 0.0010	0 / 1	--	--	0.015	-- / --	< 1
Ethylbenzene	0.0010 - 0.0010	0 / 1	--	--	0.55	-- / --	< 1
Methyl ethyl ketone	0.010 - 0.010	0 / 1	--	--	200	-- / --	< 1
Methyl isobutyl ketone	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Methyl n-butyl ketone	0.010 - 0.010	0 / 1	--	--	NSV	-- / --	NSV
Methylene chloride	0.0010 - 0.0010	0 / 1	--	--	11.0	-- / --	< 1
Styrene	0.0010 - 0.0010	0 / 1	--	--	0.032	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0010 - 0.0010	0 / 1	--	--	0.91	-- / --	< 1
Tetrachloroethene	0.0010 - 0.0010	0 / 1	--	--	0.43	-- / --	< 1
Toluene	0.0010 - 0.0010	0 / 1	--	--	0.56	-- / --	< 1

TABLE 7-21

Screening Statistics-- East Ditch Surface Water

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Trichloroethane, 1,1,1-	0.0010 - 0.0010	0 / 1	--	--	0.69	-- / --	< 1
Trichloroethane, 1,1,2-	0.0010 - 0.0010	0 / 1	--	--	3.30	-- / --	< 1
Trichloroethene	0.0010 - 0.0010	0 / 1	--	--	2.00	-- / --	< 1
Vinyl chloride	0.0010 - 0.0010	0 / 1	--	--	8.40	-- / --	< 1
Xylenes, total	0.0010 - 0.0010	0 / 1	--	--	0.24	-- / --	< 1
Dioxin/Furans (MG/L)							
Amino-2,6-dinitrotoluene, 4-	6.00E-04 - 6.00E-04	0 / 1	--	--	0.098	-- / --	< 1
Amino-4,6-dinitrotoluene, 2-	5.00E-04 - 5.00E-04	0 / 1	--	--	0.16	-- / --	< 1
Dinitrobenzene, 1,3-	2.00E-04 - 2.00E-04	0 / 1	--	--	0.10	-- / --	< 1
Dinitrotoluene, 2,4-	5.00E-04 - 5.00E-04	0 / 1	--	--	0.39	-- / --	< 1
Dinitrotoluene, 2,6-	5.00E-04 - 5.00E-04	0 / 1	--	--	0.73	-- / --	< 1
HMX	4.00E-04 - 4.00E-04	0 / 1	--	--	1.20	-- / --	< 1
Nitrobenzene	6.00E-04 - 6.00E-04	0 / 1	--	--	2.00	-- / --	< 1
Nitrotoluene, 2-	6.00E-04 - 6.00E-04	0 / 1	--	--	0.64	-- / --	< 1
Nitrotoluene, 3-	4.00E-04 - 4.00E-04	0 / 1	--	--	0.38	-- / --	< 1
Nitrotoluene, 4-	4.00E-04 - 4.00E-04	0 / 1	--	--	0.41	-- / --	< 1
RDX	6.00E-04 - 6.00E-04	0 / 1	--	--	0.52	-- / --	< 1
Tetryl	4.00E-04 - 4.00E-04	0 / 1	--	--	NSV	-- / --	NSV
Trinitrobenzene, 1,3,5-	5.00E-04 - 5.00E-04	0 / 1	--	--	NSV	-- / --	NSV
Trinitrotoluene, 2,4,6-	7.00E-04 - 7.00E-04	0 / 1	--	--	NSV	-- / --	NSV

[1]Shaded cells indicate hazard quotient based on reporting limits

[2]Macronutrient - Not considered to be a COPC

Note:

NSV = No Screening Value

TABLE 7-22

Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2

Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Detected Constituents							
Aluminum	-- - --	32 / 32	26,000	LCKSO-6 2-3	NSV	32 / 32	NSV
Antimony	5.20 - 66.0	2 / 32	1.40	EEGLKB-SS10	0.27	2 / 32	**5.2**
Barium	-- - --	48 / 48	490	EEGLKB-SS01	2,000	0 / 48	< 1
Beryllium	0.51 - 6.00	22 / 32	3.32	LCKSO-7 2-3	21.0	0 / 32	< 1
Cadmium	0.42 - 6.00	20 / 48	6.30	LCK-SO9B	0.36	16 / 48	**18**
Cobalt	11.0 - 11.0	31 / 32	12.0	LCKSO-1 2-3	120	0 / 32	< 1
Copper	21.0 - 23.0	29 / 32	140	LCKSO-8 0-1	28.0	7 / 32	**5.00**
Chromium, total	-- - --	16 / 16	22.0	LCKSB-15 0-0.5	26.0	0 / 16	< 1
Lead	-- - --	48 / 48	9,340	LCKSO-8 0-1	11.0	42 / 48	**849**
Mercury	2.00E-05 - 0.33	22 / 48	0.79	LCK-SO6B	0.10	6 / 48	**7.9**
Selenium	0.14 - 11.0	19 / 48	3.50	EEGLKB-SS02	0.63	13 / 48	**5.6**
Silver	0.42 - 11.0	4 / 48	190	EEGLKB-SS14	4.20	1 / 48	**45**
Thallium	0.51 - 18.0	17 / 32	2.80	EEGLKB-SS02	0.057	17 / 32	**49**
Zinc	-- - --	48 / 48	1,650	LCK-SO6B	46.0	39 / 48	**36**
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Chlordane, alpha-	0.0019 - 0.22	2 / 36	0.16	EEGLKB-SS12	0.22	0 / 36	< 1
Chlordane, gamma-	0.0019 - 0.22	3 / 36	0.44	EEGLKB-SS05	0.22	2 / 36	**2.0**
DDD, p,p'-	0.0020 - 0.22	6 / 40	0.36	EEGLKB-SS11	0.76	0 / 40	< 1
DDE, p,p'-	0.0020 - 0.22	8 / 40	0.20	EEGLKB-SS11	0.60	0 / 40	< 1
DDT, p,p'-	0.0020 - 0.22	11 / 40	0.42	EEGLKB-SS11	0.0035	11 / 40	**120**
PCB 1242	0.019 - 2.00	2 / 40	0.23	EEGLKB-SS05	0.000332	2 / 40	**693**
PCB 1248	0.019 - 0.77	1 / 40	16.0	EEGLKB-SS10	0.000332	1 / 40	**48,193**
PCB 1254	0.019 - 2.00	5 / 40	0.81	LCK-SODUP2	0.000332	5 / 40	**2440**
PCB 1260	0.019 - 2.00	3 / 40	0.26	EEGLKB-SS18	0.000332	1 / 40	**783**
Total PCBs	-- - --	5 / 40	22	EEGLKB-SS10	0.000332	5 / 40	**66265**

TABLE 7-22
Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Semivolatile Organic Compounds (MG/KG)							
Acenaphthene	0.038 - 8.10	19 / 41	85.0	EEGLKB-SS06	682	0 / 41	< 1
Acenaphthylene	0.038 - 8.10	9 / 41	1.90	EEGLKB-SS08	682	0 / 41	< 1
Anthracene	0.039 - 3.50	27 / 41	160	EEGLKB-SS05	1,480	0 / 41	< 1
Benz(a)anthracene	0.039 - 3.50	33 / 41	450	EEGLKB-SS05	5.21	9 / 41	**86**
Benzo(a)pyrene	0.039 - 3.50	32 / 41	380	EEGLKB-SS05	1.52	15 / 41	**250**
Benzo(b)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	59.8	6 / 41	**5.7**
Benzo(ghi)perylene	0.039 - 3.50	31 / 41	110	EEGLKB-SS05	119	0 / 41	< 1
Benzo(k)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	148	5 / 41	**2.3**
Benzoic acid	0.77 - 19.0	3 / 20	4.80	EEGLKB-SS02	NSV	-- / --	NSV
Bis(2-ethylhexyl) phthalate	0.19 - 4.70	8 / 41	16.0	LCKSB-12 0-0.5	0.93	3 / 41	**17**
Butylbenzyl phthalate	0.074 - 8.10	1 / 41	0.73	LCK-SO6B	NSV	-- / --	NSV
Carbazole	0.19 - 4.00	17 / 41	88.0	EEGLKB-SS06	NSV	-- / --	NSV
Chrysene	0.35 - 3.50	35 / 41	470	EEGLKB-SS05	4.73	10 / 41	**99**
Dibenz(ah)anthracene	0.038 - 3.50	22 / 41	71.0	EEGLKB-SS05	18.4	4 / 41	**3.9**
Dibenzofuran	0.077 - 8.10	16 / 41	42.0	EEGLKB-SS06	NSV	-- / --	NSV
Diethyl phthalate	0.074 - 8.10	1 / 41	1.30	LCK-SO6B	24.8	0 / 41	< 1
Di-n-butyl phthalate	0.040 - 8.10	1 / 41	2.60	LCK-SO6B	0.15	1 / 41	**17**
Di-n-octyl phthalate	0.35 - 9.20	1 / 41	15.0	LCKSB-12 0-0.5	NSV	-- / --	NSV
Fluoranthene	0.35 - 3.50	35 / 41	1,100	EEGLKB-SS05	122	5 / 41	**9.0**
Fluorene	0.038 - 8.10	17 / 41	67.0	EEGLKB-SS06	122	0 / 41	< 1
Indeno(1,2,3-cd)pyrene	0.039 - 3.50	30 / 41	130	EEGLKB-SS05	109	2 / 41	**1.2**
Methylnaphthalene, 2-	0.039 - 8.10	13 / 41	14.0	EEGLKB-SS06	3.24	6 / 41	**4.3**
Methylphenol, 3- and/or 4-	0.074 - 1.90	2 / 20	0.25	EEGLKB-SS05	NSV	-- / --	NSV
Naphthalene	0.039 - 8.10	11 / 41	13.0	EEGLKB-SS06	0.099	9 / 41	**131**
Phenanthrene	0.039 - 0.44	34 / 41	600	EEGLKB-SS06	45.7	6 / 41	**13**
Phenol	0.19 - 8.10	3 / 41	0.88	LCK-SO1A	1,200	0 / 41	< 1
Pyrene	0.040 - 3.50	33 / 41	870	EEGLKB-SS05	45.7	6 / 41	**19**
Total Low Molecular Weight PAHs	- - -	34 / 41	910	EEGLKB-SS06	100	5 / 41	**9.1**
Total High Molecular Weight PAHs	- - -	35 / 41	4,261	EEGLKB-SS05	1.1	14 / 41	**3874**

TABLE 7-22
Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Explosives (MG/KG)							
Trichlorobenzene, 1,2,4-	0.19 - 8.10	1 / 41	2.10	LCK-SO6B	11.1	0 / 41	< 1
Trinitrobenzene, 1,3,5-	7.00E-04 - 2.50	1 / 23	1.60	EEGLKB-SS02	4.30	0 / 23	< 1
Trinitrotoluene, 2,4,6-	5.00E-04 - 0.25	2 / 23	5.30	EEGLKB-SS08 Dup02	NSV	-- / --	NSV
Volatile Organic Compounds (MG/KG)							
Acetone	0.0090 - 0.029	20 / 41	34.0	EEGLKB-SS18	2.50	5 / 41	**14**
Ethylbenzene	0.0050 - 0.0083	1 / 40	0.026	LCK-SO6B-RE	5.16	0 / 40	< 1
Methylene chloride	0.0030 - 0.037	1 / 41	0.16	LCK-SO6B-RE	4.05	0 / 41	< 1
Toluene	0.0015 - 0.0083	10 / 40	0.014	LCK-SO6B-RE	5.45	0 / 40	< 1
Trichlorofluoromethane	0.0047 - 0.0083	14 / 20	0.0082	EEGLKB-SS03	16.4	0 / 20	< 1
Xylenes, total	0.0052 - 0.0070	1 / 20	0.033	LCK-SO6B-RE	10.0	0 / 20	< 1
Dioxin/Furans (MG/KG)							
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	5.00E-07 - 2.10E-06	13 / 15	3.17E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	7.00E-07 - 3.90E-06	4 / 15	1.52E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzofurans, total	6.00E-07 - 2.30E-06	13 / 15	0.0014	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	-- - --	15 / 15	0.0012	LCKSO-7 2-3	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxins, total	-- - --	15 / 15	0.0021	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,4,7,8-	4.00E-07 - 2.60E-06	6 / 12	5.00E-06	LCKSO-8 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,6,7,8-	4.00E-07 - 1.00E-06	7 / 15	7.70E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,7,8,9-	1.20E-07 - 2.00E-06	2 / 15	2.50E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzofuran, 2,3,4,6,7,8-	3.00E-07 - 2.30E-06	4 / 11	2.90E-06	LCKSB-12 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzofurans, total	5.40E-07 - 1.50E-05	12 / 15	3.19E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	2.80E-07 - 2.90E-06	6 / 15	3.60E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	4.00E-07 - 7.70E-06	9 / 15	1.18E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	6.00E-07 - 5.10E-06	4 / 9	8.00E-06	LCKSB-13 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxins, total	2.10E-06 - 4.00E-06	12 / 15	5.53E-04	LCKSO-7 2-3	NSV	-- / --	NSV
Octachlorodibenzofuran	8.00E-07 - 8.30E-06	13 / 15	0.0013	LCKSO-7 2-3	NSV	-- / --	NSV
Octachlorodibenzo-p-dioxin	-- - --	15 / 15	0.016	EEGLKB-SS16	NSV	-- / --	NSV
Pentachlorodibenzofuran, 1,2,3,7,8-	1.20E-07 - 1.00E-06	3 / 15	7.60E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Pentachlorodibenzofuran, 2,3,4,7,8-	4.00E-07 - 9.00E-07	4 / 15	7.80E-06	LCKSO-7 2-3	NSV	-- / --	NSV
Pentachlorodibenzofurans, total	4.00E-07 - 1.60E-06	12 / 15	1.11E-04	LCKSO-7 2-3	NSV	-- / --	NSV

TABLE 7-22
Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	4.10E-07 - 1.50E-06	4 / 15	1.58E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxins, total	4.70E-07 - 3.40E-06	9 / 15	6.98E-05	LCKSO-7 2-3	NSV	-- / --	NSV
TCDD-TEQ	-- - --	15 / 15	6.60E-05	LCKSO-7 2-3	3.15E-07	15 / 15	**210**
Tetrachlorodibenzofuran, 2,3,7,8-	4.60E-07 - 3.30E-06	7 / 15	1.63E-05	LCKSO-6 2-3	NSV	-- / --	NSV
Tetrachlorodibenzofurans, total	2.00E-07 - 4.00E-06	11 / 15	9.57E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	1.80E-07 - 1.00E-06	6 / 15	4.80E-06	LCKSO-9 0-1	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxins, total	2.90E-07 - 1.00E-06	11 / 15	4.86E-05	LCKSO-7 2-3	NSV	-- / --	NSV
Non-Detected Constituents							
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Aldrin	0.0017 - 0.22	0 / 40	--	--	0.0033	-- / --	**66**
Chlordane, technical-	0.035 - 0.041	0 / 4	--	--	NSV	-- / --	NSV
Dieldrin	0.0020 - 0.40	0 / 40	--	--	0.0024	-- / --	**168**
Endosulfan A	0.0017 - 0.22	0 / 40	--	--	0.12	-- / --	**1.8**
Endosulfan B	0.0020 - 0.40	0 / 40	--	--	0.12	-- / --	**3.4**
Endosulfan sulfate	0.0020 - 0.22	0 / 40	--	--	0.036	-- / --	**6.1**
Endrin	0.0020 - 0.40	0 / 40	--	--	0.010	-- / --	**40**
Endrin aldehyde	0.0020 - 0.40	0 / 40	--	--	0.011	-- / --	**38**
Endrin ketone	0.0020 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Heptachlor	0.0017 - 0.22	0 / 40	--	--	0.0060	-- / --	**37**
Heptachlor epoxide	0.0017 - 0.22	0 / 40	--	--	0.15	-- / --	**1.4**
Hexachlorocyclohexane, alpha-	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, beta-	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, delta-	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane)	0.0017 - 0.22	0 / 40	--	--	NSV	-- / --	NSV
Methoxychlor	0.0096 - 2.00	0 / 40	--	--	0.020	-- / --	**101**
PCB 1016	0.019 - 2.00	0 / 40	--	--	0.037	-- / --	**54**
PCB 1221	0.019 - 2.00	0 / 40	--	--	0.037	-- / --	**54**
PCB 1232	0.019 - 2.00	0 / 40	--	--	0.037	-- / --	**54**
Toxaphene	0.019 - 3.90	0 / 40	--	--	0.12	-- / --	**33**

TABLE 7-22
Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Herbicides (MG/KG)							
2,4,5-T	0.012 - 0.026	0 / 16	--	--	NSV	-- / --	NSV
2,4,5-TP	0.012 - 0.026	0 / 16	--	--	NSV	-- / --	NSV
2,4-D	0.023 - 0.052	0 / 16	--	--	0.027	-- / --	**1.9**
Semivolatile Organic Compounds (MG/KG)							
Benzidine	3.70 - 92.0	0 / 20	--	--	NSV	-- / --	NSV
Benzyl alcohol	0.74 - 19.0	0 / 20	--	--	NSV	-- / --	NSV
Bis(2-chloroethoxy) methane	0.074 - 8.10	0 / 41	--	--	0.30	-- / --	**27**
Bis(2-chloroethyl) ether	0.074 - 8.10	0 / 41	--	--	23.7	-- / --	< 1
Bis(2-chloroisopropyl) ether	0.38 - 3.50	0 / 17	--	--	NSV	-- / --	NSV
Bis(chloroisopropyl) ether	0.19 - 8.10	0 / 24	--	--	19.4	-- / --	< 1
Bromophenyl phenyl ether, 4-	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.35 - 19.0	0 / 41	--	--	1.10	-- / --	**17**
Chloronaphthalene, 2-	0.19 - 8.10	0 / 41	--	--	0.012	-- / --	**664**
Chlorophenol, 2-	0.19 - 8.10	0 / 41	--	--	0.24	-- / --	**33**
Chlorophenyl phenyl ether, 4-	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Dichlorobenzene, 1,2-	0.19 - 8.10	0 / 41	--	--	2.96	-- / --	**2.7**
Dichlorobenzene, 1,3-	0.19 - 8.10	0 / 41	--	--	37.7	-- / --	< 1
Dichlorobenzene, 1,4-	0.19 - 8.10	0 / 41	--	--	0.55	-- / --	**15**
Dichlorobenzidine, 3,3'-	0.19 - 8.10	0 / 41	--	--	0.65	-- / --	**13**
Dichlorophenol, 2,4-	0.35 - 9.20	0 / 41	--	--	87.5	-- / --	< 1
Dimethyl phthalate	0.074 - 8.10	0 / 41	--	--	734	-- / --	< 1
Dimethylphenol, 2,4-	0.35 - 9.20	0 / 41	--	--	0.010	-- / --	**920**
Dinitro-2-methylphenol, 4,6-	0.74 - 20.0	0 / 41	--	--	NSV	-- / --	NSV
Dinitrophenol, 2,4-	0.74 - 20.0	0 / 41	--	--	0.069	-- / --	**290**
Hexachlorobenzene	0.037 - 8.10	0 / 41	--	--	0.20	-- / --	**41**
Hexachlorobutadiene	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Hexachlorocyclopentadiene	0.35 - 19.0	0 / 41	--	--	NSV	-- / --	NSV
Hexachloroethane	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Isophorone	0.19 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Methylphenol, 2-	0.074 - 8.10	0 / 41	--	--	NSV	-- / --	NSV

TABLE 7-22
Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Semivolatile Organic Compounds (MG/KG)	0.35 - 8.10	0 / 21	--	--	NSV	-- / --	NSV
Methylphenol, 4-chloro-3-	0.35 - 9.20	0 / 41	--	--	NSV	-- / --	NSV
Nitroaniline, 2-	0.19 - 20.0	0 / 41	--	--	74.1	-- / --	< 1
Nitroaniline, 3-	0.74 - 20.0	0 / 41	--	--	3.16	-- / --	**6.3**
Nitroaniline, 4-	0.74 - 20.0	0 / 41	--	--	21.9	-- / --	< 1
Nitrophenol, 2-	0.35 - 9.20	0 / 41	--	--	1.60	-- / --	**5.8**
Nitrophenol, 4-	0.74 - 20.0	0 / 41	--	--	1.60	-- / --	**13**
Nitrosodi-N-propylamine, N-	0.037 - 8.10	0 / 41	--	--	NSV	-- / --	NSV
Nitrosodiphenylamine, N-	0.037 - 8.10	0 / 41	--	--	0.55	-- / --	**15**
Pentachlorophenol	0.37 - 20.0	0 / 41	--	--	0.12	-- / --	**168**
Trichlorobenzene, 1,2,3-	0.0050 - 0.0083	0 / 20	--	--	11.1	-- / --	< 1
Trichlorophenol, 2,4,5-	0.37 - 20.0	0 / 41	--	--	14.1	-- / --	**1.4**
Trichlorophenol, 2,4,6-	0.19 - 8.10	0 / 41	--	--	9.94	-- / --	< 1
Explosives (MG/KG)							
Amino-2,6-dinitrotoluene, 4-	0.0011 - 5.00	0 / 7	--	--	NSV	-- / --	NSV
Amino-4,6-dinitrotoluene, 2-	9.00E-04 - 5.00	0 / 7	--	--	NSV	-- / --	NSV
Aminodinitrotoluenes, total	0.44 - 0.50	0 / 16	--	--	NSV	-- / --	NSV
Dinitrobenzene, 1,3-	5.00E-04 - 2.50	0 / 23	--	--	NSV	-- / --	NSV
Dinitrotoluene, 2,4-	5.00E-04 - 2.50	0 / 40	--	--	1.28	-- / --	**2.0**
Dinitrotoluene, 2,6-	5.00E-04 - 5.00	0 / 40	--	--	0.033	-- / --	**152**
HMX	9.00E-04 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
Nitrobenzene	6.00E-04 - 2.50	0 / 40	--	--	1.31	-- / --	**1.9**
Nitrotoluene, 2-	9.00E-04 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
Nitrotoluene, 3-	9.00E-04 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
Nitrotoluene, 4-	0.0011 - 5.00	0 / 23	--	--	NSV	-- / --	NSV
RDX	5.00E-04 - 2.50	0 / 23	--	--	NSV	-- / --	NSV
Tetryl	0.0019 - 5.00	0 / 23	--	--	NSV	-- / --	NSV

TABLE 7-22
Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Volatile Organic Compounds (MG/KG)							
Benzene	0.0050 - 0.044	0 / 41	--	--	0.26	-- / --	< 1
Bromobenzene	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Bromochloromethane	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Bromodichloromethane	0.0050 - 0.044	0 / 41	--	--	0.54	-- / --	< 1
Bromoform	0.0050 - 0.044	0 / 41	--	--	15.9	-- / --	< 1
Bromomethane	0.0052 - 0.088	0 / 41	--	--	NSV	-- / --	NSV
Butylbenzene, 1-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Butylbenzene, sec-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Butylbenzene, tert-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Carbon disulfide	0.0052 - 0.044	0 / 41	--	--	0.094	-- / --	< 1
Carbon tetrachloride	0.0050 - 0.044	0 / 41	--	--	2.98	-- / --	< 1
Chlorobenzene	0.0050 - 0.044	0 / 40	--	--	13.1	-- / --	< 1
Chloroethane	0.0050 - 0.088	0 / 41	--	--	NSV	-- / --	NSV
Chloroform	0.0050 - 0.044	0 / 41	--	--	1.19	-- / --	< 1
Chloromethane	0.0050 - 0.088	0 / 41	--	--	NSV	-- / --	NSV
Chlorotoluene, 2-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Chlorotoluene, 4-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0050 - 0.044	0 / 41	--	--	2.05	-- / --	< 1
Dibromochloropropane	0.0050 - 0.0083	0 / 20	--	--	0.035	-- / --	< 1
Dichlorodifluoromethane	0.0050 - 0.0083	0 / 20	--	--	39.5	-- / --	< 1
Dichloroethane, 1,1-	0.0050 - 0.044	0 / 41	--	--	20.1	-- / --	< 1
Dichloroethane, 1,2-	0.0050 - 0.044	0 / 41	--	--	21.2	-- / --	< 1
Dichloroethene, 1,1-	0.0050 - 0.044	0 / 41	--	--	8.28	-- / --	< 1
Dichloroethene, 1,2-, cis-	0.0050 - 0.0083	0 / 20	--	--	0.78	-- / --	< 1
Dichloroethene, 1,2-, trans-	0.0050 - 0.0083	0 / 20	--	--	0.78	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0052 - 0.044	0 / 21	--	--	NSV	-- / --	NSV
Dichloropropane, 1,2-	0.0050 - 0.044	0 / 41	--	--	32.7	-- / --	< 1
Dichloropropane, 1,3-	0.0050 - 0.0083	0 / 20	--	--	32.7	-- / --	< 1
Dichloropropane, 2,2-	0.0050 - 0.0083	0 / 20	--	--	32.7	-- / --	< 1
Dichloropropene, 1,1-	0.0050 - 0.0083	0 / 20	--	--	0.40	-- / --	< 1

TABLE 7-22
Screening Statistics--Food Web Exposures AOC 1 Soil--Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dichloropropene, 1,3-, cis-	0.0050 - 0.044	0 / 41	--	--	0.40	-- / --	< 1
Dichloropropene, 1,3-, trans-	0.0050 - 0.044	0 / 41	--	--	0.40	-- / --	< 1
Ethylene dibromide	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Isopropylbenzene	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Isopropyltoluene, 4-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Methyl ethyl ketone	0.010 - 0.088	0 / 41	--	--	89.6	-- / --	< 1
Methyl isobutyl ketone	0.010 - 0.088	0 / 40	--	--	NSV	-- / --	NSV
Methyl n-butyl ketone	0.010 - 0.088	0 / 40	--	--	NSV	-- / --	NSV
Methyl tert-butyl ether	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Methylene bromide	0.0050 - 0.0083	0 / 20	--	--	65.0	-- / --	< 1
Propylbenzene, 1-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Styrene	0.0050 - 0.044	0 / 40	--	--	4.69	-- / --	< 1
Tetrachloroethane, 1,1,1,2-	0.0050 - 0.0083	0 / 20	--	--	0.13	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0050 - 0.044	0 / 40	--	--	0.13	-- / --	< 1
Tetrachloroethene	0.0050 - 0.044	0 / 40	--	--	9.92	-- / --	< 1
Trichloroethane, 1,1,1-	0.0050 - 0.044	0 / 41	--	--	29.8	-- / --	< 1
Trichloroethane, 1,1,2-	0.0050 - 0.044	0 / 41	--	--	28.6	-- / --	< 1
Trichloroethene	0.0050 - 0.044	0 / 41	--	--	12.4	-- / --	< 1
Trichloropropane, 1,2,3-	0.0050 - 0.0083	0 / 20	--	--	3.36	-- / --	< 1
Trimethylbenzene, 1,2,4-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Trimethylbenzene, 1,3,5-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Vinyl chloride	0.0050 - 0.088	0 / 41	--	--	0.65	-- / --	< 1
Xylene, 1,2-	0.0050 - 0.0083	0 / 20	--	--	NSV	-- / --	NSV
Xylene, 1,3- and/or 1,4-	0.0099 - 0.017	0 / 20	--	--	NSV	-- / --	NSV

[1]Shaded cells indicate hazard quotient based on reporting limits

[2]Macronutrient: Not considered to be a COPC

Note:

NSV = No Screening Value

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Detected Constituents							
Inorganics (MG/KG)							
Arsenic	-- - --	16 / 16	25.1	LCK-SO3B	18	1 / 16	**1.4**
Barium	-- - --	16 / 16	200	LCKSB-11[3]	2,000	0 / 16	< 1
Beryllium	0.57 - 1.00	6 / 8	2.40	EEGLKB-SS21	21	0 / 8	< 1
Calcium [2]	-- - --	8 / 8	100,000	LCKSB-11 2-4	NSV	-- / --	NSV
Cobalt	-- - --	8 / 8	26.0	LCKSB-11[3]	120	0 / 8	< 1
Lead	-- - --	16 / 16	40.2	LCKSB-11[3]	11	14 / 16	**3.7**
Magnesium [2]	-- - --	8 / 8	48,000	LCKSB-11 2-4	NSV	-- / --	NSV
Manganese	990 - 990	7 / 8	1,600	LCKSB-11[3]	4,000	0 / 8	< 1
Mercury	0.061 - 0.13	5 / 16	0.080	LCK-SO3A	0.10	0 / 16	< 1
Potassium [2]	-- - --	8 / 8	3,300	LCKSB-11[3]	NSV	-- / --	NSV
Selenium	0.15 - 1.80	7 / 16	0.60	EEGLKB-SS21	0.63	0 / 16	< 1
Sodium [2]	110 - 320	3 / 8	210	EEGLKB-SS20 Dup01	NSV	-- / --	NSV
Thallium	0.57 - 1.00	4 / 8	2.20	EEGLKB-SS21	0.057	4 / 8	**39**
Zinc	-- - --	16 / 16	125	LCK-SO5B	46.0	14 / 16	**2.7**
Pesticide/Polychlorinated Biphenyls (MG/KG)							
DDD, p,p'-	0.0023 - 0.012	1 / 16	0.017	LCK-SO4A	0.76	0 / 16	< 1
DDE, p,p'-	0.0023 - 0.012	3 / 16	0.81	LCK-SO4A	0.60	1 / 16	**1.4**
DDT, p,p'-	0.0023 - 0.012	3 / 16	0.46	LCK-SO4A	0.0035	3 / 16	**131**
Semivolatile Organic Compounds (MG/KG)							
Acenaphthene	0.039 - 0.44	2 / 16	0.014	EEGLKB-SS21	682	0 / 16	< 1
Anthracene	0.039 - 0.44	2 / 16	0.045	EEGLKB-SS21	1,480	0 / 16	< 1
Benz(a)anthracene	0.044 - 0.44	4 / 16	0.17	EEGLKB-SS21	5.21	0 / 16	< 1
Benzo(a)pyrene	0.044 - 0.44	4 / 16	0.17	EEGLKB-SS21	1.52	0 / 16	< 1
Benzo(b)fluoranthene	0.38 - 0.44	5 / 16	0.16	EEGLKB-SS21	59.8	0 / 16	< 1
Benzo(ghi)perylene	0.38 - 0.44	5 / 16	0.11	EEGLKB-SS21	119	0 / 16	< 1
Benzo(k)fluoranthene	0.38 - 0.44	5 / 16	0.18	EEGLKB-SS21	148	0 / 16	< 1
Benzoic acid	0.79 - 0.89	1 / 4	1.10	EEGLKB-SS21	NSV	-- / --	NSV
Chrysene	0.38 - 0.44	5 / 16	0.22	EEGLKB-SS21	4.73	0 / 16	< 1

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dibenz(ah)anthracene	0.039 - 0.44	2 / 16	0.044	EEGLKB-SS21	18.4	0 / 16	< 1
Dibenzofuran	0.079 - 0.44	2 / 16	0.070	EEGLKB-SS21	NSV	-- / --	NSV
Di-n-butyl phthalate	0.038 - 0.44	1 / 16	0.041	LCK-SO4A	0.15	0 / 16	< 1
Fluoranthene	0.38 - 0.44	7 / 16	0.32	LCK-SO4A	122	0 / 16	< 1
Indeno(1,2,3-cd)pyrene	0.039 - 0.44	3 / 16	0.095	LCK-SO4A	109	0 / 16	< 1
Methylnaphthalene, 2-	0.039 - 0.44	2 / 16	0.28	EEGLKB-SS21	3.24	0 / 16	< 1
Naphthalene	0.044 - 0.44	4 / 16	0.12	EEGLKB-SS21	0.099	1 / 16	**1.2**
Nitrosodiphenylamine, N-	0.042 - 0.44	1 / 16	0.026	EEGLKB-SS20	0.55	0 / 16	< 1
Phenanthrene	0.38 - 0.44	5 / 16	0.36	EEGLKB-SS22	45.7	0 / 16	< 1
Pyrene	0.039 - 0.44	5 / 16	0.27	EEGLKB-SS21	45.7	0 / 16	< 1
Total Low Molecular Weight PAHs	- - -	5 / 16	0.9	EEGLKB-SS21	100	0 / 16	< 1
Total High Molecular Weight PAHs	- - -	7 / 16	1.7	LCK-SO4A	1.1	1 / 16	**1.6**
Volatile Organic Compounds (MG/KG)							
Acetone	0.0050 - 0.024	5 / 16	40.0	EEGLKB-SS22	2.50	2 / 16	**16**
Dichloropropene, 1,3-, trans-	0.0052 - 0.0072	2 / 16	0.0050	LCK-SO5B	0.40	0 / 16	< 1
Methylene chloride	0.0050 - 0.023	4 / 16	0.012	LCK-SODUP1	4.05	0 / 16	< 1
Trichlorofluoromethane	0.0052 - 0.0063	1 / 4	0.0049	EEGLKB-SS22	16.4	0 / 4	< 1
Dioxin/Furans (MG/KG)							
Hexachlorodibenzofuran, 1,2,3,6,7,8-	3.00E-07 - 4.50E-07	1 / 5	5.90E-07	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxins, total	1.30E-06 - 4.60E-06	1 / 5	2.40E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Pentachlorodibenzo-p-dioxins, total	5.00E-07 - 1.10E-06	1 / 5	8.70E-07	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,4,7,8-	3.10E-07 - 5.00E-07	2 / 5	1.20E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzofuran, 2,3,4,6,7,8-	4.00E-07 - 5.00E-07	2 / 5	1.00E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	3.00E-07 - 5.00E-07	2 / 5	5.90E-07	LCKSB-10 0-0.5	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	4.00E-07 - 5.00E-07	2 / 5	1.20E-06	LCKSB-11[3]	NSV	-- / --	NSV
Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	3.00E-07 - 5.00E-07	2 / 5	3.90E-06	EEGLKB-SS20	NSV	-- / --	NSV
Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	6.00E-07 - 2.10E-06	3 / 5	2.70E-06	LCKSB-11[3]	NSV	-- / --	NSV
Heptachlorodibenzofurans, total	7.00E-07 - 2.10E-06	3 / 5	5.40E-06	LCKSB-11[3]	NSV	-- / --	NSV
Hexachlorodibenzofurans, total	5.00E-07 - 1.30E-06	3 / 5	4.90E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Octachlorodibenzofuran	5.00E-07 - 1.40E-06	3 / 5	5.60E-06	LCKSB-11 0-0.5	NSV	-- / --	NSV
Tetrachlorodibenzofuran, 2,3,7,8-	2.70E-07 - 4.00E-07	3 / 5	8.20E-07	LCKSB-18 0-0.5	NSV	-- / --	NSV

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Tetrachlorodibenzo-p-dioxins, total	8.90E-07 - 1.40E-06	3 / 5	3.90E-06	EEGLKB-SS20	NSV	-- / --	NSV
Octachlorodibenzo-p-dioxin	2.50E-06 - 2.50E-06	4 / 5	4.20E-04	EEGLKB-SS20	NSV	-- / --	NSV
Pentachlorodibenzofurans, total	5.00E-07 - 5.00E-07	4 / 5	6.30E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Tetrachlorodibenzofurans, total	4.00E-07 - 4.00E-07	4 / 5	2.90E-06	LCKSB-10 0-0.5	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	-- - --	5 / 5	7.20E-06	EEGLKB-SS20 Dup01	NSV	-- / --	NSV
Heptachlorodibenzo-p-dioxins, total	-- - --	5 / 5	1.50E-05	EEGLKB-SS20 Dup01	NSV	-- / --	NSV
TCDD-TEQ	-- - --	5 / 5	4.63E-06	EEGLKB-SS20	3.15E-07	5 / 5	**15**
Non-Detected Constituents							
Inorganics (MG/KG)							
Antimony	5.40 - 13.0	0 / 8	--	--	0.27	-- / --	**48**
Pesticide/Polychlorinated Biphenyls (MG/KG)							
Aldrin	0.0019 - 0.012	0 / 16	--	--	0.0033	-- / --	**3.6**
Chlordane, alpha-	0.0020 - 0.012	0 / 12	--	--	0.22	-- / --	< 1
Chlordane, gamma-	0.0020 - 0.012	0 / 12	--	--	0.22	-- / --	< 1
Chlordane, technical-	0.038 - 0.039	0 / 4	--	--	NSV	-- / --	NSV
Dieldrin	0.0023 - 0.012	0 / 16	--	--	0.0024	-- / --	**5.0**
Endosulfan A	0.0019 - 0.012	0 / 16	--	--	0.12	-- / --	< 1
Endosulfan B	0.0023 - 0.012	0 / 16	--	--	0.12	-- / --	< 1
Endosulfan sulfate	0.0023 - 0.012	0 / 16	--	--	0.036	-- / --	< 1
Endrin	0.0023 - 0.012	0 / 16	--	--	0.010	-- / --	**1.2**
Endrin aldehyde	0.0023 - 0.012	0 / 16	--	--	0.011	-- / --	**1.1**
Endrin ketone	0.0023 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Heptachlor	0.0019 - 0.012	0 / 16	--	--	0.0060	-- / --	**2.0**
Heptachlor epoxide	0.0019 - 0.012	0 / 16	--	--	0.15	-- / --	< 1
Hexachlorocyclohexane, alpha-	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, beta-	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, delta-	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclohexane, gamma- (Lindane	0.0019 - 0.012	0 / 16	--	--	NSV	-- / --	NSV
Methoxychlor	0.011 - 0.056	0 / 16	--	--	0.020	-- / --	**2.8**
PCB 1016	0.020 - 0.045	0 / 16	--	--	0.000332	-- / --	**136**
PCB 1221	0.020 - 0.089	0 / 16	--	--	0.000332	-- / --	**268**

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
PCB 1232	0.020 - 0.045	0 / 16	--	--	0.000332	-- / --	**136**
PCB 1242	0.020 - 0.045	0 / 16	--	--	0.000332	-- / --	**136**
PCB 1248	0.020 - 0.045	0 / 16	--	--	0.000332	-- / --	**136**
PCB 1254	0.020 - 0.045	0 / 16	--	--	0.000332	-- / --	**136**
PCB 1260	0.020 - 0.045	0 / 16	--	--	0.000332	-- / --	**136**
Toxaphene	0.023 - 0.22	0 / 16	--	--	0.12	-- / --	**1.8**
Semivolatile Organic Compounds (MG/KG)							
Acenaphthylene	0.039 - 0.44	0 / 16	--	--	682	-- / --	< 1
Benzidine	3.90 - 4.40	0 / 4	--	--	NSV	-- / --	NSV
Benzyl alcohol	0.79 - 0.89	0 / 4	--	--	NSV	-- / --	NSV
Bis(2-chloroethoxy) methane	0.079 - 0.44	0 / 16	--	--	0.30	-- / --	**1.46**
Bis(2-chloroethyl) ether	0.079 - 0.44	0 / 16	--	--	23.7	-- / --	< 1
Bis(2-chloroisopropyl) ether	0.40 - 0.44	0 / 8	--	--	NSV	-- / --	NSV
Bis(2-ethylhexyl) phthalate	0.20 - 0.44	0 / 16	--	--	0.93	-- / --	< 1
Bis(chloroisopropyl) ether	0.20 - 0.39	0 / 8	--	--	19.4	-- / --	< 1
Bromophenyl phenyl ether, 4-	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Butylbenzyl phthalate	0.079 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Carbazole	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Chloroaniline, 4-	0.38 - 0.89	0 / 16	--	--	1.10	-- / --	< 1
Chloronaphthalene, 2-	0.20 - 0.44	0 / 16	--	--	0.012	-- / --	**36**
Chlorophenol, 2-	0.20 - 0.44	0 / 16	--	--	0.24	-- / --	**1.8**
Chlorophenyl phenyl ether, 4-	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Dichlorobenzene, 1,2-	0.20 - 0.44	0 / 16	--	--	2.96	-- / --	< 1
Dichlorobenzene, 1,3-	0.20 - 0.44	0 / 16	--	--	37.7	-- / --	< 1
Dichlorobenzene, 1,4-	0.20 - 0.44	0 / 16	--	--	0.55	-- / --	< 1
Dichlorobenzidine, 3,3'-	0.20 - 0.88	0 / 16	--	--	0.65	-- / --	**1.4**
Dichlorophenol, 2,4-	0.38 - 0.44	0 / 16	--	--	87.5	-- / --	< 1
Diethyl phthalate	0.079 - 0.44	0 / 16	--	--	24.8	-- / --	< 1
Dimethyl phthalate	0.079 - 0.44	0 / 16	--	--	734	-- / --	< 1
Dimethylphenol, 2,4-	0.38 - 0.44	0 / 16	--	--	0.010	-- / --	**44**
Dinitro-2-methylphenol, 4,6-	0.79 - 2.20	0 / 16	--	--	NSV	-- / --	NSV

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Dinitrophenol, 2,4-	0.79 - 2.20	0 / 16	--	--	0.069	-- / --	**32**
Di-n-octyl phthalate	0.38 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Fluorene	0.039 - 0.44	0 / 16	--	--	122	-- / --	< 1
Hexachlorobenzene	0.039 - 0.44	0 / 16	--	--	0.20	-- / --	**2.21**
Hexachlorobutadiene	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Hexachlorocyclopentadiene	0.38 - 0.89	0 / 16	--	--	NSV	-- / --	NSV
Hexachloroethane	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Isophorone	0.20 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Methylphenol, 2-	0.079 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Methylphenol, 3- and/or 4-	0.079 - 0.089	0 / 4	--	--	NSV	-- / --	NSV
Methylphenol, 4-	0.38 - 0.44	0 / 12	--	--	NSV	-- / --	NSV
Methylphenol, 4-chloro-3-	0.38 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Nitroaniline, 2-	0.20 - 2.20	0 / 16	--	--	74.1	-- / --	< 1
Nitroaniline, 3-	0.79 - 2.20	0 / 16	--	--	3.16	-- / --	< 1
Nitroaniline, 4-	0.79 - 2.20	0 / 16	--	--	21.9	-- / --	< 1
Nitrophenol, 2-	0.38 - 0.44	0 / 16	--	--	1.60	-- / --	< 1
Nitrophenol, 4-	0.79 - 2.20	0 / 16	--	--	1.60	-- / --	**1.4**
Nitrosodi-N-propylamine, N-	0.039 - 0.44	0 / 16	--	--	NSV	-- / --	NSV
Pentachlorophenol	0.39 - 2.20	0 / 16	--	--	0.12	-- / --	**18**
Phenol	0.20 - 0.44	0 / 16	--	--	1,200	-- / --	< 1
Trichlorobenzene, 1,2,3-	0.0052 - 0.0072	0 / 4	--	--	11.1	-- / --	< 1
Trichlorobenzene, 1,2,4-	0.20 - 0.44	0 / 16	--	--	11.1	-- / --	< 1
Trichlorophenol, 2,4,5-	0.39 - 2.20	0 / 16	--	--	14.1	-- / --	< 1
Trichlorophenol, 2,4,6-	0.20 - 0.44	0 / 16	--	--	9.94	-- / --	< 1
Volatile Organic Compounds (MG/KG)							
Benzene	0.0052 - 0.0072	0 / 16	--	--	0.26	-- / --	< 1
Bromobenzene	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Bromochloromethane	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Bromodichloromethane	0.0052 - 0.0072	0 / 16	--	--	0.54	-- / --	< 1
Bromoform	0.0052 - 0.0072	0 / 16	--	--	15.9	-- / --	< 1
Bromomethane	0.0055 - 0.014	0 / 16	--	--	NSV	-- / --	NSV

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Butylbenzene, 1-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Butylbenzene, sec-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Butylbenzene, tert-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Carbon disulfide	0.0055 - 0.014	0 / 16	--	--	0.094	-- / --	< 1
Carbon tetrachloride	0.0052 - 0.0072	0 / 16	--	--	2.98	-- / --	< 1
Chlorobenzene	0.0052 - 0.0072	0 / 16	--	--	13.1	-- / --	< 1
Chloroethane	0.0052 - 0.014	0 / 16	--	--	NSV	-- / --	NSV
Chloroform	0.0052 - 0.0072	0 / 16	--	--	1.19	-- / --	< 1
Chloromethane	0.0052 - 0.014	0 / 16	--	--	NSV	-- / --	NSV
Chlorotoluene, 2-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Chlorotoluene, 4-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Dibromochloromethane	0.0052 - 0.0072	0 / 16	--	--	2.05	-- / --	< 1
Dibromochloropropane	0.0052 - 0.0072	0 / 4	--	--	0.035	-- / --	< 1
Dichlorodifluoromethane	0.0052 - 0.0072	0 / 4	--	--	39.5	-- / --	< 1
Dichloroethane, 1,1-	0.0052 - 0.0072	0 / 16	--	--	20.1	-- / --	< 1
Dichloroethane, 1,2-	0.0052 - 0.0072	0 / 16	--	--	21.2	-- / --	< 1
Dichloroethene, 1,1-	0.0052 - 0.0072	0 / 16	--	--	8.28	-- / --	< 1
Dichloroethene, 1,2-, cis-	0.0052 - 0.0072	0 / 4	--	--	0.78	-- / --	< 1
Dichloroethene, 1,2-, trans-	0.0052 - 0.0072	0 / 4	--	--	0.78	-- / --	< 1
Dichloroethenes, 1,2-, total	0.0055 - 0.0070	0 / 12	--	--	NSV	-- / --	NSV
Dichloropropane, 1,2-	0.0052 - 0.0072	0 / 16	--	--	32.7	-- / --	< 1
Dichloropropane, 1,3-	0.0052 - 0.0072	0 / 4	--	--	32.7	-- / --	< 1
Dichloropropane, 2,2-	0.0052 - 0.0072	0 / 4	--	--	32.7	-- / --	< 1
Dichloropropene, 1,1-	0.0052 - 0.0072	0 / 4	--	--	0.40	-- / --	< 1
Dichloropropene, 1,3-, cis-	0.0052 - 0.0072	0 / 16	--	--	0.40	-- / --	< 1
Ethylbenzene	0.0052 - 0.0072	0 / 16	--	--	5.16	-- / --	< 1
Ethylene dibromide	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Isopropylbenzene	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Isopropyltoluene, 4-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Methyl ethyl ketone	0.011 - 0.029	0 / 16	--	--	89.6	-- / --	< 1
Methyl isobutyl ketone	0.011 - 0.029	0 / 16	--	--	NSV	-- / --	NSV

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Methyl n-butyl ketone	0.011 - 0.029	0 / 16	--	--	NSV	-- / --	NSV
Methyl tert-butyl ether	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Methylene bromide	0.0052 - 0.0072	0 / 4	--	--	65.0	-- / --	< 1
Propylbenzene, 1-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Styrene	0.0052 - 0.0072	0 / 16	--	--	4.69	-- / --	< 1
Tetrachloroethane, 1,1,1,2-	0.0052 - 0.0072	0 / 4	--	--	0.13	-- / --	< 1
Tetrachloroethane, 1,1,2,2-	0.0052 - 0.0072	0 / 16	--	--	0.13	-- / --	< 1
Tetrachloroethene	0.0052 - 0.0072	0 / 16	--	--	9.92	-- / --	< 1
Toluene	0.0052 - 0.0072	0 / 16	--	--	5.45	-- / --	< 1
Trichloroethane, 1,1,1-	0.0052 - 0.0072	0 / 16	--	--	29.8	-- / --	< 1
Trichloroethane, 1,1,2-	0.0052 - 0.0072	0 / 16	--	--	28.6	-- / --	< 1
Trichloroethene	0.0052 - 0.0072	0 / 16	--	--	12.4	-- / --	< 1
Trichloropropane, 1,2,3-	0.0052 - 0.0072	0 / 4	--	--	3.36	-- / --	< 1
Trimethylbenzene, 1,2,4-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Trimethylbenzene, 1,3,5-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Vinyl chloride	0.0052 - 0.014	0 / 16	--	--	0.65	-- / --	< 1
Xylene, 1,2-	0.0052 - 0.0072	0 / 4	--	--	NSV	-- / --	NSV
Xylene, 1,3- and/or 1,4-	0.010 - 0.014	0 / 4	--	--	NSV	-- / --	NSV
Xylenes, total	0.0055 - 0.0070	0 / 12	--	--	10.0	-- / --	< 1
Trichloropropane, 1,2,3-					3.36	0	0.0
Trimethylbenzene, 1,2,4-					NSV	-- --	NSV
Trimethylbenzene, 1,3,5-					NSV	-- --	NSV
Vinyl chloride	0.0052 - 0.013	0 / 12	--	--	0.65	-- / --	< 1
Xylene, 1,2-					NSV	-- --	NSV
Xylene, 1,3- and/or 1,4-					NSV	-- --	NSV
Xylenes, total	0.0052 - 0.0061	0 / 12	--	--	10.0	-- / --	< 1
Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	4.80E-07 - 8.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Hexachlorodibenzofuran, 1,2,3,7,8,9-	3.30E-07 - 6.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	4.00E-07 - 6.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 1,2,3,7,8-	3.00E-07 - 5.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Pentachlorodibenzofuran, 2,3,4,7,8-	3.00E-07 - 5.00E-07	0 / 5	--	--	NSV	-- / --	NSV

TABLE 7-23
Screening Statistics--Food Web Exposures AOC 2 Soil --Step 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Analyte Name	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]
Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	5.00E-07 - 8.00E-07	0 / 5	--	--	NSV	-- / --	NSV
Amino-2,6-dinitrotoluene, 4-	0.0011 - 0.49	0 / 5	--	--	NSV	-- / --	NSV
Amino-4,6-dinitrotoluene, 2-	9.00E-04 - 0.49	0 / 5	--	--	NSV	-- / --	NSV
Aminodinitrotoluenes, total	0.45 - 0.50	0 / 8	--	--	NSV	-- / --	NSV
Dinitrobenzene, 1,3-	5.00E-04 - 0.25	0 / 13	--	--	NSV	-- / --	NSV
Dinitrotoluene, 2,4-	5.00E-04 - 0.25	0 / 16	--	--	1.28	-- / --	< 1
Dinitrotoluene, 2,6-	5.00E-04 - 0.49	0 / 16	--	--	0.033	-- / --	**15**
HMX	9.00E-04 - 2.20	0 / 13	--	--	NSV	-- / --	NSV
Nitrobenzene	6.00E-04 - 0.26	0 / 16	--	--	1.31	-- / --	< 1
Nitrotoluene, 2-	9.00E-04 - 1.00	0 / 13	--	--	NSV	-- / --	NSV
Nitrotoluene, 3-	9.00E-04 - 1.00	0 / 13	--	--	NSV	-- / --	NSV
Nitrotoluene, 4-	0.0011 - 3.00	0 / 13	--	--	NSV	-- / --	NSV
RDX	5.00E-04 - 1.10	0 / 13	--	--	NSV	-- / --	NSV
Tetryl	0.0019 - 0.75	0 / 13	--	--	NSV	-- / --	NSV
Trinitrobenzene, 1,3,5-	7.00E-04 - 0.25	0 / 13	--	--	4.30	-- / --	< 1
Trinitrotoluene, 2,4,6-	5.00E-04 - 0.25	0 / 13	--	--	NSV	-- / --	NSV
2,4,5-T	0.012 - 0.025	0 / 8	--	--	NSV	-- / --	NSV
2,4,5-TP	0.012 - 0.025	0 / 8	--	--	NSV	-- / --	NSV
2,4-D	0.024 - 0.050	0 / 8	--	--	0.027	-- / --	**1.8**

[1]Shaded cells indicate hazard quotient based on reporting limits
[2]Macronutrient: Not considered to be a COPC
NSV = No Screening Value
3 - Result from Duplicate Sample: LCKSB-15 0-0.5

TABLE 7-24
Summary of Hazard Quotients for Food Web Exposures - West Ditch
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Mink			Muskrat			Marsh wren			Belted kingfisher			Mallard		
	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC
Inorganics															
Aluminum	< 1	< 1	< 1	NA	NA	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	< 1	< 1	< 1	**9.7**	**1.9**	**4.4**	**1.9**	< 1	**1.1**	< 1	< 1	< 1	< 1	< 1	< 1
Barium	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cobalt	< 1	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lead	< 1	< 1	< 1	< 1	< 1	< 1	**1.5**	< 1	< 1	< 1	< 1	< 1	**2.9**	< 1	< 1
Manganese	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Selenium	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Zinc	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pesticides/PCBs															
4,4'-DDD	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4,4'-DDE	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4,4'-DDT	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
PCBs (total)	**15.2**	**1.5**	**4.8**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Semivolatile Organics															
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Acenaphthene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(a)anthracene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(a)pyrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(b)fluoranthene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(g,h,i)perylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(k)fluoranthene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chrysene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Fluorene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)pyrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Phenanthrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Volatile Organics															
Acetone	< 1	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin/Furans (MG/KG)															
Dioxin/furan (TEQ) - Mammal (total)	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dioxin/furan (TEQ) - Bird (total)	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

TABLE 7-25

Summary of Hazard Quotients for Food Web Exposures - East Ditch

Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Mink			Muskrat			Marsh wren			Belted kingfisher			Mallard		
	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC
Inorganics															
Barium	<0.01	<0.01	<0.01	NA	NA	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	0.01	<0.01	<0.01	NA	NA	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Semivolatile Organics															
Fluoranthene	<0.01	<0.01	<0.01	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pyrene	<0.01	<0.01	<0.01	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Volatile Organics															
Acetone	<0.01	<0.01	<0.01	< 1	< 1	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 7-26
Soil Bioconcentration Factors For Plants and Soil Invertebrates - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)	
	Value	Reference[1]	Value	Reference[1]
Inorganics				
Aluminum	0.004	Baes et al. 1984	0.039	Sample et al. 1998a
Antimony	0.200	Baes et al. 1984	0.063	Helmke et al. 1979
Cadmium	0.514	Bechtel Jacobs 1998a	7.660	Sample et al. 1998a
Copper	0.123	Bechtel Jacobs 1998a	0.468	Sample et al. 1998a
Lead	0.038	Bechtel Jacobs 1998a	0.307	Sample et al. 1998a
Mercury	0.344	Bechtel Jacobs 1998a	1.186	Sample et al. 1998a
Selenium	0.567	Bechtel Jacobs 1998a	0.982	Sample et al. 1998a
Silver	0.013	Bechtel Jacobs 1998a	2.045	Sample et al. 1998a
Thallium	0.004	Baes et al. 1984	1.000	--
Zinc	0.358	Bechtel Jacobs 1998a	2.482	Sample et al. 1998a
Pesticides/PCBs				
4,4'-DDT	0.0065	Travis and Arms 1988	0.70	Menzie et al. 1992
Aroclor-1242	0.0224	Travis and Arms 1988	4.30	Sample et al. 1998a
Aroclor-1248	0.0101	Travis and Arms 1988	4.30	Sample et al. 1998a
Aroclor-1254	0.0068	Travis and Arms 1988	4.30	Sample et al. 1998a
Aroclor-1260	0.0045	Travis and Arms 1988	4.30	Sample et al. 1998a
PCBs (total)	0.0068	Travis and Arms 1988	4.30	Sample et al. 1998a
Semivolatile Organics				
Benzo(a)anthracene	0.0197	Travis and Arms 1988	0.27	Beyer and Stafford 1993
Benzo(a)pyrene	0.0114	Travis and Arms 1988	0.34	Beyer and Stafford 1993
Benzo(b)fluoranthene	0.0101	Travis and Arms 1988	0.21	Beyer and Stafford 1993
Benzo(k)fluoranthene	0.0101	Travis and Arms 1988	0.21	Beyer and Stafford 1993
Butylbenzylphthalate	0.0617	Travis and Arms 1988	1.00	--
Carbazole	0.3258	Travis and Arms 1988	1.00	--
Chrysene	0.0197	Travis and Arms 1988	0.44	Beyer and Stafford 1993
Dibenz(a,h)anthracene	0.0053	Travis and Arms 1988	0.49	Beyer and Stafford 1993
Dibenzofuran	0.1447	Travis and Arms 1988	1.00	--
Di-n-butylphthalate	0.0838	Travis and Arms 1988	1.00	--
Di-n-octylphthalate	0.0008	Travis and Arms 1988	1.00	--
Fluoranthene	0.0425	Travis and Arms 1988	0.37	Beyer and Stafford 1993
Fluorene	0.1428	Travis and Arms 1988	0.20	Beyer and Stafford 1993

TABLE 7-26
Soil Bioconcentration Factors For Plants and Soil Invertebrates - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)	
	Value	Reference[1]	Value	Reference[1]
Naphthalene	0.4425	Travis and Arms 1988	0.21	Beyer and Stafford 1993
Phenanthrene	0.0908	Travis and Arms 1988	0.28	Beyer and Stafford 1993
Pyrene	0.0431	Travis and Arms 1988	0.39	Beyer and Stafford 1993
Volatile Organics				
Acetone	53.2991	Travis and Arms 1988	1.00	--
Explosives				
2,4,6,Trinitrotoluene	2.3987	Travis and Arms 1988	1.00	--
Dioxin/Furans				
Dioxin/furan (TEQ) - Mammal (total)	0.0065	Travis and Arms 1988	8.27	Sample et al. 1998a
Dioxin/furan (TEQ) - Bird (total)	0.0065	Travis and Arms 1988	8.27	Sample et al. 1998a

Notes:
[1] - See Section 9 of Text for Complete Reference

TABLE 7-27
Soil Bioaccumulation Factors For Small Mammals - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Soil-Mouse BAF (dry weight)		Soil-Shrew BAF (dry weight)	
	Value	Reference[1]	Value	Reference[1]
Inorganics				
Aluminum	0.062	Sample et al. 1998b	0.026	Sample et al. 1998b
Antimony	--	see text	--	see text
Cadmium	0.144	Sample et al. 1998b	2.212	Sample et al. 1998b
Copper	0.111	Sample et al. 1998b	0.502	Sample et al. 1998b
Lead	0.055	Sample et al. 1998b	0.148	Sample et al. 1998b
Mercury	0.054	Sample et al. 1998b	0.067	Sample et al. 1998b
Selenium	0.258	Sample et al. 1998b	0.273	Sample et al. 1998b
Silver	0.151	Sample et al. 1998b	0.036	Sample et al. 1998b
Thallium	0.112	Sample et al. 1998b	0.112	Sample et al. 1998b
Zinc	0.509	Sample et al. 1998b	0.862	Sample et al. 1998b
Pesticides/PCBs				
4,4'-DDT	--	see text	--	see text
Aroclor-1242	--	see text	--	see text
Aroclor-1248	--	see text	--	see text
Aroclor-1254	--	see text	--	see text
Aroclor-1260	--	see text	--	see text
PCBs (total)	--	see text	--	see text
Semivolatile Organics				
Benzo(a)anthracene	--	see text	--	see text
Benzo(a)pyrene	--	see text	--	see text
Benzo(b)fluoranthene	--	see text	--	see text
Benzo(k)fluoranthene	--	see text	--	see text
bis(2-Ethylhexyl)phthalate	--	see text	--	see text
Butylbenzylphthalate	--	see text	--	see text
Carbazole	--	see text	--	see text
Chrysene	--	see text	--	see text
Dibenz(a,h)anthracene	--	see text	--	see text
Dibenzofuran	--	see text	--	see text
Di-n-butylphthalate	--	see text	--	see text
Di-n-octylphthalate	--	see text	--	see text
Fluoranthene	--	see text	--	see text
Naphthalene	--	see text	--	see text
Phenanthrene	--	see text	--	see text
Pyrene	--	see text	--	see text
Volatile Organics				
Acetone	--	see text	--	see text
Explosives				
2,4,6,Trinitrotoluene	--	see text	--	see text
Dioxin/Furans				
Dioxin/furan (TEQ) - Mammal (total)	1.067	Sample et al. 1998b	1.067	Sample et al. 1998b
Dioxin/furan (TEQ) - Bird (total)	1.067	Sample et al. 1998b	1.067	Sample et al. 1998b

Notes:
[1] - See Section 9 of Text for Complete Reference

TABLE 7-28

Sediment Bioaccumulation Factors For Benthic Invertebrates, Fish, and Aquatic Plants- Step 3

Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Sediment-Invertebrate BAF (dry weight)		Sediment-Fish BAF (dry weight)		Sediment-Plant BCF (dry weight)	
	Value	Reference[1]	Value	Reference[1]	Value	Reference[1]
Inorganics						
Arsenic	0.466	Bechtel Jacobs 1998b	0.126	Pascoe et al. 1996	0.037	Bechtel Jacobs 1998a
Lead	0.080	Bechtel Jacobs 1998b	0.070	Krantzberg and Boyd 1992	0.038	Bechtel Jacobs 1998a
Pesticides/PCBs						
PCBs (total)	1.919	Bechtel Jacobs 1998b	12.940	Oliver and Niimi 1988	0.0068	Travis and Arms 1988

Notes:

[1] - See Section 9 of Text for Complete Reference

TABLE 7-29
Exposure Parameters for Upper Trophic Level Ecological Receptors - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Receptor	Body Weight (kg)		Water Ingestion Rate (L/day)		Food Ingestion Rate (kg/day - dry)	
	Value	Reference[1]	Value	Reference[1]	Value	Reference[1]
Birds						
American robin	0.077	USEPA 1993d	0.0106	allometric equation	0.0055	Levey and Karasov 1989
Belted kingfisher	0.148	Dunning 1993	0.0164	allometric equation	0.0180	USEPA 1993a
Mallard	1.18	Bellrose 1980	0.0658	allometric equation	0.0647	allometric equation
Marsh wren	0.011	Dunning 1993	0.0029	allometric equation	0.0025	USEPA 1993d
Mourning dove	0.127	Tomlinson et al. 1994	0.0148	allometric equation	0.0151	allometric equation
Mammals						
Deer mouse	0.017	Silva and Downing 1995	0.0030	USEPA 1993d	0.0005	USEPA 1993d
Mink	0.777	Silva and Downing 1995	0.0218	USEPA 1993d	0.0263	USEPA 1993d
Muskrat	1.17	Silva and Downing 1995	0.1139	allometric equation	0.0596	USEPA 1993d
Red fox	4.06	Silva and Downing 1995	0.3494	allometric equation	0.1231	Sample and Suter 1994
Short-tailed shrew	0.017	USEPA 1993d	0.0038	USEPA 1993d	0.0015	USEPA 1993d

TABLE 7-29
Exposure Parameters for Upper Trophic Level Ecological Receptors - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Receptor	Dietary Composition (percent)							Soil/ Sediment Ingestion (percent)	
	Terr. Plants	Soil Invert.	Small Mammals	Fish/ Frogs	Aquatic Plants	Benthic Invert.	Reference[1]	Value	Reference[1]
Birds									
American robin	51.9	43.5	0	0	0	0	Martin et al. 1951	4.6	Sample and Suter 1994
Belted kingfisher	0	0	0	84.0	0	16.0	USEPA 1993d	0	Sample and Suter 1994
Mallard	0	0	0	0	86.7	10.0	Palmer 1976	3.3	Beyer et al. 1994
Marsh wren	0	0	0	0	0	95.0	USEPA 1993d	5.0	Assumed based on diet
Mourning dove	95.0	0	0	0	0	0	Tomlinson et al. 1994	5.0	Assumed based on diet
Mammals									
Deer mouse	53.0	45.0	0	0	0	0	Martin et al. 1951	2.0	Beyer et al. 1994
Mink	0	0	0	94.0	1.0	5.0	USEPA 1993d	0	Sample and Suter 1994
Muskrat	0	0	0	0	90.6	0	USEPA 1993d	9.4	Beyer et al. 1994 (raccoon)
Red fox	7.0	2.8	87.4	0	0	0	USEPA 1993d	2.8	Beyer et al. 1994
Short-tailed shrew	4.7	82.3	0	0	0	0	USEPA 1993d; Sample and Suter 1994	13.0	Sample and Suter 1994

Notes:
[1] - See Section 9 of Text for Complete Reference

TABLE 7-30
Ingestion Screening Values for Mammals
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor		
									Deermouse	Red Fox	Shrew
Inorganics											
Aluminum	mouse	0.03	3 generations (390 days)	oral in water/diet	reproduction	245	49.0	ATSDR 2008	X	X	X
Antimony	mouse	0.03	lifetime	oral in water	lifespan/longevity	1.25	0.25	Sample et al. 1996	X	X	X
Cadmium	rat	0.303	6 weeks	oral (gavage)	reproduction	10.0	1.00	Sample et al. 1996	X		X
Cadmium	dog	10.0	3 months	oral in diet	reproduction	3.75	0.75	ATSDR 1999a		X	
Copper	mouse	0.03	1 month + GD 0-19	oral in diet	developmental	104	78.0	ATSDR 2004c	X		X
Copper	mink	1.00	357 days	oral in diet	reproduction	15.1	11.7	Sample et al. 1996		X	
Lead	rat	0.35	3 generations	oral in diet	reproduction	80.0	8.00	Sample et al. 1996	X	X	X
Mercury	rat	0.35	3 generations	oral in diet	reproduction	0.07	0.02	Sample et al. 1996	X		X
Mercury	mink	1.00	93 days	oral in diet	survival/weight loss	0.07	0.02	Sample et al. 1996		X	
Selenium	rat	0.35	1 year	oral in water	reproduction	0.33	0.20	Sample et al. 1996	X	X	X
Silver	rat	0.35	2 weeks	oral in water	survival	45.3	9.06	ATSDR 1990	X	X	X
Thallium	rat	0.365	60 days	oral in water	reproduction	0.185	0.037	Sample et al. 1996	X	X	X
Zinc	rat	0.35	GD 1-16	oral in diet	reproduction	320	160	Sample et al. 1996	X		X
Zinc	mink	1.00	25 weeks	oral	reproduction	104	20.8	ATSDR 2005		X	
Pesticides/PCBs											
4,4'-DDT	rat	0.35	2 years	oral in diet	reproduction	4.00	0.80	Sample et al. 2002b	X		X
4,4'-DDT	dog	10.0	2 generations	oral in diet	reproduction	5.00	1.00	ATSDR 1994b		X	
Aroclor-1242	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.68	0.14	Sample et al. 1996	X		X
Aroclor-1242	mink	1.00	7 months	oral in diet	reproduction	0.69	0.14	Sample et al. 1996		X	
Aroclor-1248	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.68	0.14	Sample et al. 1996	X		X
Aroclor-1248	mink	1.00	4.5 months	oral in diet	reproduction	0.69	0.14	Sample et al. 1996		X	
Aroclor-1254	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.68	0.14	Sample et al. 1996	X		X
Aroclor-1254	mink	1.00	4.5 months	oral in diet	reproduction	0.69	0.14	Sample et al. 1996		X	
Aroclor-1260	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.68	0.14	Sample et al. 1996	X		X
Aroclor-1260	mink	1.00	4.5 months	oral in diet	reproduction	0.69	0.14	Sample et al. 1996		X	
PCBs (total)	oldfield mouse	0.014	12 months	oral in diet	reproduction	0.037	0.00	Sample et al. 1996	X		X
PCBs (total)	mink	1.00	4.5 months	oral in diet	reproduction	0.037	0.0037	Sample et al. 1996		X	
Semivolatile Organics											
Benzo(a)anthracene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X	X
Benzo(a)pyrene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X	X
Benzo(b)fluoranthene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X	X
Benzo(k)fluoranthene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X	X
bis(2-Ethylhexyl)phthalate	mouse	0.03	105 days	oral in diet	reproduction	183	18.3	Sample et al. 1996	X	X	X
Butylbenzylphthalate	--	--	--	--	--	NA	NA	--	X	X	X
Carbazole	--	--	--	--	--	NA	NA	--	X	X	X
Chrysene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X	X
Dibenz(a,h)anthracene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X	X

TABLE 7-30
Ingestion Screening Values for Mammals
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor		
									Deermouse	Red Fox	Shrew
Dibenzofuran	--	--	--	--	--	NA	NA	--	X	X	X
Di-n-butylphthalate	mouse	0.03	105 days	oral in diet	reproduction	1,833	550	Sample et al. 1996	X	X	X
Di-n-octylphthalate	mouse	0.03	105 days	oral in diet	reproduction	550	110	Sample et al. 1996	X	X	X
Fluoranthene	mouse	0.03	13 weeks	oral (gavage)	reproduction	2,500	500	ATSDR 1995	X	X	X
Naphthalene	mouse	0.03	13 weeks	oral (gavage)	reproduction	1,000	200	ATSDR 1995	X	X	X
Phenanthrene	mouse	0.03	13 weeks	oral (gavage)	reproduction	2,500	500	ATSDR 1995	X	X	X
Pyrene	mouse	0.03	GD 7-16	oral (gavage)	reproduction	10.0	2.00	Sample et al. 1996	X	X	X
Volatile Organics											
Acetone	rat	0.35	90 days	oral (gavage)	liver/kidney	500	100	Sample et al. 1996	X	X	X
Dioxins/Furans											
Dioxin/furan (TEQ) - Mammal (total)	rat	0.35	3 generations	oral in diet	reproduction	0.00001	0.000001	Sample et al. 1996	X	X	X
Dioxin/furan (TEQ) - Bird (total)	rat	0.35	3 generations	oral in diet	reproduction	0.00001	0.000001	Sample et al. 1996	X	X	X

Notes:
[1] - See Section 9 of Text for Complete Reference

TABLE 7-31
Ingestion Screening Values for Birds
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor		
									American Robin	Mourning Dove	Red-Tailed Hawk
Inorganics											
Aluminum	ringed dove	0.155	4 months	oral in diet	reproduction	549	110	Sample et al. 1996	X	X	X
Antimony	--	--	--	--	--	NA	NA	--	X	X	X
Cadmium	mallard	1.15	90 days	oral in diet	reproduction	20.0	1.45	Sample et al. 1996	X	X	X
Copper	chicken (chicks)	0.534	10 weeks	oral in diet	growth/survival	61.7	47.0	Sample et al. 1996	X	X	X
Lead	Japanese quail	0.15	12 weeks	oral in diet	reproduction	11.3	1.13	Sample et al. 1996		X	
Lead	American kestrel	0.13	7 months	oral in diet	reproduction	19.3	3.85	Sample et al. 1996	X		X
Mercury	red-tailed hawk	1.10	12 weeks	oral in diet	survival/neurological	0.30	0.05	USEPA 1995a	X		X
Mercury	Japanese quail	0.15	1 year	oral in diet	reproduction	0.30	0.05	Sample et al. 1996		X	
Selenium	screech owl	0.20	13.7 weeks	oral in diet	reproduction	1.50	0.44	Sample et al. 1996	X	X	X
Silver	chicken (chicks)	0.80	not specified	oral in diet	growth	35.0	7.00	Eisler 1996	X	X	X
Thallium	European starling	0.082	acute	oral	survival	1.75	0.35	USEPA 1999	X	X	X
Zinc	chicken	1.94	44 weeks	oral in diet	reproduction	131	14.5	Sample et al. 1996	X	X	X
Pesticides/PCBs											
4,4'-DDT	Japanese quail	0.11	3 generations	oral in diet	reproduction	5.00	0.50	USEPA 1995a	X	X	
4,4'-DDT	barn owl	0.47	2 years	oral in diet	reproduction	0.40	0.08	Blus 1996			X
Aroclor-1242	ring-necked pheasant	1.00	17 weeks	oral	reproduction	1.80	0.36	Sample et al. 1996		X	
Aroclor-1242	screech owl	0.181	2 generations	oral in diet	reproduction	2.05	0.41	Sample et al. 1996	X		X
Aroclor-1248	ring-necked pheasant	1.00	17 weeks	oral	reproduction	1.80	0.36	Sample et al. 1996		X	
Aroclor-1248	screech owl	0.181	2 generations	oral in diet	reproduction	2.05	0.41	Sample et al. 1996	X		X
Aroclor-1254	ring-necked pheasant	1.00	17 weeks	oral	reproduction	1.80	0.36	Sample et al. 1996		X	
Aroclor-1254	screech owl	0.181	2 generations	oral in diet	reproduction	2.05	0.41	Sample et al. 1996	X		X
Aroclor-1260	ring-necked pheasant	1.00	17 weeks	oral	reproduction	1.80	0.36	Sample et al. 1996		X	
Aroclor-1260	screech owl	0.181	2 generations	oral in diet	reproduction	2.05	0.41	Sample et al. 1996	X		X
PCBs (total)	ring-necked pheasant	1.00	17 weeks	oral	reproduction	0.58	0.29	Sample et al. 1996		X	
PCBs (total)	screech owl	0.181	2 generations	oral in diet	reproduction	0.58	0.29	Sample et al. 1996	X		X
Semivolatile Organics											
Benzo(a)anthracene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(a)pyrene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(b)fluoranthene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Benzo(k)fluoranthene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
bis(2-Ethylhexyl)phthalate	ringed dove	0.155	4 weeks	oral in diet	reproduction	5.55	1.11	Sample et al. 1996	X	X	X
Butylbenzylphthalate	--	--	--	--	--	NA	NA	--	X	X	X
Carbazole	--	--	--	--	--	NA	NA	--	X	X	X
Chrysene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Dibenz(a,h)anthracene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Di-n-butylphthalate	ringed dove	0.155	4 weeks	oral in diet	reproduction	1.10	0.22	Sample et al. 1996	X	X	X
Di-n-octylphthalate	--	--	--	--	--	NA	NA	--	X	X	X
Fluoranthene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Naphthalene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X

TABLE 7-31
Ingestion Screening Values for Birds
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	NOAEL (mg/kg/d)	Reference[1]	Receptor		
									American Robin	Mourning Dove	Red-Tailed Hawk
Phenanthrene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Pyrene	chicken	1.50	35 days	oral in diet	reproduction	35.5	7.10	Rigdon and Neal 1963	X	X	X
Volatile Organics											
Acetone	--	--	--	--	--	NA	NA	--	X	X	X
Dioxins/Furans											
Dioxin/furan (TEQ) - Mammal (total)	ring-necked pheasant	1.00	10 weeks	injection	reproduction	0.00014	0.000014	Sample et al. 1996	X	X	X

Notes:
[1] - See Section 9 of Text for Complete Reference

TABLE 7-32
Screening Statistics - AOC 1 Soil - Direct Exposures - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	95% UCL	Screening Value	Frequency of Exceedance	Mean Hazard Quotient[1]	95% UCL HQ
Inorganics (MG/KG)										
Aluminum	-- - --	32 / 32	26,000	LCKSO-6 2-3	7,666	9263	50.0	32 / 32	153	185
Barium	-- - --	48 / 48	490	EEGLKB-SS01	112	128.90	330	2 / 48	< 1	< 1
Chromium, total	11.0 - 11.0	47 / 48	35.5	LCK-SO6B	12.3	13.56	0.40	47 / 48	31	34
Copper	21.0 - 23.0	29 / 32	140	LCKSO-8 0-1	24.8	29.85	70.0	1 / 32	< 1	< 1
Lead	-- - --	48 / 48	9,340	LCKSO-8 0-1	238	2,170	120	4 / 48	2.0	18
Mercury	2.00E-05 - 0.33	22 / 48	0.79	LCK-SO6B	0.077	0.24	0.10	6 / 48	< 1	2.4
Selenium	0.14 - 11.0	19 / 48	3.50	EEGLKB-SS02	0.89	1.64	0.52	16 / 48	1.7	3.2
Thallium	0.51 - 18.0	17 / 32	2.80	EEGLKB-SS02	2.06	3.70	1.00	17 / 32	2.1	2.8[2]
Zinc	-- - --	48 / 48	1,650	LCK-SO6B	121	274.4	120	7 / 48	1.01	2.3
Pesticide/Polychlorinated Biphenyls (MG/KG)										
Chlordane, gamma-	0.0019 - 0.22	3 / 36	0.44	EEGLKB-SS05	0.052	0.206	0.22	2 / 36	< 1	< 1
DDT, p,p'-	0.0020 - 0.22	11 / 40	0.42	EEGLKB-SS11	0.059	0.200	0.0035	11 / 40	17	57
PCB 1248	0.019 - 0.77	1 / 40	16.0	EEGLKB-SS10	0.44	4.41	0.371	1 / 40	1.2	12
PCB 1254	0.019 - 2.00	5 / 40	0.81	LCK-SODUP2	0.092	0.410	0.371	1 / 40	< 1	1.1
Total PCBs	-- - --	5 40	22	EEGLKB-SS10	0.901	6.35	0.371	5 / 40	2.4	17
Semivolatile Organic Compounds (MG/KG)										
Acenaphthene	0.038 - 8.10	19 / 41	85.0	EEGLKB-SS06	4.93	29.79	20.0	4 / 41	< 1	1.5
Benz(a)anthracene	0.039 - 3.50	33 / 41	450	EEGLKB-SS05	37.0	188.2	5.21	9 / 41	7.1	36.1
Benzo(a)pyrene	0.039 - 3.50	32 / 41	380	EEGLKB-SS05	32.7	165	1.52	15 / 41	22	108
Benzo(b)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	28.5	141.30	59.8	6 / 41	< 1	2.4
Benzo(k)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	29.2	148.90	148	5 / 41	< 1	1.01
Benzoic acid	0.77 - 19.0	3 / 20	4.80	EEGLKB-SS02	2.10	8.055	NSV	-- / --	NSV	NSV
Bis(2-ethylhexyl) phthalate	0.19 - 4.70	8 / 41	16.0	LCKSB-12 0-0.5	0.90	4.8	0.93	3 / 41	< 1	5.2
Butylbenzyl phthalate	0.074 - 8.10	1 / 41	0.73	LCK-SO6B	0.38	1.446	NSV	-- / --	NSV	NSV
Carbazole	0.19 - 4.00	17 / 41	88.0	EEGLKB-SS06	5.16	32.18	NSV	-- / --	NSV	NSV
Chrysene	0.35 - 3.50	35 / 41	470	EEGLKB-SS05	37.7	196.7	4.73	10 / 41	8.0	42
Dibenz(ah)anthracene	0.038 - 3.50	22 / 41	71.0	EEGLKB-SS05	5.14	28.30	18.4	4 / 41	< 1	1.5
Dibenzofuran	0.077 - 8.10	16 / 41	42.0	EEGLKB-SS06	2.92	15.65	NSV	-- / --	NSV	NSV
Di-n-butyl phthalate	0.040 - 8.10	1 / 41	2.60	LCK-SO6B	0.55	1.87	0.15	1 / 41	3.6	12
Di-n-octyl phthalate	0.35 - 9.20	1 / 41	15.0	LCKSB-12 0-0.5	1.03	4.829	NSV	-- / --	NSV	NSV
Fluoranthene	0.35 - 3.50	35 / 41	1,100	EEGLKB-SS05	87.7	467.80	122	5 / 41	< 1	3.8
Fluorene	0.038 - 8.10	17 / 41	67.0	EEGLKB-SS06	4.69	26.69	30.0	3 / 41	< 1	< 1
Indeno(1,2,3-cd)pyrene	0.039 - 3.50	30 / 41	130	EEGLKB-SS05	12.5	60.63	109	2 / 41	< 1	< 1
Methylnaphthalene, 2-	0.039 - 8.10	13 / 41	14.0	EEGLKB-SS06	1.14	1.52	3.24	6 / 41	< 1	< 1
Methylphenol, 3- and/or 4-	0.074 - 1.90	2 / 20	0.25	EEGLKB-SS05	0.20	0.78	NSV	-- / --	NSV	NSV
Naphthalene	0.039 - 8.10	11 / 41	13.0	EEGLKB-SS06	0.84	4	0.099	9 / 41	8.4	42
Phenanthrene	0.039 - 0.44	34 / 41	600	EEGLKB-SS06	45.5	243.1	45.7	6 / 41	< 1	5.3
Pyrene	0.040 - 3.50	33 / 41	870	EEGLKB-SS05	67.3	358.8	45.7	6 / 41	1.5	7.9
Total Low Molecular Weight PAHs	- - -	34 / 41	910	EEGLKB-SS06	68.26	366.8	28	8 / 41	2.4	13
Total High Molecular Weight PAHs	- - -	35 / 41	4,261	EEGLKB-SS05	349	1802	18	14 / 41	19	100
Explosives (MG/KG)										
Trinitrotoluene, 2,4,6-	5.00E-04 - 0.25	2 / 23	5.30	EEGLKB-SS08 Dup02	0.50	3.31	NSV	-- / --	NSV	NSV
Volatile Organic Compounds (MG/KG)										
Acetone	0.0090 - 0.029	20 / 41	34.0	EEGLKB-SS18	1.38	9.8	2.50	5 / 41	< 1	3.9
Dioxin/Furans (MG/KG)										
TCDD-TEQ	-- - --	15 / 15	6.60E-05	LCKSO-7 2-3	9.33E-06	0.000018	3.15E-07	15 / 15	30	57.1

NSV - No Screening Value
1 - Shaded cells indicate hazard quotient based on reporting limits
2 - HQ based on maximum concentration due to 95 percent UCL exceeding Maximum Value

TABLE 7-33
Screening Statistics - AOC 2 Soil - Direct Exposures - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	95%	Screening Value	Frequency of Exceedance	Mean Hazard Quotient[1]	95% UCL HQ
Inorganics (MG/KG)										
Arsenic	-- - --	16 / 16	25.1	LCK-SO3B	10.7	13.3	18.0	1 / 16	< 1	< 1
Cobalt	-- - --	8 / 8	26.0	LCKSB-11[2]	9.35	19.99	13.0	1 / 8	< 1	1.5
Manganese	990 - 990	7 / 8	1,600	LCKSB-11[2]	511	915	220	5 / 8	2.3	4.2
Selenium	0.15 - 1.80	7 / 16	0.60	EEGLKB-SS21	0.44	0.53	0.52	3 / 16	< 1	1.02
Thallium	0.57 - 1.00	4 / 8	2.20	EEGLKB-SS21	1.26	--	1.00	4 / 8	1.3	2.2[3]
Zinc	-- - --	16 / 16	125	LCK-SO5B	70.1	79.5	120	1 / 16	< 1	< 1
Pesticide/Polychlorinated Biphenyls (MG/KG)										
DDE, p,p'-	0.0023 - 0.012	3 / 16	0.81	LCK-SO4A	0.066	0.571	0.60	1 / 16	< 1	< 1
DDT, p,p'-	0.0023 - 0.012	3 / 16	0.46	LCK-SO4A	0.043	0.332	0.0035	3 / 16	12	95
Semivolatile Organic Compounds (MG/KG)										
Naphthalene	0.044 - 0.44	4 / 16	0.12	EEGLKB-SS21	0.16	0.24	0.099	1 / 16	1.2	2.4
Volatile Organic Compounds (MG/KG)										
Acetone	0.0050 - 0.024	5 / 16	40.0	EEGLKB-SS22	2.79	27.56	2.50	2 / 16	1.1	11
Dioxin/Furans (MG/KG)										
TCDD-TEQ	-- - --	5 / 5	4.63E-06	EEGLKB-SS20	2.38E-06	--	3.15E-07	5 / 5	7.54	15[4]

NSV - No Screening Value
1 - Shaded cells indicate hazard quotient based on reporting limits
2 - Result from Duplicate Sample: LCKSB-15 0-0.5
3 - HQ based on maximum concentration due to 95 percent UCL exceeding Maximum Value
4 - HQ based on maximum concentration due to insufficient samples to calculate UCL

TABLE 7-34
Screening Statistics - Direct Exposures for West Ditch Sediment - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	95% UCL	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient[1]	95% UCL HQ
Inorganics (MG/KG)									
Arsenic	-- - --	9 / 9	22.0	EEGLKB-SD02	16.6	9.79	8 / 9	2.2	1.7
Cobalt	-- - --	6 / 6	16.0	LCKSD-4	--	NSV	-- / --	NSV	NSV
Lead	-- - --	9 / 9	51.0	EEGLKB-SD04	29.75	35.8	1 / 9	1.4	< 1
Pesticide/Polychlorinated Biphenyls (MG/KG)									
DDD, p,p'-	0.0038 - 0.011	6 / 9	0.077	EEGLKB-SD03	0.0412	0.0049	6 / 9	16	8.4
DDE, p,p'-	0.0025 - 0.011	2 / 9	0.0091	EEGLKB-SD03	0.00611	0.0032	2 / 9	2.9	1.9
DDT, p,p'-	0.0038 - 0.011	5 / 9	0.019	EEGLKB-SD03	0.0101	0.0042	5 / 9	4.6	2.4
PCB 1260	0.019 - 0.073	1 / 9	0.023	EEGLKB-SD01	0.0245	0.810	-- / --	4.6	< 1
Total PCBs	-- - --	1 / 9	0.089	EEGLKB-SD01	0.185	0.0598	1 / 9	1.5	3.1
Semivolatile Organic Compounds (MG/KG)									
Acenaphthene	0.043 - 0.73	2 / 9	0.038	EEGLKB-SD02	0.21	0.0067	2 / 9	5.7	5.7
Benz(a)anthracene	0.043 - 0.73	4 / 9	0.13	EEGLKB-SD02	0.03	0.11	1 / 9	1.2	1.2
Benzo(a)pyrene	0.043 - 0.73	4 / 9	0.17	LCK-SE1	0.22	0.15	1 / 9	1.1	< 1
Chrysene	0.39 - 0.39	6 / 9	0.37	LCKSD-4	0.25	0.17	4 / 9	2.2	1.11
Fluoranthene	0.39 - 0.39	7 / 9	0.71	LCKSD-4	0.48	0.42	3 / 9	1.7	< 1
Methylnaphthalene, 2-	0.043 - 0.73	2 / 9	0.048	EEGLKB-SD03	0.22	0.020	2 / 9	2.4	2.4
Phenanthrene	0.043 - 0.73	3 / 9	0.21	EEGLKB-SD03	0.23	NSV	-- / --	NSV	NSV
Pyrene	0.043 - 0.39	6 / 9	0.63	LCKSD-4	0.36	0.20	4 / 9	3.2	1.2
Total Low Molecular Weight PAHs	-- - --	3 9	2.56	LCKSD-4	1.483	0.076	3 / 9	34	20
Total High Molecualr Weight PAHs	-- - --	7 9	4.37	LCKSD-4	2.52	0.19	7 / 9	23	13
Total PAHs	-- - --	7 9	6.93	LCKSD-4	3.97	1.61	7 / 9	4.3	2.5
Volatile Organic Compounds (MG/KG)									
Acetone	0.0040 - 0.033	6 / 9	9.80	EEGLKB-SD02	12.01	0.0099	6 / 9	990	1213
Chloroethane	0.0049 - 0.097	1 / 9	0.0048	EEGLKB-SD04	0.0308	NSV	-- / --	NSV	NSV
Methyl ethyl ketone	0.011 - 0.097	1 / 9	0.036	LCKSD-4	0.0288	0.042	0 / 9	< 1	< 1
Methylene chloride	0.0059 - 0.097	1 / 8	0.024	LCK-SE1-RE	0.038	0.16	0 / 8	< 1	< 1
Toluene	0.0049 - 0.024	3 / 9	0.0024	EEGLKB-SD04	0.00858	1.22	0 / 9	< 1	< 1
Trichlorofluoromethane	0.0022 - 0.097	2 / 4	0.0038	EEGLKB-SD01	--	NSV	-- / --	NSV	NSV
Dioxin/Furans (MG/KG)									
TCDD-TEQ	-- - --	2 / 2	4.06E-06	LCKSD-6	--	1.20E-07	2 / 2	34	--

NSV - No Screening Value
1 - Shaded cells indicate hazard quotient based on reporting limits
2 - Macronutrient - Not considered to be a COPC

TABLE 7-35
Screening Statistics - Food Web Exposures for AOC 1 Soil - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	95% UCL	Screening Value	Frequency of Exceedance	Mean Hazard Quotient[1]	95% UCL HQ
Inorganics (MG/KG)										
Aluminum	-- - --	32 / 32	26,000	LCKSO-6 2-3	7,666	9263	NSV	-- / --	NSV	NSV
Antimony	5.20 - 66.0	2 / 32	1.40	EEGLKB-SS10	6.32	12.20	0.27	2 / 32	5.2	45
Cadmium	0.42 - 6.00	20 / 48	6.30	LCK-SO9B	0.81	1.51	0.36	16 / 48	2.2	4.2
Copper	21.0 - 23.0	29 / 32	140	LCKSO-8 0-1	24.8	29.9	28.0	7 / 32	< 1	1.1
Lead	-- - --	48 / 48	9,340	LCKSO-8 0-1	238	2,170	11.0	42 / 48	22	197
Mercury	2.00E-05 - 0.33	22 / 48	0.79	LCK-SO6B	0.077	0.240	0.10	6 / 48	< 1	2.4
Selenium	0.14 - 11.0	19 / 48	3.50	EEGLKB-SS02	0.89	1.64	0.63	13 / 48	1.4	2.6
Silver	0.42 - 11.0	4 / 48	190	EEGLKB-SS14	4.84	44.10	4.20	1 / 48	1.2	11
Thallium	0.51 - 18.0	17 / 32	2.80	EEGLKB-SS02	2.06	--	0.057	17 / 32	36	49[2]
Zinc	-- - --	48 / 48	1,650	LCK-SO6B	121	274	46.0	39 / 48	2.6	6.0
Pesticide/Polychlorinated Biphenyls (MG/KG)										
Chlordane, gamma-	0.0019 - 0.22	3 / 36	0.44	EEGLKB-SS05	0.052	0.206	0.22	2 / 36	< 1	< 1
DDT, p,p'-	0.0020 - 0.22	11 / 40	0.42	EEGLKB-SS11	0.059	0.200	0.0035	11 / 40	17	57
PCB 1242	0.019 - 2.00	2 / 40	0.23	EEGLKB-SS05	0.074	0.339	0.000332	2 / 40	223	1021
PCB 1248	0.019 - 0.77	1 / 40	16.0	EEGLKB-SS10	0.44	4.41	0.000332	1 / 40	1327	13289
PCB 1254	0.019 - 2.00	5 / 40	0.81	LCK-SODUP2	0.092	0.410	0.000332	5 / 40	277	1235
PCB 1260	0.019 - 2.00	3 / 40	0.26	EEGLKB-SS18	0.071	0.338	0.000332	1 / 40	215	1018
Total PCBs	-- - --	5 40	22	EEGLKB-SS10	0.901	6.35	0.000332	5 / 40	2714	19127
Semivolatile Organic Compounds (MG/KG)										
Benz(a)anthracene	0.039 - 3.50	33 / 41	450	EEGLKB-SS05	37.0	450	5.21	9 / 41	7.1	86
Benzo(a)pyrene	0.039 - 3.50	32 / 41	380	EEGLKB-SS05	32.7	380	1.52	15 / 41	22	250
Benzo(b)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	28.5	340	59.8	6 / 41	< 1	5.7
Benzo(k)fluoranthene	0.35 - 3.50	34 / 41	340	EEGLKB-SS05	29.2	148.90	148	5 / 41	< 1	1.01
Benzoic acid	0.77 - 19.0	3 / 20	4.80	EEGLKB-SS02	2.10	8.055	NSV	-- / --	NSV	NSV
Bis(2-ethylhexyl) phthalate	0.19 - 4.70	8 / 41	16.0	LCKSB-12 0-0.5	0.90	16.0	0.93	3 / 41	< 1	17
Butylbenzyl phthalate	0.074 - 8.10	1 / 41	0.73	LCK-SO6B	0.38	1.446	NSV	-- / --	NSV	NSV
Carbazole	0.19 - 4.00	17 / 41	88.0	EEGLKB-SS06	5.16	32.18	NSV	-- / --	NSV	NSV
Chrysene	0.35 - 3.50	35 / 41	470	EEGLKB-SS05	37.7	196.7	4.73	10 / 41	8.0	42
Dibenz(ah)anthracene	0.038 - 3.50	22 / 41	71.0	EEGLKB-SS05	5.14	28.30	18.4	4 / 41	< 1	1.5
Dibenzofuran	0.077 - 8.10	16 / 41	42.0	EEGLKB-SS06	2.92	15.65	NSV	-- / --	NSV	NSV
Di-n-butyl phthalate	0.040 - 8.10	1 / 41	2.60	LCK-SO6B	0.55	1.87	0.15	1 / 41	3.6	12
Di-n-octyl phthalate	0.35 - 9.20	1 / 41	15.0	LCKSB-12 0-0.5	1.03	4.829	NSV	-- / --	NSV	NSV
Fluoranthene	0.35 - 3.50	35 / 41	1,100	EEGLKB-SS05	87.7	467.80	122	5 / 41	< 1	3.8
Indeno(1,2,3-cd)pyrene	0.039 - 3.50	30 / 41	130	EEGLKB-SS05	12.5	60.63	109	2 / 41	< 1	< 1
Methylnaphthalene, 2-	0.039 - 8.10	13 / 41	14.0	EEGLKB-SS06	1.14	1.52	3.24	6 / 41	< 1	< 1
Methylphenol, 3- and/or 4-	0.074 - 1.90	2 / 20	0.25	EEGLKB-SS05	0.20	0.78	NSV	-- / --	NSV	NSV
Naphthalene	0.039 - 8.10	11 / 41	13.0	EEGLKB-SS06	0.84	4	0.099	9 / 41	8.4	42

TABLE 7-35
Screening Statistics - Food Web Exposures for AOC 1 Soil - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	95% UCL	Screening Value	Frequency of Exceedance	Mean Hazard Quotient[1]	95% UCL HQ
Phenanthrene	0.039 - 0.44	34 / 41	600	EEGLKB-SS06	45.5	243.1	45.7	6 / 41	< 1	5.3
Pyrene	0.040 - 3.50	33 / 41	870	EEGLKB-SS05	67.3	358.8	45.7	6 / 41	1.5	7.9
Total Low Molecular Weight PAHs	- - -	34 / 41	910	EEGLKB-SS06	68.26	366.8	100	5 / 41	< 1	3.7
Total High Molecular Weight PAHs	- - -	35 / 41	4,261	EEGLKB-SS05	349	1802	1.1	37 / 41	317	1638
Explosives (MG/KG)										
Trinitrotoluene, 2,4,6-	5.00E-04 - 0.25	2 / 23	5.30	EEGLKB-SS08 Dup02	0.50	3.31	NSV	-- / --	NSV	NSV
Volatile Organic Compounds (MG/KG)										
Acetone	0.0090 - 0.029	20 / 41	34.0	EEGLKB-SS18	1.38	34.00	2.50	5 / 41	< 1	14
Dioxin/Furans (MG/KG)										
TCDD-TEQ	-- - --	15 / 15	6.60E-05	LCKSO-7 2-3	9.33E-06	6.60E-05	3.15E-07	15 / 15	30	210

NSV - No Screening Value
1 - Shaded cells indicate hazard quotient based on reporting limits
2 - HQ based on maximum concentration due to 95 percent UCL exceeding Maximum Value

TABLE 7-36
Summary of Hazard Quotients for Food Web Exposures Soil, AOC 1 - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Short-tailed shrew			Deer mouse			Red fox			American robin			Mourning dove			Red-tailed hawk		
	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC
Inorganics																		
Aluminum	2.7	< 1	1.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Antimony	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Cadmium	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Copper	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lead	9.2	< 1	2.9	1.5	< 1	< 1	< 1	< 1	< 1	8.0	1.6	3.6	20	2.0	6.2	1.5	< 1	< 1
Mercury	1.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Selenium	0.70	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Silver	0.78	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Thallium	6.4	1.3	2.9	1.1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Zinc	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.8	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pesticides/PCBs																		
4,4'-DDT	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Aroclor-1242	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Aroclor-1248	10.52	2.10	4.71	1.93	< 1	< 1	< 1	< 1	< 1	1.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Aroclor-1254	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Aroclor-1260	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
PCBs (total)	557	56	176	102	10	32	26	2.6	8.1	3.0	1.5	2.1	< 1	< 1	< 1	< 1	< 1	< 1
Semivolatile Organics																		
Benzo(a)anthracene	7.0	1.4	3.1	1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(a)pyrene	6.9	1.4	3.1	1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(b)fluoranthene	4.6	< 1	2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(k)fluoranthene	2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Butylbenzylphthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	4.29	< 1	1.92	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibenz(a,h)anthracene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibenzofuran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Di-n-octylphthalate	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Fluoranthene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.08	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Phenanthrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pyrene	7.19	1.44	3.22	1.19	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Volatile Organics																		
Acetone	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Explosives																		
2,4,6,Trinitrotoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dioxin/Furans																		
Dioxin/furan (TEQ) - Mammal (total)	45.97	4.60	15	8.5	< 1	2.7	2.7	< 1	< 1	--	--	--	--	--	--	--	--	--
Dioxin/furan (TEQ) - Bird (total)	--	--	--	--	--	--	--	--	--	1.8	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

TABLE 7-37
Screening Statistics - Food Web Exposures for AOC 2 Soil - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

AnalyteName	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	95% UCL	Screening Value	Frequency of Exceedance	Mean Hazard Quotient[1]	95% UCL HQ
Inorganics (MG/KG)										
Arsenic	-- - --	16 / 16	25.1	LCK-SO3B	10.7	13.3	18.0	1 / 16	< 1	< 1
Cobalt	-- - --	8 / 8	26.0	LCKSB-11[2]	9.35	19.99	28.0	0 / 8	< 1	< 1
Manganese	990 - 990	7 / 8	1,600	LCKSB-11[2]	511	915	4,000	0 / 8	< 1	< 1
Selenium	0.15 - 1.80	7 / 16	0.60	EEGLKB-SS21	0.44	0.53	0.63	0 / 16	< 1	< 1
Thallium	0.57 - 1.00	4 / 8	2.20	EEGLKB-SS21	1.26	--	0.057	4 / 8	22	38[3]
Pesticide/Polychlorinated Biphenyls (MG/KG)										
DDE, p,p'-	0.0023 - 0.012	3 / 16	0.81	LCK-SO4A	0.066	0.571	0.60	1 / 16	< 1	< 1
DDT, p,p'-	0.0023 - 0.012	3 / 16	0.46	LCK-SO4A	0.043	0.332	0.0035	3 / 16	12	95
Volatile Organic Compounds (MG/KG)										
Acetone	0.0050 - 0.024	5 / 16	40.0	EEGLKB-SS22	2.79	27.56	2.50	2 / 16	1.1	11
Dioxin/Furans (MG/KG)										
TCDD-TEQ	-- - --	5 / 5	4.63E-06	EEGLKB-SS20	2.38E-06	--	3.15E-07	5 / 5	7.5	15[4]

NSV - No Screening Value
1 - Shaded cells indicate hazard quotient based on reporting limits
2 - Result from Duplicate Sample: LCKSB-15 0-0.5
3 - HQ based on maximum concentration due to 95 percent UCL exceeding Maximum Value
4 - HQ based on maximum concentration due to insufficient samples to calculate UCL

TABLE 7-38
Summary of Hazard Quotients for Food Web Exposures Soil, AOC 2 - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Short-tailed shrew			Deer mouse			Red fox			American robin			Mourning dove			Red-tailed hawk		
	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC
Inorganics																		
Thallium	5	1.1	2.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pesticides/PCBs																		
4,4'-DDT	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Volatile Organics																		
Acetone	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dioxin/Furans																		
Dioxin/furan (TEQ) - Mammal (total)	3.71	< 1	1.17	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dioxin/furan (TEQ) - Bird (total)	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

TABLE 7-39
Summary of Hazard Quotients for Food Web Exposures Soil, West Ditch - Step 3
Former Lockbourne Air Force Base, Lockbourne, Ohio

Chemical	Mink			Muskrat			Marsh wren			Belted kingfisher			Mallard		
	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC	NOAEL	LOAEL	MATC
Inorganics															
Arsenic	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Lead	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pesticides/PCBs															
PCBs (total)	10.0	< 1	3.2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

TABLE 7-40
Attributes for Judging Measures of Effects
Former Lockbourne Air Force Base, Lockbourne, Ohio

Category/Attribute	Description
I. Relationship between Measure of Effect and Assessment Endpoint	
▪ Degree of Association	The extent to which the measure of effect is representative of, correlated with, or applicable to the assessment endpoint; in particular, with respect to similarity of effect, target organ, mechanism of action, and level of ecological organization.
▪ Stressor/Response	The ability of an endpoint to demonstrate effects from chronic exposure to the stressor and to correlate the effects with the degree of exposure, susceptibility, and magnitude of effect.
▪ Utility of Measure	The ability to judge results of the study against well-accepted standards, criteria, or objective measures (e.g., sediment quality criteria and toxicity thresholds). As such, the attribute describes the applicability, certainty, and scientific basis of the measure, as well as the sensitivity of a benchmark in detecting environmental harm.
II. Data Quality	
▪ Quality of Data	The degree to which data quality objectives (DQOs) and other recognized characteristics of high quality studies are met. The appropriateness of data collection and analysis practices, as well as the implementation of the experimental design and the minimization of confounding factors strongly influence the data quality.
III. Study Design	
▪ Site-specificity	The extent to which chemical and/or biological data, media, species, environmental conditions, and habitat types used in the study reflect the site of interest.
▪ Stressor-specificity	The degree to which the measure of effect is associated with the specific stressor(s) of concern. Some measures of effects respond to a broad range of stressors, complicating interpretation of results, while others are more specific to a particular stressor.
▪ Sensitivity	The ability to detect a response in the measure of effect, expressed as a percentage of the total possible variability that the endpoint is able to detect. Additionally, this attribute reflects the ability of the measure of effect to discriminate between responses to a stressor and those resulting from natural or design variability and uncertainty.
▪ Spatial Representativeness	The degree of compatibility or overlap between the study area and locations of measurements or samples, stressors, ecological receptors, and potential exposure points.
▪ Temporal Representativeness	The compatibility or overlap between when data were collected or the period for which data are representative and the period during which effects of concern would be likely to be detected. Also linked to this attribute is the number of measurement or sampling events and the expected variability over time.
▪ Quantitativeness	The degree to which numbers can be used to describe the magnitude of response to the stressor. Some measure of effects yield qualitative or hierarchical results, while others are more quantitative. In addition, this attribute encompasses the extent to which biological significance can be interpreted from statistical significance.
▪ Use of a Standard Method	The extent to which the study follows protocols recommended by a recognized scientific authority (e.g., study designs or chemical measures published in the Code of Federal Regulations, developed by ASTM, or repeatedly published in the peer-reviewed scientific literature). This attribute also reflects the suitability and applicability of the method to the endpoint and the site, as well as any modifications made to the method.

TABLE 7-41
Score Definitions
Former Lockbourne Air Force Base, Lockbourne, Ohio

Attribute Category	Score/Definitions		
	Low	**Medium**	**High**
I. Relationship between Measurement and Assessment Endpoint	▪ Assessment endpoint is measured only indirectly. A weak correlation exists between the measurement and assessment endpoint. ▪ Endpoint response to stressor not demonstrated previously but is expected to occur based upon observations of similar stressors. ▪ Measure developed by investigator, has limited applicability, weak scientific basis, and relatively insensitive benchmark.	▪ Endpoints linked by the effect, target organ, and mechanism of action evaluated are not the same, or levels of ecological organization differ; or all of the above criteria are met but the assessment endpoint is not directly measured. ▪ Endpoint response to stressor has been noted, but not necessarily proven or has a statistically significant correlation ▪ Measure ranges from a personal index with limited applicability or a weak scientific basis or relatively insensitive benchmark to a well-accepted measure developed by a third party with moderate certainty, and scientific basis, and the benchmark is moderately sensitive.	▪ Assessment endpoint is measured directly ▪ A statistically significant correlation exists ▪ Measure was developed by a third party, is well accepted, and has very high levels of certainty and applicability, strong scientific basis, and is sensitive.
II. Data Quality	▪ Three or more DQOs not met; or ▪ DQOs just meet the needs of the risk assessment; or ▪ No documentation exists for not meeting DQOs and not discussion of that impact on the risk assessment provided	▪ One to two DQOs are not met; DQOs meet the risk assessment needs or are rigorous and comprehensive; and reasons for not meeting DQOs and the impact on the risk assessment are provided.	▪ DQOs are rigorous and comprehensive ▪ All DQOs were met
III. Study Design	▪ Only one or two of the following is derived from or reflects the site: data, media, species, environmental conditions, benchmark, and habitat type ▪ Measure of effect responds in the expected manner to various non-related stressors. ▪ Only changes greater than 1,000 times can be detected.	▪ Three to five of the following is derived from or reflects the site: data, media, species, environmental conditions, benchmark, and habitat type ▪ Measure of effect responds in the expected manner to closely related stressors. ▪ Changes between 2 and 1,000 times can be detected ▪ The locations of two to four of the following are overlapped spatially: study area, sampling/measurement site, stressors, receptors, and points of potential exposure	▪ Data, media, species, environmental conditions, benchmark, and habitat type are derived from or reflect the site conditions ▪ Particular stressor is known to be the only site-related stressor that the measure of effect responds in the expected manner. ▪ Changes of less than 2 times can be detected

TABLE 7-41
Score Definitions
Former Lockbourne Air Force Base, Lockbourne, Ohio

Attribute Category	Score/Definitions		
	Low	**Medium**	**High**
III. Study Design (cont.)	▪ Only two of the following are spatially overlapped, but only to a limited extent: study area, sampling/ measurement site, stressors, receptors, and points of potential exposures. ▪ Measurements were collected during a season when effects are not expected to be most observable and a single sampling or measurement event is conducted and there is high variability in the parameter over time. ▪ Results are qualitative and subjective. ▪ Method not previously published and is not an impact assessment, field survey, toxicity test, benchmark approach, toxicity quotient or tissue residue analysis.	▪ Ranges from measurements collected during a season different from when effects would be most observable or a single sampling or measurement was collected that also has high variability to measurements collected during the same period that effects would be most observable during two sampling or measurement events and have moderate variability. ▪ Results range from qualitative but objective to quantitative, can be tested for statistical significance, but do not reflect biological significance ▪ Ranges from the method being an impact assessment, field survey, toxicity test, benchmark approach, toxicity quotient, or tissue residue analysis, but the application has not been published or standardized to a standard method that is directly applicable to the measure of effect, but needs slight modifications or the methodology published in two peer-reviewed studies.	▪ At least five of the following are spatially overlapped: study area, sampling/measurement site, stressors, receptors, and points of potential exposures. ▪ Measurements were collected during the same periods that effects would be expected to be most observable and at least two sampling events are conducted and variability is low; or multiple sampling events are conducted and variability is moderate to high. ▪ Results are quantitative and can be tested for statistical significance. ▪ A standard method exists that was developed to test a measure of effect such as this with no modifications necessary or the methodology was used in three or more peer-reviewed studies.

TABLE 7-42
Measure of Effect Weighting
Former Lockbourne Air Force Base, Lockbourne, Ohio

Category/Attribute	Attribute Weighting Factor	Measure of effect Scoring	
		Modeled Exposure and Effects	**Rationale**
I. Relationship between Measurement and Assessment Endpoints			
▪ Degree of Association	High	Medium	Exposure models were species-specific, but effects data were benchmark values for surrogate mammalian species
▪ Stressor/Response	High	Medium	Exposure modeling was species and chemical-specific, but benchmarks instead of site-specific toxicity studies were used
▪ Utility of Measure	High	Medium	Modeled exposure and effects procedures used are standardized and widely accepted, the primary limitation is lack of receptor-specific effects data
II. Data Quality			
▪ Quality of data	High	High	Exposure and effect data were gathered primarily from peer reviewed scientific literature
III. Study Design			
▪ Site-specificity	High	Medium	Media concentrations used in exposure models were site-specific, but other exposure parameters were literature-based
▪ Stressor-specificity	High	High	Modeled exposure and effects were specific to each of the COECs
▪ Sensitivity	High	N/A	Modeled exposure and effects do not compare potential effects associated with other stressors
▪ Spatial representativeness	High	Medium	Modeled exposures relied on abiotic media data collected throughout the Lockbourne landfill, but may not reflect all potential exposures to target species
▪ Temporal representativeness	High	High	Model exposure and effects lines of evidence spanned critical life stages and in general tissue data used was collected when exposure was expected to be high
▪ Quantitativeness	High	Medium	Exposure and effects modeling is quantitative but does not propagate uncertainty associated with modeling procedures
▪ Use of a standard method	Medium	Medium	Generally accepted exposure and effects modeling procedures were followed.
Total Score	**---**	Medium-High	---

* Adapted from scaling presented in Menzie et al., 1996

TABLE 7-43
Scoring Sheet for Evidence of Harm and Magnitude: Habitat: Terrestrial – AOC 1
Former Lockbourne Air Force Base, Lockbourne, Ohio

Measures of Effects (Target Receptor)	**Weighting Score (high, medium or low)**	**Evidence of Harm (Yes/No/Undetermined)**	**Magnitude (High/Low)**
Lower-Trophic Terrestrial	Medium-High	Yes	High
American Robin	Medium-High	Yes	Low
Mourning Dove	Medium-High	Yes	Low
Red-tailed Hawk	Medium-High	No	---
Deer Mouse	Medium-High	Yes	Low
Short-tailed Shrew	Medium-High	Yes	High
Red Fox	Medium-High	Yes	Low

Adapted from: Menzie et al., 1996.

TABLE 7-44
Scoring Sheet for Evidence of Harm and Magnitude: Habitat: Terrestrial – AOC 2
Former Lockbourne Air Force Base, Lockbourne, Ohio

Measures of Effects (Target Receptor)	**Weighting Score (high, medium or low)**	**Evidence of Harm (Yes/No/Undetermined)**	**Magnitude (High/Low)**
Lower-Trophic Terrestrial	Medium-High	Yes	Low
American Robin	Medium-High	Yes	Low
Mourning Dove	Medium-High	Yes	Low
Red-tailed Hawk	Medium-High	No	---
Deer Mouse	Medium-High	Yes	Low
Short-tailed Shrew	Medium-High	Yes	High
Red Fox	Medium-High	Yes	Low

Adapted from: Menzie et al., 1996.

TABLE 7-45
Scoring Sheet for Evidence of Harm and Magnitude: Habitat: Aquatic – West Ditch
Former Lockbourne Air Force Base, Lockbourne, Ohio

Measures of Effects (Target Receptor)	**Weighting Score (high, medium or low)**	**Evidence of Harm (Yes/No/Undetermined)**	**Magnitude (High/Low)**
Lower Trophic Receptors	Medium-High	Surface Water: Yes Sediment: Yes	Surface Water: -High Sediment: High
Marsh Wren	Medium-High	No	---
Mallard	Medium-High	No	---
Belted Kingfisher	Medium-High	No	---
Muskrat	Medium-High	No	---
Mink	Medium-High	No	---

Adapted from: Menzie et al., 1996.

TABLE 7-46
Scoring Sheet for Evidence of Harm and Magnitude: Habitat: Aquatic – East Ditch
Former Lockbourne Air Force Base, Lockbourne, Ohio

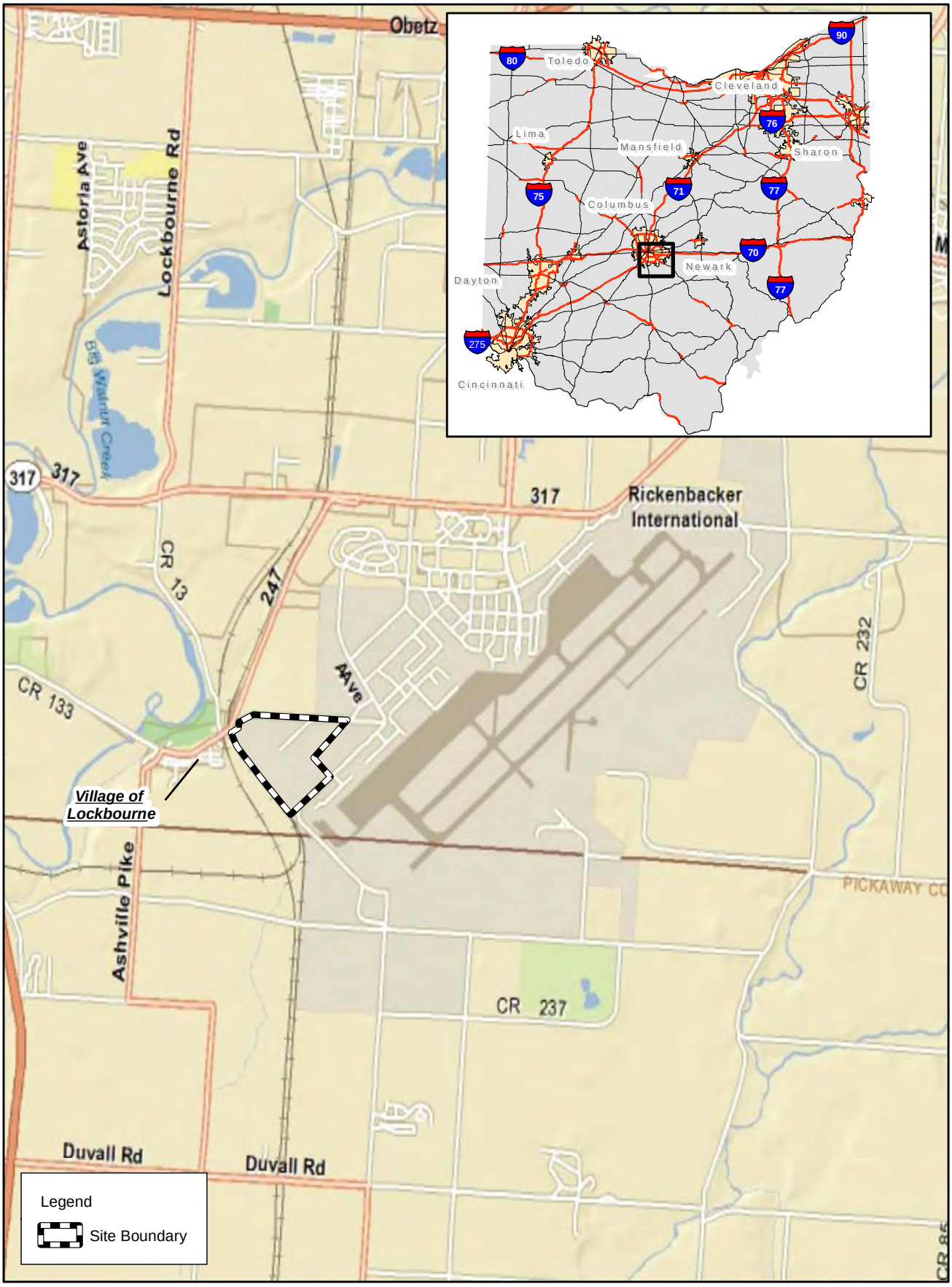
Measures of Effects (Target Receptor)	**Weighting Score (high, medium or low)**	**Evidence of Harm (Yes/No/Undetermined)**	**Magnitude (High/Low)**
Lower Trophic Receptors	Medium-High	Surface Water: No Sediment: Yes	Surface Water: --- Sediment: High
Marsh Wren	Medium-High	No	--
Mallard	Medium-High	No	--
Belted Kingfisher	Medium-High	No	--
Muskrat	Medium-High	No	--
Mink	Medium-High	No	--

Adapted from: Menzie et al., 1996.

TABLE 7-47
Ecological Risk Assessment COPC Summary
Former Lockbourne Air Force Base, Lockbourne, Ohio

COPC	Direct Exposures						Food Web Exposures					
	AOC 1	AOC 2	West Ditch	East Ditch	West Ditch	East Ditch	AOC 1	AOC 2	AOC 1	AOC 2	West Ditch	East Ditch
	Surface Soil		Sediment		Surface Water		Terrestrial (Mammals)		Terrestrial (Avian)		Aquatic (Mammals / Avian)	
Inorganics (MG/KG)												
Aluminium	X											
Arsenic			X									
Cadmium												
Chromium	X											
Cobalt		X										
Copper												
Lead	X								X			
Manganese		X										
Mercury	X											
Selenium	X	X										
Silver												
Thallium	X	X					X	X				
Vanadium												
Zinc	X											
Pesticide/Polychlorinated Biphenyls (MG/KG)												
DDD p,p'-			X									
DDE, p,p'-			X									
DDT, p,p'-	X	X	X									
PCB 1248	X						X					
PCB 1254	X											
Total PCBs	X		X				X		X			
Semivolatile Organic Compounds (MG/KG)												
Acenaphthene	X		X									
Benzo(a)anthracene	X		X				X					
Benzo(a)pyrene	X		X				X					
Benzo(b)fluoranthene	X											
Benzo(k)fluoranthene	X											
Bis(2-ethylhexyl) phthalate	X											
Chrysene	X		X									
Dibenzo(a,h)anthracene	X											
Di-n-butyl phthalate	X											
Fluoranthene	X		X									
Methylnaphthalene-2			X									
Phenanthrene	X		X									
Pyrene	X		X	X			X					
Total Low Molecular Weight PAHs	X		X	X								
Total High Molecular Weight PAHs	X		X	X								
Total PAHs			X	X								
Dioxin/Furans (MG/KG)												
TCDD-TEQ	X	X	X		X							
Dioxin/furan (TEQ) - Mammal (ind)							X					

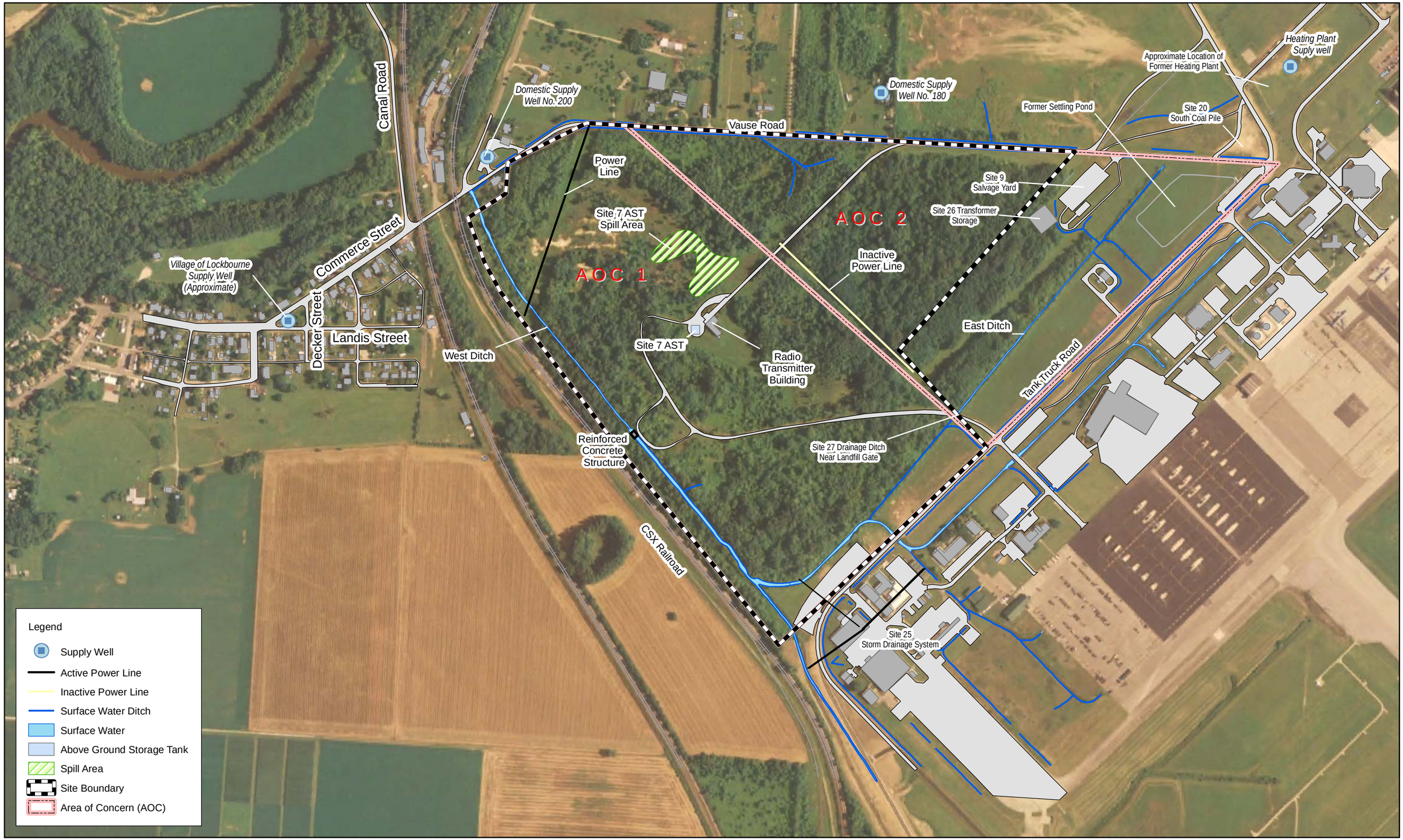
Figures



0 0.5 1
Miles

Figure 1-1
Site Location Map
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

CH2MHILL



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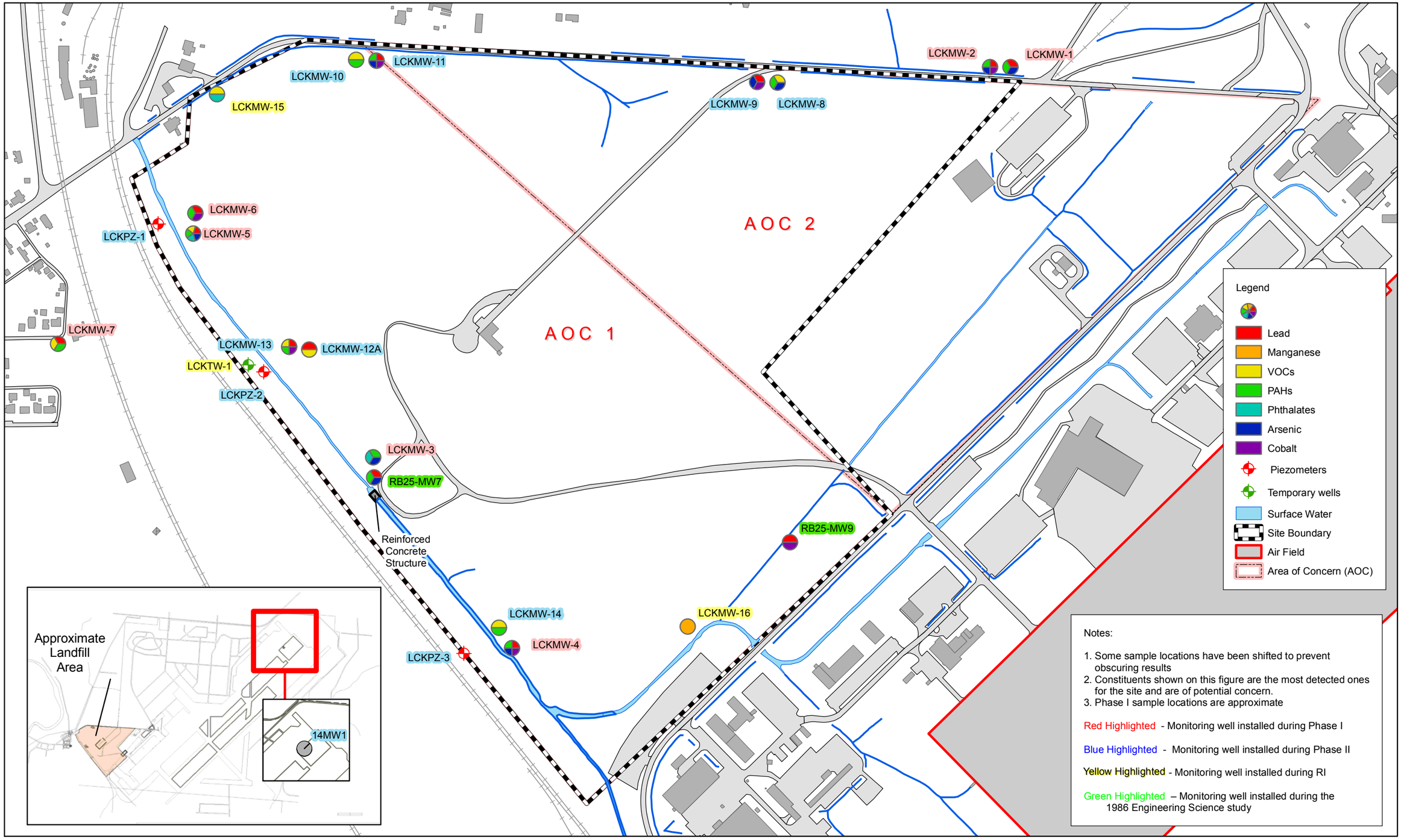
Feet

Figure 1-2
Site Features Map
Remedial Investigation Report
Former Lockbourne Air Force Base, Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\368856_RI\MAPFILES\FIGURE 1-2 (SITE FEATURES MAP).MXD KBUCKVOL 2/9/2010 13:23:30

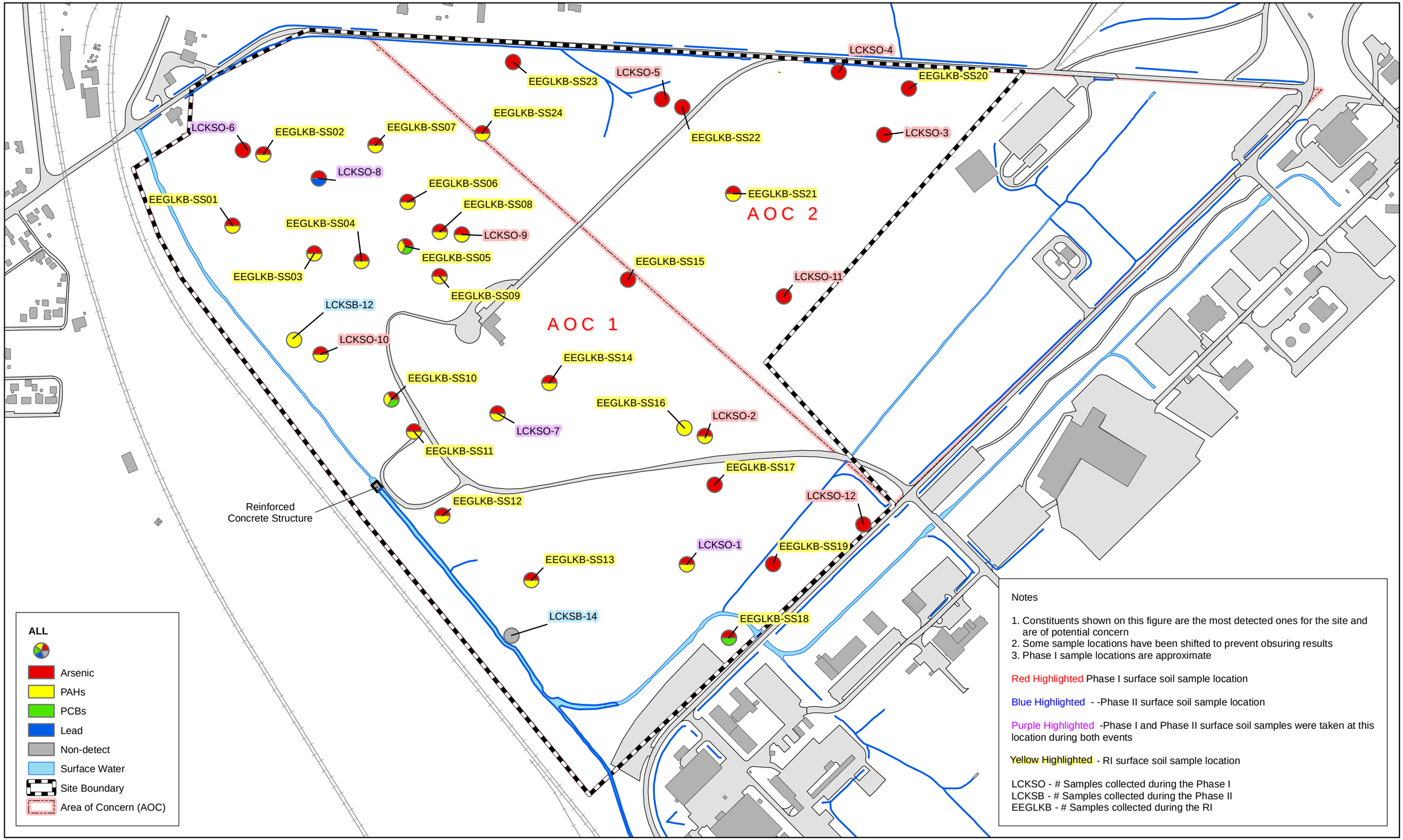


DRAFT

Figure 2-1
Monitoring Well Locations and Most Common Detections
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\05_REPORT\MAPFILES\FIGURE 2-1 (MONITORING WELL).MXD KBUCKVOL 2/10/10



N

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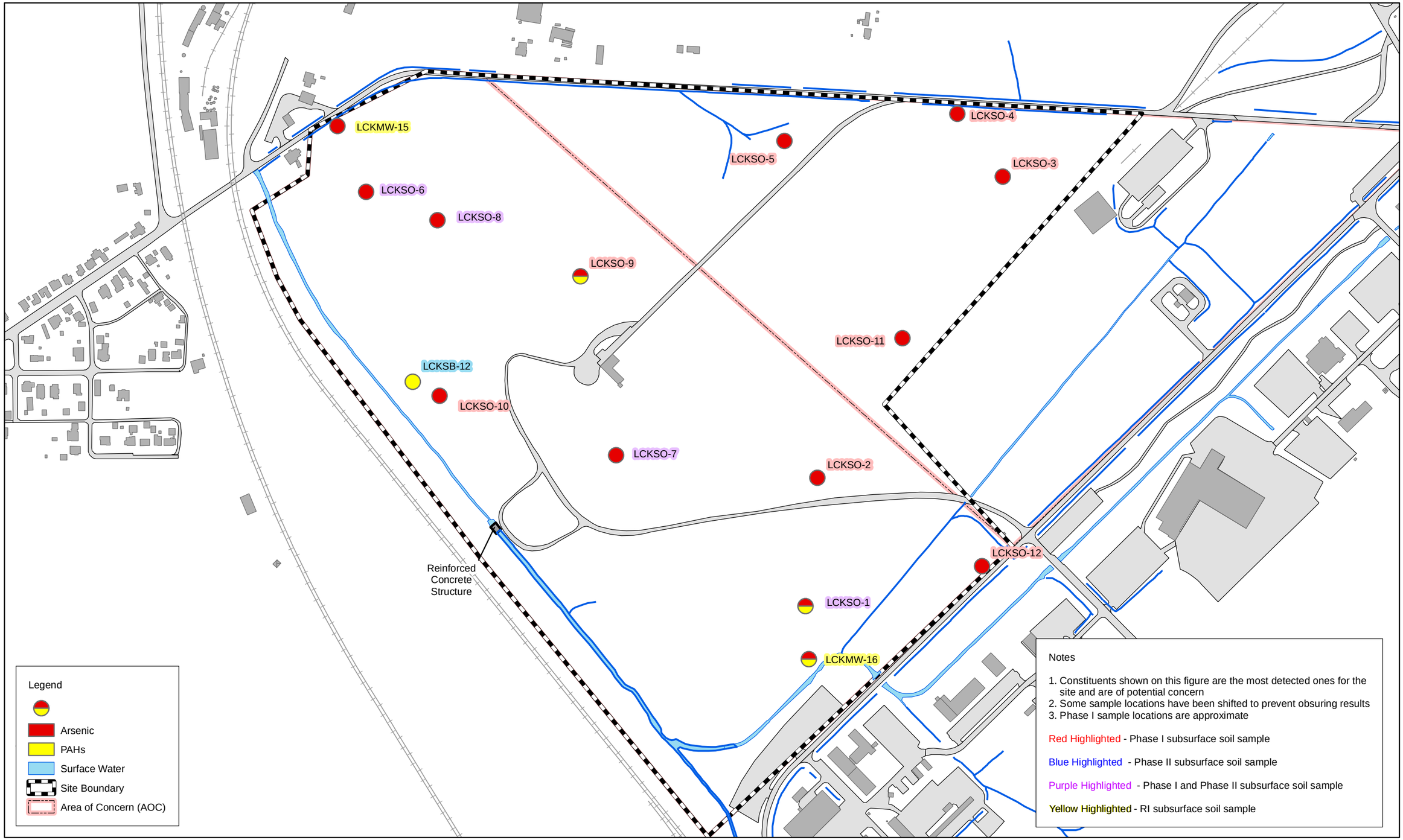
Feet

DRAFT

Figure 2-2
Surface Soil Sampling Locations and Most Common Detections
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\05_REPORT\MAPFILES\FIGURE 2-2 (SURFACE SOIL EXCEEDANCES).MXD KBUCKVOL 3/1/10



N

0 350 700

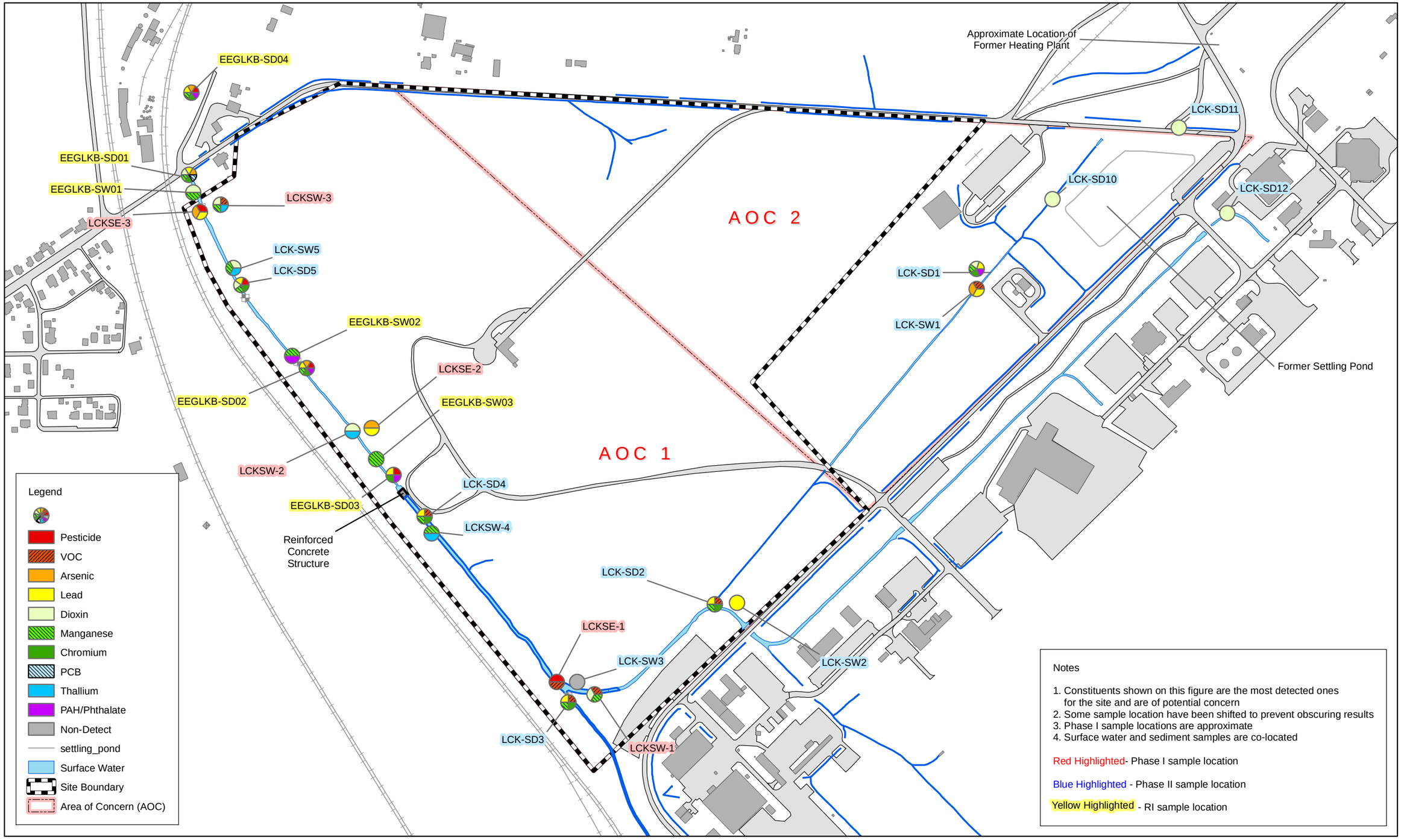
Feet

DRAFT

Figure 2-3
Subsurface Soil Sampling Locations and Most Common Detections
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\05_REPORT\MAPFILES\FIGURE 2-3 (SUBSURFACE SOIL EXCEEDANCES).MXD KBUCKVOL 2/22/2010 15:36:54

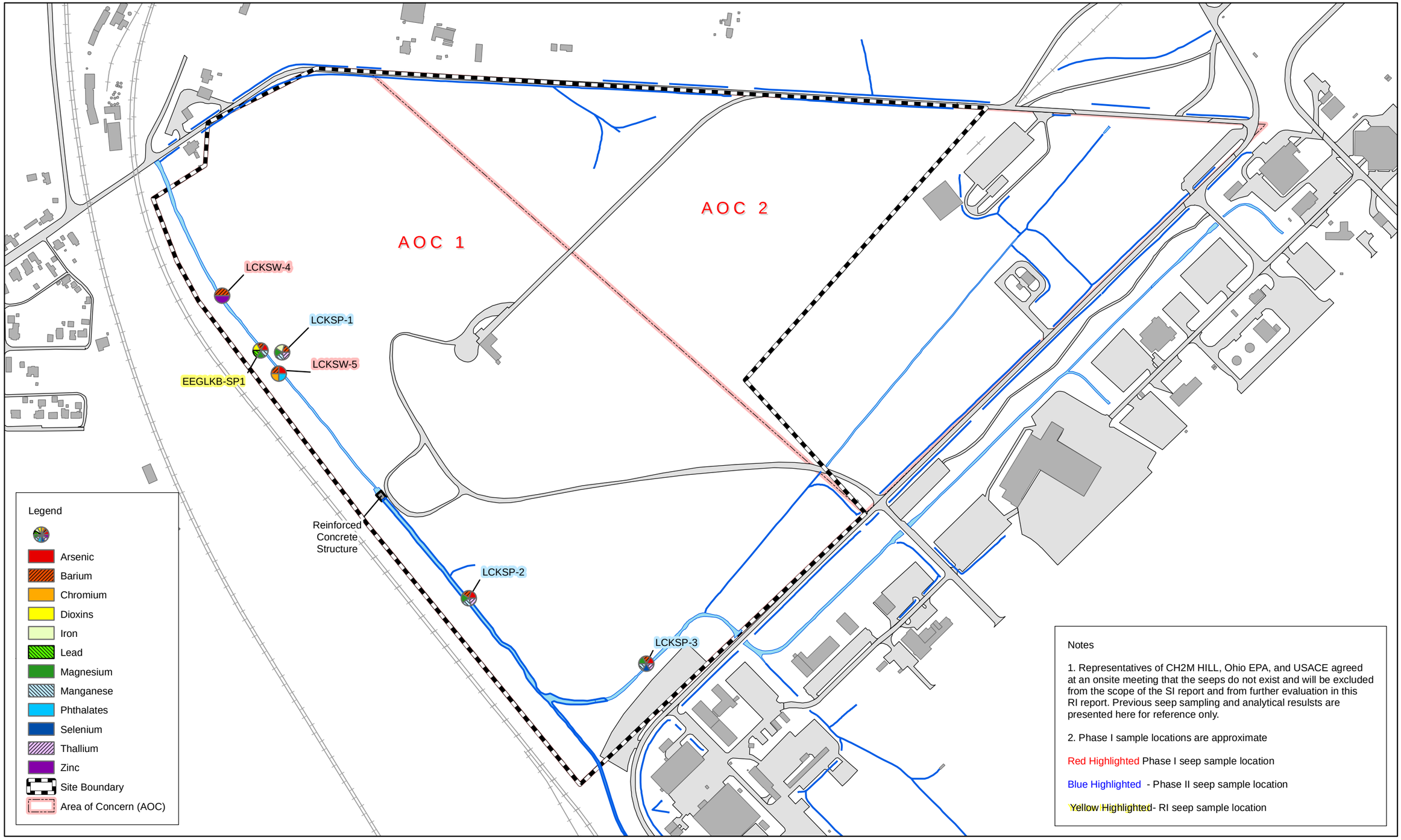


DRAFT

Figure 2-4
Surface Water and Sediment Sample Locations and Most Common Detections
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\05_REPORT\MAPFILES\FIGURE 2-4 (SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS).MXD KBUCKVOL 3/1/10



N

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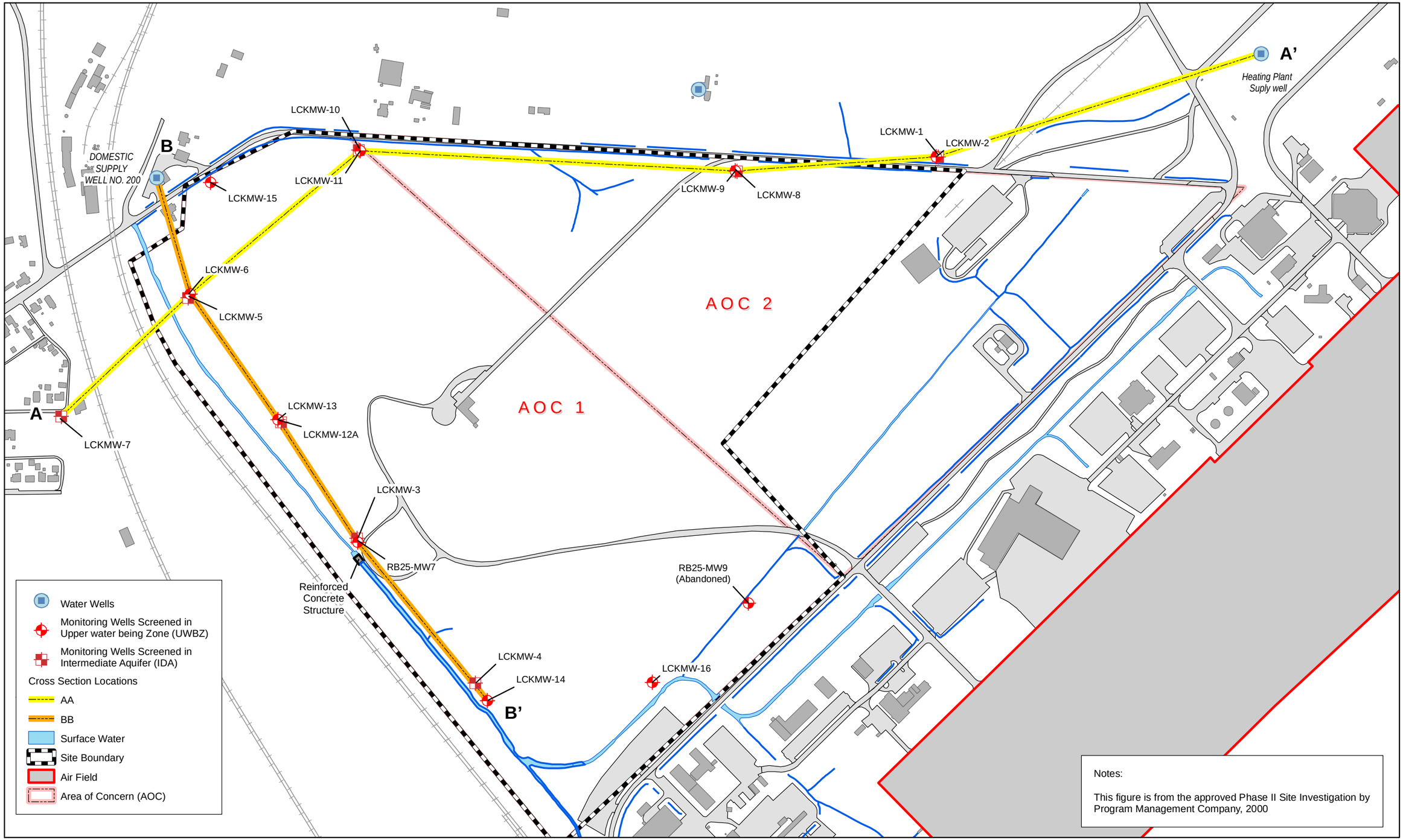
Feet

DRAFT

Figure 2-5
Seep Sampling Locations and Most Common Detections
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\368856_RI\MAPFILES\FIGURE 2-5 (SEEP SAMPLING LOCATIONS).MXD KBUCKVOL 3/1/10



N

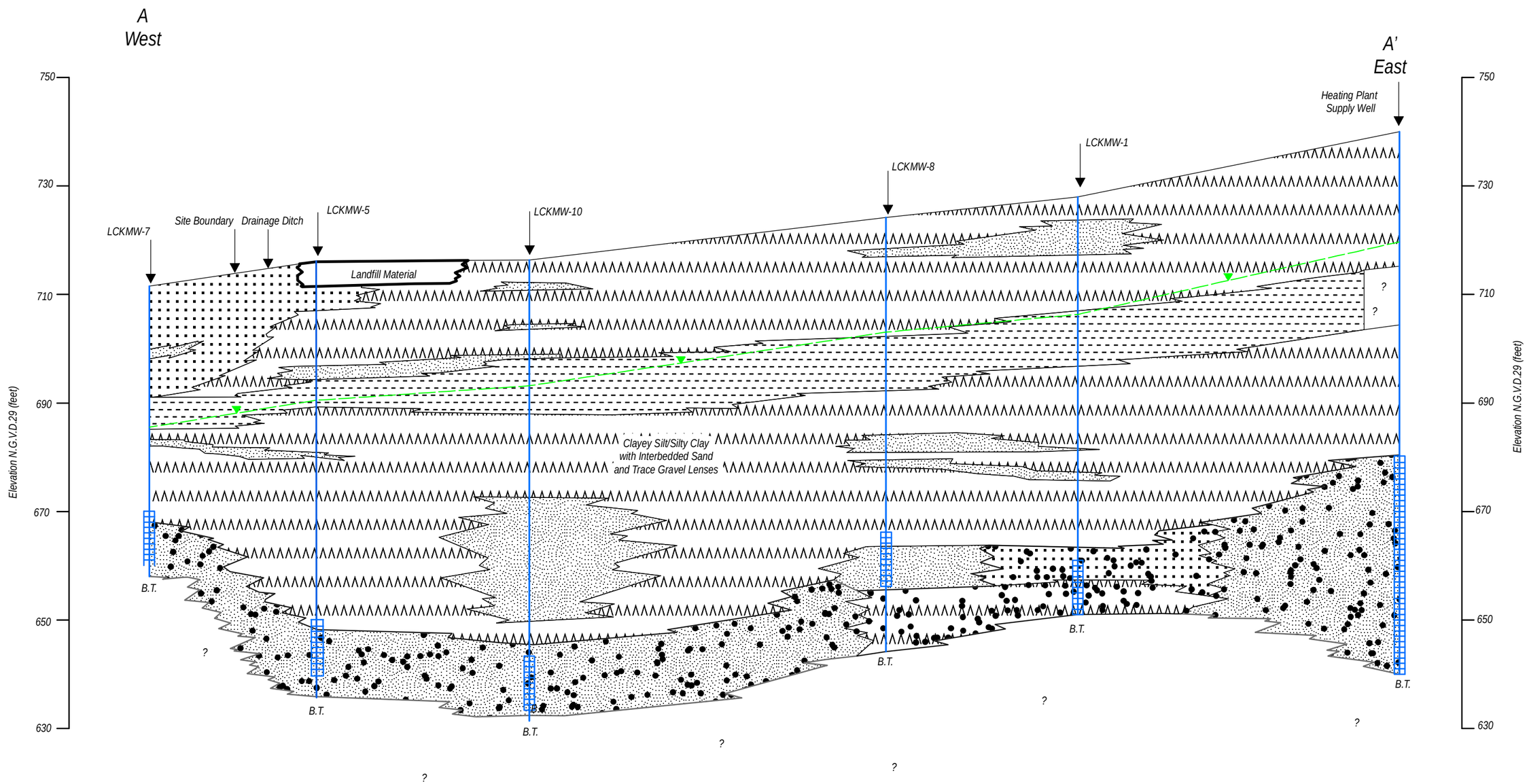
0 350 700

Feet

Figure 3-1
Cross Section Index Map
Remedial Investigation Report
Former Lockbourne Air Force Base, Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\368856_RI\MAPFILES\FIGURE 3-1 (CROSS SECTION).MXD KBUCKVOL 2/9/2010 14:23:19



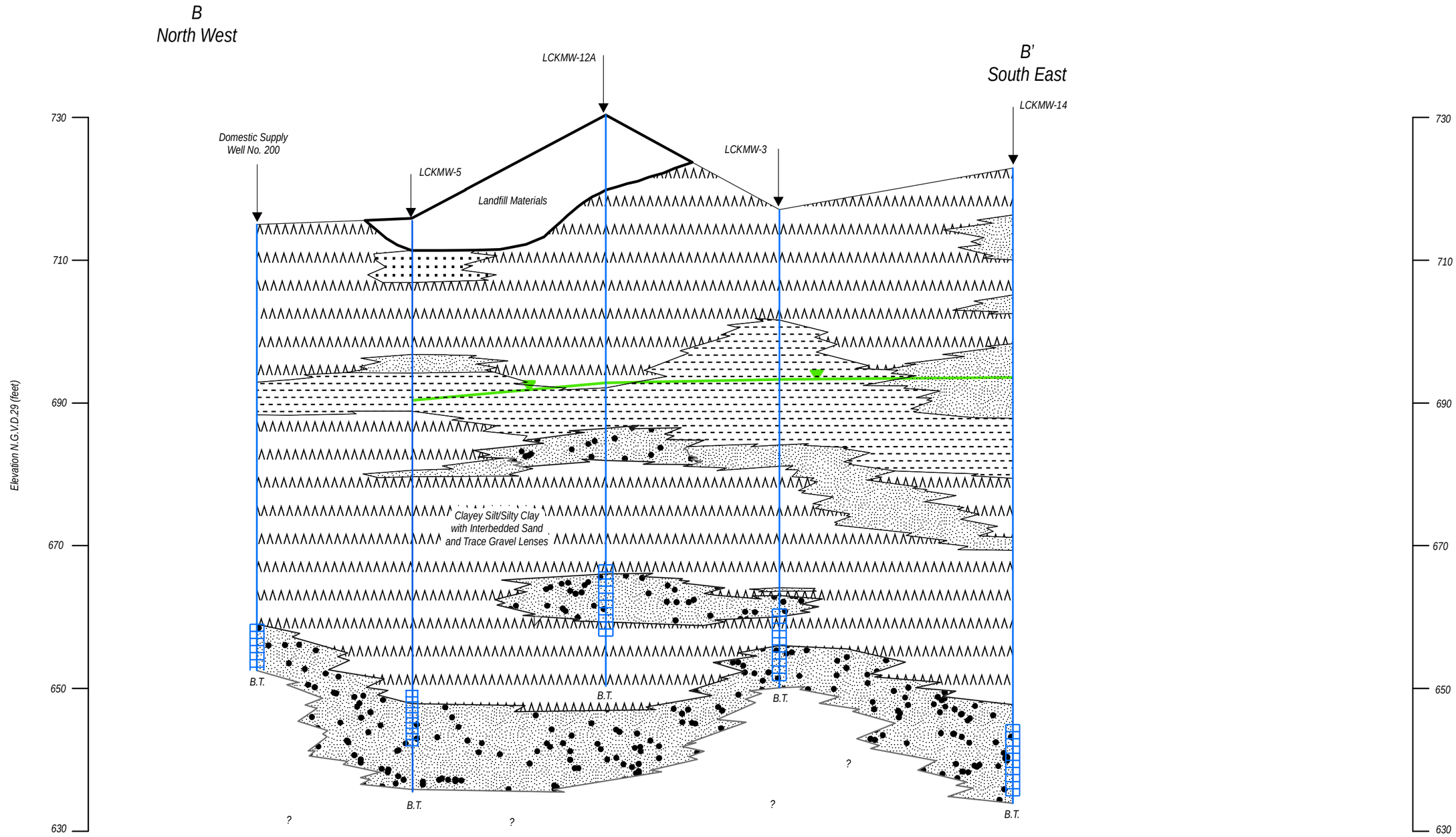
Notes:
This figure is from the approved Phase II Site Investigation by Program Management Company, 2000
Vertical Exaggeration = 25x

0 250 500
Feet

Deep Potentiometric Surface
Lime/Fly Ash Landfill Cover
Sandy Silt (SP-SM)
Clayey Silt/Silty Clay (CL)
Gravel/Cobbles
Gray Clay (CL)
Sand (SM)
Well Screen Interval
Boring Terminal

Figure 3-2
Cross Section A-A'
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

CH2MHILL



Notes:
This figure is from the approved Phase II Site Investigation by Program Management Company, 2000
Vertical Exaggeration = 25x

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Feet

Layer
- Deep Potentiometric Surface
- Lime/Fly Ash Landfill Cover
- Sandy Silt (SP-SM)
- Clayey Silt/Silty Clay (CL)
- Gravel/Cobbles
- Gray Clay (CL)
- Sand (SM)

B.T. Well Screen Interval
Boring Terminal

Figure 3-3
Cross Section B-B'
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

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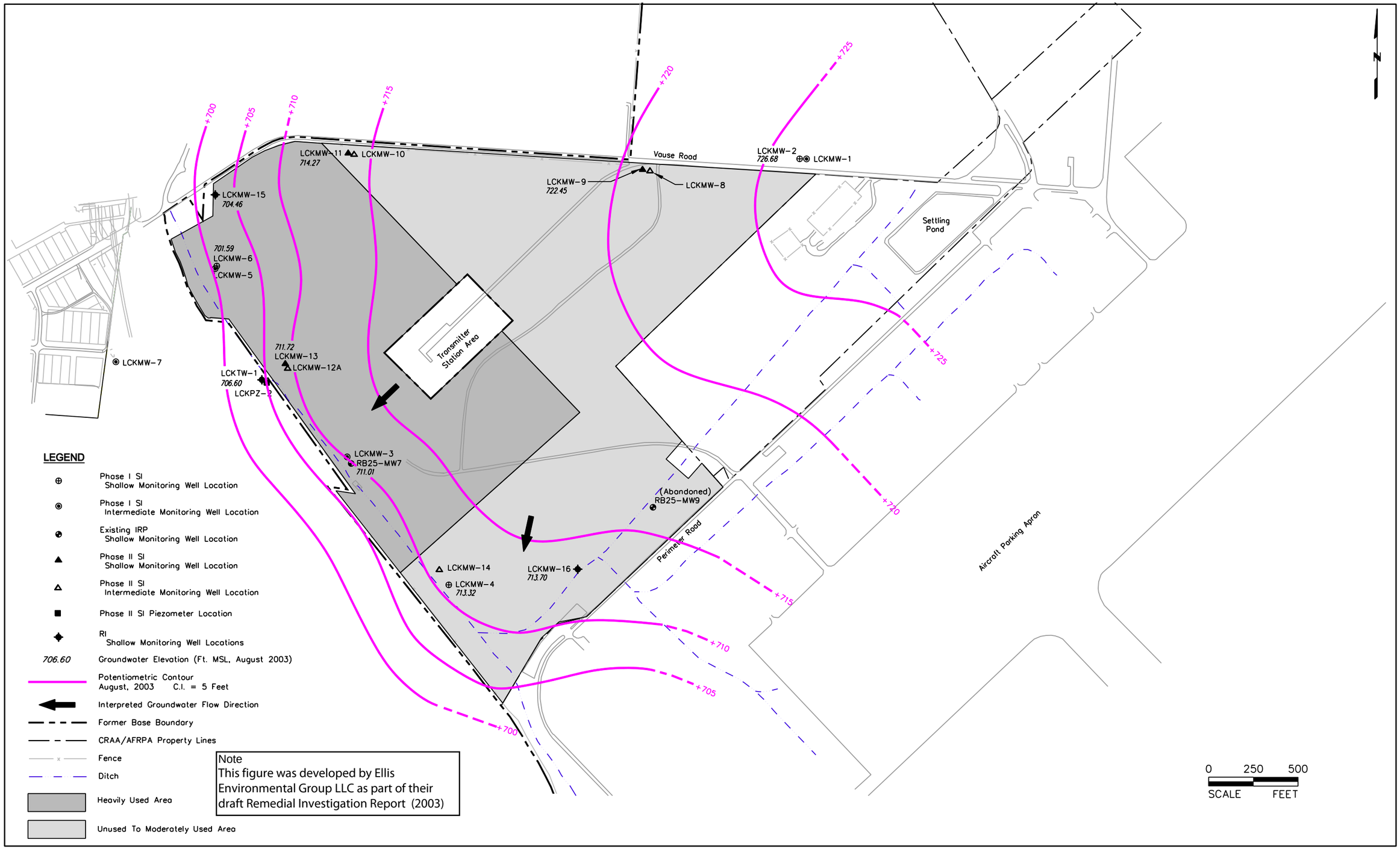

Figure 3-4
RI UWBZ Potentiometric Surface Map, August 2003
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne , Ohio

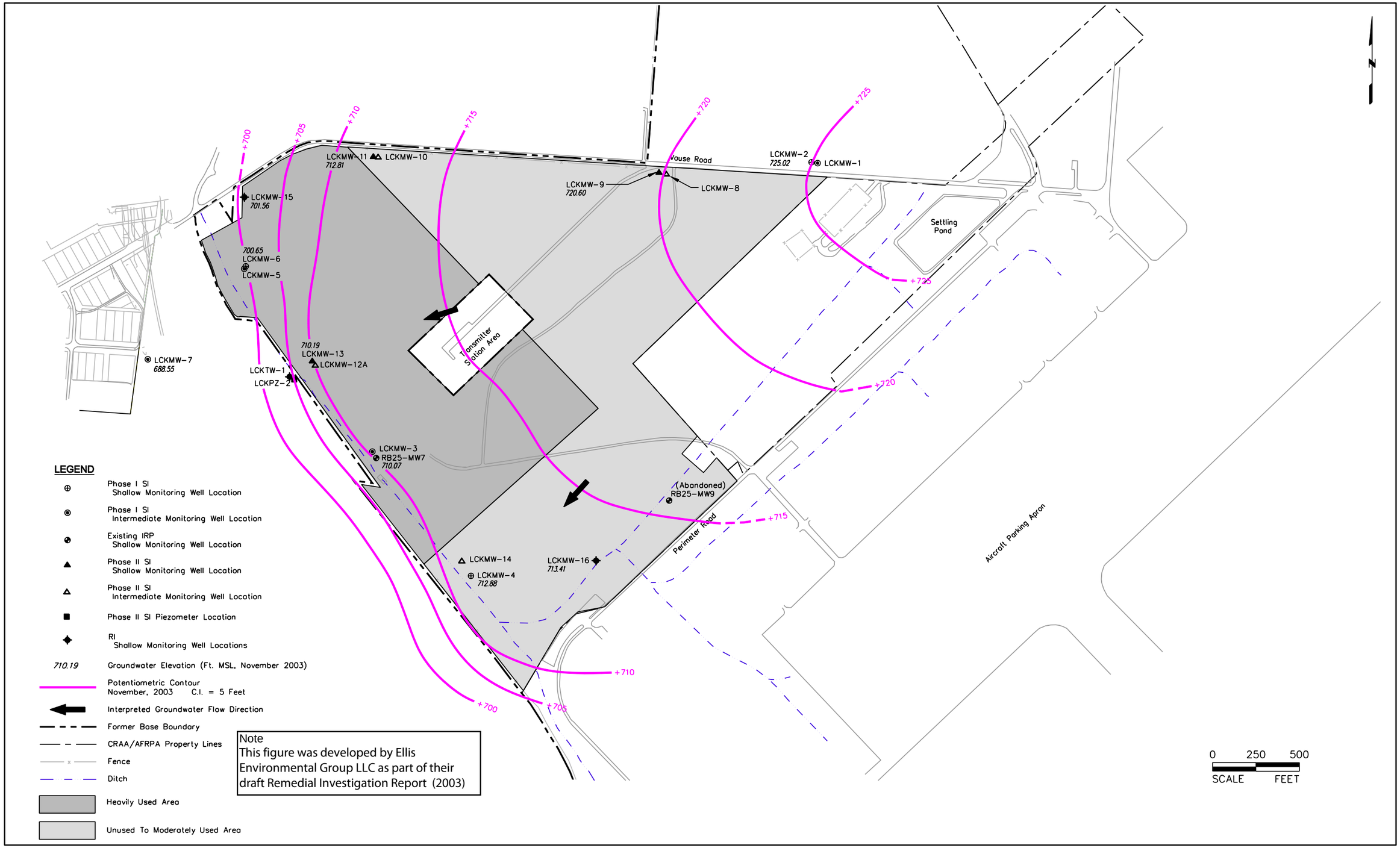

Figure 3-5
RI UWBZ Potentiometric Surface Map, November 2003
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

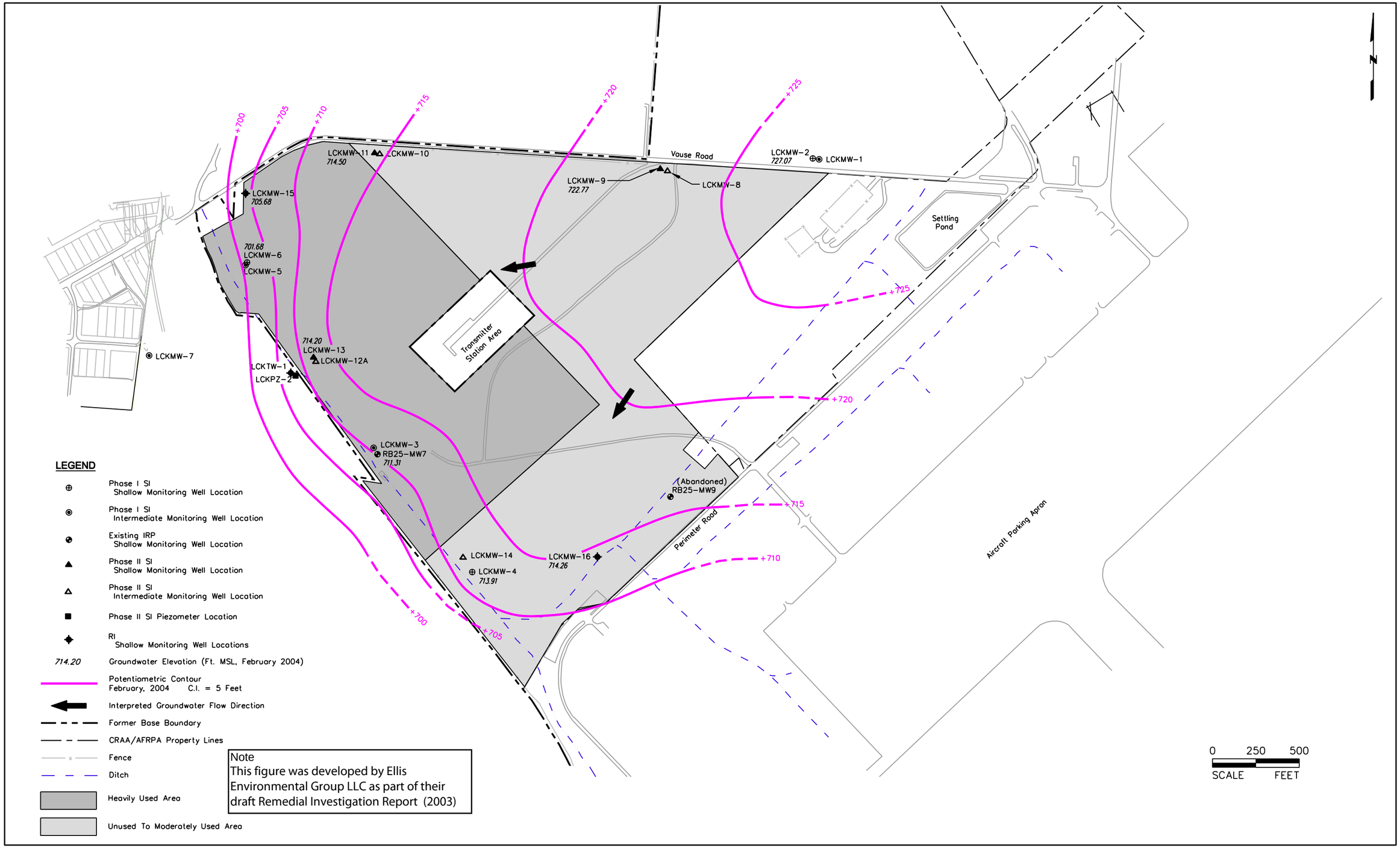

Figure 3-6
RI UWBZ Potentiometric Surface Map, February 2004
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

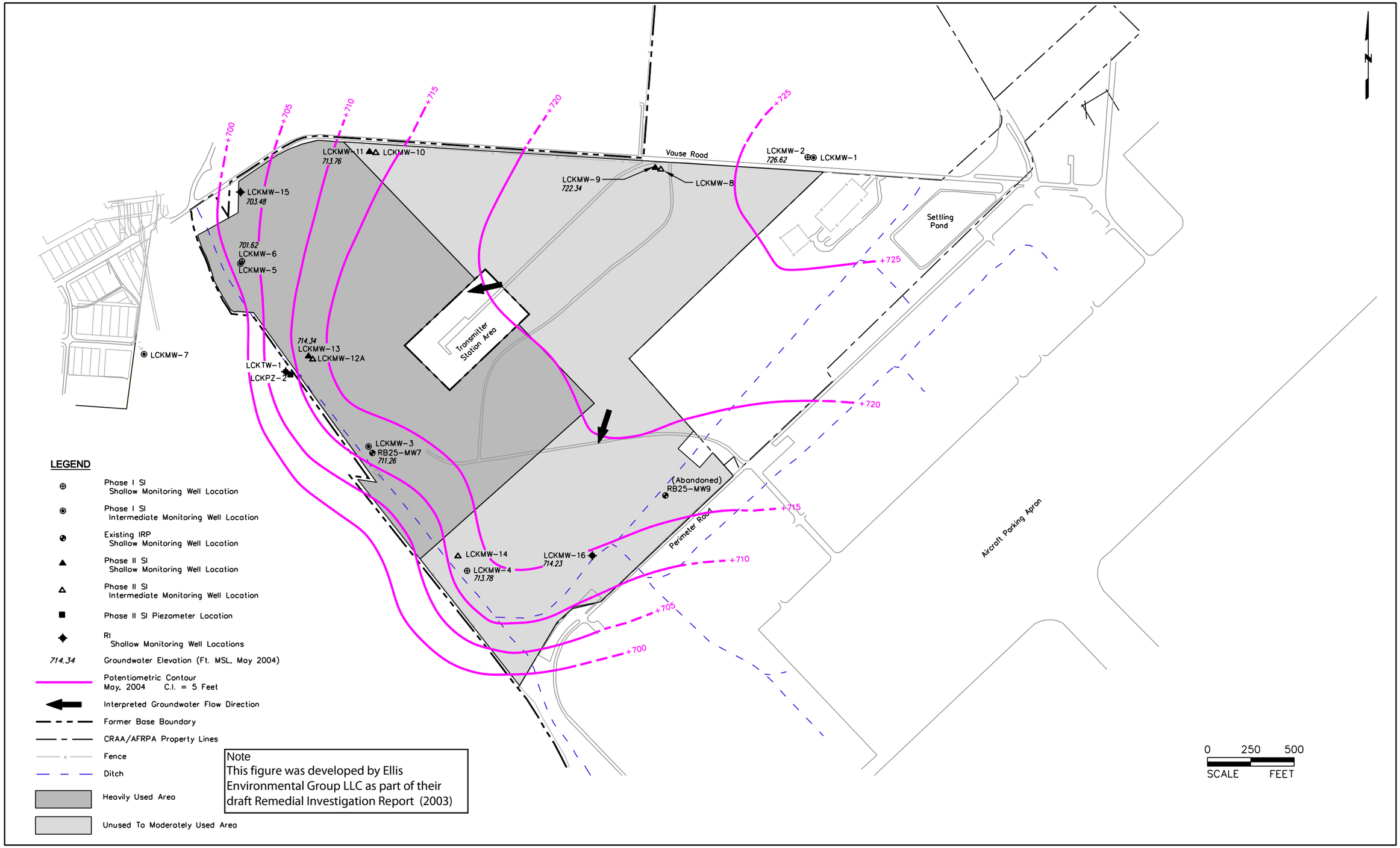

Figure 3-7
RI UWBZ Potentiometric Surface Map, May 2004
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbouren, Ohio

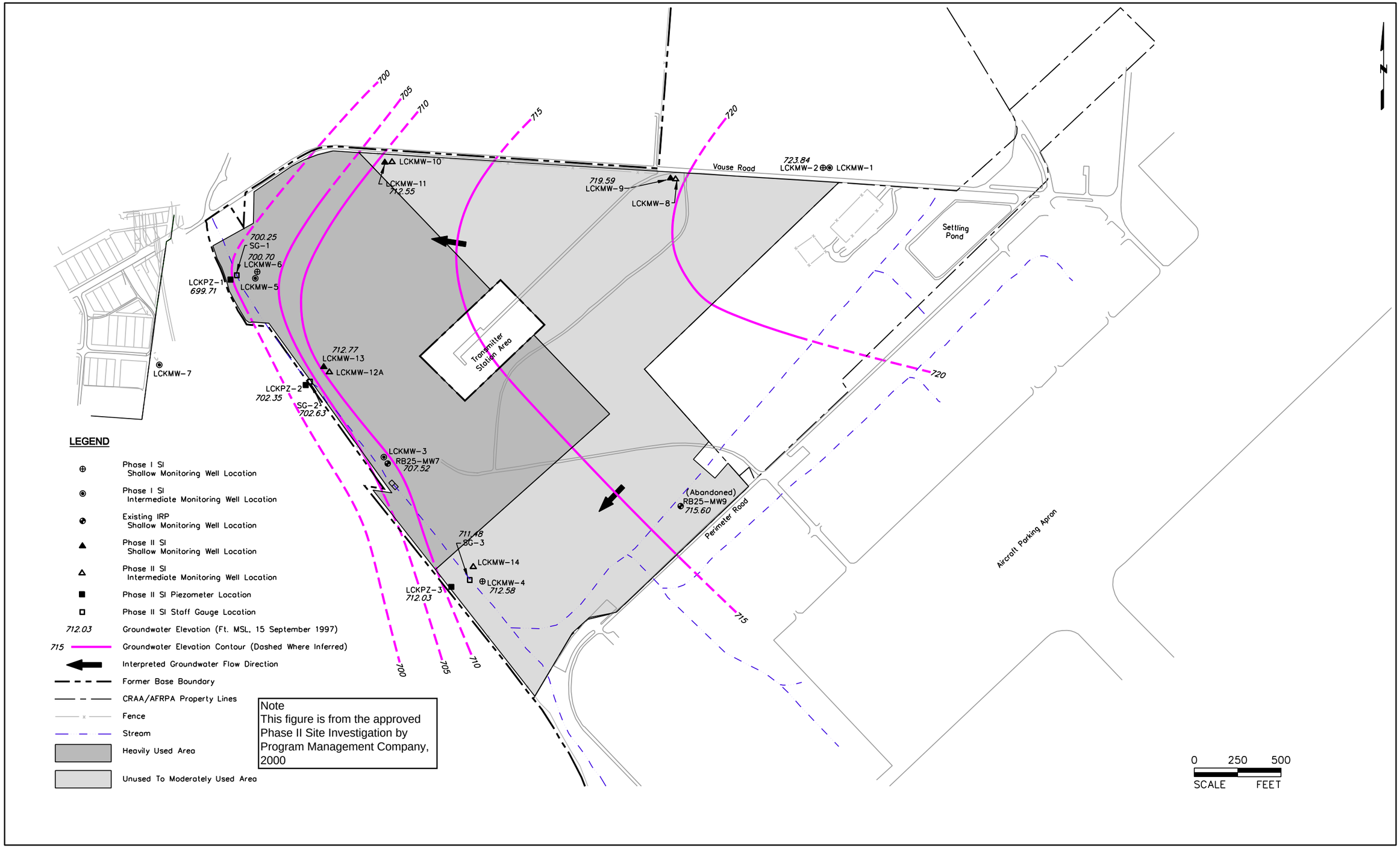

Figure 3-8
Phase II SI UWBZ Potentiometric Surface Map
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbouren, Ohio

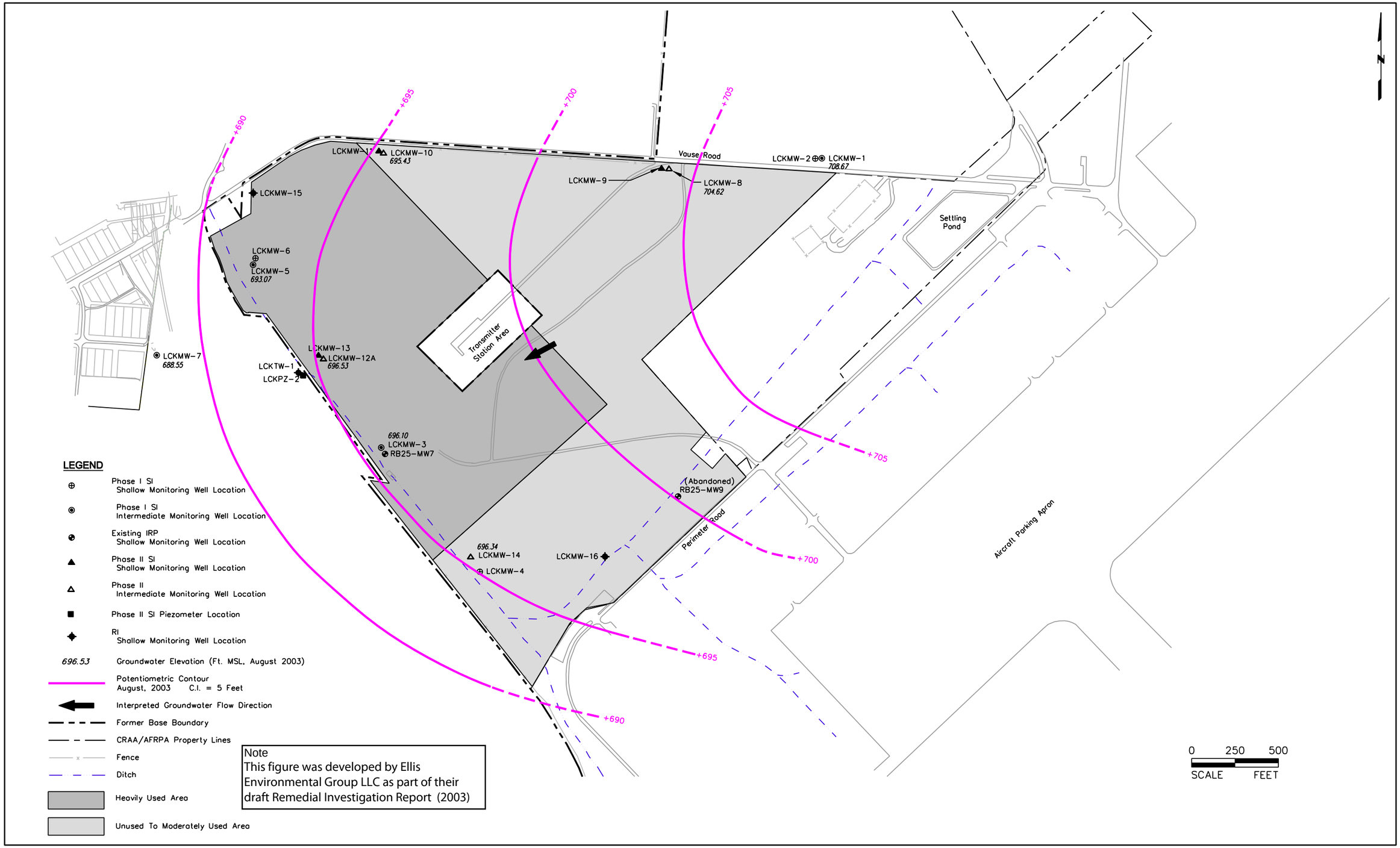

Figure 3-9
RI IDA Potentiometric Surface Map, August 2003
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

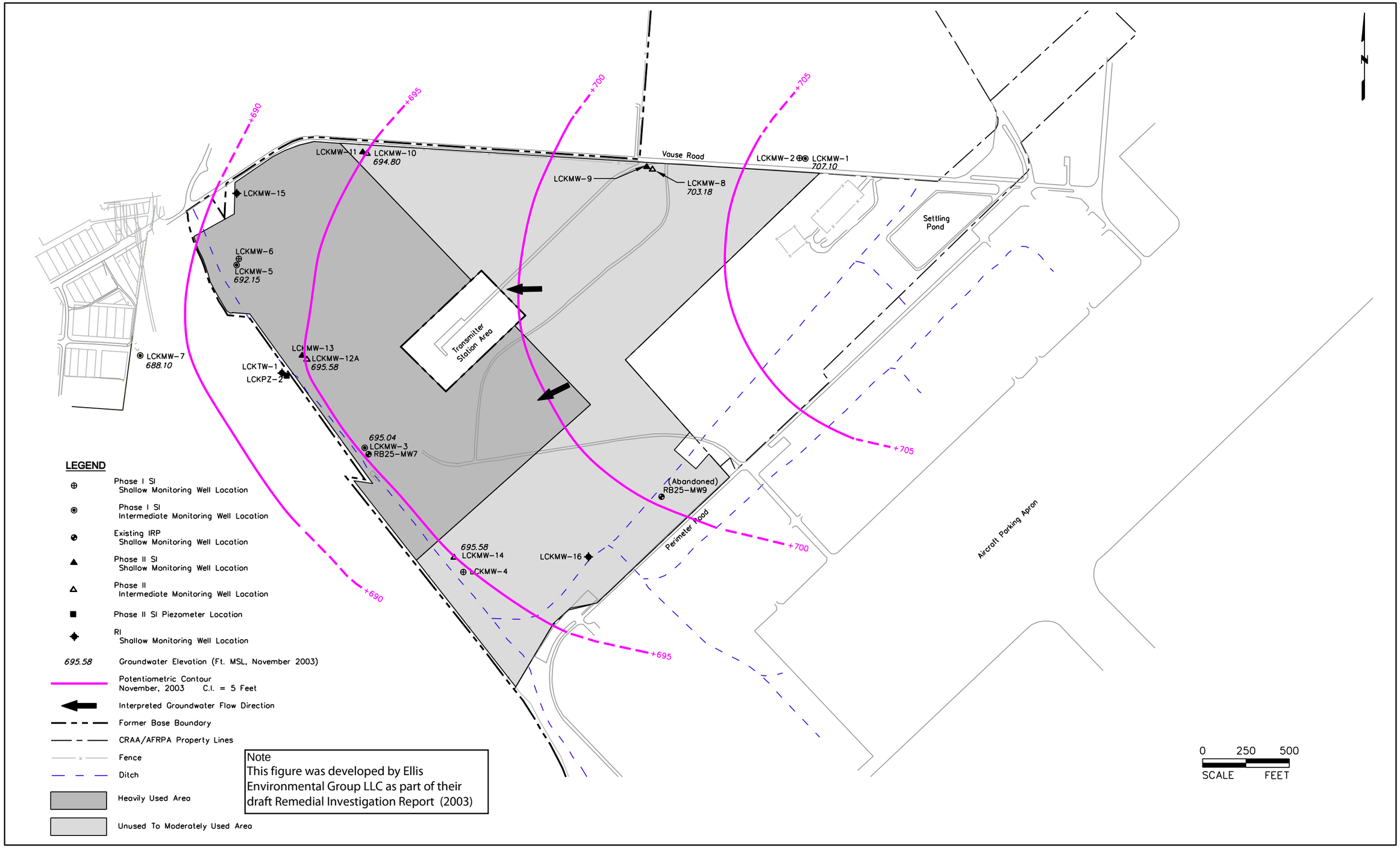

Figure 3-10
RI IDA Potentiometric Surface Map, November 2003
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

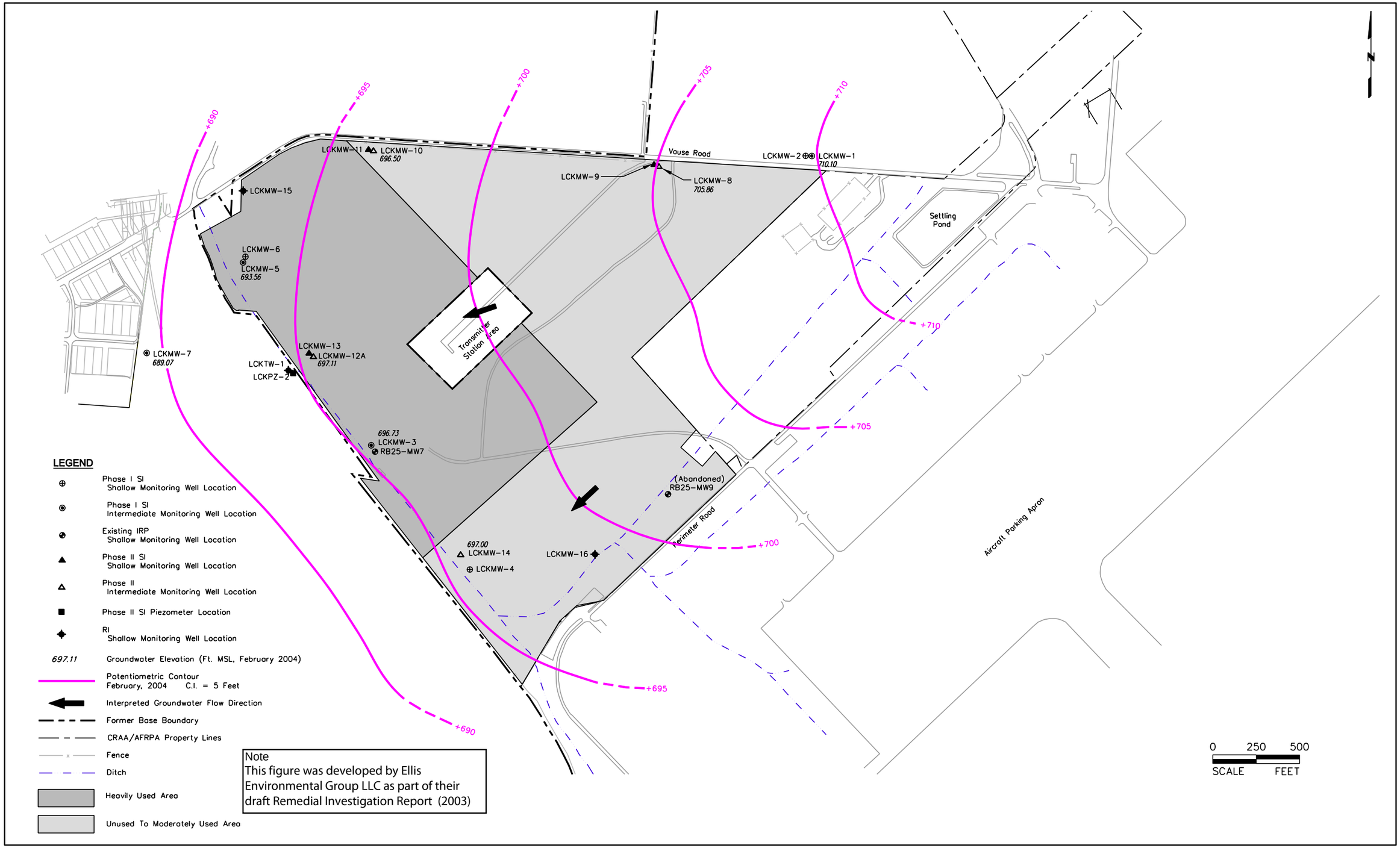

Figure 3-11
RI IDA Potentiometric Surface Map, February 2004
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

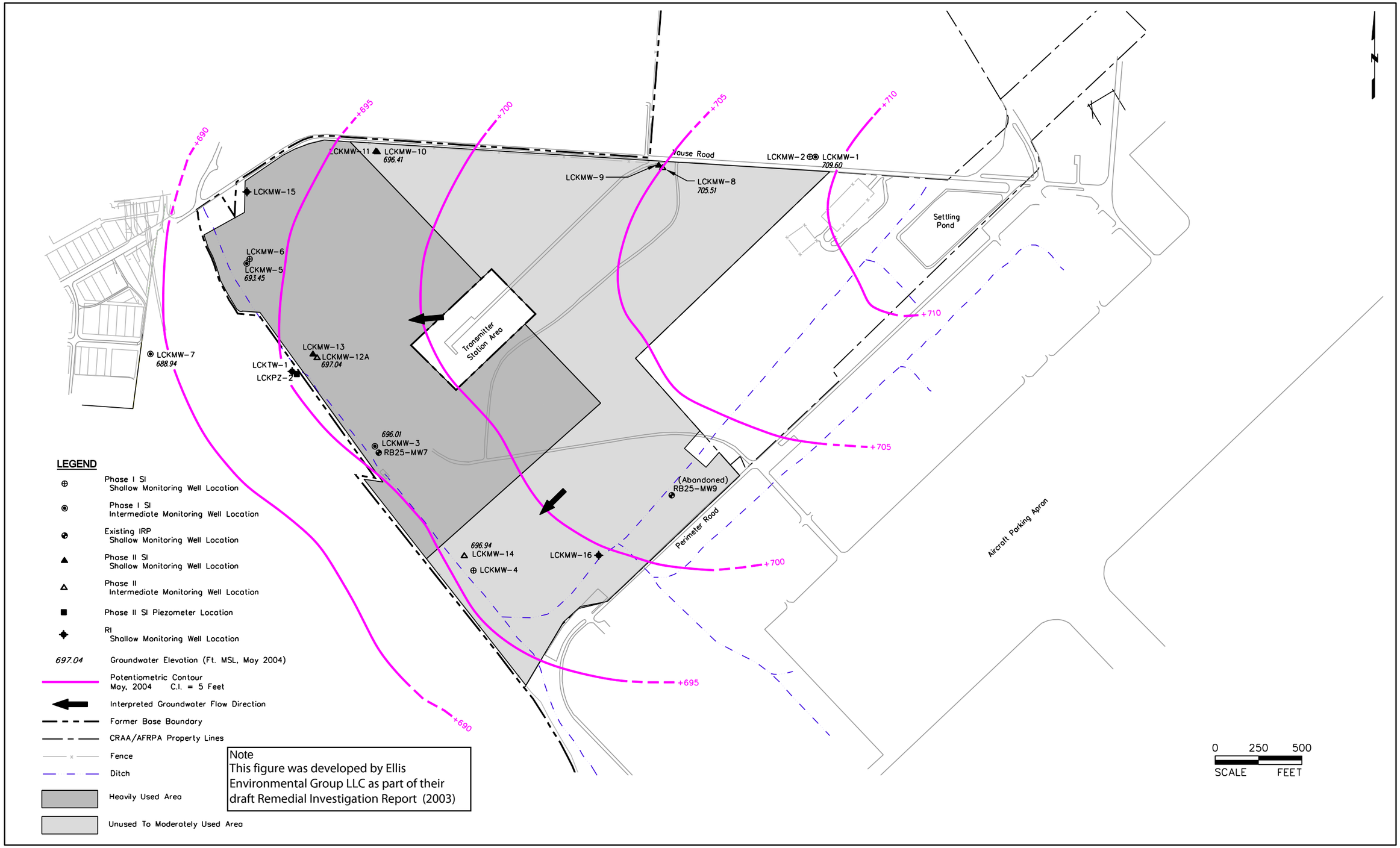

Figure 3-12
RI IDA Potentiometric Surface Map, May 2004
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

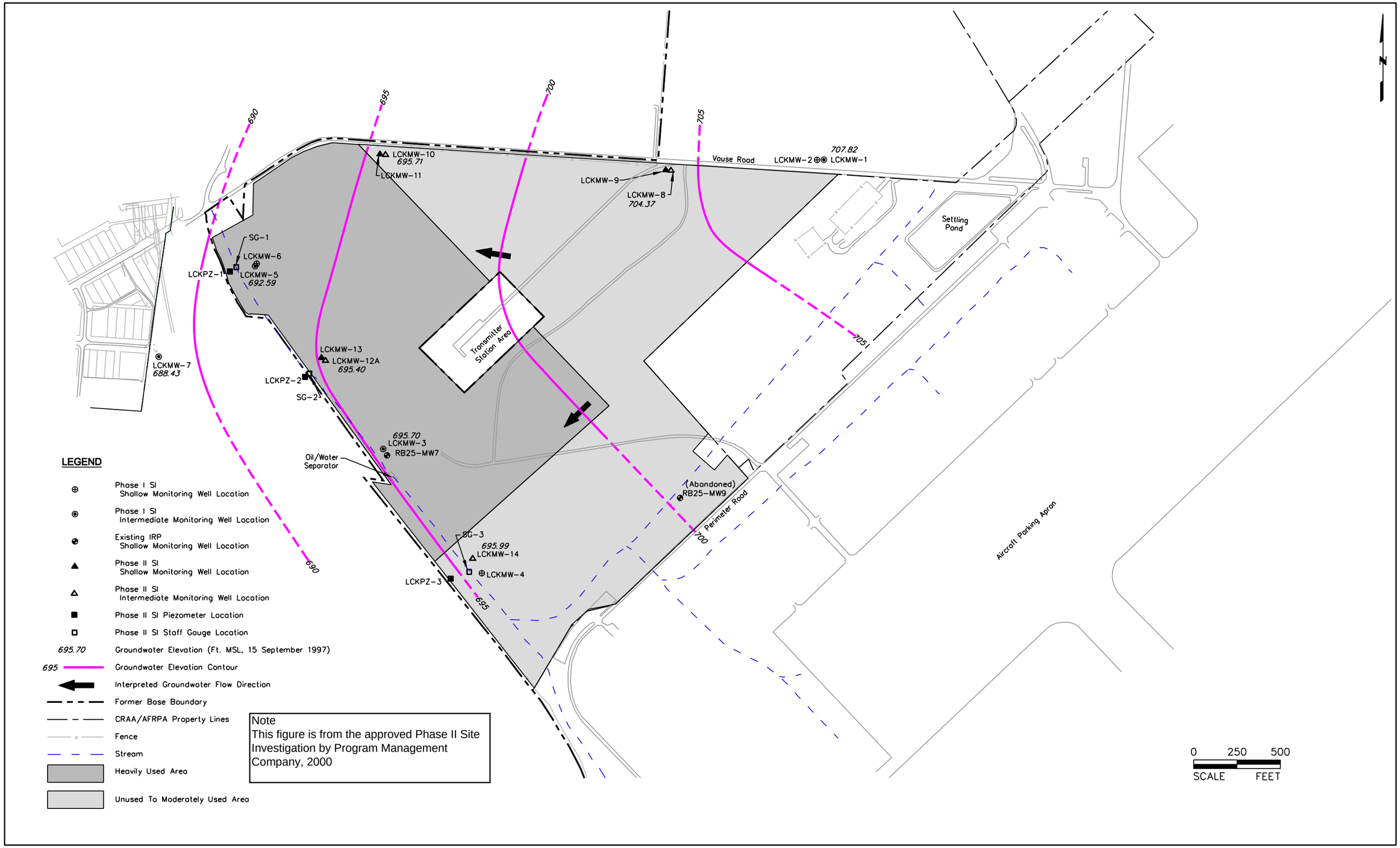

Figure 3-13
Phase II SI IDA Potentiometric Surface Map
Site Monitoring Well Network
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

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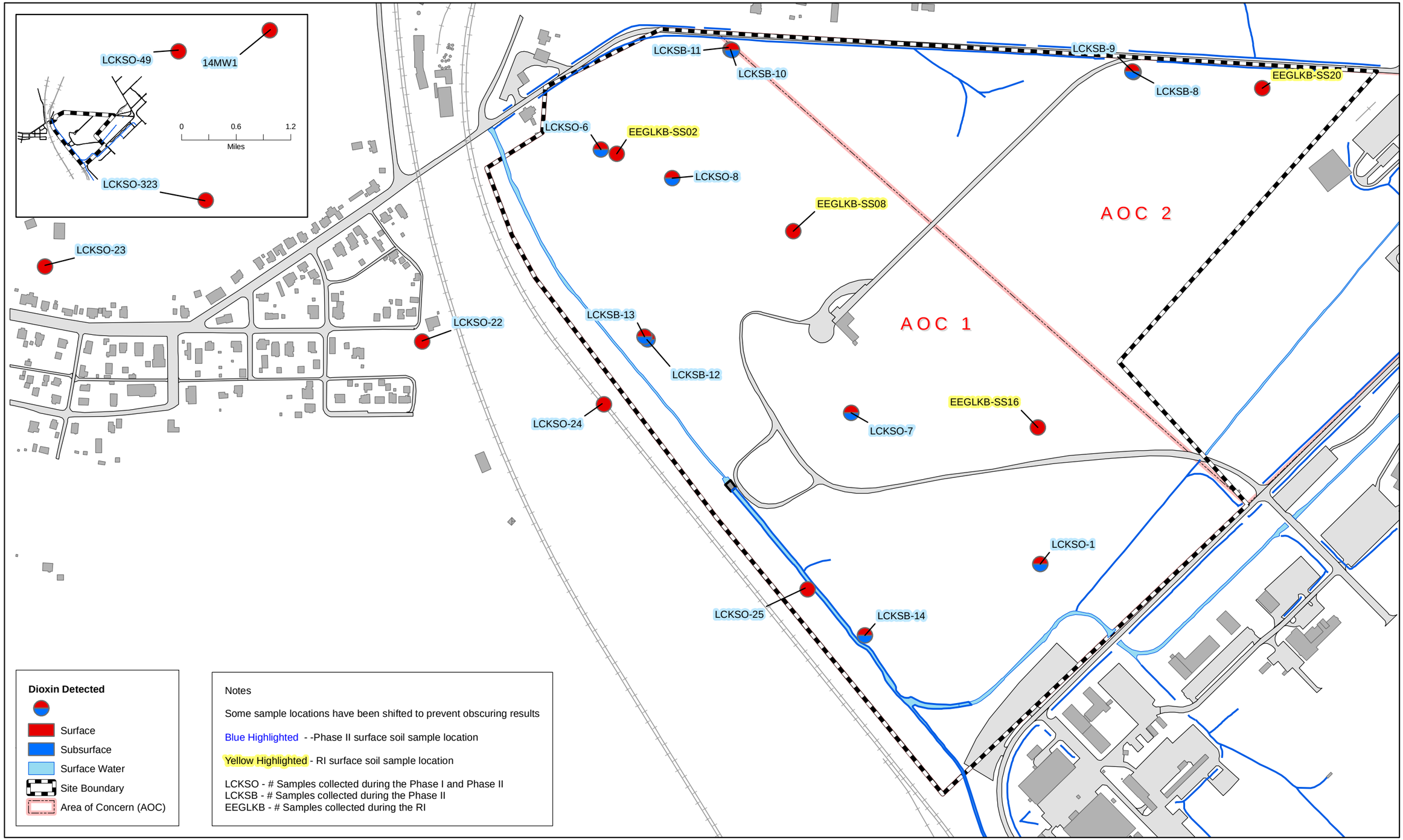

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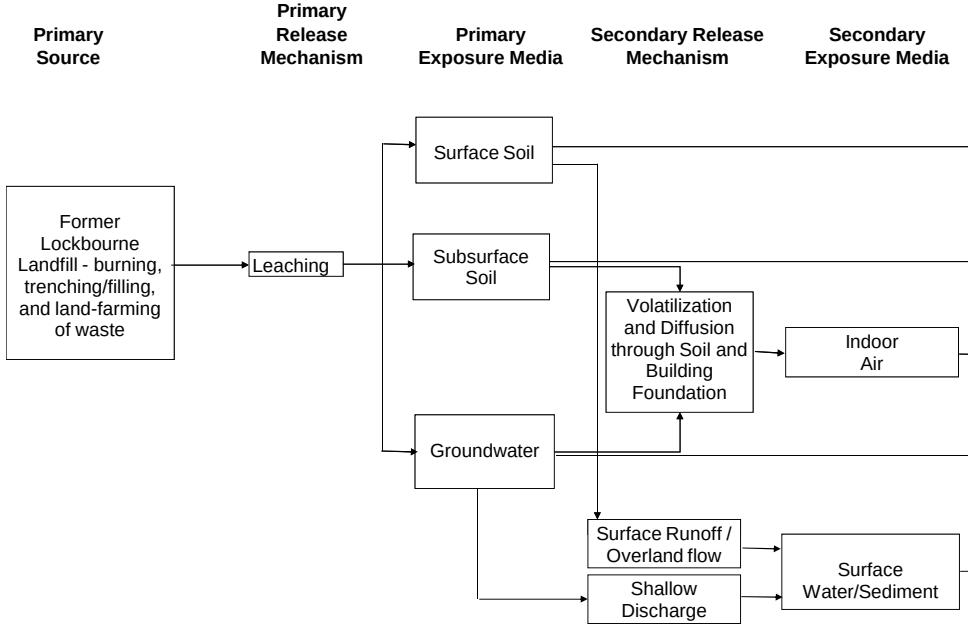
0 350 700
Feet

DRAFT

Figure 4-1
Dioxins Detected in Surface and Subsurface Soil Samples
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Ohio

CH2MHILL

\\CORVUS\GROUPS\GIS\PROJECTS\GEOBASE\LOCKBOURNE_AFB\REPORTS\05_REPORT\MAPFILES\FIGURE 4-1 (DIOXINS SUBSURFACE AND SURFACE SOIL).MXD KBUCKVOL 2/9/2010 14:34:13

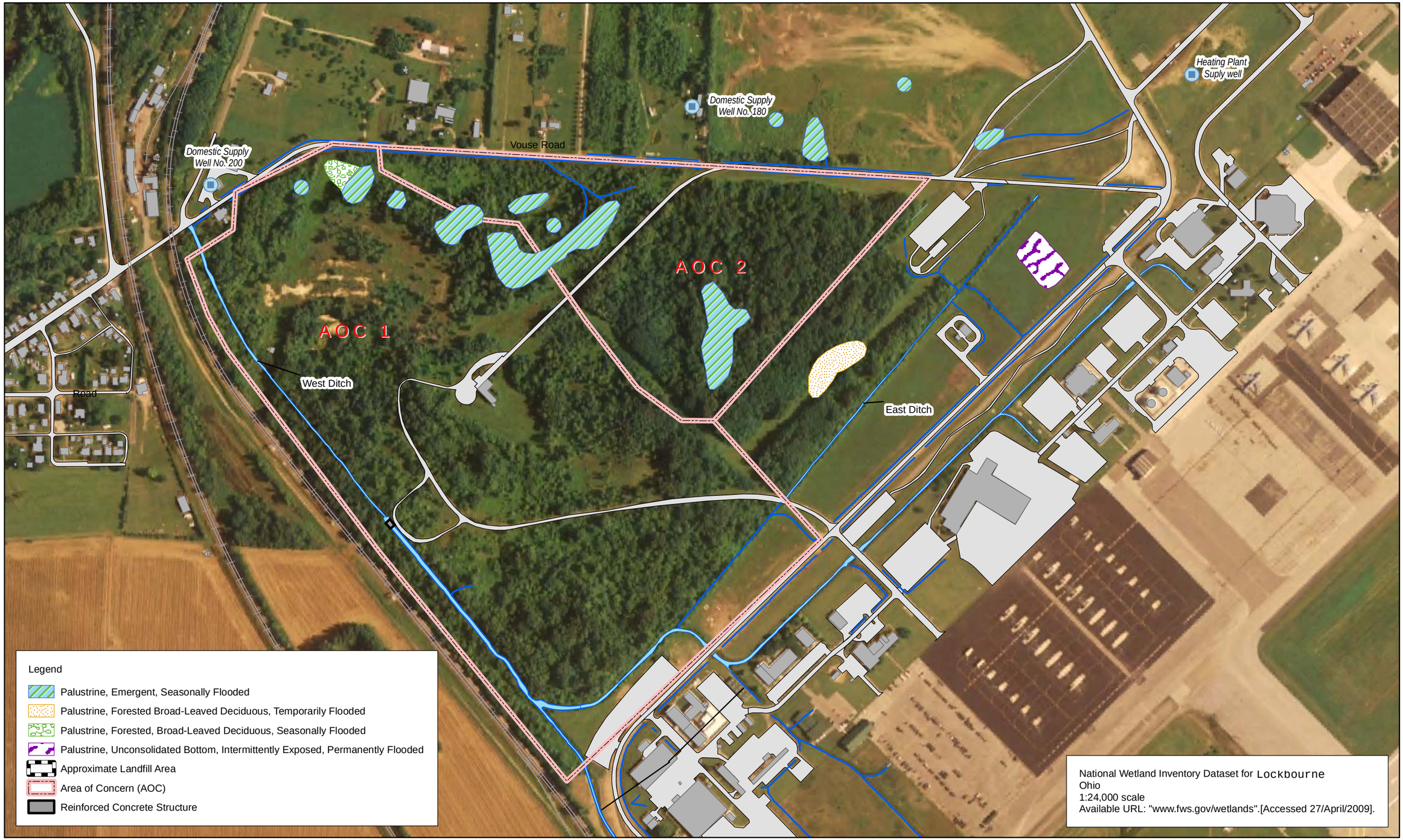


Potential Human Receptors

Exposure Route	Maintenance Worker	Trespasser	Off-Site Industrial Worker	On-Site Facility Worker	Construction Worker	Off-Site Resident
Ingestion	X	X	NA	X	NA	NA
Dermal Contact	X	X	NA	X	NA	NA
Inhalation	X	X	X	X	NA	NA
Ingestion	NA	NA	NA	NA	X	NA
Dermal Contact	NA	NA	NA	NA	X	NA
Inhalation	NA	NA	NA	NA	X	NA
Inhalation	NA	NA	NA	X	NA	X[1]
Ingestion	NA	NA	NA	NA	NA	X
Dermal Contact	NA	NA	NA	NA	X	X
Inhalation	NA	NA	NA	NA	X	X
Ingestion	NA	X	NA	NA	X	NA
Dermal Contact	NA	X	NA	NA	X	NA
Inhalation	NA	X	NA	NA	X	NA

NA - Not Applicable or pathway is incomplete
X - Potentially complete exposure pathways
X[1] - No chemicals of potential concern were identifed for indoor air via vapor intrusion of groundwater

Figure 6-1
Conceptual Site Model for the Human Health Risk Assessment
Remedial Investigation Report
Former Lockbourne Air Force Base, Lockbourne, Ohio



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Feet

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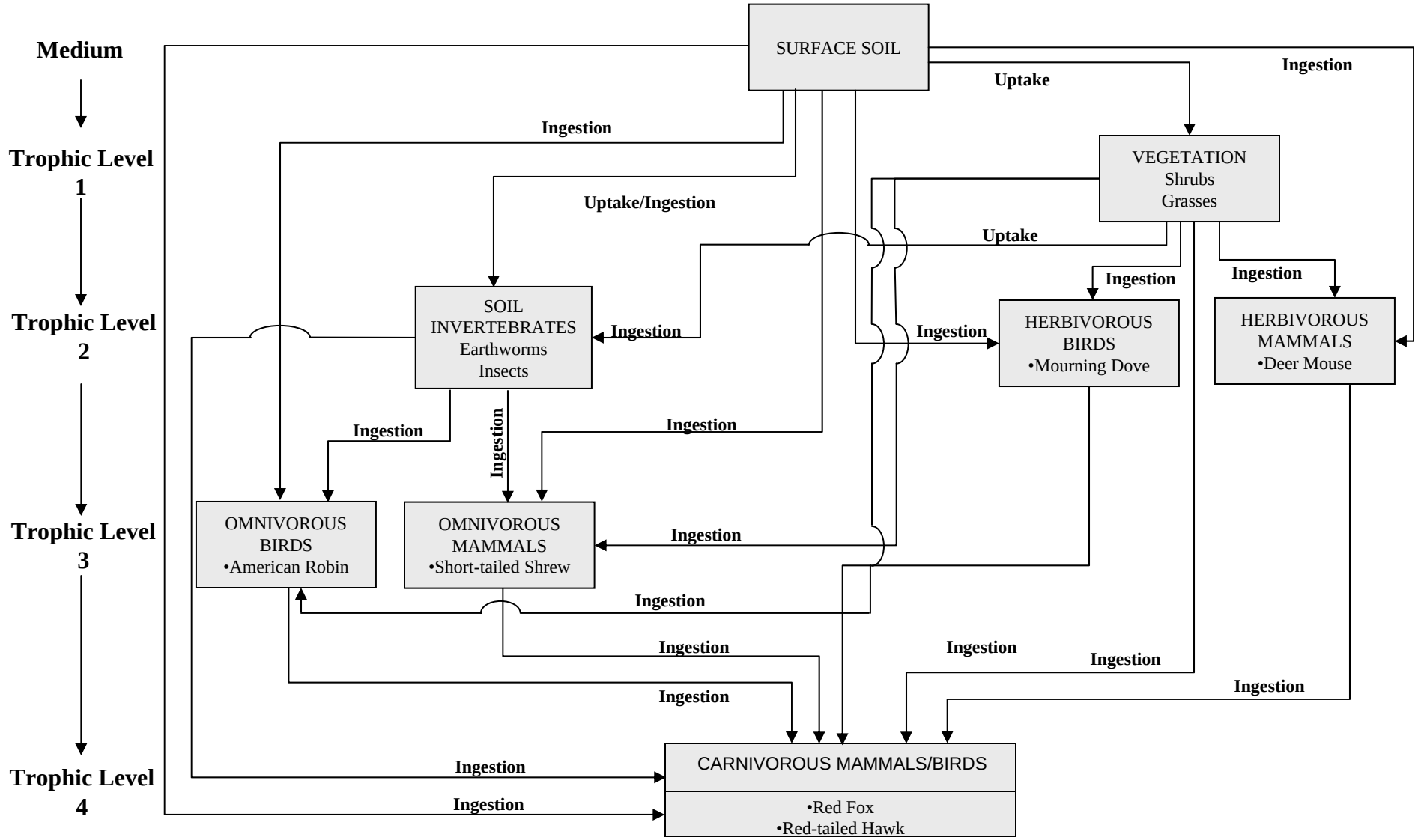
Figure 7-1
Wetlands Identified by the National Wetland Inventory
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

CH2MHILL

\\LSG31039025\GIS\GEOBASE\LOCKBOURNE_AFB\REPORTS\368856_RI\MAPFILES\FIGURE 7-1 (NATIONAL WETLAND INVENTORY).MXD FIGURE 7-1 (NATIONAL WETLAND INVENTORY).MXD RVANSLAM 4/27/2009 16:37:18



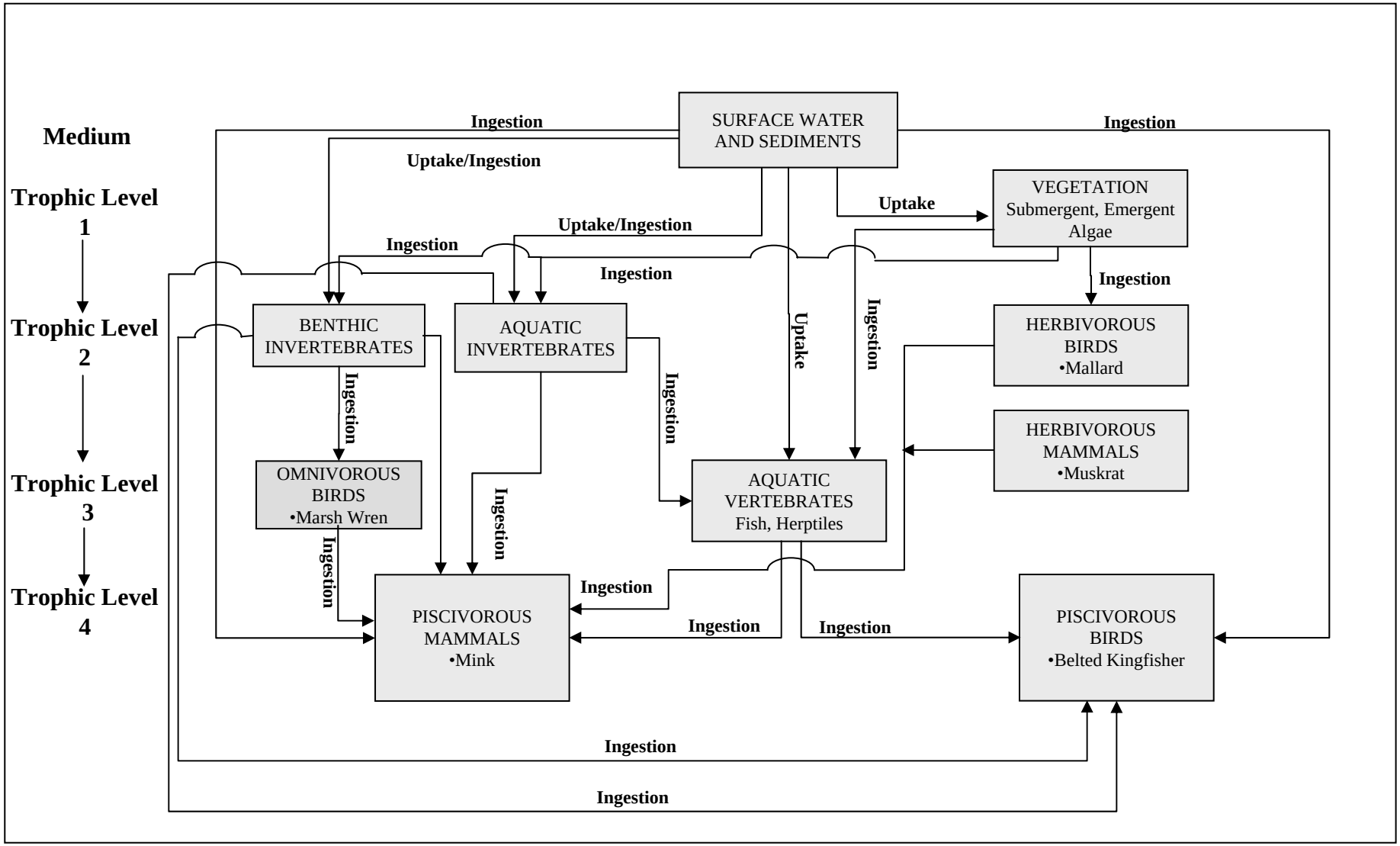
LEGEND

• Representative species

→ Pathway evaluated for at least one species in feeding guild

▭ Feeding guild evaluated

Figure 7-2
Site Conceptual Model for the Terrestrial Ecosystem
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio



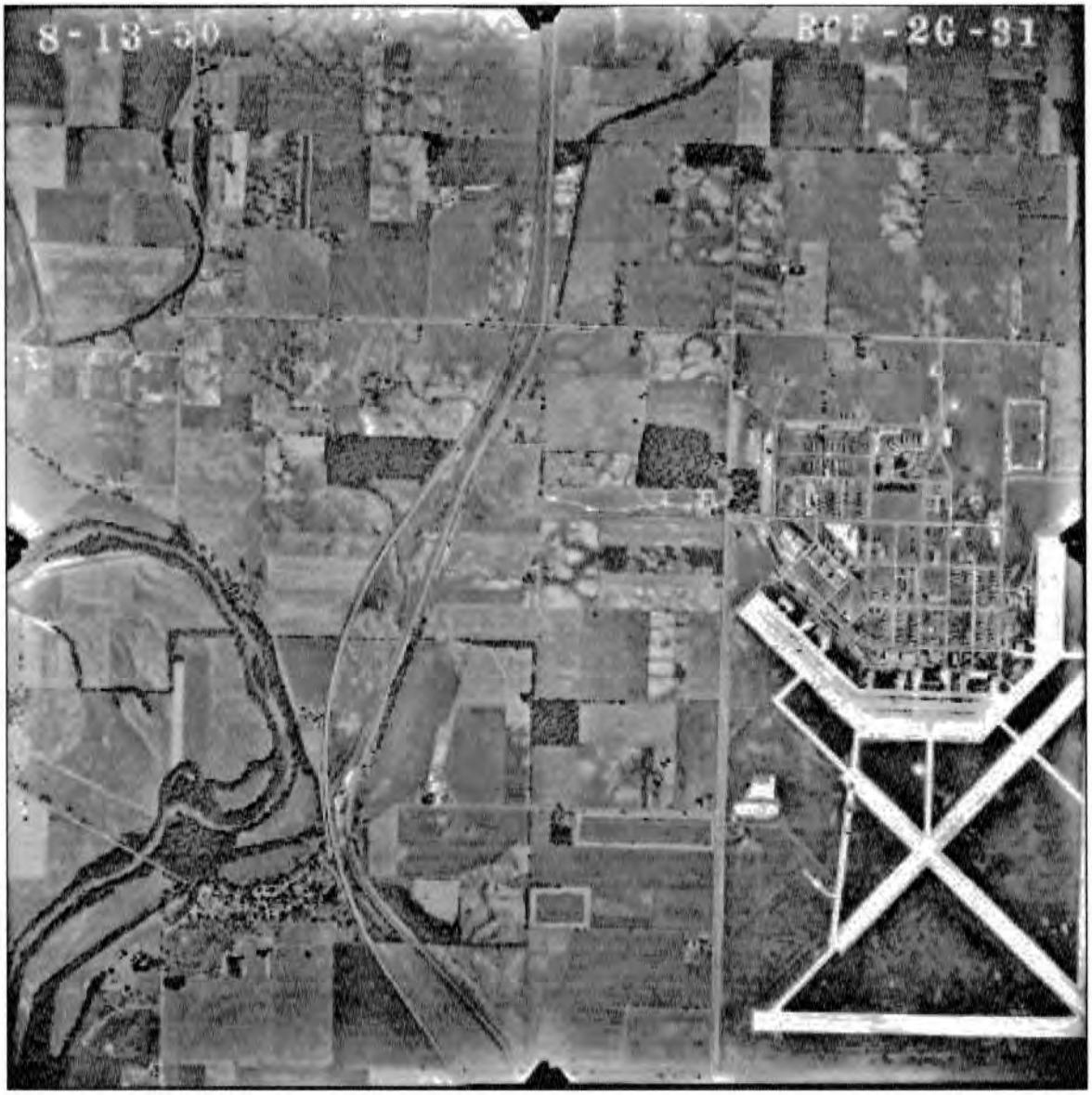
LEGEND

- • Representative species
- → Pathway evaluated for at least one species in feeding guild
- ▭ Feeding guild evaluated

FIGURE 7-3
Site Conceptual Model for the Aquatic Ecosystem
Remedial Investigation Report
Former Lockbourne Air Force Base Landfill, Lockbourne, Ohio

Appendix A
Historical Aerial Photographs

Photo from August 13, 1950
(credit unknown)



Approximate north
all photos

Photo from August 22, 1957
(credit unknown)

Photo from June 19, 1960
(credit unknown)

Photo from April 14, 1964
(credit unknown)

Photo from October 1, 1971
(credit unknown)

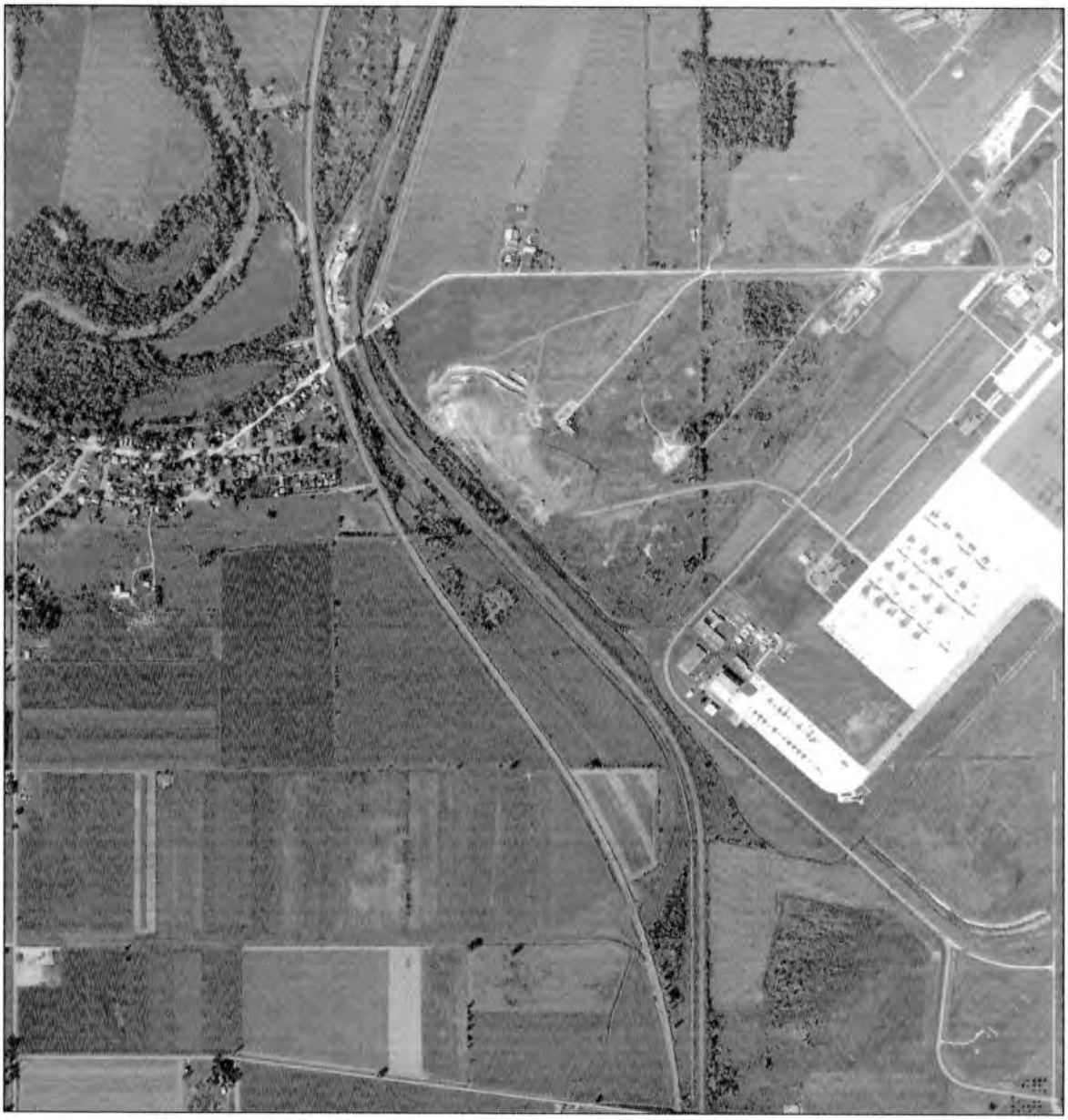


Photo from September 30, 1980
(credit unknown)

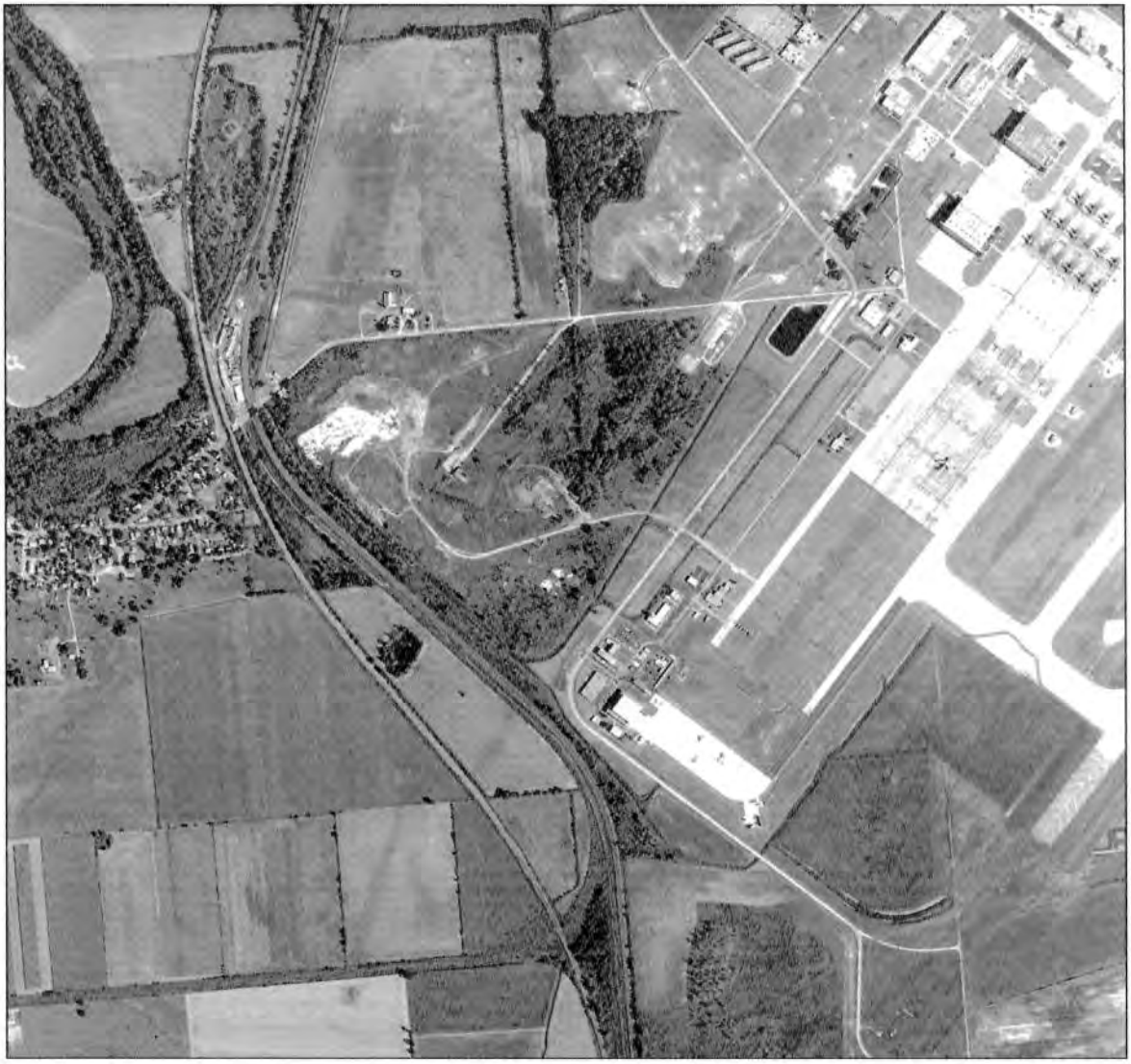
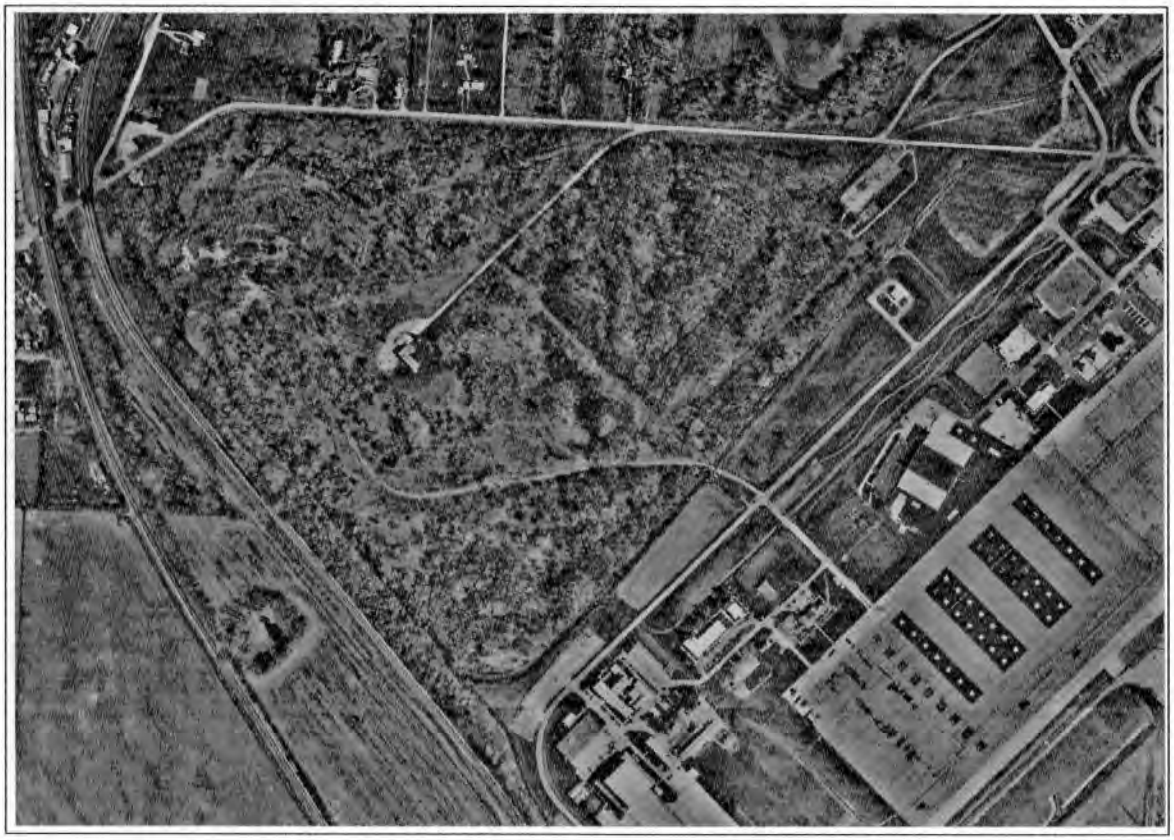


Photo from 1996
(credit unknown)

Photo from 2003
(credit unknown)



Appendix B1

Transmitter Property Delineation Report

ELLIS
ENVIRONMENTAL
GROUP, LC

414 SW 140th Terrace
Newberry, FL 32669-5400
Phone (352) 332-3888
Fax (352) 332-3222
ellisenv.com

November 10, 2005

Ms. Diana Bynum
Ohio EPA, DERR, CDO
3232 Alum Creek Dr.
Columbus, OH 43207

Re: **Transmitter Property Delineation Letter Report**
Former Lockbourne Air Force Base, FUDS Property No. G05OH0007

Dear Ms. Bynum:

This letter report represents activities and findings associated with transmitter property delineation trenching activities conducted during the Remedial Investigation at the Former Lockbourne Air Force Base Landfill. Figure 1, Transmitter Property Trenching Locations, and photographic documentation are supplied as attachments to this report.

Objectives for the transmitter property delineation included:

- Determination of the approximate extent of placed waste to evaluate the need for or feasibility of excavating and removing wastes in the vicinity of the transmitter facility
- Determination of the footprint of the area never used as a landfill

Following a site walkover by Ellis Environmental Group, LC (EEG), R.D. Zande & Associates surveyed and marked transmitter property corners on December 2, 2002. Utility lines were located and marked prior to initiation of trenching operations. Representatives from the United States Corps of Engineers (USACE), Ohio Environmental Protection Agency (OEPA), Columbus Regional Airport Authority (CRAA), Rickenbacker Air National Guard Base (RANGB), and EEG met at the site on December 3, 2002.

A total of seven test pits were excavated for the transmitter property delineation at three corners of the transmitter property and at one corner of CRAA/RANGB property (see Figure 1). Belasco Drilling Services Inc., of Columbus, Ohio, performed the trenching operations using a backhoe.

Trenching operations began at the **west corner of the transmitter property**. One trench, trending northeast-southwest, approximately 1.5 feet wide, 15 feet long, and 2 feet deep, was excavated northeast of the marked property corner. No evidence of landfill debris was observed. This trench was left open until OEPA arrived on location.

Operations then mobilized to the **south corner of the transmitter property**, where the second and third trenches were excavated. The first excavation, northwest of the south corner and trending northwest-southeast, was dug into a mound approximately 10 feet long, 10 feet wide, and 3 feet above grade. This mound appeared to be soil pushed off to the side during clearing of grading and apparently not a debris pile. A few tires and some concrete debris were at surface. The mound was leveled to natural grade, with no evidence of landfill trenching or disposal. The second excavation, northeast of the south corner and trending northeast-southwest, consisted of a trench approximately 1.5 feet wide, 15 feet long, and 2.5 feet deep. This trench revealed natural undisturbed clay, with tree roots at surface and no evidence of landfill debris. This trench was also left open pending arrival of OEPA representatives.

Prior to mobilizing to the east corner of the transmitter property, OEPA representatives arrived. All parties then agreed that one trench along each boundary was sufficient. All parties also agreed that previous trenching did not exhibit any evidence of landfill burial.

Two trenches were dug along the **east corner of the transmitter property**. The first trench, northwest of the east corner and trending northwest-southeast, was approximately 1.5 feet wide, 10 feet long, and 2 feet deep. This trench penetrated natural, undisturbed clay below topsoil. The second trench, southwest of the east corner and trending northeast-southwest, approximately 1.5 feet wide, 10 feet long, and 2 feet deep, also penetrated natural, undisturbed clay under topsoil. All parties agreed that there was no evidence of landfill activities.

The **north corner of the transmitter property** fell on the asphalt access road to the transmitter building. All parties concurred that burial would not be likely in this area. The USACE, OEPA, CRAA, and RANGB representatives then agreed that trenching for transmitter property delineation could be concluded, and all trenches were backfilled.

Operations were then mobilized to the **corner of CRAA/RANGB property**, located east-southeast of the east corner of the transmitter property. Two trenches were dug, one northeast of the property corner and one southeast of the corner. Both trenches were approximately 1.5 feet wide, 5 feet long, and 2 feet deep. Soil in both trenches appeared undisturbed, with no evidence of landfill trenching or disposal in these

trenches. USACE, OEPA, CRAA, and RANGB representatives agreed that no evidence existed of trenching or disposal in these trenches, and all trenching operations were concluded.

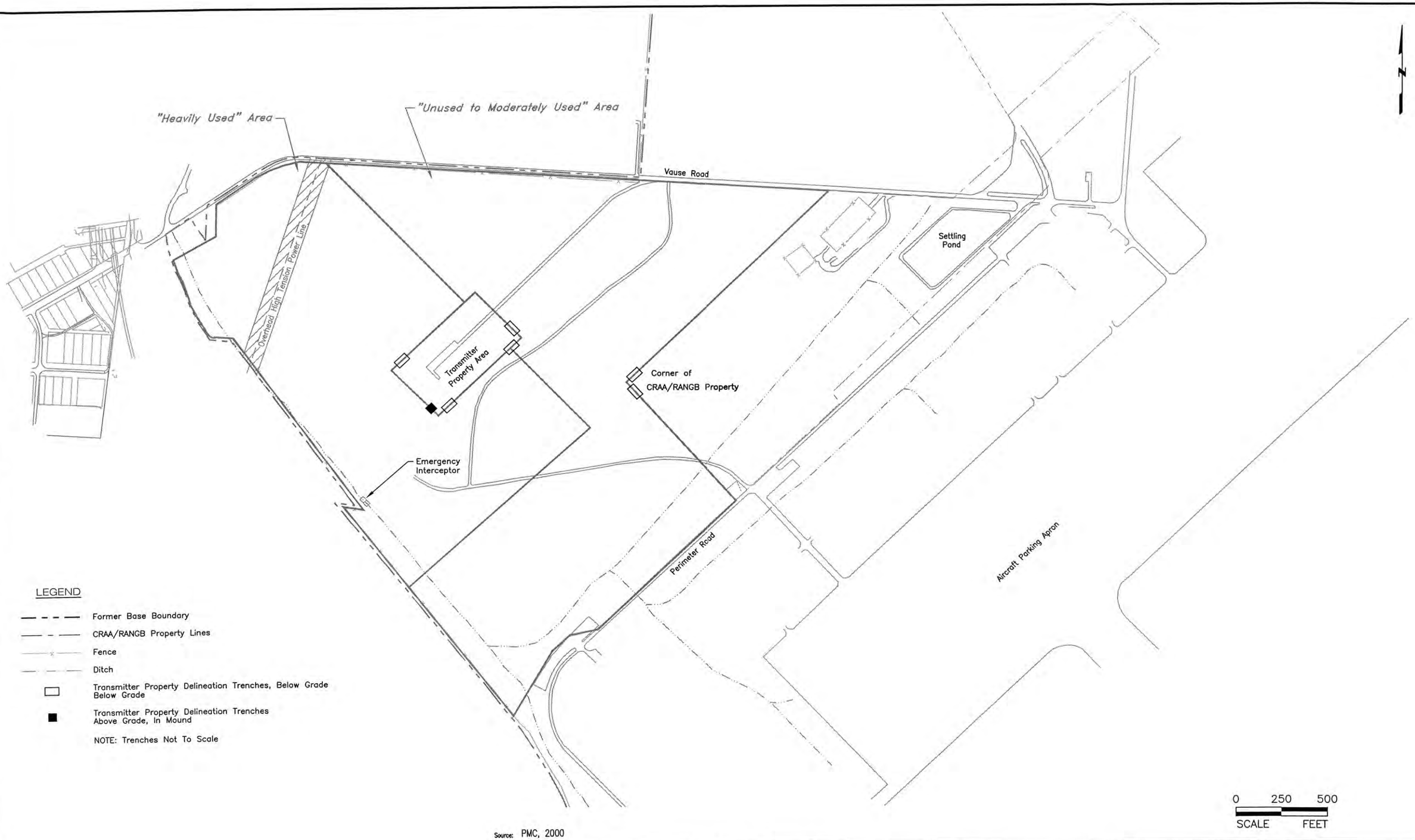
Transmitter property delineation trenching conducted at both the transmitter station area and at the corner of CRAA/RANGB property revealed no evidence landfill activities and determined the footprint of the transmitter property. This area was not used for landfill activities and should be excluded from remedial activities at the area designated as the Former Lockbourne Air Force Base Landfill.

Should you have any questions or comments, please do not hesitate to contact me.

Sincerely,

Mark Webster
Senior Geologist
Telephone (817) 514-1600
e-mail: Mark.Webster@ellisenv.com

Attachments



LEGEND

- Former Base Boundary
- CRAA/RANGB Property Lines
- Fence
- Ditch
- Transmitter Property Delineation Trenches, Below Grade Below Grade
- Transmitter Property Delineation Trenches Above Grade, In Mound

NOTE: Trenches Not To Scale

Source: PMC, 2000

ELLIS ENVIRONMENTAL GROUP, LC	Contract No. DACA27-98-D-0015	Former Lockbourne AFB Landfill Lockbourne, Ohio	Figure No. 1
	Delivery Order No.: 0004 / EEG No: 7005.501		Transmitter Property Trenching Locations
	Document Date: November 2005	Client: US Army Corps of Engineers Louisville District	

Drawing: S:\PROJECTS\ ...rme\7005_501_Sept2005\Trench_Report_Figure_1.dwg Plotted by: rthomas Plot date: 11/9/05 time: 11:03 am

Transmitter Property Delineation
Former Lockbourne Air Force Base Landfill RI

Photograph Log

Photo Number	Date	View Direction	Subject
1	12-03-02	Northeast	Single NE-SW trending trench, west corner of transmitter station area
2	12-03-02	Southwest	NE-SW trending trench, south corner of transmitter station area
3	12-03-02	Southwest	NE-SW trending trench, south corner of transmitter station area
4	12-03-02	Southwest	NW-SE trending trench, south corner of transmitter station area, mounded area
5	12-03-02	Northeast	NE-SW trending trench, east corner of transmitter station area
6	12-03-02	West	NE-SW trending trench, east corner of transmitter station area
7	12-03-02	Southeast	NW-SE trending trench, east corner of transmitter station area
8	12-03-02	Northeast	NE-SW trending trench, CRAA / RANGB property line

Photo 1
Single NE-SW trending trench, west corner of transmitter station area

Photo 2
NE-SW trending trench, south corner of transmitter station area

Photo 3
NE-SW trending trench, south corner of transmitter station area

Photo 4
NW-SE trending trench, south corner of transmitter station area, mounded area

Photo 5
NE-SW trending trench, east corner of transmitter station area

Photo 6
NE-SW trending trench, east corner of transmitter station area

Photo 7
NW-SE trending trench, east corner of transmitter station area

Photo 8
NE-SW trending trench, CRAA / RANGB property line

Appendix B2

Remedial Investigation Analytical Results

November 2003 Sampling Event VOC

VOLATILES BY GC/MS
USACE-LOCKBOURNE AFB
JOB# 222172

Laboratory Chronicle 1
Chain of Custody 6
I. Case Narrative 12
II. Quality Control Summary 16
- A. System Monitoring Compound Summary (Form II)
- B. MS/MSD/ICAL Spike Summary (Form III)
- C. Method Blank Summary (Form IV)
- D. GC/MS Instrument Performance Check (Form V)
- E. Internal Standard Area and RT Summary (Form VIII)

III. Sample Data Package 39
- A. Sample Data in Order of Analysis
  - 1. Tabulated Results (Form I)
  - 2. Tentatively Identified Compound (Form 1E)
  - 3. Raw Data in Order:
    - a. Reconstructed Ion Chromatograms
    - b. Quantitation Reports and Mass Spectra of Target Compounds
    - c. Quantitation Reports and Mass Spectra of TICs with Library Search

IV. Standards Data Package 56
- A. Initial Calibration Data (Form VI)
  - 1. Reconstructed Ion Chromatograms
  - 2. Quantitation Reports
- B. Continuing Calibration Data (Form VII)
  - 1. Reconstructed Ion Chromatograms
  - 2. Quantitation Reports

V. Raw Quality Control Data Package 129
- A. GC/MS Tuning Instrument Performance Check BFB
  - 1. Reconstructed Ion Chromatogram
  - 2. Mass Spectra and Ion Abundance Criteria
  - 3. Mass Tabulation Spectra
- B. Blank Data
  - 1. Tabulated Results (Form I)
  - 2. TIC Results (Form IB)
  - 3. Raw Data
    - a. Reconstructed Ion Chromatograms
    - b. Quantitation Reports and Mass Spectra of Target Compounds
    - c. Quantitation Reports and Mass Spectra of TICs with Library Search
- C. MS/MSD/LCS/ICAL Spike Data
  - 1. Tabulated Results (Form I)
  - 2. Raw Data
    - a. Reconstructed Ion Chromatograms
    - b. Quantitation Reports
- D. Run Log Summary
- E. Sample Prep Log (5035 Soils)
- F. Job Analysis History

STL Chicago is part of Severn Trent Laboratories, Inc.

SAMPLE INFORMATION
Date: 12/11/2003

Job Number.: 222172
Customer...: Ellis Environmental Group, LC
Attn.....: Karen Hatfield

Project Number.....: 20002508
Customer Project ID....: USACE-LOCKBOURNE AFB
Project Description....: USACE-Lockbourne AFB

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
222172-1	LCKMW-15	Water	11/10/2003	14:20	11/11/2003	09:25
222172-2	DUP01	Water	11/10/2003	02:00	11/11/2003	09:25
222172-3	TRIP BLANK	Water	11/10/2003	15:00	11/11/2003	09:25

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY CHRONICLE

Job Number: 222172

Date: 12/11/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

Lab ID: 222172-1 Client ID: LCKMW-15 Date Recvd: 11/11/2003 Sample Date: 11/10/2003

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
5030B	5030 25 mL Purge Prep	1	102284		11/20/2003	2242	
8260B	Volatile Organics	1	102291	102284	11/20/2003	2242	1.00000

Lab ID: 222172-2 Client ID: DUP01 Date Recvd: 11/11/2003 Sample Date: 11/10/2003

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
5030B	5030 25 mL Purge Prep	1	102284		11/21/2003	0008	
8260B	Volatile Organics	1	102291	102284	11/21/2003	0008	1.00000

Lab ID: 222172-3 Client ID: TRIP BLANK Date Recvd: 11/11/2003 Sample Date: 11/10/2003

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED		DILUTION
5030B	5030 25 mL Purge Prep	1	102284		11/20/2003	2214	
8260B	Volatile Organics	1	102291	102284	11/20/2003	2214	1.00000

REPORT COMMENTS

1) All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.
2) Soil, sediment and sludge sample results are reported on a "dry weight" basis except when analyzed for landfill disposal or incineration parameters. All other solid matrix samples are reported on an "as received" basis unless noted differently.
3) Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.
4) The test results for the noted analytical method(s) meet the requirements of NELAC. Lab Cert. ID# 100201
5) According to 40CFR Part 136.3, pH, Chlorine Residual and Dissolved Oxygen analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field (e.g. pH Field) they were not analyzed immediately, but as soon as possible on laboratory receipt.

Glossary of flags, qualifiers and abbreviations (any number of which may appear in the report)

Inorganic Qualifiers (Q-Column)

U Analyte was not detected at or above the stated limit.
< Not detected at or above the reporting limit.
J Result is less than the RL, but greater than or equal to the method detection limit.
B Result is less than the CRDL/RL, but greater than or equal to the IDL/MDL.
S Result was determined by the Method of Standard Additions.
F AFCEE: Result is less than the RL, but greater than or equal to the method detection limit.

Inorganic Flags (Flag Column)

^ ICV,CCV,ICB,CCB,ISA,ISB,CRI,CRA,MRL: Instrument related QC exceed the upper or lower control limits.
* LCS, LCD, MD: Batch QC exceeds the upper or lower control limits.
+ MSA correlation coefficient is less than 0.995.
4 MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
E SD: Serial dilution exceeds the control limits.
H MB, EB1, EB2, EB3: Batch QC is greater than reporting limit or had a negative instrument reading lower than the absolute value of the reporting limit.
N MS, MSD: Spike recovery exceeds the upper or lower control limits.
W AS(GFAA) Post-digestion spike was outside 85-115% control limits.

Organic Qualifiers (Q - Column)

U Analyte was not detected at or above the stated limit.
ND Compound not detected.
J Result is an estimated value below the reporting limit or a tentatively identified compound (TIC).
Q Result was qualitatively confirmed, but not quantified.
C Pesticide identification was confirmed by GC/MS.
Y The chromatographic response resembles a typical fuel pattern.
Z The chromatographic response does not resemble a typical fuel pattern.
E Result exceeded calibration range, secondary dilution required.
F AFCEE:Result is an estimated value below the reporting limit or a tentatively identified compound (TIC)

Organic Flags (Flags Column)

B MB: Batch QC is greater than reporting limit.
* LCS, LCD, ELC, ELD, CV, MS, MSD, Surrogate: Batch QC exceeds the upper or lower control limits.
^ EB1, EB2, EB3, MLE: Batch QC is greater than reporting Limit
A Concentration exceeds the instrument calibration range
a Concentration is below the method Reporting Limit (RL)
B Compound was found in the blank and sample.
D Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution will be flagged with a D.
H Alternate peak selection upon analytical review
I Indicates the presence of an interfence, recovery is not calculated.
M Manually integrated compound.
P The lower of the two values is reported when the % difference between the results of two GC columns is

greater than 25%.

Abbreviations

AS	Post Digestion Spike (GFAA Samples - See Note 1 below)
Batch	Designation given to identify a specific extraction, digestion, preparation set, or analysis set
CAP	Capillary Column CCB Continuing Calibration Blank
CCV	Continuing Calibration Verification
CF	Confirmation analysis of original
C1	Confirmation analysis of A1 or D1
C2	Confirmation analysis of A2 or D2
C3	Confirmation analysis of A3 or D3
CRA	Low Level Standard Check - GFAA; Mercury
CRI	Low Level Standard Check - ICP
CV	Calilbration Verification Standard
Dil Fac	Dilution Factor - Secondary dilution analysis
D1	Dilution 1
D2	Dilution 2
D3	Dilution 3
DLFac	Detection Limit Factor
DSH	Distilled Standard - High Level
DSL	Distilled Standard - Low Level
DSM	Distilled Standard - Medium Level
EB1	Extraction Blank 1
EB2	Extraction Blank 2
EB3	DI Blank
ELC	Method Extracted LCS
ELD	Method Extracted LCD
ICAL	Initial calibration
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
ISA	Interference Check Sample A - ICAP
ISB	Interference Check Sample B - ICAP
Job No.	The first six digits of the sample ID which refers to a specific client, project and sample group
	Lab ID An 8 number unique laboratory identification
LCD	Laboratory Control Standard Duplicate
LCS	Laboratory Control Standard with reagent grade water or a matrix free from the analyte of interest
MB	Method Blank or (PB) Preparation Blank
MD	Method Duplicate
MDL	Method Detection Limit
MLE	Medium Level Extraction Blank
MRL	Method Reporting Limit Standard
MSA	Method of Standard Additions
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not Detected
PREPF	Preparation factor used by the Laboratory's Information Management System (LIMS)
PDS	Post Digestion Spike (ICAP)
RA	Re-analysis of original
A1	Re-analysis of D1
A2	Re-analysis of D2
A3	Re-analysis of D3
RD	Re-extraction of dilution
RE	Re-extraction of original
RC	Re-extraction Confirmation
RL	Reporting Limit
RPD	Relative Percent Difference of duplicate (unrounded) analyses
RRF	Relative Response Factor
RT	Retention Time

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 12/11/2003

RTW	Retention Time Window Sample ID A 9 digit number unique for each sample, the first six digits are referred as the Job number
SCB	Seeded Control Blank
SD	Serial Dilution (Calculated when sample concentration exceeds 50 times the MDL)
UCB	Unseeded Control Blank
SSV	Second Source Verification Standard
SLCS	Solid Laboratory Control Standard(LCS)
PHC	pH Calibration Check LCSP pH Laboratory Control Sample
LCDP	pH Laboratory Control Sample Duplicate
MDPH	pH Sample Duplicate
MDFP	Flashpoint Sample Duplicate
LCFP	Flashpoint LCS
G1	Gelex Check Standard Range 0-1
G2	Gelex Check Standard Range 1-10
G3	Gelex Check Standard Range 10-100
G4	Gelex Check Standard Range 100-1000

Note 1: The Post Spike Designation on Batch QC for GFAA is designated with an "S" added to the current abbreviation used. EX. LCS S=LCS Post Spike (GFAA); MSS=MS Post Spike (GFAA)

Note 2: The MD calculates an absolute difference (A) when the sample concentration is less than 5 times the reporting limit. The control limit is represented as +/- the RL.

CHAIN OF CUSTODY

SEVERN TRENT **STL**

STL Chicago
2417 Bond Street
University Park, IL 60466
Phone: 708-534-5200
Fax: 708-534-5211

Report To:
Contact: MIKE GEARHART
Company: ELLIS ENVIRONMENTAL
Address: 4114 SW 140TH TERRACE
NEWBERRY, FL 32669
Phone: 352-332-3888
Fax: 352-332-3222
E-Mail: MICHAEL.GEARHART@ELLISENV.COM

Bill To:
Contact:
Company:
Address:
Phone:
Fax:
PO#: Quote:
SAME

Shaded Areas For Internal Use Only 1 of 1

Lab Lot# 222172

Package Sealed	Samples Sealed
Yes No	Yes No
Received on Ice	**Samples Intact**
Yes No	Yes No

Temperature °C of Cooler (3.1) (3.8) (4.3) (4.8)

Within Hold Time	Preserv. Indicated
Yes No	Yes No NA
pH Check OK	**Res Cl_2 Check OK**
Yes No NA	Yes No NA

Sample Labels and COC Agree: Yes No COC not present

Sampler Name: MARK WEBSTER
Signature: [signature]
Project Name: LOCKBOURNE
Project Number: 7005.201
Project Location: LOCKBOURNE, OHIO
Lab PM: NANCY McDONALD
Date Required Hard Copy: __/__/__ Fax: __/__/__

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	VOCs SW 8260B	SVOCs SW 8270C	TAL METALS 200.8/7000	PEST./PCBs SW 8082 SW 8081	EXPLOSIVES SW 8330	Additional Analyses / Remarks
		Refrig #										
		# / Cont.					2	4	1	4	4	
		Volume					40 ml	1 L	500 ml	1 L	1 L	
		Preserv					1	6	3	6	6	
1		LCKMW-15	11-10-02	1420	W	G	X	X	X	X	X	
1	X	LCKMW-15 MS	11-10-02	1420	W	G	X	X	X	X	X	
1	X	LCKMW-15 MSD	11-10-02	1420	W	G	X	X	X	X	X	
2		DUP01	11-10-02	0200	W	G	X	X	X	X	X	
3		TRIP BLANK	11-10-03	1500	W	G	X					
		TRIP BLANK	11-10-03	1500	W	G						

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	Ellis Environmental	11-10-03	1800	[signature]	STL	11/11/03	0925
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

Matrix Key
WW = Wastewater
W = Water
S = Soil
SL = Sludge
MS = Miscellaneous
OL = Oil
A = Air
SE = Sediment
SO = Solid
DS = Drum Solid
DL = Drum Liquid
L = Leachate
WI = Wipe
O = _____

Container Key
1. Plastic
2. VOA Vial
3. Sterile Plastic
4. Amber Glass
5. Widemouth Glass
6. Other _____

Preservative Key
1. HCl, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. Cool to 4°
7. None

COMMENTS

Date Received 11/11/03
Courier: FX
Hand Delivered ☐
Bill of Lading see attach

STL Chicago
Internal Sample Custody Transfer Record

8

Sample Lot#: 222172 Client: Ellis

Sample No.	Analysis	Relinquished by:	Received by:	Date	Time	Comments
1-3	8260	[illegible]	Cooler 5	11/11/03	1215	
1&2	ORG	[illegible]	[illegible]	11/12/03	0808	
1-2	8330	[illegible]	[illegible]	11/18/03	1900	
1-2	8330	[illegible]	[illegible]	11/13/03	2000	
1&2	ORG	[illegible]	[illegible]	11/14/03	1120	

CHI-22-11-001/C-1/99

rpjsckl | Job Sample Receipt Checklist Report | V2

Job Number.: 222172 Location.: 57222 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.: 12/10/2003 Date of the Report..: 12/10/2003
Project Number.: 20002508 Project Description.: USACE-Lockbourne AFB Project Manager.....: nsm
Customer.....: Ellis Environmental Group, LC Contact.: Karen Hatfield

Questions ?	(Y/N)	Comments
Chain-of-Custody Present.....	Y	
Were samples dropped off at or picked up by STL?..	N	
Custody seal on shipping container?.....	Y	
...If "yes", custody seal intact?.....	Y	
Custody seals on sample containers?.....	N	
...If "yes", custody seal intact?.....		
Samples iced?.....	Y	
Temperature of cooler acceptable? (4 deg C +/- 2).	Y	3.1,3.8,4.3,4.8
Samples received intact (good condition)?.....	Y	
Volatile samples acceptable? (no headspace).....	Y	
Correct containers used?.....	Y	
Adequate sample volume provided?.....	Y	
Samples preserved correctly?.....	Y	
Samples received within holding-time?.....	Y	
Agreement between COC and sample labels?.....	Y	
Radioactivity at or below background levels?.....	Y	
A Sample Discrepancy Report (SDR) was needed?.....	N	
If samples were shipped was there an air bill #?..	Y	
Sample Custodian Signature/Date.....	Y	

FedEx Express USA Airbill

FedEx Tracking Number 8417 4572 5250

Form ID No. 0200

1 From

Date

Sender's Name Phone

Company

Address Dept./Floor/Suite/Room

City State ZIP

2 Your Internal Billing Reference

3 To

Recipient's Name Phone

Company

Address
To "HOLD" at FedEx location, print FedEx address. We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address Dept./Floor/Suite/Room

City State ZIP

8417 4572 5250

4a Express Package Service — Packages up to 150 lb. Delivery commitment may be later in some areas

- [x] FedEx Priority Overnight — Next business morning
- [ ] FedEx Standard Overnight — Next business afternoon
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations
- [ ] FedEx 2Day — Second business day
- [ ] FedEx Express Saver — Third business day

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service — Packages over 150 lb. Delivery commitment may be later in some areas

- [ ] FedEx 1Day Freight* — Next business day
- [ ] FedEx 2Day Freight — Second business day
- [ ] FedEx 3Day Freight — Third business day

* Call for Confirmation:

5 Packaging — * Declared value limit $

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak
- [x] Other

6 Special Handling — Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available only for FedEx Priority Overnight and FedEx 2Day to select ZIP codes
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight
- [ ] HOLD Saturday at FedEx Location — Available only for FedEx Priority Overnight and FedEx 2Day to select locations

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration
- [ ] Yes — Shipper's Declaration not required
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____

Dangerous Goods (including Dry Ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip. Acct. No.

- [x] Sender — Acct. No. in Section 1 will be billed
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

Total Packages	Total Weight	Total Declared Value†	Total Charges
	53	$ .00	

†Our liability is limited to $100 unless you declare a higher value. See back for details.

Credit Card Auth.

8 Release Signature Sign to authorize delivery without obtaining signature.

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

Questions? Visit our Web site at fedex.com
or call 1.800.Go.FedEx® 800.463.3339.

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446

FedEx Express USA Airbill

FedEx Tracking Number 8417 4572 5238

Form ID No. 0200

1 From

Date

Sender's Name Phone

Company

Address Dept./Floor/Suite/Room

City State ZIP

2 Your Internal Billing Reference

3 To

Recipient's Name Phone

Company

Address
To "HOLD" at FedEx location, print FedEx address. We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address Dept./Floor/Suite/Room

City State ZIP

8417 4572 5238

4a Express Package Service — Packages up to 150 lb. Delivery commitment may be later in some areas

- [x] FedEx Priority Overnight — Next business morning
- [ ] FedEx Standard Overnight — Next business afternoon
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations
- [ ] FedEx 2Day — Second business day
- [ ] FedEx Express Saver — Third business day

FedEx Envelope rate not available. Minimum charge: One-pound rate.

4b Express Freight Service — Packages over 150 lb. Delivery commitment may be later in some areas

- [ ] FedEx 1Day Freight* — Next business day
- [ ] FedEx 2Day Freight — Second business day
- [ ] FedEx 3Day Freight — Third business day

* Call for Confirmation:

5 Packaging — * Declared value limit $

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak
- [x] Other

6 Special Handling — Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available only for FedEx Priority Overnight and FedEx 2Day to select ZIP codes
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight
- [ ] HOLD Saturday at FedEx Location — Available only for FedEx Priority Overnight and FedEx 2Day to select locations

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration
- [ ] Yes — Shipper's Declaration not required
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____

Dangerous Goods (including Dry Ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip. Acct. No.

- [x] Sender — Acct. No. in Section 1 will be billed
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

Total Packages	Total Weight	Total Declared Value†	Total Charges
	53	$ .00	

†Our liability is limited to $100 unless you declare a higher value. See back for details.

Credit Card Auth.

8 Release Signature Sign to authorize delivery without obtaining signature.

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

Questions? Visit our Web site at fedex.com
or call 1.800.Go.FedEx® 800.463.3339.

10

446

FedEx Express USA Airbill — FedEx Tracking Number 8417 4572 5249

0200

1 From

Date

Sender's Name — Phone

Company

Address — Dept./Floor/Suite/Room

City — State FL — ZIP 32607

2 Your Internal Billing Reference 222172

3 To

Recipient's Name — Phone

Company

Address — To "HOLD" at FedEx location, print FedEx address. — We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address — Dept./Floor/Suite/Room

City — State — ZIP

8417 4572 5249

4a Express Package Service — Packages up to 150 lbs. Delivery commitment may be later in some areas.

- [x] FedEx Priority Overnight — Next business morning
- [ ] FedEx Standard Overnight — Next business afternoon
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations
- [ ] FedEx 2Day — Second business day
- [ ] FedEx Express Saver — Third business day

FedEx Envelope rate not available. Minimum charge: One-pound rate

4b Express Freight Service — Packages over 150 lbs. Delivery commitment may be later in some areas.

- [ ] FedEx 1Day Freight* — Next business day
- [ ] FedEx 2Day Freight — Second business day
- [ ] FedEx 3Day Freight — Third business day

* Call for Confirmation.

5 Packaging — * Declared value limit $

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak
- [x] Other

6 Special Handling — Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available only for FedEx Priority Overnight and FedEx 2Day to select ZIP codes.
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight
- [ ] HOLD Saturday at FedEx Location — Available only for FedEx Priority Overnight and FedEx 2Day at select locations

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration
- [ ] Yes — Shipper's Declaration not required
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____

Dangerous goods (including Dry Ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below.

- [ ] Obtain Recip. Acct. No.
- [x] Sender — Acct. No. in Section 1 will be billed
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Che

Total Packages	Total Weight	Total Declared Value*	Total Charges
	56	$ .00	

Our liability is limited to $100 unless you declare a higher value. See back for details.

Credit Card Auth.

8 Release Signature — Sign to authorize delivery without obtaining a signature.

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

Questions? Visit our Web site at fedex.com or call 1.800.Go.FedEx® 800.463.3339.

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FedEx Express USA Airbill — FedEx Tracking Number 8417 4572 5227

0200

1 From

Date

Sender's Name — Phone

Company

Address — Dept./Floor/Suite/Room

City — State FL — ZIP

2 Your Internal Billing Reference 222172

3 To

Recipient's Name — Phone

Company

Address — To "HOLD" at FedEx location, print FedEx address. — We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address — Dept./Floor/Suite/Room

City — State — ZIP

8417 4572 5227

4a Express Package Service — Packages up to 150 lbs. Delivery commitment may be later in some areas.

- [x] FedEx Priority Overnight — Next business morning
- [ ] FedEx Standard Overnight — Next business afternoon
- [ ] FedEx First Overnight — Earliest next business morning delivery to select locations
- [ ] FedEx 2Day — Second business day
- [ ] FedEx Express Saver — Third business day

FedEx Envelope rate not available. Minimum charge: One-pound rate

4b Express Freight Service — Packages over 150 lbs. Delivery commitment may be later in some areas.

- [ ] FedEx 1Day Freight* — Next business day
- [ ] FedEx 2Day Freight — Second business day
- [ ] FedEx 3Day Freight — Third business day

* Call for Confirmation.

5 Packaging — * Declared value limit $50

- [ ] FedEx Envelope*
- [ ] FedEx Pak* — Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak
- [x] Other

6 Special Handling — Include FedEx address in Section 3.

- [ ] SATURDAY Delivery — Available only for FedEx Priority Overnight and FedEx 2Day to select ZIP codes
- [ ] HOLD Weekday at FedEx Location — Not available for FedEx First Overnight
- [ ] HOLD Saturday at FedEx Location — Available only for FedEx Priority Overnight and FedEx 2Day at select locations

Does this shipment contain dangerous goods? One box must be checked.

- [x] No
- [ ] Yes — As per attached Shipper's Declaration
- [ ] Yes — Shipper's Declaration not required
- [ ] Dry Ice — Dry Ice, 9, UN 1845 ____ x ____

Dangerous goods (including Dry Ice) cannot be shipped in FedEx packaging.

- [ ] Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below.

- [ ] Obtain Recip. Acct. No.
- [x] Sender — Acct. No. in Section 1 will be billed
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Chec

Total Packages	Total Weight	Total Declared Value*	Total Charges
		$ .00	

Our liability is limited to $100 unless you declare a higher value. See back for details.

Credit Card Auth.

8 Release Signature — Sign to authorize delivery without obtaining a signature.

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

Questions? Visit our Web site at fedex.com or call 1.800.Go.FedEx®

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I. CASE NARRATIVE

Severn Trent Laboratories Chicago
GC/MS Case Narrative

Ellis Environmental Group
USACE-Lockbourne AFB
STL JOB# 222172
VOA DATA:

1. The water samples were analyzed within the 14-day hold time from the date of collection.

2. The Method Blank target compounds were below reporting limits.

3. The QC limits specified in the QAPP were used to evaluate QC acceptance. Dichlorodifluoromethane (58%) and Chloromethane (45%) were below the QC limits in the LCS for batch 102424. The ICAL spike had Carbon Disulfide (78%) spike recovery below the QAPP specified QC limits of (80-120) for 9S1016. All other spike recoveries were within the QAPP specified QC limits in the LCS sample and the ICAL Spike. The compounds that exceeded the control limits were not contaminants of concern.

4. Matrix Spike/Matrix Spike Duplicate analyses were performed on sample 1. The QC limits specified in the QAPP were used to evaluate QC acceptance. Chloromethane was below the QC limits in the MS for sample 1. All other spike recoveries were within the QAPP specified QC limits in the MS and MSD samples.

5. MRL verification standards were analyzed before and after the sample analysis in all of the tune batches. Dichlorodifluoromethane was outside of the QC limits in the MRL standard and Dichlorodifluoromethane and 2-Butanone were outside of the QC limits in the MRL2 standard for batch 102284. A low level detection limit check was analyzed and all compounds were detected. All other compounds were within the QAPP specified QC limits.

6. All of the samples had surrogate recoveries within the QAPP specified QC limits.

7. All samples were prepared using Method 5030 and analyzed following SW846 Method 8260B and 8000B. All of the calibration criteria are met per method or QAPP (for minimum R values for certain compounds). The low point in the initial calibration verifies the base reporting limits. The target compounds were quantitated using the initial calibration.

8. All manual integrations were preformed following the laboratory's Manual Integration Standard Operating Procedure (SOP). The reason for manual integration was documented, reviewed and included as part of the package.

9. All internal standard areas and retention times were within SOP acceptance limits as compared to the corresponding calibration verification standard.

10. The water samples were analyzed without dilution using a 25-ml purge volume.

John Nagel
GC/MS Dept

12-12-03
Date

PROJECT

Note Number : 45819
Date : 8/21/2003
Author : nsm
Subject : Revised Contaminants of Concern

Project Code....: 20002508 USACE-Lockbourne AFB

Location Code...: 57222
Job/Sales Order.:

Customer.....: ELLISENVIR Ellis Environmental Group, LC
Contact Location: NEWBERR FL Newberry, FL
Contact.....: HATFIELD K Karen Hatfield

Invoice.....:

Batch.....:

Note For.....:

GC/MS VOCs: Toluene, Xylene, Ethylbenzene, Benzene, MTBE, TCE, DCE, PCE.

GC/MS SVOCs: PAHs and Diethylphthalate.

MANUAL INTEGRATION SUMMARY REPORT

Sample Name	Data File	Client ID	Compound
~~VSTD0.5~~	~~101603a_25ml9w.b/9i1016a.d~~		~~Tetrahydrofuran~~
VSTD0.5	101603a_25ml9w.b/9i1016a.d		Carbon tetrachloride
VSTD0.5	101603a_25ml9w.b/9i1016a.d		1,2-Dichloroethane
VSTD0.5	101603a_25ml9w.b/9i1016a.d		Dibromomethane
VSTD0.5	101603a_25ml9w.b/9i1016a.d		1,2-Dibromoethane
VSTD0.5	101603a_25ml9w.b/9i1016a.d		Bromoform
VSTD0.5	101603a_25ml9w.b/9i1016a.d		1,2-Dibromo-3-Chloropropane
VSTD001	101603a_25ml9w.b/9i1016b.d		2-Butanone
VSTD040	101603a_25ml9w.b/9i1016i.d		Pentafluorobenzene
ICAL SPIKE	101603a_25ml9w.b/9s1016.d		Chloroethane

JM 121003

MANUAL INTEGRATION SUMMARY REPORT

Sample Name	Data File	Client ID	Compound
222172-1MSD	112003a.b/2172-01t.d		4-Methyl-2-pentanone
VSTD010	112003a.b/9c1120b.d	2	2-Butanone
MRL	112003a.b/911120.d		4-Methyl-2-pentanone
MRL	112003a.b/911120a.d		4-Methyl-2-pentanone
MRL	112003a.b/911120a.d		1,2-Dibromo-3-Chloropropane
DLCK CHECK	112003a.b/911120.d		Methyl-tert-Butyl Ether
DLCK CHECK	112003a.b/911120.d		2,2-Dichloropropane

12/10/03

II. QUALITY CONTROL SUMMARY

STL Chicago is part of Severn Trent Laboratories, Inc.

SURROGATE RECOVERIES REPORT

Job Number.: 222172 Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

Method.....: Volatile Organics
Method Code...: 8260B
Test Matrix...: Water
Batch(s).....: 102291
Prep Batch..: 102284

Lab ID	DT	Sample ID	Date	12DCED	BRFLBE	DBRFLM	TOLD8
DLCK			11/21/2003	90	91	99	100
LCS			11/20/2003	89	90	97	97
MB			11/20/2003	92	91	100	101
MRL			11/20/2003	91	91	99	101
MRL2			11/21/2003	94	93	101	101
222172- 1		LCKMW-15	11/20/2003	89	90	96	100
222172- 1	MS	LCKMW-15	11/20/2003	93	93	99	100
222172- 1	MSD	LCKMW-15	11/20/2003	94	93	99	100
222172- 2		DUP01	11/21/2003	90	91	96	101
222172- 3		TRIP BLANK	11/20/2003	81	87	91	99

Test	Test Description	Limits
12DCED	1,2-Dichloroethane-d4 (surr)	50 - 150
BRFLBE	4-Bromofluorobenzene (surr)	50 - 150
DBRFLM	Dibromofluoromethane (surr)	50 - 150
TOLD8	Toluene-d8 (surr)	50 - 150

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8260B
Method Description.: Volatile Organics

Equipment Code....: GCL9
Batch.....: 102291

Analyst...: jdn

MS	Matrix Spike	V03K200SE	222172-1		11/20/2003	2311

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	6.068		10.000	1.000 U	61	%	59-134	
Chloromethane	ug/L	5.039		10.000	1.000 U	50	%	58-135	*
Vinyl chloride	ug/L	8.534		10.000	1.000 U	85	%	73-134	
Bromomethane	ug/L	5.445		10.000	1.000 U	54	%	35-153	
Chloroethane	ug/L	9.880		10.000	1.000 U	99	%	72-129	
Trichlorofluoromethane	ug/L	9.291		10.000	1.000 U	93	%	68-133	
1,1-Dichloroethene	ug/L	9.317		10.000	1.000 U	93	%	75-125	
Carbon disulfide	ug/L	7.860		10.000	5.000 U	79	%	74-123	
Acetone	ug/L	8.745		10.000	5.000 U	87	%	51-157	
Methylene chloride	ug/L	9.738		10.000	1.000 U	97	%	69-118	
trans-1,2-Dichloroethene	ug/L	9.894		10.000	1.000 U	99	%	75-134	
Methyl-tert-butyl-ether (MTBE)	ug/L	9.389		10.000	1.000 U	94	%	59-129	
1,1-Dichloroethane	ug/L	10.259		10.000	1.000 U	103	%	75-133	
2,2-Dichloropropane	ug/L	10.374		10.000	1.000 U	104	%	62-134	
cis-1,2-Dichloroethene	ug/L	10.475		10.000	1.000 U	105	%	73-133	
2-Butanone (MEK)	ug/L	10.532		10.000	5.000 U	105	%	45-150	
Bromochloromethane	ug/L	8.946		10.000	1.000 U	89	%	75-127	
Chloroform	ug/L	10.346		10.000	1.000 U	103	%	74-127	
1,1,1-Trichloroethane	ug/L	9.963		10.000	1.000 U	100	%	70-127	
1,1-Dichloropropene	ug/L	10.028		10.000	1.000 U	100	%	75-135	
Carbon tetrachloride	ug/L	10.134		10.000	1.000 U	101	%	71-132	
Benzene	ug/L	10.122		10.000	1.000 U	101	%	75-126	
1,2-Dichloroethane	ug/L	9.455		10.000	1.000 U	95	%	67-132	
Trichloroethene	ug/L	10.442		10.000	1.000 U	104	%	67-128	
1,2-Dichloropropane	ug/L	10.226		10.000	1.000 U	102	%	75-127	
Dibromomethane	ug/L	9.841		10.000	1.000 U	98	%	76-132	
Bromodichloromethane	ug/L	10.686		10.000	1.000 U	107	%	70-130	
cis-1,3-Dichloropropene	ug/L	10.413		10.400	1.000 U	100	%	73-132	
4-Methyl-2-pentanone (MIBK)	ug/L	10.219		10.000	5.000 U	102	%	59-150	
Toluene	ug/L	10.200		10.000	1.000 U	102	%	75-125	
trans-1,3-Dichloropropene	ug/L	9.684		9.600	1.000 U	101	%	74-131	
1,1,2-Trichloroethane	ug/L	10.391		10.000	1.000 U	104	%	75-136	
Tetrachloroethene	ug/L	10.088		10.000	1.000 U	101	%	75-129	
1,3-Dichloropropane	ug/L	10.740		10.000	1.000 U	107	%	75-133	
2-Hexanone	ug/L	9.806		10.000	5.000 U	98	%	53-139	
Dibromochloromethane	ug/L	9.972		10.000	1.000 U	100	%	74-145	
1,2-Dibromoethane (EDB)	ug/L	9.891		10.000	1.000 U	99	%	75-127	
Chlorobenzene	ug/L	10.048		10.000	1.000 U	100	%	75-127	
1,1,1,2-Tetrachloroethane	ug/L	10.504		10.000	1.000 U	105	%	75-127	
Ethylbenzene	ug/L	10.584		10.000	1.000 U	106	%	75-120	
m&p-Xylenes	ug/L	20.778		20.000	2.000 U	104	%	75-122	
o-Xylene	ug/L	10.473		10.000	1.000 U	105	%	75-118	
Styrene	ug/L	10.945		10.000	1.000 U	109	%	75-130	
Bromoform	ug/L	9.003		10.000	1.000 U	90	%	72-136	
Isopropylbenzene	ug/L	10.098		10.000	1.000 U	101	%	75-126	
Bromobenzene	ug/L	10.215		10.000	1.000 U	102	%	74-123	
1,1,2,2-Tetrachloroethane	ug/L	10.059		10.000	1.000 U	101	%	68-129	
1,2,3-Trichloropropane	ug/L	10.353		10.000	1.000 U	104	%	65-139	
n-Propylbenzene	ug/L	11.003		10.000	1.000 U	110	%	75-127	
2-Chlorotoluene	ug/L	10.780		10.000	1.000 U	108	%	75-121	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MS	Matrix Spike	V03K20DSE	222172-1		11/20/2003	2311

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
1,3,5-Trimethylbenzene	ug/L	10.949		10.000	1.000 U	109	%	75-121	
4-Chlorotoluene	ug/L	10.636		10.000	1.000 U	106	%	73-127	
tert-Butylbenzene	ug/L	10.937		10.000	1.000 U	109	%	75-125	
1,2,4-Trimethylbenzene	ug/L	11.517		10.000	1.000 U	115	%	75-123	
sec-Butylbenzene	ug/L	11.194		10.000	1.000 U	112	%	75-125	
p-Isopropyltoluene	ug/L	10.512		10.000	1.000 U	105	%	75-125	
n-Butylbenzene	ug/L	12.379		10.000	1.000 U	124	%	75-126	
1,2-Dibromo-3-chloropropane	ug/L	9.004		10.000	1.000 U	90	%	75-132	
1,2,3-Trichlorobenzene	ug/L	11.208		10.000	1.000 U	112	%	75-133	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8260B
Method Description.: Volatile Organics

Equipment Code....: GCL9
Batch.....: 102291

Analyst...: jdn

MSD	Matrix Spike Duplicate	V03K20DSE	222172-1		11/20/2003	2340

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value		QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	6.014	6.068	10.000	1.000	U	60 2	% R	59-134 30	
Chloromethane	ug/L	5.624	5.039	10.000	1.000	U	56 11	% R	58-135 30	*
Vinyl chloride	ug/L	8.459	8.534	10.000	1.000	U	85 0	% R	73-134 30	
Bromomethane	ug/L	5.997	5.445	10.000	1.000	U	60 11	% R	35-153 30	
Chloroethane	ug/L	9.991	9.880	10.000	1.000	U	100 1	% R	72-129 30	
Trichlorofluoromethane	ug/L	9.267	9.291	10.000	1.000	U	93 0	% R	68-133 30	
1,1-Dichloroethene	ug/L	8.903	9.317	10.000	1.000	U	89 4	% R	75-125 30	
Carbon disulfide	ug/L	7.539	7.860	10.000	5.000	U	75 5	% R	74-123 30	
Acetone	ug/L	11.679	8.745	10.000	5.000	U	117 29	% R	51-157 30	
Methylene chloride	ug/L	9.300	9.738	10.000	1.000	U	93 4	% R	69-118 30	
trans-1,2-Dichloroethene	ug/L	9.594	9.894	10.000	1.000	U	96 3	% R	75-134 30	
Methyl-tert-butyl-ether (MTBE)	ug/L	9.240	9.389	10.000	1.000	U	92 2	% R	59-129 30	
1,1-Dichloroethane	ug/L	9.842	10.259	10.000	1.000	U	98 5	% R	75-133 30	
2,2-Dichloropropane	ug/L	9.837	10.374	10.000	1.000	U	98 6	% R	62-134 30	
cis-1,2-Dichloroethene	ug/L	10.214	10.475	10.000	1.000	U	102 3	% R	73-133 30	
2-Butanone (MEK)	ug/L	9.916	10.532	10.000	5.000	U	99 6	% R	45-150 30	
Bromochloromethane	ug/L	8.494	8.946	10.000	1.000	U	85 5	% R	75-127 30	
Chloroform	ug/L	10.123	10.346	10.000	1.000	U	101 2	% R	74-127 30	
1,1,1-Trichloroethane	ug/L	9.588	9.963	10.000	1.000	U	96 4	% R	70-127 30	
1,1-Dichloropropene	ug/L	9.673	10.028	10.000	1.000	U	97 3	% R	75-135 30	
Carbon tetrachloride	ug/L	9.386	10.134	10.000	1.000	U	94 7	% R	71-132 30	
Benzene	ug/L	9.656	10.122	10.000	1.000	U	97 4	% R	75-126 30	
1,2-Dichloroethane	ug/L	9.528	9.455	10.000	1.000	U	95 0	% R	67-132 30	
Trichloroethene	ug/L	9.951	10.442	10.000	1.000	U	100 4	% R	67-128 30	
1,2-Dichloropropane	ug/L	9.907	10.226	10.000	1.000	U	99 3	% R	75-127 30	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MSD	Matrix Spike Duplicate	V03K200SE	222172-1		11/20/2003	2340

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Dibromomethane	ug/L	9.647	9.841	10.000	1.000 U	96 2	% R	76-132 30	
Bromodichloromethane	ug/L	10.475	10.686	10.000	1.000 U	105 2	% R	70-130 30	
cis-1,3-Dichloropropene	ug/L	10.082	10.413	10.400	1.000 U	97 3	% R	73-132 30	
4-Methyl-2-pentanone (MIBK)	ug/L	10.720	10.219	10.000	5.000 U	107 5	% R	59-150 30	
Toluene	ug/L	9.934	10.200	10.000	1.000 U	99 3	% R	75-125 30	
trans-1,3-Dichloropropene	ug/L	9.606	9.684	9.600	1.000 U	100 1	% R	74-131 30	
1,1,2-Trichloroethane	ug/L	10.238	10.391	10.000	1.000 U	102 2	% R	75-136 30	
Tetrachloroethene	ug/L	9.664	10.088	10.000	1.000 U	97 4	% R	75-129 30	
1,3-Dichloropropene	ug/L	10.517	10.740	10.000	1.000 U	105 2	% R	75-133 30	
2-Hexanone	ug/L	9.569	9.806	10.000	5.000 U	96 2	% R	53-139 30	
Dibromochloromethane	ug/L	9.797	9.972	10.000	1.000 U	98 2	% R	74-145 30	
1,2-Dibromoethane (EDB)	ug/L	9.812	9.891	10.000	1.000 U	98 1	% R	75-127 30	
Chlorobenzene	ug/L	9.747	10.048	10.000	1.000 U	97 3	% R	75-127 30	
1,1,1,2-Tetrachloroethane	ug/L	10.385	10.504	10.000	1.000 U	104 1	% R	75-127 30	
Ethylbenzene	ug/L	10.188	10.584	10.000	1.000 U	102 4	% R	75-120 30	
m&p-Xylenes	ug/L	20.360	20.778	20.000	2.000 U	102 2	% R	75-122 30	
o-Xylene	ug/L	10.225	10.473	10.000	1.000 U	102 3	% R	75-118 30	
Styrene	ug/L	10.676	10.945	10.000	1.000 U	107 2	% R	75-130 30	
Bromoform	ug/L	8.935	9.003	10.000	1.000 U	89 1	% R	72-136 30	
Isopropylbenzene	ug/L	9.813	10.098	10.000	1.000 U	98 3	% R	75-126 30	
Bromobenzene	ug/L	10.203	10.215	10.000	1.000 U	102 0	% R	74-123 30	
1,1,2,2-Tetrachloroethane	ug/L	9.997	10.059	10.000	1.000 U	100 1	% R	68-129 30	
1,2,3-Trichloropropane	ug/L	9.900	10.353	10.000	1.000 U	99 5	% R	65-139 30	
n-Propylbenzene	ug/L	10.680	11.003	10.000	1.000 U	107 3	% R	75-127 30	
2-Chlorotoluene	ug/L	10.387	10.780	10.000	1.000 U	104 4	% R	75-121 30	
1,3,5-Trimethylbenzene	ug/L	10.675	10.949	10.000	1.000 U	107 2	% R	75-121 30	
4-Chlorotoluene	ug/L	10.360	10.636	10.000	1.000 U	104 2	% R	73-127 30	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MSD	Matrix Spike Duplicate	V03K200SE	222172-1		11/20/2003	2340

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value		QC Calc.	*	Limits	F
tert-Butylbenzene	ug/L	10.565	10.937	10.000	1.000	U	106 3	% R	75-125 30	
1,2,4-Trimethylbenzene	ug/L	11.276	11.517	10.000	1.000	U	113 2	% R	75-123 30	
sec-Butylbenzene	ug/L	10.838	11.194	10.000	1.000	U	108 4	% R	75-125 30	
p-Isopropyltoluene	ug/L	10.156	10.512	10.000	1.000	U	102 3	% R	75-125 30	
n-Butylbenzene	ug/L	11.948	12.379	10.000	1.000	U	119 4	% R	75-126 30	
1,2-Dibromo-3-chloropropane	ug/L	8.962	9.004	10.000	1.000	U	90 0	% R	75-132 30	
1,2,3-Trichlorobenzene	ug/L	11.602	11.208	10.000	1.000	U	116 4	% R	75-133 30	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172 | Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
LCS	Laboratory Control Sample	V03K200BE	102284-022		11/20/2003	2102

Test Method.....: 8260B
Method Description.: Volatile Organics
Equipment Code....: GCL9
Batch.....: 102291
Analyst...: jdn

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value		QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	5.833		10.000	1.000	U	58	%	59-134	*
Chloromethane	ug/L	4.540		10.000	1.000	U	45	%	58-135	*
Vinyl chloride	ug/L	7.707		10.000	1.000	U	77	%	73-134	
Bromomethane	ug/L	4.743		10.000	1.000	U	47	%	35-153	
Chloroethane	ug/L	8.966		10.000	1.000	U	90	%	72-129	
Trichlorofluoromethane	ug/L	8.641		10.000	1.000	U	86	%	68-133	
1,1-Dichloroethene	ug/L	8.661		10.000	1.000	U	87	%	75-125	
Carbon disulfide	ug/L	7.361		10.000	5.000	U	74	%	74-123	
Acetone	ug/L	9.235		10.000	5.000	U	92	%	51-157	
Methylene chloride	ug/L	9.079		10.000	1.000	U	91	%	69-118	
trans-1,2-Dichloroethene	ug/L	9.343		10.000	1.000	U	93	%	75-134	
Methyl-tert-butyl-ether (MTBE)	ug/L	9.405		10.000	1.000	U	94	%	59-129	
1,1-Dichloroethane	ug/L	9.644		10.000	1.000	U	96	%	75-133	
2,2-Dichloropropane	ug/L	9.766		10.000	1.000	U	98	%	62-134	
cis-1,2-Dichloroethene	ug/L	9.877		10.000	1.000	U	99	%	73-133	
2-Butanone (MEK)	ug/L	10.685		10.000	5.000	U	107	%	45-150	
Bromochloromethane	ug/L	8.410		10.000	1.000	U	84	%	75-127	
Chloroform	ug/L	9.734		10.000	1.000	U	97	%	74-127	
1,1,1-Trichloroethane	ug/L	9.360		10.000	1.000	U	94	%	70-127	
1,1-Dichloropropene	ug/L	9.374		10.000	1.000	U	94	%	75-135	
Carbon tetrachloride	ug/L	9.049		10.000	1.000	U	90	%	71-132	
Benzene	ug/L	9.399		10.000	1.000	U	94	%	75-126	
1,2-Dichloroethane	ug/L	9.129		10.000	1.000	U	91	%	67-132	
Trichloroethene	ug/L	9.754		10.000	1.000	U	98	%	67-128	
1,2-Dichloropropane	ug/L	9.632		10.000	1.000	U	96	%	75-127	
Dibromomethane	ug/L	9.499		10.000	1.000	U	95	%	76-132	
Bromodichloromethane	ug/L	10.172		10.000	1.000	U	102	%	70-130	
cis-1,3-Dichloropropene	ug/L	10.000		10.400	1.000	U	96	%	73-132	
4-Methyl-2-pentanone (MIBK)	ug/L	9.354		10.000	5.000	U	94	%	59-150	
Toluene	ug/L	9.635		10.000	1.000	U	96	%	75-125	
trans-1,3-Dichloropropene	ug/L	9.193		9.600	1.000	U	96	%	74-131	
1,1,2-Trichloroethane	ug/L	9.959		10.000	1.000	U	100	%	75-136	
Tetrachloroethene	ug/L	9.489		10.000	1.000	U	95	%	75-129	
1,3-Dichloropropane	ug/L	10.299		10.000	1.000	U	103	%	75-133	
2-Hexanone	ug/L	10.516		10.000	5.000	U	105	%	53-139	
Dibromochloromethane	ug/L	9.557		10.000	1.000	U	96	%	74-145	
1,2-Dibromoethane (EDB)	ug/L	9.566		10.000	1.000	U	96	%	75-127	
Chlorobenzene	ug/L	9.522		10.000	1.000	U	95	%	75-127	
1,1,1,2-Tetrachloroethane	ug/L	10.098		10.000	1.000	U	101	%	75-127	
Ethylbenzene	ug/L	9.958		10.000	1.000	U	100	%	75-120	
m&p-Xylenes	ug/L	19.686		20.000	2.000	U	98	%	75-122	
o-Xylene	ug/L	9.850		10.000	1.000	U	99	%	75-118	
Styrene	ug/L	10.369		10.000	1.000	U	104	%	75-130	
Bromoform	ug/L	8.640		10.000	1.000	U	86	%	72-136	
Isopropylbenzene	ug/L	9.413		10.000	1.000	U	94	%	75-126	
Bromobenzene	ug/L	9.681		10.000	1.000	U	97	%	74-123	
1,1,2,2-Tetrachloroethane	ug/L	9.941		10.000	1.000	U	99	%	68-129	
1,2,3-Trichloropropane	ug/L	9.467		10.000	1.000	U	95	%	65-139	
n-Propylbenzene	ug/L	10.201		10.000	1.000	U	102	%	75-127	
2-Chlorotoluene	ug/L	9.964		10.000	1.000	U	100	%	75-121	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
LCS	Laboratory Control Sample	V03K20DSE	102284-022		11/20/2003	2102

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
1,3,5-Trimethylbenzene	ug/L	10.144		10.000	1.000	U 101	%	75-121	
4-Chlorotoluene	ug/L	10.014		10.000	1.000	U 100	%	73-127	
tert-Butylbenzene	ug/L	10.094		10.000	1.000	U 101	%	75-125	
1,2,4-Trimethylbenzene	ug/L	10.712		10.000	1.000	U 107	%	75-123	
sec-Butylbenzene	ug/L	10.396		10.000	1.000	U 104	%	75-125	
p-Isopropyltoluene	ug/L	9.883		10.000	1.000	U 99	%	75-125	
n-Butylbenzene	ug/L	11.423		10.000	1.000	U 114	%	75-126	
1,2-Dibromo-3-chloropropane	ug/L	7.970		10.000	1.000	U 80	%	75-132	
1,2,3-Trichlorobenzene	ug/L	10.790		10.000	1.000	U 108	%	75-133	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: ICAL SPIKE
Level: LOW
Data Type: MS DATA
SpikeList File: ical.spk
Sublist File: 02ICAL1.sub
Method File: /var/chem/gcl9.i/101603a_25ml9w.b/25ml9w.m
Misc Info: ICAL SPIKE.1.22

Client SDG: 101603a
Fraction: VOA
Client Smp ID: ICAL SPIKE
Operator: EA
SampleType: BS
Quant Type: ISTD

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	DAPP LIMITS 80-120
1 Dichlorodifluorome	10.000	8.760	87.60	~~75-125~~
2 Chloromethane	10.000	9.272	92.72	75-125
3 Vinyl chloride	10.000	9.502	95.02	75-125
5 Bromomethane	10.000	9.777	97.77	75-125
6 Chloroethane	10.000	9.831	98.31	75-125
7 Trichlorofluoromet	10.000	10.618	106.18	75-125
12 1,1-Dichloroethene	10.000	8.750	87.50	75-125
19 Methylene chloride	10.000	8.931	89.31	75-125
21 trans-1,2-Dichloro	10.000	9.276	92.76	75-125
25 1,1-Dichloroethane	10.000	9.555	95.55	75-125
28 2,2-Dichloropropan	10.000	9.426	94.26	75-125
29 cis-1,2-Dichloroet	10.000	9.822	98.22	75-125
33 Bromochloromethane	10.000	9.343	93.43	75-125
36 Chloroform	10.000	9.684	96.84	75-125
39 1,1,1-Trichloroeth	10.000	9.823	98.23	75-125
43 1,1-Dichloropropen	10.000	9.239	92.39	75-125
42 Carbon tetrachlori	10.000	10.199	101.99	75-125
45 Benzene	10.000	9.579	95.79	75-125
47 1,2-Dichloroethane	10.000	9.691	96.91	75-125
52 Trichloroethene	10.000	9.971	99.71	75-125
54 1,2-Dichloropropan	10.000	9.709	97.09	75-125
56 Dibromomethane	10.000	10.033	100.33	75-125
58 Bromodichlorometha	10.000	10.655	106.55	75-125
61 cis-1,3-Dichloropr	10.400	10.397	99.97	75-125
64 Toluene	10.000	9.798	97.98	75-125
65 trans-1,3-Dichloro	9.600	9.951	103.66	75-125
68 1,1,2-Trichloroeth	10.000	9.971	99.71	75-125
69 Tetrachloroethene	10.000	9.967	99.67	75-125
70 1,3-Dichloropropan	10.000	10.424	104.24	75-125
72 Dibromochlorometha	10.000	10.307	103.07	75-125
73 1,2-Dibromoethane	10.000	10.017	100.17	75-125
76 Chlorobenzene	10.000	9.789	97.89	75-125
78 1,1,1,2-Tetrachlor	10.000	10.271	102.71	75-125

TP
10/12/03

GAPP

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS 80-120
77 Ethylbenzene	10.000	10.042	100.42	~~75-125~~
79 p,m-Xylene	20.000	20.101	100.50	75-125
80 o-Xylene	10.000	10.137	101.37	75-125
81 Styrene	10.000	10.620	106.20	75-125
82 Bromoform	10.000	9.596	95.96	75-125
83 Isopropylbenzene	10.000	9.513	95.13	75-125
88 1,1,2,2-Tetrachlor	10.000	9.854	98.54	75-125
87 Bromobenzene	10.000	10.055	100.55	75-125
90 1,2,3-Trichloropro	10.000	10.239	102.39	75-125
89 n-Propylbenzene	10.000	9.812	98.12	75-125
92 2-Chlorotoluene	10.000	9.803	98.03	75-125
93 1,3,5-Trimethylben	10.000	10.00	100.00	75-125
94 4-Chlorotoluene	10.000	10.230	102.30	75-125
95 tert-Butylbenzene	10.000	9.965	99.65	75-125
96 1,2,4-Trimethylben	10.000	10.442	104.42	75-125
98 sec-Butylbenzene	10.000	10.106	101.06	75-125
100 1,3-Dichlorobenzen	10.000	9.872	98.72	75-125
99 p-Isopropyltoluene	10.000	9.600	96.00	75-125
102 1,4-Dichlorobenzen	10.000	9.561	95.61	75-125
103 n-Butylbenzene	10.000	10.410	104.10	75-125
104 1,2-Dichlorobenzen	10.000	9.716	97.16	75-125
105 1,2-Dibromo-3-Chlo	10.000	10.288	102.88	75-125
107 1,2,4-Trichloroben	10.000	10.498	104.98	75-125
108 Hexachlorobutadien	10.000	11.220	112.20	75-125
109 Naphthalene	10.000	9.376	93.76	75-125
110 1,2,3-Trichloroben	10.000	10.289	102.89	75-125
13 Acetone	10.000	8.402	84.03	75-125
30 2-Butanone	10.000	8.978	89.78	75-125
15 Carbon Disulfide	10.000	7.812	78.13 *	75-125 *
57 2-Chloroethylviny	10.000	0.000	NA *	75-125
71 2-Hexanone	10.000	9.862	98.62	75-125
14 Iodomethane	10.000	0.000	NA *	75-125
62 4-Methyl-2-pentano	10.000	10.927	109.27	75-125
26 Vinyl Acetate	10.000	10.666	106.66	75-125
M 84 1,2-Dichloroethene	20.000	19.050	95.25	75-125
M 112 Xylene (total)	30.000	32.660	108.87	75-125
74 1-Chlorohexane	10.000	9.654	96.54	75-125
34 Tetrahydrofuran	10.000	9.011	90.11	~~75-125~~

TP 12/12/03

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 40 Dibromofluorometha	10.770	10.703	99.38	~~66-132~~
$ 46 1,2-Dichloroethane	10.770	10.728	99.61	61-131

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 63 Toluene-d8	10.770	10.898	101.18	78-128
$ 86 p-Bromofluorobenze	10.770	10.240	95.08	73-122

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8260B
Method Description.: Volatile Organics

Equipment Code....: GCL9
Batch.....: 102291

Analyst...: jdn

MRL	Method Reporting Limit Standard	V03K200MA	102284-018		11/20/2003 2131

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	2.792		2.000		140	%	70-130	*
Chloromethane	ug/L	1.797		2.000		90	%	70-130	
Vinyl chloride	ug/L	2.292		2.000		115	%	70-130	
Bromomethane	ug/L	1.799		2.000		90	%	70-130	
Chloroethane	ug/L	2.048		2.000		102	%	70-130	
Trichlorofluoromethane	ug/L	1.797		2.000		90	%	70-130	
1,1-Dichloroethene	ug/L	1.963		2.000		98	%	70-130	
Carbon disulfide	ug/L	3.908	J	4.000		98	%	70-130	
Acetone	ug/L	3.147	J	4.000		79	%	70-130	
Methylene chloride	ug/L	2.058		2.000		103	%	70-130	
trans-1,2-Dichloroethene	ug/L	1.984		2.000		99	%	70-130	
Methyl-tert-butyl-ether (MTBE)	ug/L	2.017		2.000		101	%	70-130	
1,1-Dichloroethane	ug/L	2.059		2.000		103	%	70-130	
2,2-Dichloropropane	ug/L	2.000		2.000		100	%	70-130	
cis-1,2-Dichloroethene	ug/L	2.068		2.000		103	%	70-130	
2-Butanone (MEK)	ug/L	5.072		4.000		127	%	70-130	
Bromochloromethane	ug/L	1.990		2.000		99	%	70-130	
Chloroform	ug/L	2.021		2.000		101	%	70-130	
1,1,1-Trichloroethane	ug/L	1.877		2.000		94	%	70-130	
1,1-Dichloropropene	ug/L	1.943		2.000		97	%	70-130	
Carbon tetrachloride	ug/L	1.746		2.000		87	%	70-130	
Benzene	ug/L	2.023		2.000		101	%	70-130	
1,2-Dichloroethane	ug/L	1.997		2.000		100	%	70-130	
Trichloroethene	ug/L	2.041		2.000		102	%	70-130	
1,2-Dichloropropane	ug/L	2.105		2.000		105	%	70-130	
Dibromomethane	ug/L	2.062		2.000		103	%	70-130	
Bromodichloromethane	ug/L	1.873		2.000		94	%	70-130	
cis-1,3-Dichloropropene	ug/L	1.833		2.000		92	%	70-130	
4-Methyl-2-pentanone (MIBK)	ug/L	4.221	J	4.000		106	%	70-130	
Toluene	ug/L	1.982		2.000		99	%	70-130	
trans-1,3-Dichloropropene	ug/L	1.743		2.000		87	%	70-130	
1,1,2-Trichloroethane	ug/L	1.959		2.000		98	%	70-130	
Tetrachloroethene	ug/L	1.903		2.000		95	%	70-130	
1,3-Dichloropropane	ug/L	2.039		2.000		102	%	70-130	
2-Hexanone	ug/L	4.914	J	4.000		123	%	70-130	
Dibromochloromethane	ug/L	1.740		2.000		87	%	70-130	
1,2-Dibromoethane (EDB)	ug/L	1.855		2.000		93	%	70-130	
Chlorobenzene	ug/L	1.962		2.000		98	%	70-130	
1,1,1,2-Tetrachloroethane	ug/L	1.990		2.000		99	%	70-130	
Ethylbenzene	ug/L	1.985		2.000		99	%	70-130	
m&p-Xylenes	ug/L	3.992		4.000		100	%	70-130	
o-Xylene	ug/L	1.972		2.000		99	%	70-130	
Styrene	ug/L	1.960		2.000		98	%	70-130	
Bromoform	ug/L	2.137		2.000		107	%	70-130	
Isopropylbenzene	ug/L	2.000		2.000		100	%	70-130	
Bromobenzene	ug/L	1.912		2.000		96	%	70-130	
1,1,2,2-Tetrachloroethane	ug/L	2.051		2.000		103	%	70-130	
1,2,3-Trichloropropane	ug/L	1.999		2.000		100	%	70-130	
n-Propylbenzene	ug/L	2.076		2.000		104	%	70-130	
2-Chlorotoluene	ug/L	2.069		2.000		103	%	70-130	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172 Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MRL	Method Reporting Limit Standard	V03K20DMA	102284-018		11/20/2003	2131

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
1,3,5-Trimethylbenzene	ug/L	2.068		2.000		103	%	70-130	
4-Chlorotoluene	ug/L	2.062		2.000		103	%	70-130	
tert-Butylbenzene	ug/L	2.038		2.000		102	%	70-130	
1,2,4-Trimethylbenzene	ug/L	2.112		2.000		106	%	70-130	
sec-Butylbenzene	ug/L	2.083		2.000		104	%	70-130	
p-Isopropyltoluene	ug/L	2.004		2.000		100	%	70-130	
n-Butylbenzene	ug/L	2.270		2.000		114	%	70-130	
1,2-Dibromo-3-chloropropane	ug/L	2.063		2.000		103	%	70-130	
1,2,3-Trichlorobenzene	ug/L	2.429		2.000		121	%	70-130	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8260B
Method Description.: Volatile Organics

Equipment Code....: GCL9
Batch.....: 102291

Analyst...: jdn

MRL2	Method Reporting Limit Standard	V03K200MA	102284-019		11/21/2003	0623

Parameter/Test Description	Units	QC Result		QC Result		True Value	Orig. Value	QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	2.842		2.792		2.000		142	%	70-130	*
Chloromethane	ug/L	1.810		1.797		2.000		91	%	70-130	
Vinyl chloride	ug/L	2.340		2.292		2.000		117	%	70-130	
Bromomethane	ug/L	1.578		1.799		2.000		79	%	70-130	
Chloroethane	ug/L	2.128		2.048		2.000		106	%	70-130	
Trichlorofluoromethane	ug/L	1.883		1.797		2.000		94	%	70-130	
1,1-Dichloroethene	ug/L	2.009		1.963		2.000		100	%	70-130	
Carbon disulfide	ug/L	3.972	J	3.908	J	4.000		99	%	70-130	
Acetone	ug/L	4.075	J	3.147	J	4.000		102	%	70-130	
Methylene chloride	ug/L	2.356		2.058		2.000		118	%	70-130	
trans-1,2-Dichloroethene	ug/L	2.034		1.984		2.000		102	%	70-130	
Methyl-tert-butyl-ether (MTBE)	ug/L	2.043		2.017		2.000		102	%	70-130	
1,1-Dichloroethane	ug/L	2.149		2.059		2.000		107	%	70-130	
2,2-Dichloropropane	ug/L	1.943		2.000		2.000		97	%	70-130	
cis-1,2-Dichloroethene	ug/L	2.057		2.068		2.000		103	%	70-130	
2-Butanone (MEK)	ug/L	5.397		5.072		4.000		135	%	70-130	*
Bromochloromethane	ug/L	2.066		1.990		2.000		103	%	70-130	
Chloroform	ug/L	2.032		2.021		2.000		102	%	70-130	
1,1,1-Trichloroethane	ug/L	1.935		1.877		2.000		97	%	70-130	
1,1-Dichloropropene	ug/L	2.048		1.943		2.000		102	%	70-130	
Carbon tetrachloride	ug/L	1.843		1.746		2.000		92	%	70-130	
Benzene	ug/L	2.029		2.023		2.000		101	%	70-130	
1,2-Dichloroethane	ug/L	2.037		1.997		2.000		102	%	70-130	
Trichloroethene	ug/L	1.982		2.041		2.000		99	%	70-130	
1,2-Dichloropropane	ug/L	2.053		2.105		2.000		103	%	70-130	
Dibromomethane	ug/L	2.092		2.062		2.000		105	%	70-130	
Bromodichloromethane	ug/L	1.886		1.873		2.000		94	%	70-130	
cis-1,3-Dichloropropene	ug/L	1.817		1.833		2.000		91	%	70-130	
4-Methyl-2-pentanone (MIBK)	ug/L	4.076	J	4.221	J	4.000		102	%	70-130	
Toluene	ug/L	2.001		1.982		2.000		100	%	70-130	
trans-1,3-Dichloropropene	ug/L	1.724		1.743		2.000		86	%	70-130	
1,1,2-Trichloroethane	ug/L	1.986		1.959		2.000		99	%	70-130	
Tetrachloroethene	ug/L	1.829		1.903		2.000		91	%	70-130	
1,3-Dichloropropane	ug/L	2.096		2.039		2.000		105	%	70-130	
2-Hexanone	ug/L	4.773	J	4.914	J	4.000		119	%	70-130	
Dibromochloromethane	ug/L	1.781		1.740		2.000		89	%	70-130	
1,2-Dibromoethane (EDB)	ug/L	1.842		1.855		2.000		92	%	70-130	
Chlorobenzene	ug/L	1.932		1.962		2.000		97	%	70-130	
1,1,1,2-Tetrachloroethane	ug/L	1.935		1.990		2.000		97	%	70-130	
Ethylbenzene	ug/L	1.942		1.985		2.000		97	%	70-130	
m&p-Xylenes	ug/L	3.924		3.992		4.000		98	%	70-130	
o-Xylene	ug/L	2.020		1.972		2.000		101	%	70-130	
Styrene	ug/L	1.915		1.960		2.000		96	%	70-130	
Bromoform	ug/L	2.072		2.137		2.000		104	%	70-130	
Isopropylbenzene	ug/L	1.912		2.000		2.000		96	%	70-130	
Bromobenzene	ug/L	1.933		1.912		2.000		97	%	70-130	
1,1,2,2-Tetrachloroethane	ug/L	1.979		2.051		2.000		99	%	70-130	
1,2,3-Trichloropropane	ug/L	1.872		1.999		2.000		94	%	70-130	
n-Propylbenzene	ug/L	2.021		2.076		2.000		101	%	70-130	
2-Chlorotoluene	ug/L	1.974		2.069		2.000		99	%	70-130	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MRL2	Method Reporting Limit Standard	V03K20DMA	102284-019		11/21/2003	0623

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
1,3,5-Trimethylbenzene	ug/L	2.001	2.068	2.000		100	%	70-130	
4-Chlorotoluene	ug/L	2.051	2.062	2.000		103	%	70-130	
tert-Butylbenzene	ug/L	2.007	2.038	2.000		100	%	70-130	
1,2,4-Trimethylbenzene	ug/L	2.001	2.112	2.000		100	%	70-130	
sec-Butylbenzene	ug/L	2.020	2.083	2.000		101	%	70-130	
p-Isopropyltoluene	ug/L	1.938	2.004	2.000		97	%	70-130	
n-Butylbenzene	ug/L	2.134	2.270	2.000		107	%	70-130	
1,2-Dibromo-3-chloropropane	ug/L	2.047	2.063	2.000		102	%	70-130	
1,2,3-Trichlorobenzene	ug/L	2.190	2.429	2.000		109	%	70-130	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172 | Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 8260B
Method Description.: Volatile Organics
Equipment Code....: GCL9
Batch.....: 102291
Analyst...: jdn

DLCK	Detection Limit Check Standard	V03K20DLA	102284-020		11/21/2003	0651

Parameter/Test Description	Units	QC Result		QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Dichlorodifluoromethane	ug/L	2.037			1.000		204	%	10-190	*
Chloromethane	ug/L	1.298			1.000		130	%	10-190	
Vinyl chloride	ug/L	1.453			1.000		145	%	10-190	
Bromomethane	ug/L	1.346			1.000		135	%	10-190	
Chloroethane	ug/L	1.167			1.000		117	%	10-190	
Trichlorofluoromethane	ug/L	1.045			1.000		104	%	10-190	
1,1-Dichloroethene	ug/L	1.101			1.000		110	%	10-190	
Carbon disulfide	ug/L	2.045	J		2.000		102	%	10-190	
Acetone	ug/L	1.205	J		2.000		60	%	10-190	
Methylene chloride	ug/L	1.168			1.000		117	%	10-190	
trans-1,2-Dichloroethene	ug/L	1.041			1.000		104	%	10-190	
Methyl-tert-butyl-ether (MTBE)	ug/L	1.087			1.000		109	%	10-190	
1,1-Dichloroethane	ug/L	1.070			1.000		107	%	10-190	
2,2-Dichloropropane	ug/L	0.992	J		1.000		99	%	10-190	
cis-1,2-Dichloroethene	ug/L	1.071			1.000		107	%	10-190	
2-Butanone (MEK)	ug/L	2.888	J		2.000		144	%	10-190	
Bromochloromethane	ug/L	1.044			1.000		104	%	10-190	
Chloroform	ug/L	1.056			1.000		106	%	10-190	
1,1,1-Trichloroethane	ug/L	1.044			1.000		104	%	10-190	
1,1-Dichloropropene	ug/L	1.100			1.000		110	%	10-190	
Carbon tetrachloride	ug/L	0.903	J		1.000		90	%	10-190	
Benzene	ug/L	1.038			1.000		104	%	10-190	
1,2-Dichloroethane	ug/L	1.005			1.000		100	%	10-190	
Trichloroethene	ug/L	1.028			1.000		103	%	10-190	
1,2-Dichloropropane	ug/L	1.057			1.000		106	%	10-190	
Dibromomethane	ug/L	1.032			1.000		103	%	10-190	
Bromodichloromethane	ug/L	0.933	J		1.000		93	%	10-190	
cis-1,3-Dichloropropene	ug/L	0.903	J		1.000		90	%	10-190	
4-Methyl-2-pentanone (MIBK)	ug/L	2.148	J		2.000		107	%	10-190	
Toluene	ug/L	1.018			1.000		102	%	10-190	
trans-1,3-Dichloropropene	ug/L	0.884	J		1.000		88	%	10-190	
1,1,2-Trichloroethane	ug/L	0.966	J		1.000		97	%	10-190	
Tetrachloroethene	ug/L	1.006			1.000		101	%	10-190	
1,3-Dichloropropane	ug/L	1.052			1.000		105	%	10-190	
2-Hexanone	ug/L	2.473	J		2.000		124	%	10-190	
Dibromochloromethane	ug/L	0.819	J		1.000		82	%	10-190	
1,2-Dibromoethane (EDB)	ug/L	0.968	J		1.000		97	%	10-190	
Chlorobenzene	ug/L	1.003			1.000		100	%	10-190	
1,1,1,2-Tetrachloroethane	ug/L	0.943	J		1.000		94	%	10-190	
Ethylbenzene	ug/L	1.050			1.000		105	%	10-190	
m&p-Xylenes	ug/L	2.047			2.000		102	%	10-190	
o-Xylene	ug/L	1.010			1.000		101	%	10-190	
Styrene	ug/L	0.981	J		1.000		98	%	10-190	
Bromoform	ug/L	1.360			1.000		136	%	10-190	
Isopropylbenzene	ug/L	1.018			1.000		102	%	10-190	
Bromobenzene	ug/L	0.985	J		1.000		98	%	10-190	
1,1,2,2-Tetrachloroethane	ug/L	0.961	J		1.000		96	%	10-190	
1,2,3-Trichloropropane	ug/L	1.057			1.000		106	%	10-190	
n-Propylbenzene	ug/L	1.049			1.000		105	%	10-190	
2-Chlorotoluene	ug/L	1.024			1.000		102	%	10-190	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

QUALITY CONTROL RESULTS

Job Number.: 222172

Report Date.: 12/09/2003

CUSTOMER: Ellis Environmental Group, LC PROJECT: USACE-LOCKBOURNE AFB ATTN: Karen Hatfield

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
DLCK	Detection Limit Check Standard	V03K20DLA	102284-020		11/21/2003	0651

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
1,3,5-Trimethylbenzene	ug/L	1.033		1.000		103	%	10-190	
4-Chlorotoluene	ug/L	1.039		1.000		104	%	10-190	
tert-Butylbenzene	ug/L	1.055		1.000		105	%	10-190	
1,2,4-Trimethylbenzene	ug/L	1.035		1.000		104	%	10-190	
sec-Butylbenzene	ug/L	1.041		1.000		104	%	10-190	
p-Isopropyltoluene	ug/L	1.015		1.000		101	%	10-190	
n-Butylbenzene	ug/L	1.136		1.000		114	%	10-190	
1,2-Dibromo-3-chloropropane	ug/L	0.773	J	1.000		77	%	10-190	
1,2,3-Trichlorobenzene	ug/L	1.136		1.000		114	%	10-190	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 222172

Lab File ID: 9M1120A Lab Sample ID: MB

Date Analyzed: 11/20/03 Time Analyzed: 2033

Matrix: (soil/water) WATER Level:(low/med) LOW

Instrument ID: GCL9

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	102284BS	LCS	9S1120A	2102
02	MRL	MRL	9I1120	2131
03	TRIP BLANK	222172-3	2172-03	2214
04	LCKMW-15	222172-1	2172-01	2242
05	LCKMW-15MS	222172-1MS	2172-01S	2311
06	LCKMW-15MSD	222172-1MSD	2172-01T	2340
07	DUP01	222172-2	2172-02	0008
08	MRL	MRL	9I1120A	0623
09	DLCK CHECK	DLCK CHECK	9L1120	0651
10				
11				
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COMMENTS:

FORM IV VOA 1/87 Rev.

5A
VOLATILE ORGANIC GC/MS TUNING AND MASS
CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 25M9W_ICAL1

Lab File ID: 9B1016 BFB Injection Date: 10/16/03

Instrument ID: GCL9 BFB Injection Time: 1838

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	19.2
75	30.0 - 60.0% of mass 95	45.0
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	5.7
173	Less than 2.0% of mass 174	0.2 (0.3)1
174	50.0 - 99.0% of mass 95	60.1
175	5.0 - 9.0% of mass 174	4.2 (7.1)1
176	Greater than 95.0%, but less than 101.0% of mass 174	58.1 (96.7)1
177	5.0 - 9.0% of mass 176	4.1 (7.0)2

1-Value is % of mass 174 2-Value is % of mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD0.5	VSTD0.5	9I1016A	10/16/03	1957
02	VSTD001	VSTD001	9I1016B	10/16/03	2026
03	VSTD002	VSTD002	9I1016C	10/16/03	2054
04	VSTD005	VSTD005	9I1016D	10/16/03	2123
05	VSTD008	VSTD008	9I1016E	10/16/03	2151
06	VSTD010	VSTD010	9I1016F	10/16/03	2220
07	VSTD014	VSTD014	9I1016G	10/16/03	2249
08	VSTD020	VSTD020	9I1016H	10/16/03	2318
09	VSTD040	VSTD040	9I1016I	10/16/03	2346
10	ICAL SPIKE	ICAL SPIKE	9S1016	10/17/03	0044
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM V VOA 1/87 Rev.

5A
VOLATILE ORGANIC GC/MS TUNING AND MASS
CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 222172

Lab File ID: 9B1120A BFB Injection Date: 11/20/03

Instrument ID: GCL9 BFB Injection Time: 1939

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	16.0
75	30.0 - 60.0% of mass 95	43.2
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	5.7
173	Less than 2.0% of mass 174	0.3 (0.5)1
174	50.0 - 99.0% of mass 95	61.7
175	5.0 - 9.0% of mass 174	4.2 (6.8)1
176	Greater than 95.0%, but less than 101.0% of mass 174	58.9 (95.6)1
177	5.0 - 9.0% of mass 176	3.8 (6.4)2

1-Value is % of mass 174 2-Value is % of mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD010	VSTD010	9C1120B	11/20/03	2004
02	102284	MB	9M1120A	11/20/03	2033
03	102284BS	LCS	9S1120A	11/20/03	2102
04	MRL	MRL	9I1120	11/20/03	2131
05	TRIP BLANK	222172-3	2172-03	11/20/03	2214
06	LCKMW-15	222172-1	2172-01	11/20/03	2242
07	LCKMW-15MS	222172-1MS	2172-01S	11/20/03	2311
08	LCKMW-15MSD	222172-1MSD	2172-01T	11/20/03	2340
09	DUP01	222172-2	2172-02	11/21/03	0008
10	MRL	MRL	9I1120A	11/21/03	0623
11	DLCK CHECK	DLCK CHECK	9L1120	11/21/03	0651
12					
13					
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19					
20					
21					
22					

FORM V VOA 1/87 Rev.

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 222172

Lab File ID (Standard): 9I1016F Date Analyzed: 10/16/03

Instrument ID: GCL9 Time Analyzed: 2220

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

		IS1 AREA #	RT	IS2(DFB) AREA #	RT	IS3(CBZ) AREA #	RT
	12 HOUR STD	1652004	8.45	1567137	9.41	1006474	13.25
	UPPER LIMIT	3304008	8.95	3134274	9.91	2012948	13.75
	LOWER LIMIT	826002	7.95	783568	8.91	503237	12.75
	EPA SAMPLE NO.						
01	102284	1922548	8.45	1879215	9.41	1229812	13.24
02	102284BS	1986904	8.44	1960088	9.41	1230876	13.25
03	MRL	1946684	8.44	1904490	9.41	1213622	13.25
04	TRIP BLANK	1864793	8.43	1768181	9.39	1085789	13.24
05	LCKMW-15	1917799	8.45	1854535	9.41	1180649	13.25
06	LCKMW-15MS	1937512	8.45	1904623	9.41	1200412	13.24
07	LCKMW-15MSD	1933787	8.45	1908607	9.41	1204475	13.24
08	DUP01	1938801	8.45	1870866	9.41	1204878	13.24
09	MRL	1864223	8.44	1843297	9.41	1185535	13.23
10	DLCK CHECK	1889139	8.44	1864297	9.41	1196087	13.24
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = - 50% of internal standard area.

Column used to flag internal standard area values with an asterisk.

FORM VIII VOA 1/87 Rev.

8A
VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 222172

Lab File ID (Standard): 9I1016F Date Analyzed: 10/16/03

Instrument ID: GCL9 Time Analyzed: 2220

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

		IS4(DCB) AREA #	RT	AREA #	RT	AREA #	RT
	12 HOUR STD	473202	16.30				
	UPPER LIMIT	946404	16.80				
	LOWER LIMIT	236601	15.80				
	EPA SAMPLE NO.						
01	102284	590563	16.29				
02	102284BS	592038	16.29				
03	MRL	570506	16.29				
04	TRIP BLANK	487409	16.28				
05	LCKMW-15	551820	16.29				
06	LCKMW-15MS	572444	16.29				
07	LCKMW-15MSD	573772	16.30				
08	DUP01	575348	16.29				
09	MRL	570079	16.28				
10	DLCK CHECK	576670	16.29				
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = 1,4-Dichlorobenzene-d4

UPPER LIMIT = +100% of internal standard area.

Column used to flag internal standard area values with an asterisk.

FORM VIII VOA 1/87 Rev.

III. SAMPLE DATA

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Hatfield

Customer Sample ID: LCKMW-15
Date Sampled.....: 11/10/2003
Time Sampled.....: 14:20
Sample Matrix.....: Water

Laboratory Sample ID: 222172-1
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8260B	Volatile Organics											
	Dichlorodifluoromethane	1.0	U	*	0.14	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Chloromethane	1.0	U	*	0.16	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Vinyl chloride	1.0	U		0.18	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Bromomethane	1.0	U		0.18	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Chloroethane	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Trichlorofluoromethane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,1-Dichloroethene	1.0	U		0.19	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Carbon disulfide	2.0	U		0.40	2.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Acetone	10	U		1.5	10	1.00000	ug/L	102291		11/20/03 2242	jdn
	Methylene chloride	2.0	U		0.19	2.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	trans-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Methyl-tert-butyl-ether (MTBE)	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,1-Dichloroethane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	2,2-Dichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	cis-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	2-Butanone (MEK)	10	U		1.7	10	1.00000	ug/L	102291		11/20/03 2242	jdn
	Bromochloromethane	1.0	U		0.19	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Chloroform	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,1,1-Trichloroethane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,1-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Carbon tetrachloride	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Benzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,2-Dichloroethane	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Trichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,2-Dichloropropane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Dibromomethane	1.0	U		0.26	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Bromodichloromethane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	cis-1,3-Dichloropropene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Hatfield

Customer Sample ID: LCKMW-15
Date Sampled.....: 11/10/2003
Time Sampled.....: 14:20
Sample Matrix.....: Water

Laboratory Sample ID: 222172-1
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	4-Methyl-2-pentanone (MIBK)	10	U		0.92	10	1.00000	ug/L	102291		11/20/03 2242	jdn
	Toluene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	trans-1,3-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,1,2-Trichloroethane	1.0	U		0.33	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Tetrachloroethene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,3-Dichloropropane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	2-Hexanone	10	U		1.2	10	1.00000	ug/L	102291		11/20/03 2242	jdn
	Dibromochloromethane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,2-Dibromoethane (EDB)	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Chlorobenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,1,1,2-Tetrachloroethane	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Ethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	m&p-Xylenes	2.0	U		0.39	2.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	o-Xylene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Styrene	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Bromoform	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Isopropylbenzene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	Bromobenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,1,2,2-Tetrachloroethane	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,2,3-Trichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	n-Propylbenzene	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	2-Chlorotoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,3,5-Trimethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	4-Chlorotoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	tert-Butylbenzene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	1,2,4-Trimethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	sec-Butylbenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	p-Isopropyltoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn
	n-Butylbenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2242	jdn

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Hatfield

Customer Sample ID: LCKMW-15
Date Sampled.....: 11/10/2003
Time Sampled.....: 14:20
Sample Matrix.....: Water

Laboratory Sample ID: 222172-1
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	1,2-Dibromo-3-chloropropane	2.0	U		0.46	2.0	1.00000	ug/L	102291		11/20/03 2242	jdh
	1,2,3-Trichlorobenzene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2242	jdh

* In Description = Dry Wgt.

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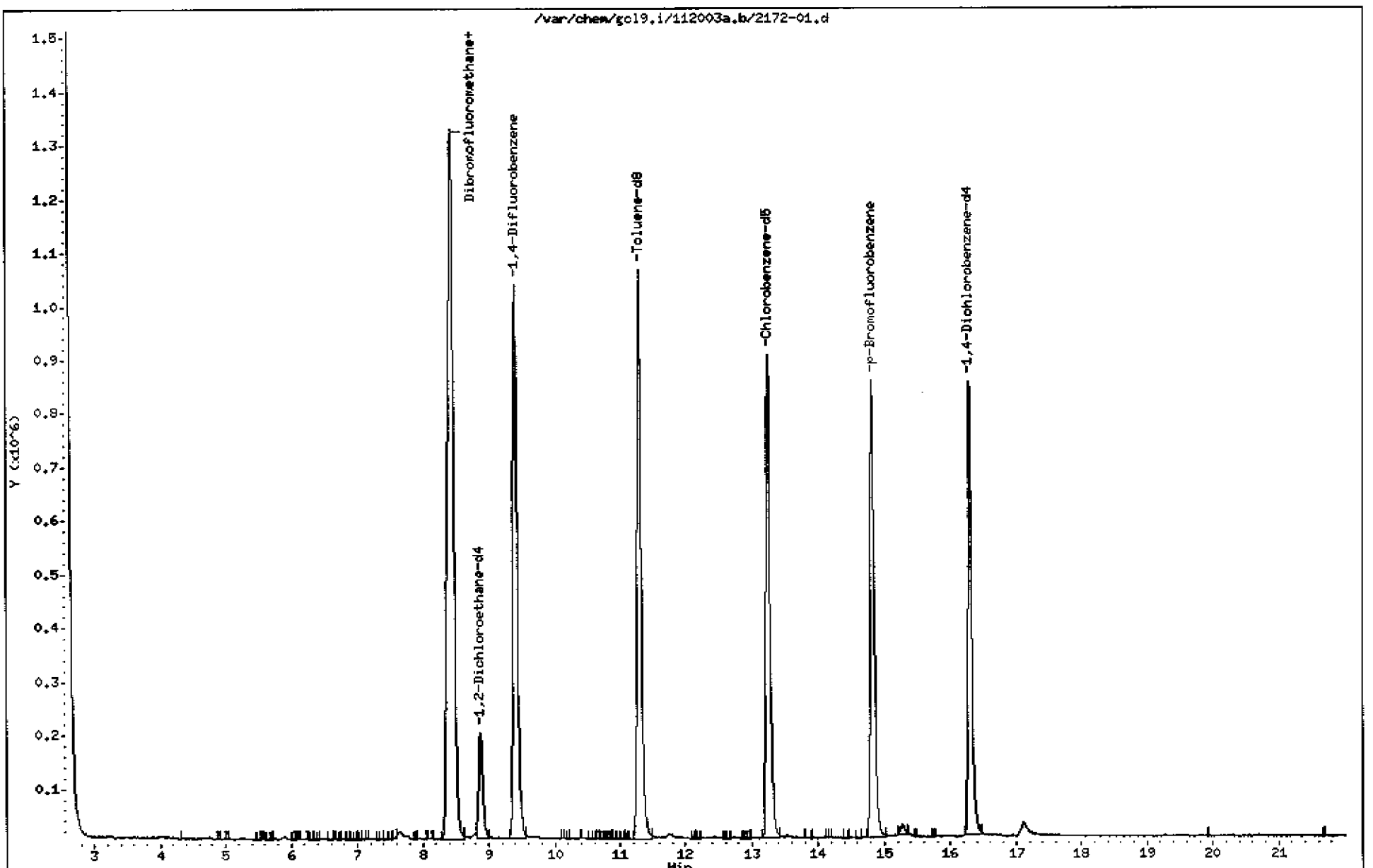
Data File: /var/chem/gc19.i/112003a.b/2172-01.d
Date : 20-NOV-2003 22:42
Client ID: LCKMW-15
Sample Info: 222172-001
Purge Volume: 25.0
Column phase: Cap

Instrument: gc19.i

Operator: DCT
Column diameter: 0.53



VOLATILE REPORT SW846 METHOD 8260B WATERS

Data file : /var/chem/gcl9.i/112003a.b/2172-01.d
Lab Smp Id: 222172-1 Client Smp ID: LCKMW-15
Inj Date : 20-NOV-2003 22:42
Operator : DCI Inst ID: gcl9.i
Smp Info : 222172-001
Misc Info : 222172-1,1,7
Comment : HP 5972/ 5890 GC TEKMAR 3000/2016
Method : /var/chem/gcl9.i/112003a.b/25ml9w.m
Meth Date : 09-Dec-2003 13:53 nagelj Quant Type: ISTD
Cal Date : 17-OCT-2003 04:31 Cal File: 9i1016o.d
Als bottle: 7
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: Lockbourne.sub
Target Version: 3.50
Processing Host: manatee

Concentration Formula: Amt * DF * Uf * 1/Vo * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Uf	25.00000	ng unit correction factor
Vo	25.00000	Sample Volume purged (mL)

Cpnd Variable Local Compound Variable

12 a 03

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
$ 40 Dibromofluoromethane	113	8.394	8.386	(0.994)	772790	10.3453	10.345
* 41 Pentafluorobenzene	168	8.448	8.440	(1.000)	1917799	10.7700	
$ 46 1,2-Dichloroethane-d4	65	8.874	8.865	(0.943)	285780	9.63930	9.639
* 50 1,4-Difluorobenzene	114	9.407	9.399	(1.000)	1854535	10.7700	
$ 63 Toluene-d8	98	11.306	11.298	(1.202)	1685252	10.7972	10.797
* 75 Chlorobenzene-d5	117	13.251	13.233	(1.000)	1180649	10.7700	
$ 86 p-Bromofluorobenzene	95	14.824	14.816	(1.119)	865228	9.68564	9.686
* 101 1,4-Dichlorobenzene-d4	152	16.290	16.281	(1.000)	551820	10.7700	

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LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Hatfield

Customer Sample ID: DUP01
Date Sampled.....: 11/10/2003
Time Sampled.....: 02:00
Sample Matrix.....: Water

Laboratory Sample ID: 222172-2
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8260B	Volatile Organics											
	Dichlorodifluoromethane	1.0	U	*	0.14	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Chloromethane	1.0	U	*	0.16	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Vinyl chloride	1.0	U		0.18	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Bromomethane	1.0	U		0.18	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Chloroethane	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Trichlorofluoromethane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,1-Dichloroethene	1.0	U		0.19	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Carbon disulfide	2.0	U		0.40	2.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Acetone	13			1.5	10	1.00000	ug/L	102291		11/21/03 0008	jdn
	Methylene chloride	2.0	U		0.19	2.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	trans-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Methyl-tert-butyl-ether (MTBE)	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,1-Dichloroethane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	2,2-Dichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	cis-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	2-Butanone (MEK)	10	U		1.7	10	1.00000	ug/L	102291		11/21/03 0008	jdn
	Bromochloromethane	1.0	U		0.19	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Chloroform	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,1,1-Trichloroethane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,1-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Carbon tetrachloride	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Benzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,2-Dichloroethane	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Trichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,2-Dichloropropane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Dibromomethane	1.0	U		0.26	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Bromodichloromethane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	cis-1,3-Dichloropropene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn

* In Description = Dry Wgt.

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Hatfield

Customer Sample ID: DUP01
Date Sampled.....: 11/10/2003
Time Sampled.....: 02:00
Sample Matrix.....: Water

Laboratory Sample ID: 222172-2
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	4-Methyl-2-pentanone (MIBK)	10	U		0.92	10	1.00000	ug/L	102291		11/21/03 0008	jdn
	Toluene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	trans-1,3-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,1,2-Trichloroethane	1.0	U		0.33	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Tetrachloroethene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,3-Dichloropropane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	2-Hexanone	10	U		1.2	10	1.00000	ug/L	102291		11/21/03 0008	jdn
	Dibromochloromethane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,2-Dibromoethane (EDB)	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Chlorobenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,1,1,2-Tetrachloroethane	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Ethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	m&p-Xylenes	2.0	U		0.39	2.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	o-Xylene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Styrene	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Bromoform	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Isopropylbenzene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	Bromobenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,1,2,2-Tetrachloroethane	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,2,3-Trichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	n-Propylbenzene	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	2-Chlorotoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,3,5-Trimethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	4-Chlorotoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	tert-Butylbenzene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,2,4-Trimethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	sec-Butylbenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	p-Isopropyltoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	n-Butylbenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Batfield

Customer Sample ID: DUP01
Date Sampled.....: 11/10/2003
Time Sampled.....: 02:00
Sample Matrix.....: Water

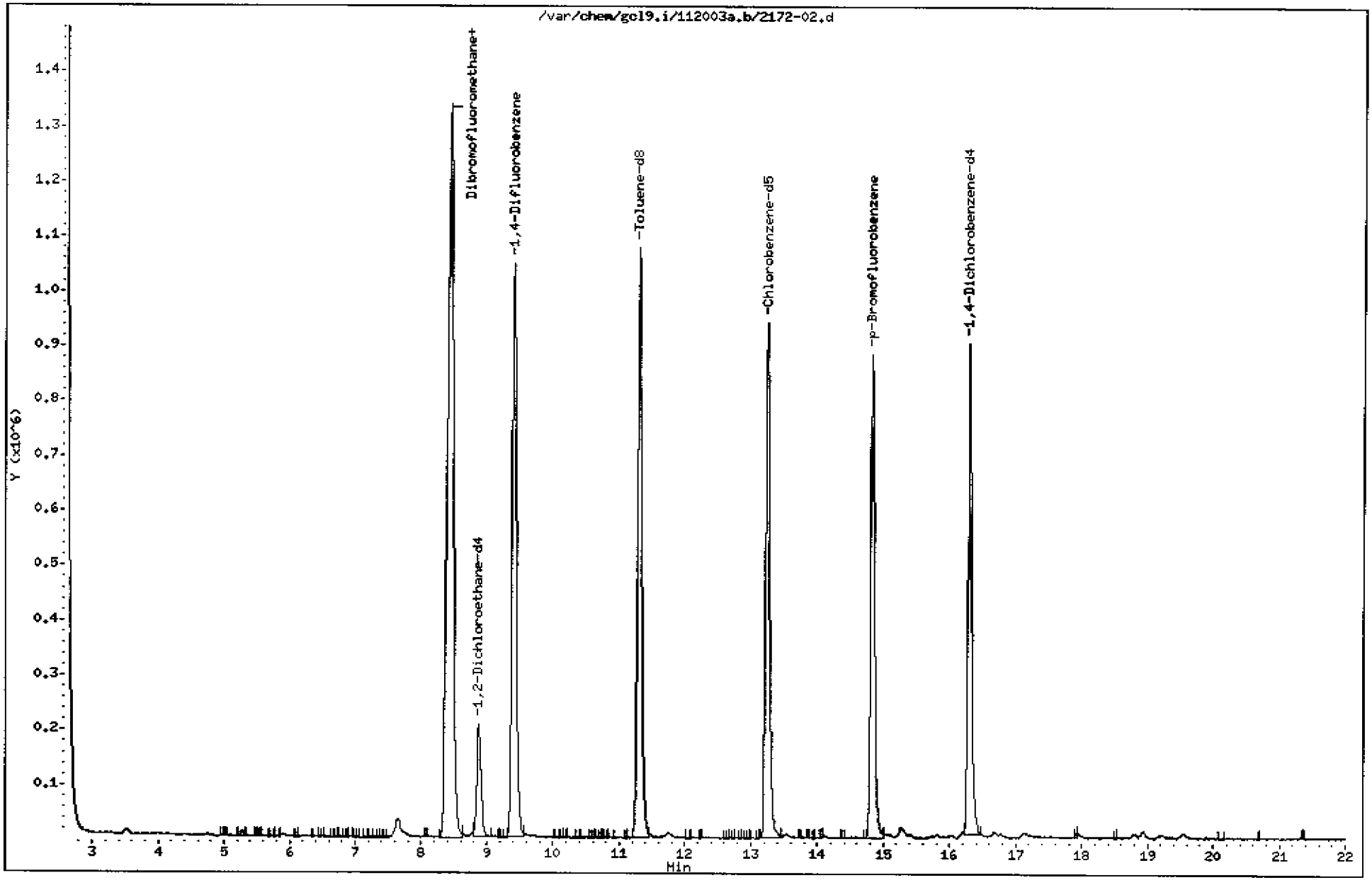
Laboratory Sample ID: 222172-2
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	1,2-Dibromo-3-chloropropane	2.0	U		0.46	2.0	1.00000	ug/L	102291		11/21/03 0008	jdn
	1,2,3-Trichlorobenzene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/21/03 0008	jdn

* In Description = Dry Wgt.

Data File: /var/chem/gcl9.i/112003a.b/2172-02.d
Date : 21-NOV-2003 00:08
Client ID: DUP01
Sample Info: 222172-002
Purge Volume: 25.0
Column phase: Cap

Instrument: gcl9.i
Operator: DCT
Column diameter: 0.53



VOLATILE REPORT SW846 METHOD 8260B WATERS

Data file : /var/chem/gcl9.i/112003a.b/2172-02.d
Lab Smp Id: 222172-2 Client Smp ID: DUP01
Inj Date : 21-NOV-2003 00:08
Operator : DCI Inst ID: gcl9.i
Smp Info : 222172-002
Misc Info : 222172-2,I,10
Comment : HP 5972/ 5890 GC TEKMAR 3000/2016
Method : /var/chem/gcl9.i/112003a.b/25ml9w.m
Meth Date : 09-Dec-2003 13:53 nagelj Quant Type: ISTD
Cal Date : 17-OCT-2003 04:31 Cal File: 9i1016o.d
Als bottle: 10
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: Lockbourne.sub
Target Version: 3.50
Processing Host: manatee

Concentration Formula: Amt * DF * Uf * 1/Vo * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Uf	25.00000	ng unit correction factor
Vo	25.00000	Sample Volume purged (mL)

Cpnd Variable Local Compound Variable

12-9-03

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
13 Acetone	43	5.276	5.257	(0.624)	30864	13.2284	13.228
$ 40 Dibromofluoromethane	113	8.387	8.386	(0.992)	786145	10.4101	10.410
* 41 Pentafluorobenzene	168	8.451	8.440	(1.000)	1938801	10.7700	
$ 46 1,2-Dichloroethane-d4	65	8.876	8.865	(0.943)	291584	9.74921	9.749
* 50 1,4-Difluorobenzene	114	9.409	9.399	(1.000)	1870866	10.7700	
$ 63 Toluene-d8	98	11.299	11.298	(1.201)	1718268	10.9126	10.912
* 75 Chlorobenzene-d5	117	13.244	13.233	(1.000)	1204878	10.7700	
$ 86 p-Bromofluorobenzene	95	14.826	14.816	(1.119)	891105	9.77472	9.775
* 101 1,4-Dichlorobenzene-d4	152	16.292	16.281	(1.000)	575348	10.7700	

Data File: /var/chem/gcl9.i/112003a.b/2172-02.d

Date : 21-NOV-2003 00:08

Client ID: DUP01

Instrument: gcl9.i

Sample Info: 222172-002

Purge Volume: 25.0

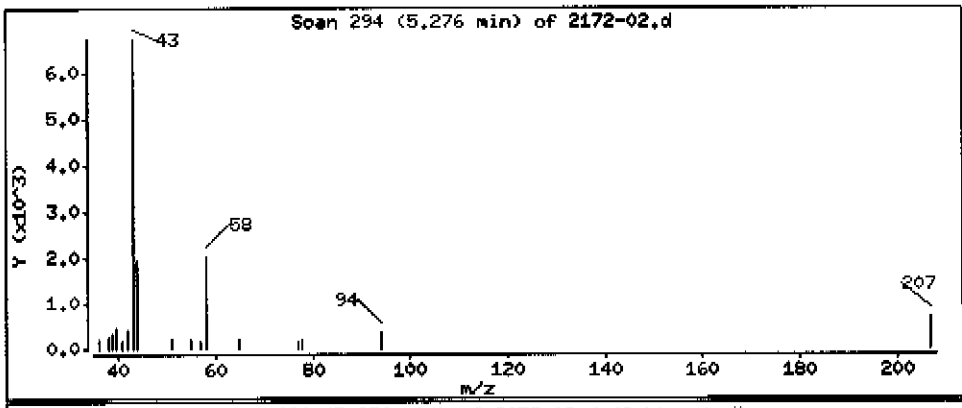
Operator: DCT

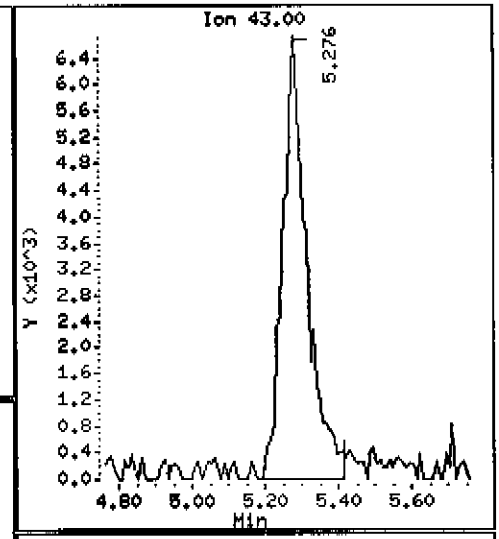
Column phase: Cap

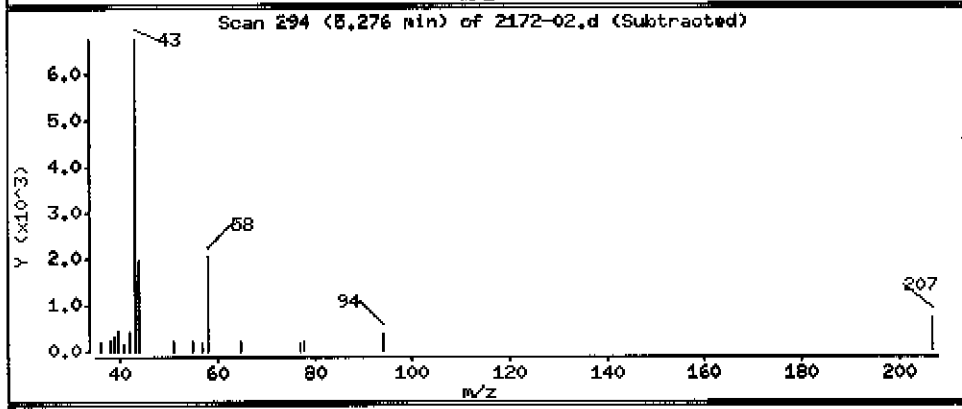
Column diameter: 0.53

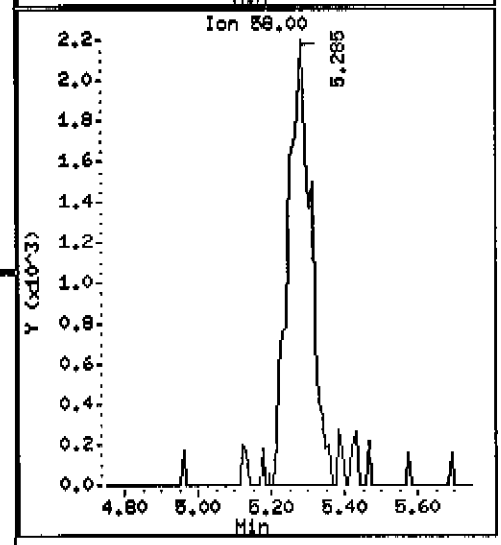
13 Acetone

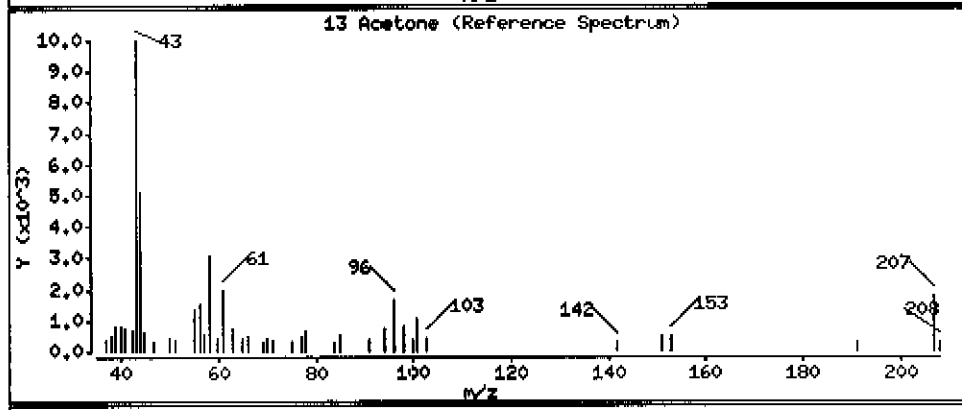
Concentration: 13.228 ug/L

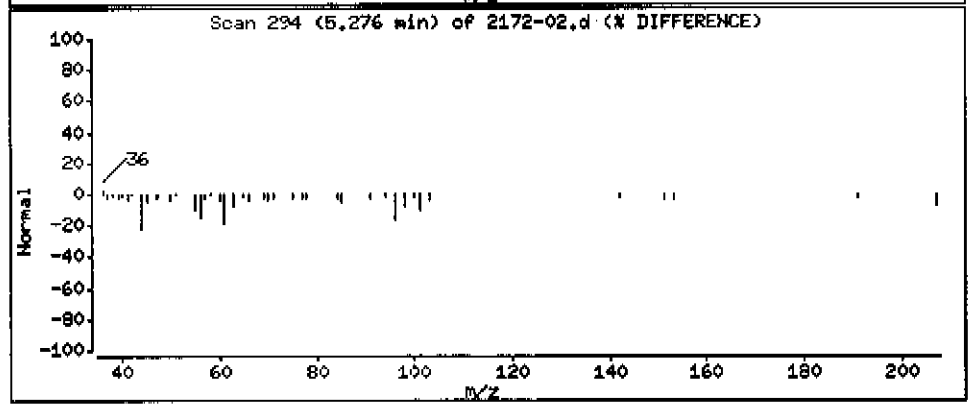












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LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC | PROJECT: USACE-LOCKBOURNE AFB | ATTN: Karen Hatfield

Customer Sample ID: TRIP BLANK
Date Sampled.....: 11/10/2003
Time Sampled.....: 15:00
Sample Matrix.....: Water

Laboratory Sample ID: 222172-3
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8260B	Volatile Organics											
	Dichlorodifluoromethane	1.0	U	*	0.14	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Chloromethane	1.0	U	*	0.16	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Vinyl chloride	1.0	U		0.18	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Bromomethane	1.0	U		0.18	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Chloroethane	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Trichlorofluoromethane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,1-Dichloroethene	1.0	U		0.19	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Carbon disulfide	2.0	U		0.40	2.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Acetone	10	U		1.5	10	1.00000	ug/L	102291		11/20/03 2214	jdn
	Methylene chloride	2.0	U		0.19	2.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	trans-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Methyl-tert-butyl-ether (MTBE)	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,1-Dichloroethane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	2,2-Dichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	cis-1,2-Dichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	2-Butanone (MEK)	10	U		1.7	10	1.00000	ug/L	102291		11/20/03 2214	jdn
	Bromochloromethane	1.0	U		0.19	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Chloroform	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,1,1-Trichloroethane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,1-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Carbon tetrachloride	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Benzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,2-Dichloroethane	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Trichloroethene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,2-Dichloropropane	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Dibromomethane	1.0	U		0.26	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Bromodichloromethane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	cis-1,3-Dichloropropene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Hatfield

Customer Sample ID: TRIP BLANK
Date Sampled.....: 11/10/2003
Time Sampled.....: 15:00
Sample Matrix.....: Water

Laboratory Sample ID: 222172-3
Date Received.....: 11/11/2003
Time Received.....: 09:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	4-Methyl-2-pentanone (MIBK)	10	U		0.92	10	1.00000	ug/L	102291		11/20/03 2214	jdn
	Toluene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	trans-1,3-Dichloropropene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,1,2-Trichloroethane	1.0	U		0.33	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Tetrachloroethene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,3-Dichloropropane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	2-Hexanone	10	U		1.2	10	1.00000	ug/L	102291		11/20/03 2214	jdn
	Dibromochloromethane	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,2-Dibromoethane (EDB)	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Chlorobenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,1,1,2-Tetrachloroethane	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Ethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	m&p-Xylenes	2.0	U		0.39	2.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	o-Xylene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Styrene	1.0	U		0.23	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Bromoform	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Isopropylbenzene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	Bromobenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,1,2,2-Tetrachloroethane	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,2,3-Trichloropropane	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	n-Propylbenzene	1.0	U		0.25	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	2-Chlorotoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,3,5-Trimethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	4-Chlorotoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	tert-Butylbenzene	1.0	U		0.21	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,2,4-Trimethylbenzene	1.0	U		0.20	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	sec-Butylbenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	p-Isopropyltoluene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	n-Butylbenzene	1.0	U		0.22	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn

* In Description = Dry Wgt.

STL Chicago is part of Severn Trent Laboratories, Inc.

LABORATORY TEST RESULTS

Job Number: 222172

Date:12/09/2003

CUSTOMER: Ellis Environmental Group, LC

PROJECT: USACE-LOCKBOURNE AFB

ATTN: Karen Hatfield

Customer Sample ID: TRIP BLANK
Date Sampled.....: 11/10/2003
Time Sampled.....: 15:00
Sample Matrix.....: Water

Laboratory Sample ID: 222172-3
Date Received.....: 11/11/2003
Time Received.....: 09:25

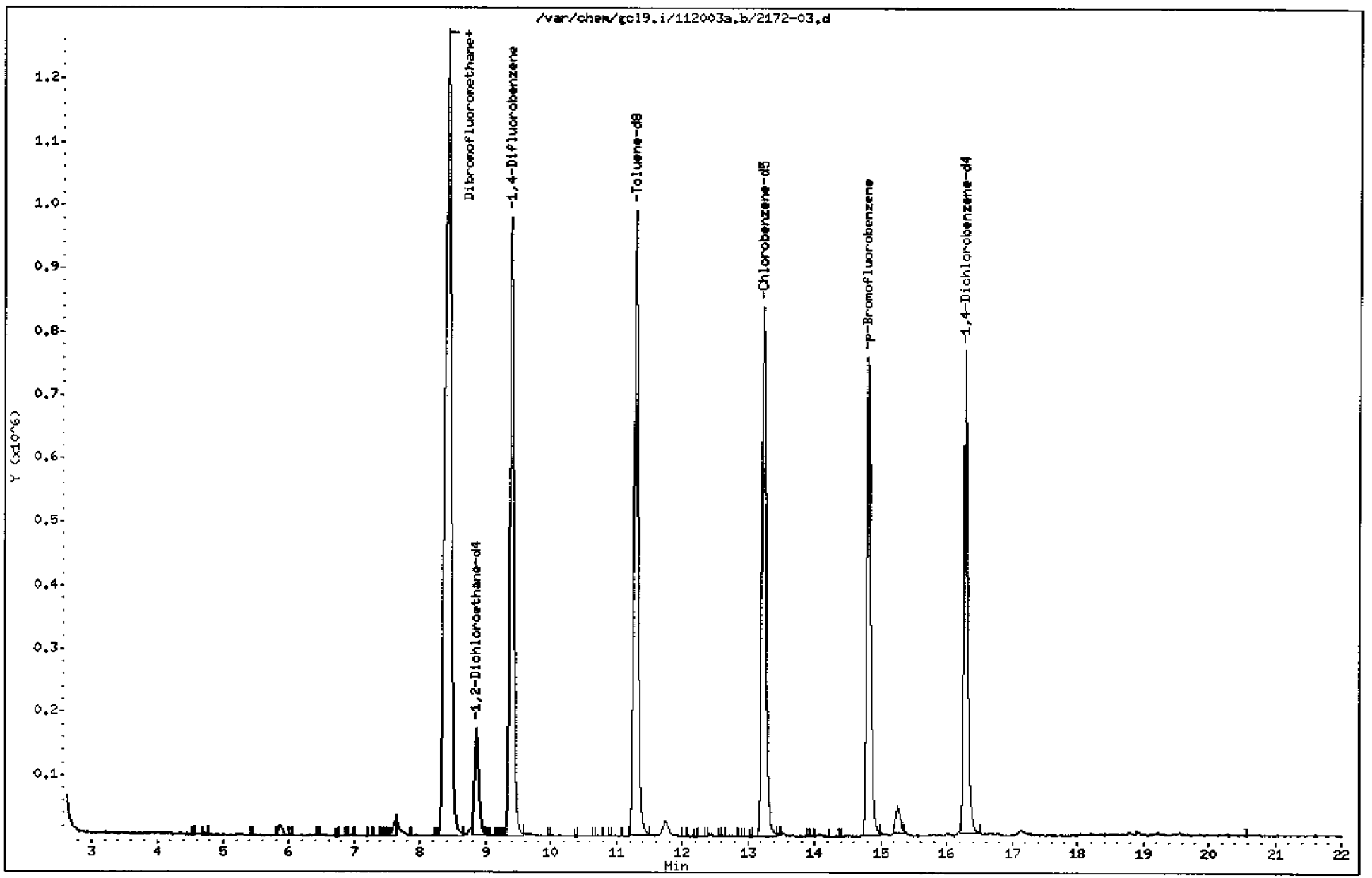
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
	1,2-Dibromo-3-chloropropane	2.0	U		0.46	2.0	1.00000	ug/L	102291		11/20/03 2214	jdn
	1,2,3-Trichlorobenzene	1.0	U		0.24	1.0	1.00000	ug/L	102291		11/20/03 2214	jdn

* In Description = Dry Wgt.

Data File: /var/chem/gc19.i/112003a.b/2172-03.d
Date : 20-NOV-2003 22:14
Client ID: TRIP BLANK
Sample Info: 222172-003
Purge Volume: 25.0
Column phase: Cap

Instrument: gc19.i

Operator: DCT
Column diameter: 0.53



VOLATILE REPORT SW846 METHOD 8260B WATERS

Data file : /var/chem/gcl9.i/112003a.b/2172-03.d
Lab Smp Id: 222172-3 Client Smp ID: TRIP BLANK
Inj Date : 20-NOV-2003 22:14
Operator : DCT Inst ID: gcl9.i
Smp Info : 222172-003
Misc Info : 222172-3,1.6
Comment : HP 5972/ 5890 GC TEKMAR 3000/2016
Method : /var/chem/gcl9.i/112003a.b/725ml9w.m
Meth Date : 09-Dec-2003 13:53 nagelj Quant Type: ISTD
Cal Date : 17-OCT-2003 04:31 Cal File: 9i1016o.d
Als bottle: 6
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: Lockbourne.sub
Target Version: 3.50
Processing Host: manatee

Concentration Formula: Amt * DF * Uf * 1/Vo * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Uf	25.00000	ng unit correction factor
Vo	25.00000	Sample Volume purged (mL)
Cpnd Variable		Local Compound Variable

12-9-03

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
$ 40 Dibromofluoromethane	113	8.379	8.386	(0.994)	716408	9.86314	9.863
* 41 Pentafluorobenzene	168	8.433	8.440	(1.000)	1864793	10.7700	
$ 46 1,2-Dichloroethane-d4	65	8.858	8.865	(0.943)	246323	8.71419	8.714
* 50 1,4-Difluorobenzene	114	9.392	9.399	(1.000)	1768181	10.7700	
$ 63 Toluene-d8	98	11.291	11.298	(1.202)	1592355	10.7002	10.700
* 75 Chlorobenzene-d5	117	13.236	13.233	(1.000)	1085789	10.7700	
$ 86 p-Bromofluorobenzene	95	14.809	14.816	(1.119)	770089	9.37376	9.374
* 101 1,4-Dichlorobenzene-d4	152	16.283	16.281	(1.000)	487409	10.7700	

IV. STANDARDS DATA

6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 25M9W_ICAL1

Instrument ID: GCL9 Calibration Date(s): 10/16/03 10/17/03

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF1 =9i1016j.d RRF2 =9i1016k.d
RRF3 =9i1016l.d RRF4 =9i1016m.d RRF5 =9i1016n.d

COMPOUND	RRF1	RRF2	RRF3	RRF4	RRF5	RRF	% RSD
Dichlorodifluoromethane	0.231	0.203	0.196	0.194	0.525		
Chloromethane	0.225	0.183	0.181	0.165	0.269		
Vinyl chloride	0.244	0.236	0.238	0.230	0.338		
Bromomethane	0.222	0.146	0.160	0.163	0.215		
Chloroethane	0.188	0.166	0.168	0.166	0.210		
Trichlorofluoromethane	0.656	0.639	0.655	0.659	0.791		
2-Propanol							
1,1-Dichloroethene	0.345	0.306	0.316	0.313	0.323		
Acrolein		0.006	0.006	0.006	0.006		
Acetone		0.027	0.018	0.018	0.016		
Carbon Disulfide		0.893	0.951	0.893	0.934		
Iodomethane		0.187	0.285	0.371	0.386		
Acetonitrile		0.005	0.005	0.003	0.003		
3-Chloropropene		0.141	0.144	0.147	0.138		
Methylene chloride	0.314	0.248	0.234	0.216	0.218		
Trichlorotrifluoroethane	0.400	0.376	0.407	0.398	0.407		
Ethyl ether	0.086	0.076	0.079	0.080	0.073		
Methyl-tert-Butyl Ether	0.214	0.204	0.193	0.195	0.193		
trans-1,2-Dichloroethene	0.375	0.343	0.352	0.340	0.344		
Acrylonitrile		0.013	0.015	0.012	0.013		
1,2-Dichloroethene (total)	0.350	0.318	0.319	0.315	0.312		
1,1-Dichloroethane	0.595	0.565	0.597	0.587	0.593		
Vinyl Acetate		0.179	0.179	0.169	0.170		
2-Chloro-1,3-butadiene	0.484	0.507	0.509	0.513	0.488		
Ethyl Acetate	0.076	0.056	0.071	0.066	0.053		
cis-1,2-Dichloroethene	0.325	0.293	0.286	0.290	0.279		
2,2-Dichloropropane	0.548	0.540	0.531	0.548	0.547		
2-Butanone		0.030	0.018	0.023	0.020		
Propionitrile		0.005	0.005	0.004	0.004		
Bromochloromethane	0.096	0.099	0.098	0.103	0.102		
Chloroform	0.575	0.558	0.569	0.559	0.552		
Tetrahydrofuran	0.015	0.016	0.017	0.014	0.013		
1,1,1-Trichloroethane	0.599	0.584	0.592	0.597	0.591		
1,1-Dichloropropene	0.572	0.537	0.520	0.539	0.537		
Hexane	0.544	0.507	0.471	0.497	0.466		
Carbon tetrachloride	0.420	0.592	0.618	0.642	0.637		
Isobutanol		0.003	0.002	0.002	0.002		
Methacrylonitrile		0.035	0.028	0.036	0.030		

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6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 25M9W_ICAL1

Instrument ID: GCL9 Calibration Date(s): 10/16/03 10/17/03

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF1 =9i1016j.d RRF2 =9i1016k.d
RRF3 =9i1016l.d RRF4 =9i1016m.d RRF5 =9i1016n.d

COMPOUND	RRF1	RRF2	RRF3	RRF4	RRF5	RRF	% RSD
Benzene	0.963	0.869	0.890	0.872	0.878		
1,2-Dichloroethane	0.204	0.185	0.189	0.178	0.185		
Crotononitrile							
Trichloroethene	0.402	0.384	0.397	0.394	0.387		
1,2-Dichloropropane	0.306	0.284	0.285	0.287	0.288		
2-Chloroethylvinylether							
Methylmethacrylate		0.072	0.075	0.086	0.072		
n-Butanol		0.001	0.001	0.001	0.001		
Dibromomethane	0.131	0.124	0.121	0.136	0.134		
Bromodichloromethane	0.394	0.389	0.399	0.420	0.416		
Bis(chloromethyl)ether							
cis-1,3-Dichloropropene	0.318	0.304	0.324	0.324	0.321		
4-Methyl-2-pentanone		0.054	0.061	0.053	0.058		
2-Nitropropane		0.013	0.016	0.019	0.016		
Toluene	0.607	0.580	0.592	0.605	0.591		
trans-1,3-Dichloropropene	0.213	0.188	0.198	0.198	0.199		
Ethylmethacrylate		0.185	0.185	0.219	0.183		
1,1,2-Trichloroethane	0.124	0.112	0.118	0.120	0.115		
1,3-Dichloropropane	0.237	0.299	0.309	0.328	0.326		
Tetrachloroethene	0.822	0.740	0.764	0.789	0.752		
2-Hexanone		0.061	0.050	0.045	0.053		
Dibromochloromethane	0.315	0.313	0.330	0.349	0.356		
1,2-Dibromoethane	0.158	0.153	0.161	0.160	0.155		
1-Chlorohexane	0.504	0.496	0.487	0.515	0.503		
Chlorobenzene	# 1.018	0.917	0.972	0.961	0.934		#
1,1,1,2-Tetrachloroethane	0.368	0.386	0.380	0.413	0.405		
Ethylbenzene	0.550	0.496	0.530	0.539	0.521		
p,m-Xylene	1.576	1.386	1.470	1.517	1.435		
Xylene (total)	1.372	1.250	1.297	1.339	1.284		
o-Xylene	1.372	1.250	1.297	1.339	1.284		
Styrene	0.835	0.757	0.809	0.818	0.827		
Bromoform	0.111	0.094	0.141	0.170	0.175		
Isopropylbenzene	4.347	3.970	4.161	4.194	4.146		
trans-1,4-Dichloro-2-butene		0.047	0.045	0.056	0.044		
1,1,2,2-Tetrachloroethane	# 0.469	0.413	0.457	0.441	0.452		#
Bromobenzene	0.827	0.796	0.840	0.849	0.838		
1,2,3-Trichloropropane	0.098	0.101	0.100	0.105	0.100		
n-Propylbenzene	5.214	4.706	4.911	5.212	5.079		

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6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 25M9W_ICAL1

Instrument ID: GCL9 Calibration Date(s): 10/16/03 10/17/03

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF1 =9i1016j.d RRF2 =9i1016k.d
RRF3 =9i1016l.d RRF4 =9i1016m.d RRF5 =9i1016n.d

COMPOUND	RRF1	RRF2	RRF3	RRF4	RRF5	RRF	% RSD
2-Chlorotoluene	3.487	3.076	3.096	3.413	3.359		
1,3,5-Trimethylbenzene	2.901	2.734	2.842	3.009	2.979		
4-Chlorotoluene	2.851	2.846	2.803	3.125	3.070		
Pentachloroethane		0.230	0.243	0.305	0.251		
tert-Butylbenzene	3.258	3.008	3.117	3.276	3.238		
1,2,4-Trimethylbenzene	2.637	2.430	2.570	2.706	2.661		
sec-Butylbenzene	4.890	4.419	4.649	4.929	4.829		
1,3-Dichlorobenzene	1.642	1.529	1.528	1.554	1.510		
p-Isopropyltoluene	4.233	3.620	3.510	3.606	3.523		
1,4-Dichlorobenzene	1.924	1.604	1.666	1.617	1.600		
n-Butylbenzene	3.127	3.053	3.225	3.556	3.526		
1,2-Dichlorobenzene	1.302	1.126	1.130	1.135	1.141		
1,2-Dibromo-3-Chloropropane	0.102	0.096	0.077	0.062	0.071		
1,2,4-Trichlorobenzene	0.746	0.659	0.699	0.716	0.733		
Hexachlorobutadiene	0.909	0.834	0.849	1.060	1.055		
Naphthalene	0.280	0.245	0.370	0.380	0.429		
1,2,3-Trichlorobenzene	0.431	0.453	0.480	0.510	0.528		
tert-Butyl alcohol							
Heptane	0.707	0.690	0.670	0.688	0.663		
1,3,5-Trichlorobenzene	1.257	1.091	1.172	1.203	1.167		
Isopropyl ether	0.721	0.710	0.729	0.756	0.709		
1,3-Butadiene	0.184	0.191	0.180	0.178	0.168		
2-Methylnaphthalene							
Cyclohexanone		0.013	0.010	0.009	0.007		
Methyl acetate	0.105	0.076	0.063	0.050	0.051		
Cyclohexane	0.561	0.815	0.699	0.626	0.579		
Methyl cyclohexane	0.538	0.537	0.546	0.548	0.519		
Dichlorofluoromethane	0.736	0.814	0.840	0.849	0.806		
1,2-Dichloroethane-d4	0.159	0.170	0.161	0.166	0.193		
Toluene-d8	0.808	0.893	0.863	0.906	1.018		
p-Bromofluorobenzene	0.819	0.845	0.759	0.822	0.946		
Dibromofluoromethane	0.374	0.419	0.404	0.414	0.463		

FORM VI VOA 1/87 Rev.

6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 25M9W_ICAL1

Instrument ID: GCL9 Calibration Date(s): 10/16/03 10/17/03

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF6 =9i1016o.d RRF7 =9i1016p.d
RRF8 =9i1016q.d RRF9 =9i1016r.d

COMPOUND	RRF6	RRF7	RRF8	RRF9		RRF	% RSD
Dichlorodifluoromethane	0.478	0.506	0.523	0.503		0.373	1.0
Chloromethane	0.248	0.250	0.259	0.262		0.227	1.0
Vinyl chloride	0.307	0.320	0.338	0.327		0.286	1.0
Bromomethane	0.215	0.224	0.230	0.249		0.203	1.0
Chloroethane	0.194	0.199	0.209	0.204		0.189	9.6
Trichlorofluoromethane	0.738	0.766	0.795	0.778		0.720	9.2
2-Propanol							
1,1-Dichloroethene	0.331	0.333	0.335	0.340		0.327	4.1
Acrolein	0.006	0.006	0.006	0.006		0.006	5.4
Acetone	0.016	0.012	0.012	0.014		0.017	1.0
Carbon Disulfide	0.977	1.003	1.019	1.034		0.963	5.7
Iodomethane	0.436	0.426	0.452	0.482		0.378	1.0
Acetonitrile	0.003	0.003	0.003	0.003		0.004	26.6
3-Chloropropene	0.140	0.138	0.144	0.144		0.142	2.3
Methylene chloride	0.229	0.228	0.226	0.232		0.238	12.4
Trichlorotrifluoroethane	0.417	0.424	0.420	0.430		0.409	4.0
Ethyl ether	0.078	0.077	0.079	0.082		0.079	4.7
Methyl-tert-Butyl Ether	0.200	0.202	0.202	0.208		0.201	3.5
trans-1,2-Dichloroethene	0.352	0.352	0.356	0.364		0.353	3.1
Acrylonitrile	0.013	0.013	0.014	0.014		0.013	5.8
1,2-Dichloroethene (total)	0.324	0.324	0.325	0.333		0.324	3.5
1,1-Dichloroethane	0.615	0.612	0.619	0.628		0.601	3.2
Vinyl Acetate	0.171	0.184	0.185	0.195		0.179	5.0
2-Chloro-1,3-butadiene	0.506	0.512	0.527	0.530		0.508	3.0
Ethyl Acetate	0.057	0.061	0.059	0.044		0.060	1.0
cis-1,2-Dichloroethene	0.296	0.296	0.294	0.302		0.296	4.3
2,2-Dichloropropane	0.564	0.563	0.564	0.576		0.553	2.5
2-Butanone	0.019	0.019	0.018	0.020		0.021	1.0
Propionitrile	0.004	0.004	0.004	0.004		0.004	6.6
Bromochloromethane	0.107	0.108	0.110	0.113		0.104	5.6
Chloroform	0.585	0.576	0.577	0.592		0.571	2.3
Tetrahydrofuran	0.014	0.014	0.012	0.013		0.014	10.5
1,1,1-Trichloroethane	0.614	0.616	0.619	0.634		0.605	2.7
1,1-Dichloropropene	0.546	0.559	0.549	0.562		0.547	2.9
Hexane	0.479	0.484	0.504	0.486		0.493	4.8
Carbon tetrachloride	0.639	0.658	0.657	0.647		0.612	12.2
Isobutanol	0.002	0.002	0.002	0.002		0.002	1.0
Methacrylonitrile	0.030	0.029	0.030	0.031		0.031	9.7

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VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 25M9W_ICAL1

Instrument ID: GCL9 Calibration Date(s): 10/16/03 10/17/03

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF6 =9i1016o.d RRF7 =9i1016p.d
RRF8 =9i1016q.d RRF9 =9i1016r.d

COMPOUND	RRF6	RRF7	RRF8	RRF9		RRF	% RSD	
Benzene	0.909	0.901	0.894	0.895		0.897	3.1	
1,2-Dichloroethane	0.193	0.188	0.190	0.193		0.189	3.7	
Crotononitrile								*
Trichloroethene	0.410	0.405	0.403	0.402		0.398	2.2	
1,2-Dichloropropane	0.303	0.297	0.297	0.300		0.294	2.8	
2-Chloroethylvinylether								*
Methylmethacrylate	0.073	0.076	0.076	0.076		0.076	6.1	
n-Butanol	0.001	0.001	0.001	0.001		0.001	9.3	
Dibromomethane	0.146	0.143	0.142	0.146		0.136	6.8	
Bromodichloromethane	0.455	0.442	0.440	0.450		0.423	5.9	
Bis(chloromethyl)ether								*
cis-1,3-Dichloropropene	0.349	0.342	0.338	0.346		0.330	4.6	
4-Methyl-2-pentanone	0.055	0.056	0.057	0.060		0.057	5.0	
2-Nitropropane	0.016	0.016	0.017	0.017		0.016	9.7	
Toluene	0.629	0.612	0.607	0.601		0.603	2.4	
trans-1,3-Dichloropropene	0.214	0.208	0.207	0.212		0.204	4.3	
Ethylmethacrylate	0.190	0.193	0.196	0.192		0.193	6.0	
1,1,2-Trichloroethane	0.126	0.124	0.122	0.128		0.121	4.5	
1,3-Dichloropropane	0.348	0.344	0.342	0.352		0.320	11.3	
Tetrachloroethene	0.783	0.785	0.780	0.786		0.778	3.1	
2-Hexanone	0.049	0.054	0.057	0.053		0.053	9.4	
Dibromochloromethane	0.392	0.386	0.387	0.402		0.359	9.5	
1,2-Dibromoethane	0.170	0.170	0.167	0.169		0.162	4.1	
1-Chlorohexane	0.523	0.532	0.525	0.539		0.514	3.4	
Chlorobenzene #	1.010	0.989	0.982	0.981		0.974	3.4#	
1,1,1,2-Tetrachloroethane	0.441	0.435	0.426	0.439		0.410	6.6	
Ethylbenzene	0.561	0.546	0.549	0.554		0.538	3.8	
p,m-Xylene	1.563	1.512	1.514	1.504		1.497	4.0	
Xylene (total)	1.389	1.362	1.361	1.373		1.336	3.6	
o-Xylene	1.389	1.362	1.361	1.373		1.336	3.6	
Styrene	0.889	0.874	0.881	0.880		0.841	5.2	
Bromoform	0.191	0.195	0.196	0.207		0.164	1.0	
Isopropylbenzene	4.440	4.305	4.240	4.384		4.243	3.4	
trans-1,4-Dichloro-2-butene	0.044	0.047	0.046	0.047		0.047	8.0	
1,1,2,2-Tetrachloroethane #	0.483	0.486	0.459	0.478		0.460	5.0#	
Bromobenzene	0.930	0.903	0.885	0.913		0.864	5.2	
1,2,3-Trichloropropane	0.109	0.108	0.109	0.110		0.104	4.3	
n-Propylbenzene	5.418	5.276	5.194	5.350		5.151	4.3	

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VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: STL CHICAGO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 25M9W_ICAL1

Instrument ID: GCL9 Calibration Date(s): 10/16/03 10/17/03

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) CAP

Min RRF for SPCC(#) = 0.300 (0.250 for Bromoform) Max %RSD for CCC(*) = 30.0%

LAB FILE ID: RRF6 =9i1016o.d RRF7 =9i1016p.d
RRF8 =9i1016q.d RRF9 =9i1016r.d

COMPOUND	RRF6	RRF7	RRF8	RRF9		RRF	% RSD
2-Chlorotoluene	3.587	3.473	3.476	3.498		3.385	5.3
1,3,5-Trimethylbenzene	3.178	3.095	3.057	3.154		2.994	4.9
4-Chlorotoluene	3.295	3.228	3.167	3.185		3.063	6.0
Pentachloroethane	0.258	0.266	0.272	0.262		0.261	8.6
tert-Butylbenzene	3.423	3.336	3.282	3.427		3.263	4.1
1,2,4-Trimethylbenzene	2.856	2.804	2.776	2.822		2.696	5.1
sec-Butylbenzene	5.073	4.970	4.804	5.083		4.850	4.3
1,3-Dichlorobenzene	1.603	1.567	1.557	1.586		1.564	2.6
p-Isopropyltoluene	3.686	3.641	3.504	3.653		3.664	6.1
1,4-Dichlorobenzene	1.649	1.703	1.637	1.663		1.674	5.9
n-Butylbenzene	3.639	3.703	3.471	3.647		3.438	7.0
1,2-Dichlorobenzene	1.199	1.192	1.175	1.188		1.176	4.7
1,2-Dibromo-3-Chloropropane	0.080	0.077	0.073	0.077		0.079	1.0
1,2,4-Trichlorobenzene	0.760	0.800	0.768	0.797		0.742	6.2
Hexachlorobutadiene	1.055	1.097	0.995	1.121		0.997	10.8
Naphthalene	0.442	0.504	0.473	0.473		0.400	1.0
1,2,3-Trichlorobenzene	0.552	0.569	0.554	0.565		0.516	9.9
tert-Butyl alcohol							
Heptane	0.685	0.691	0.709	0.684		0.687	2.2
1,3,5-Trichlorobenzene	1.201	1.248	1.294	1.244		1.208	5.0
Isopropyl ether	0.738	0.733	0.764	0.771		0.737	3.1
1,3-Butadiene	0.172	0.176	0.180	0.178		0.178	3.7
2-Methylnaphthalene							
Cyclohexanone	0.010	0.009	0.008	0.010		0.010	1.0
Methyl acetate	0.048	0.046	0.049	0.048		0.060	1.0
Cyclohexane	0.593	0.594	0.606	0.592		0.629	12.7
Methyl cyclohexane	0.536	0.546	0.562	0.553		0.543	2.3
Dichlorofluoromethane	0.824	0.872	0.871	0.854		0.830	5.1
1,2-Dichloroethane-d4	0.176	0.171	0.172	0.182		0.172	6.2
Toluene-d8	0.914	0.912	0.903	0.940		0.906	6.2
p-Bromofluorobenzene	0.764	0.772	0.794	0.812		0.815	7.1
Dibromofluoromethane	0.422	0.413	0.418	0.449		0.420	6.1

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INITIAL CALIBRATION DATA

Start Cal Date : 16-OCT-2003 19:57
End Cal Date : 17-OCT-2003 05:58
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc19.i/101603a_25ml9w.b/25ml9w.m
Cal Date : 17-Oct-2003 12:41 alikpata

Calibration File Names:
Level 1: /var/chem/gc19.i/101603a_25ml9w.b/9i1016j.d
Level 2: /var/chem/gc19.i/101603a_25ml9w.b/9i1016k.d
Level 3: /var/chem/gc19.i/101603a_25ml9w.b/9i1016l.d
Level 4: /var/chem/gc19.i/101603a_25ml9w.b/9i1016m.d
Level 5: /var/chem/gc19.i/101603a_25ml9w.b/9i1016n.d
Level 6: /var/chem/gc19.i/101603a_25ml9w.b/9i1016o.d
Level 7: /var/chem/gc19.i/101603a_25ml9w.b/9i1016p.d
Level 8: /var/chem/gc19.i/101603a_25ml9w.b/9i1016q.d
Level 9: /var/chem/gc19.i/101603a_25ml9w.b/9i1016r.d

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
1 Dichlorodifluoromethane	18335	31003	60416	147362	643681	733118					
	1080555	1568574	2987351				LINR	0.08621	0.52447		0.99374
2 Chloromethane	17819	27914	55627	125806	329696	380453					
	534075	775893	1557238				LINR	0.05710	0.26620		0.99797
3 Vinyl chloride	19319	36111	73150	175252	414507	471242					
	682765	1013360	1942723				LINR	0.04499	0.33371		0.99810
4 1,3-Butadiene	0.18449	0.19080	0.17959	0.17852	0.16819	0.17178					
	0.17618	0.17953	0.17830				AVRG		0.17860		3.68309
5 Bromomethane	17611	22296	49364	123903	263686	330038					
	479345	686671	1480933				LINR	0.09557	0.25183		0.99739

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INITIAL CALIBRATION DATA

Start Cal Date : 16-OCT-2003 19:57
End Cal Date : 17-OCT-2003 05:58
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc19.i/101603a.25ml9w.b/25ml9w.m
Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
6 Chloroethane	0.18806	0.16589	0.16833	0.16652	0.21034	0.19363					
	0.19862	0.20881	0.20433				AVRG		0.18939		9.63290
7 Trichlorofluoromethane	0.65596	0.63896	0.65476	0.65881	0.79078	0.73821					
	0.75581	0.79493	0.77769				AVRG		0.71954		9.19888
8 Dichlorofluoromethane	0.73568	0.81424	0.83958	0.84878	0.80561	0.82448					
	0.87196	0.87074	0.85356				AVRG		0.82940		5.07730
9 Ethyl ether	0.08622	0.07554	0.07929	0.08013	0.07343	0.07775					
	0.07716	0.07941	0.08184				AVRG		0.07898		4.68753
10 Acrolein	++++++	0.00611	0.00654	0.00558	0.00553	0.00583					
	0.00570	-0.00598	0.00608				AVRG		0.00593		5.40707
11 Trichlorotrifluoroethane	0.40026	0.37598	0.40690	0.39789	0.40743	0.41691					
	0.42374	0.41956	0.42972				AVRG		0.40871		3.97986
12 1,1-Dichloroethene	0.34520	0.30592	0.31645	0.31294	0.32333	0.33148					
	0.33342	0.33527	0.34041				AVRG		0.32716		4.05435
13 Acetone	++++++	8205	10938	13567	19138	24523					
	25185	35627	84064				QUAD	-0.39810	113	-649	0.99195
14 Iodomethane	++++++	56769	218170	565444	873896	1333161					
	1947854	2768326	4372767				LINR	0.23066	0.49205		0.99753

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INITIAL CALIBRATION DATA

Start Cal Date : 16-OCT-2003 19:57
End Cal Date : 17-OCT-2003 05:58
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc19.i/101603a.25ml9w.b/25ml9w.m
Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
15 Carbon Disulfide	+++++	0.89285	0.95098	0.89282	0.93399	0.97684					
	1.00344	1.01928	1.03454				AVRG		0.96309		5.67961
16 3-Chloropropene	+++++	0.14128	0.14357	0.14691	0.13834	0.14013					
	0.13775	0.14460	0.14423				AVRG		0.14210		2.28414
17 Methyl acetate	8081	11472	19290	37903	61486	73044					
	99196	150406	290899				LINR	-0.03866	0.04742		0.99929
18 Acetonitrile	+++++	0.00532	0.00509	0.00316	0.00298	0.00299					
	0.00314	0.00331	0.00318				AVRG		0.00365		26.56856 <-
19 Methylene chloride	0.31351	0.24816	0.23360	0.21630	0.21854	0.22867					
	0.22825	0.22657	0.23218				AVRG		0.23842		12.42328
20 Methyl-tert-Butyl Ether	0.21427	0.20407	0.19300	0.19484	0.19313	0.20010					
	0.20221	0.20171	0.20803				AVRG		0.20126		3.51821
21 trans-1,2-Dichloroethene	0.37469	0.34350	0.35212	0.34015	0.34384	0.35220					
	0.35258	0.35652	0.36421				AVRG		0.35331		3.08163
22 Acrylonitrile	+++++	0.01333	0.01496	0.01241	0.01285	0.01317					
	0.01316	0.01355	0.01403				AVRG		0.01343		5.80796
23 Hexane	0.54368	0.50685	0.47098	0.49677	0.46633	0.47947					
	0.48425	0.50397	0.48561				AVRG		0.49310		4.75912

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Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	ml	m2	%RSD or R^2
24 Isopropyl ether	0.72083	0.71017	0.72914	0.75638	0.70909	0.73819					
	0.73281	0.76354	0.77095				AVRG		0.73679		3.06254
25 1,1-Dichloroethane	0.59485	0.56482	0.59731	0.58702	0.59274	0.61540					
	0.61241	0.61864	0.62777				AVRG		0.60122		3.21508
26 Vinyl Acetate	++++++	0.17884	0.17916	0.16899	0.16981	0.17104					
	0.18358	0.18501	0.19526				AVRG		0.17896		5.04127
27 2-Chloro-1,3-butadiene	0.48373	0.50736	0.50910	0.51346	0.48794	0.50644					
	0.51152	0.52738	0.52967				AVRG		0.50851		3.01483
28 2,2-Dichloropropane	0.54822	0.54034	0.53149	0.54826	0.54707	0.56357					
	0.56260	0.56357	0.57561				AVRG		0.55341		2.49777
29 cis-1,2-Dichloroethene	0.32489	0.29333	0.28651	0.29042	0.27947	0.29601					
	0.29593	0.29419	0.30204				AVRG		0.29586		4.26818
30 2-Butanone	++++++	9338	10916	17602	24482	28668					
	39777	54544	122003				LINR	0.02343	0.02021		0.99306
31 Ethyl Acetate	58660	84910	218753	501963	640244	872160					
	1305418	1804674	2676695				QUAD	0.69917	10.42965	6.90485	0.99241
32 Propionitrile	++++++	0.00478	0.00523	0.00414	0.00445	0.00450					
	0.00429	0.00454	0.00459				AVRG		0.00455		6.63647

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Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1	1 Level 2	2 Level 3	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2	
	14 Level 7	20 Level 8	40 Level 9									
33 Bromochloromethane	0.09579	0.09872	0.09771	0.10322	0.10208	0.10727						
	0.10838	0.10956	0.11265				AVRG		0.10393		5.63865	
34 Tetrahydrofuran	0.01472	0.01605	0.01696	0.01383	0.01309	0.01397						
	0.01395	0.01233	0.01301				AVRG		0.01421		10.47497	
35 Methacrylonitrile	+++++	0.03522	0.02791	0.03648	0.03060	0.03000						
	0.02907	0.02973	0.03068				AVRG		0.03121		9.65479	
36 Chloroform	0.57488	0.55819	0.56939	0.55945	0.55248	0.58547						
	0.57597	0.57695	0.59225				AVRG		0.57157		2.29344	
37 Crotononitrile	+++++	+++++	+++++	+++++	+++++	+++++						
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00	<-
38 Cyclohexane	0.56094	0.81540	0.69936	0.62597	0.57862	0.59287						
	0.59375	0.60522	0.59163				AVRG		0.62942		12.72724	
39 1,1,1-Trichloroethane	0.59943	0.58454	0.59152	0.59665	0.59130	0.61423						
	0.61647	0.61920	0.63427				AVRG		0.60529		2.71653	
42 Carbon tetrachloride	0.42026	0.59245	0.61768	0.64170	0.63679	0.63887						
	0.65759	0.65691	0.64667				AVRG		0.61210		12.21107	
43 1,1-Dichloropropene	0.57205	0.53673	0.51996	0.53941	0.53695	0.54603						
	0.55878	0.54934	0.56164				AVRG		0.54677		2.87863	

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Integrator : HP RTE
Method file : /var/chem/gc19.i/101603a.25ml9w.b/25ml9w.m
Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2	
44 Isobutanol	+++++	36870	66691	145158	170270	224734						
	330951	442812	620020				LINR	-9.12461	0.00173		0.99731	
45 Benzene	0.96279	0.86868	0.89030	0.87238	0.87799	0.90950						
	0.90075	0.89396	0.89473				AVRG		0.89679		3.13606	
47 1,2-Dichloroethane	0.20399	0.18540	0.18949	0.17799	0.18502	0.19260						
	0.18778	0.18965	0.19282				AVRG		0.18942		3.74577	
48 Heptane	0.70709	0.69024	0.67005	0.68777	0.66334	0.68475						
	0.69088	0.70885	0.68381				AVRG		0.68742		2.16260	
49 Bis(chloromethyl)ether	+++++	+++++	+++++	+++++	+++++	+++++						
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00	<-
51 n-Butanol	+++++	0.00122	0.00097	0.00122	0.00101	0.00099						
	0.00104	0.00105	0.00102				AVRG		0.00106		9.29844	<-
52 Trichloroethene	0.40186	0.38350	0.39696	0.39378	0.38713	0.41030						
	0.40531	0.40332	0.40232				AVRG		0.39827		2.19817	
53 Methyl cyclohexane	0.53860	0.53677	0.54637	0.54828	0.51862	0.53563						
	0.54642	0.56174	0.55322				AVRG		0.54285		2.26871	
54 1,2-Dichloropropane	0.30604	0.28397	0.29489	0.28723	0.28769	0.30296						
	0.29726	0.29691	0.30031				AVRG		0.29414		2.82778	

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Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2	
55 Methylmethacrylate	+++++	0.07250	0.07461	0.08631	0.07155	0.07323						
	0.07561	0.07611	0.07588				AVRG		0.07572		6.06200	
56 Dibromomethane	0.13109	0.12356	0.12087	0.13577	0.13431	0.14577						
	0.14325	0.14198	0.14573				AVRG		0.13582		6.83128	
57 2-Chloroethylvinylether	+++++	+++++	+++++	+++++	+++++	+++++						
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00	<-
58 Bromodichloromethane	0.39448	0.38911	0.39929	0.41992	0.41628	0.45468						
	0.44158	0.44014	0.45011				AVRG		0.42285		5.88674	
59 2-Nitropropane	+++++	0.01347	0.01553	0.01916	0.01584	0.01633						
	0.01653	0.01665	0.01667				AVRG		0.01627		9.66042	
60 2-Propanol	+++++	+++++	+++++	+++++	+++++	+++++						
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00	<-
61 cis-1,3-Dichloropropene	0.31778	0.30387	0.32400	0.32360	0.32106	0.34914						
	0.34241	0.33855	0.34583				AVRG		0.32958		4.59060	
62 4-Methyl-2-pentanone	+++++	0.05440	0.06141	0.05308	0.05819	0.05478						
	0.05650	0.05746	0.05987				AVRG		0.05696		4.99450	
64 Toluene	0.60695	0.57955	0.59243	0.60475	0.59083	0.62938						
	0.61179	0.60727	0.60098				AVRG		0.60255		2.36314	

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Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	ml	m2	%RSD or R^2	
65 trans-1,3-Dichloropropene	0.21293	0.18809	0.19769	0.19847	0.19944	0.21358						
	0.20828	0.20697	0.21231				AVRG		0.20420		4.28234	
66 Ethylmethacrylate	+++++	0.18482	0.18512	0.21906	0.18293	0.18976						
	0.19332	0.19571	0.19174				AVRG		0.19281		5.97390	
67 tert-Butyl alcohol	++++++	++++++	++++++	++++++	++++++	++++++						
	++++++	++++++	++++++				AVRG		0.000e+00		0.000e+00	<-
68 1,1,2-Trichloroethane	0.12426	0.11179	0.11811	0.11977	0.11468	0.12657						
	0.12411	0.12247	0.12788				AVRG		0.12107		4.48147	
69 Tetrachloroethene	0.82200	0.74009	0.76397	0.78882	0.75185	0.78280						
	0.78476	0.78016	0.78583				AVRG		0.77781		3.05114	
70 1,3-Dichloropropane	0.23705	0.29934	0.30878	0.32846	0.32572	0.34784						
	0.34427	0.34182	0.35232				AVRG		0.32052		11.25578	
71 2-Hexanone	++++++	0.06113	0.04973	0.04503	0.05296	0.04910						
	0.05414	0.05679	0.05341				AVRG		0.05279		9.36195	
72 Dibromochloromethane	0.31526	0.32341	0.33052	0.34908	0.35581	0.39151						
	0.38623	0.38670	0.40252				AVRG		0.35900		9.53366	
73 1,2-Dibromoethane	0.15852	0.15270	0.16068	0.16014	0.15543	0.16954						
	0.17025	0.16712	0.16942				AVRG		0.16264		4.06334	

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Method file : /var/chem/gcl9.i/101603a.25ml9w.b/25ml9w.m
Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
74 1-Chlorohexane	0.50436	0.49591	0.48691	0.51519	0.50342	0.52331					
	0.53198	0.52529	0.53908				AVRG		0.51394		3.39333
76 Chlorobenzene	1.01839	0.91713	0.97247	0.96117	0.93441	1.01011					
	0.98913	0.98258	0.98119				AVRG		0.97406		3.36546
77 Ethylbenzene	0.55046	0.49592	0.52978	0.53895	0.52094	0.56108					
	0.54640	0.54943	0.55385				AVRG		0.53853		3.75332
78 1,1,1,2-Tetrachloroethane	0.36828	0.38654	0.37966	0.41275	0.40526	0.44150					
	0.43482	0.42650	0.43874				AVRG		0.41045		6.64213
79 p,m-Xylene	1.57641	1.38555	1.46988	1.51725	1.43466	1.56270					
	1.51170	1.51372	1.50369				AVRG		1.49727		3.99409
80 o-Xylene	1.37156	1.24954	1.29688	1.33945	1.28450	1.38917					
	1.36157	1.36097	1.37277				AVRG		1.33627		3.58792
81 Styrene	0.83516	0.75716	0.80867	0.81837	0.82687	0.88918					
	0.87442	0.88135	0.88009				AVRG		0.84125		5.21799
82 Bromoform	5267	8804	26296	78087	129434	178237					
	255203	359016	754464				LINR	0.07395	0.20922		0.99920 <-
83 Isopropylbenzene	4.34690	3.96952	4.16083	4.19416	4.14595	4.43982					
	4.30493	4.24002	4.38398				AVRG		4.24290		3.40120

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Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
M 84 1,2-Dichloroethene (total)	0.34979	0.31842	0.31932	0.31529	0.31166	0.32410					
	0.32426	0.32535	0.33313				AVRG		0.32459		3.49315
85 Cyclohexanone	+++++	47132	90508	152771	178717	345648					
	470614	579508	1080920				QUAD	-6.21395	143	-18.81524	0.99021 <-
87 Bromobenzene	0.82665	0.79597	0.84011	0.84882	0.83788	0.93037					
	0.90283	0.88512	0.91319				AVRG		0.86455		5.21836
88 1,1,2,2-Tetrachloroethane	0.46893	0.41337	0.45687	0.44116	0.45229	0.48349					
	0.48556	0.45950	0.47845				AVRG		0.45996		4.99551
89 n-Propylbenzene	5.21455	4.70556	4.91140	5.21228	5.07919	5.41759					
	5.27589	5.19388	5.34985				AVRG		5.15113		4.32366
90 1,2,3-Trichloropropane	0.09856	0.10073	0.10049	0.10533	0.10034	0.10879					
	0.10776	0.10892	0.10963				AVRG		0.10451		4.25850
91 trans-1,4-Dichloro-2-butene	+++++	0.04702	0.04507	0.05558	0.04442	0.04357					
	0.04733	0.04560	0.04691				AVRG		0.04694		7.96605
92 2-Chlorotoluene	3.48660	3.07638	3.09642	3.41295	3.35895	3.58720					
	3.47258	3.47575	3.49832				AVRG		3.38503		5.32530
93 1,3,5-Trimethylbenzene	2.90093	2.73357	2.84181	3.00861	2.97948	3.17754					
	3.09480	3.05706	3.15421				AVRG		2.99422		4.91921

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Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
94 4-Chlorotoluene	2.85074	2.84642	2.80285	3.12514	3.07055	3.29527					
	3.22799	3.16714	3.18518				AVRG		3.06347		6.00235
95 tert-Butylbenzene	3.25804	3.00815	3.11675	3.27574	3.23857	3.42307					
	3.33581	3.28163	3.42672				AVRG		3.26272		4.12905
96 1,2,4-Trimethylbenzene	2.63722	2.43001	2.57031	2.70632	2.66141	2.85627					
	2.80443	2.77551	2.82171				AVRG		2.69591		5.09398
97 Pentachloroethane	+++++	0.22970	0.24342	0.30541	0.25125	0.25849					
	0.26599	0.27192	0.26160				AVRG		0.26097		8.57640
98 sec-Butylbenzene	4.88964	4.41875	4.64882	4.92861	4.82877	5.07292					
	4.96985	4.80416	5.08341				AVRG		4.84944		4.34565
99 p-Isopropyltoluene	4.23339	3.61983	3.50994	3.60659	3.52293	3.68558					
	3.64095	3.50441	3.65295				AVRG		3.66406		6.10023
100 1,3-Dichlorobenzene	1.64163	1.52945	1.52785	1.55427	1.51045	1.60316					
	1.56708	1.55695	1.58563				AVRG		1.56405		2.63126
102 1,4-Dichlorobenzene	1.92357	1.60426	1.66619	1.61588	1.59990	1.64908					
	1.70298	1.63681	1.66263				AVRG		1.67359		5.93522
103 n-Butylbenzene	3.12705	3.05316	3.22539	3.55597	3.52639	3.63899					
	3.70339	3.47092	3.64733				AVRG		3.43873		7.02947

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Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1 / 14 Level 7	1 Level 2 / 20 Level 8	2 Level 3 / 40 Level 9	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
104 1,2-Dichlorobenzene	1.30233	1.12632	1.12990	1.13481	1.14087	1.19948					
	1.19219	1.17537	1.18807				AVRG		1.17659		4.69751
105 1,2-Dibromo-3-Chloropropane	2182	4192	6732	13463	24991	34939					
	47786	64578	132604				LINR	0.01836	0.07713		0.99835
106 1,3,5-Trichlorobenzene	1.25730	1.09111	1.17236	1.20286	1.16728	1.20063					
	1.24763	1.29387	1.24430				AVRG		1.20862		5.01387
107 1,2,4-Trichlorobenzene	0.74623	0.65871	0.69912	0.71552	0.73271	0.75981					
	0.80030	0.76759	0.79672				AVRG		0.74186		6.20378
108 Hexachlorobutadiene	0.90899	0.83366	0.84934	1.06034	1.05507	1.05523					
	1.09693	0.99476	1.12093				AVRG		0.99725		10.77390
109 Naphthalene	5984	10703	32345	82420	149942	194397					
	313750	416043	810737				LINR	0.04611	0.48220		0.99841
110 1,2,3-Trichlorobenzene	0.43111	0.45280	0.48028	0.50951	0.52798	0.55249					
	0.56934	0.55404	0.56543				AVRG		0.51589		9.86727
111 2-Methylnaphthalene	+++++	+++++	+++++	+++++	+++++	+++++					
	+++++	+++++	+++++				AVRG		0.000e+00		0.000e+00 <-
M 112 Xylene (total)	1.37156	1.24954	1.29688	1.33945	1.28450	1.38917					
	1.36157	1.36097	1.37277				AVRG		1.33627		3.58792

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INITIAL CALIBRATION DATA

Start Cal Date : 16-OCT-2003 19:57
End Cal Date : 17-OCT-2003 05:58
Quant Method : ISID
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gcl9.i/101603a.25ml9w.b/25ml9w.m
Cal Date : 17-Oct-2003 12:41 alikpata

Compound	0.5000 Level 1	1 Level 2	2 Level 3	5 Level 4	8 Level 5	10 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
	14 Level 7	20 Level 8	40 Level 9								
$ 40 Dibromofluoromethane	0.37374	0.41916	0.40354	0.41436	0.46312	0.42166					
	0.41305	0.41799	0.44886				AVRG		0.41950		6.07068
$ 46 1,2-Dichloroethane-d4	0.15890	0.16978	0.16113	0.16615	0.19334	0.17558					
	0.17088	0.17159	0.18221				AVRG		0.17217		6.16941
$ 63 Toluene-d8	0.80767	0.89277	0.86344	0.90631	1.01856	0.91387					
	0.91215	0.90300	0.94011				AVRG		0.90643		6.24028
$ 86 p-Bromofluorobenzene	0.81948	0.84534	0.75692	0.82210	0.94656	0.76371					
	0.77155	0.79412	0.81220				AVRG		0.81489		7.05023

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INITIAL CALIBRATION DATA

Start Cal Date : 16-OCT-2003 19:57
End Cal Date : 17-OCT-2003 05:58
Quant Method : ISTD
Target Version : 3.50
Integrator : HP RTE
Method file : /var/chem/gc19.i/101603a.25ml9w.b/25ml9w.m
Cal Date : 17-Oct-2003 12:41 alikpata

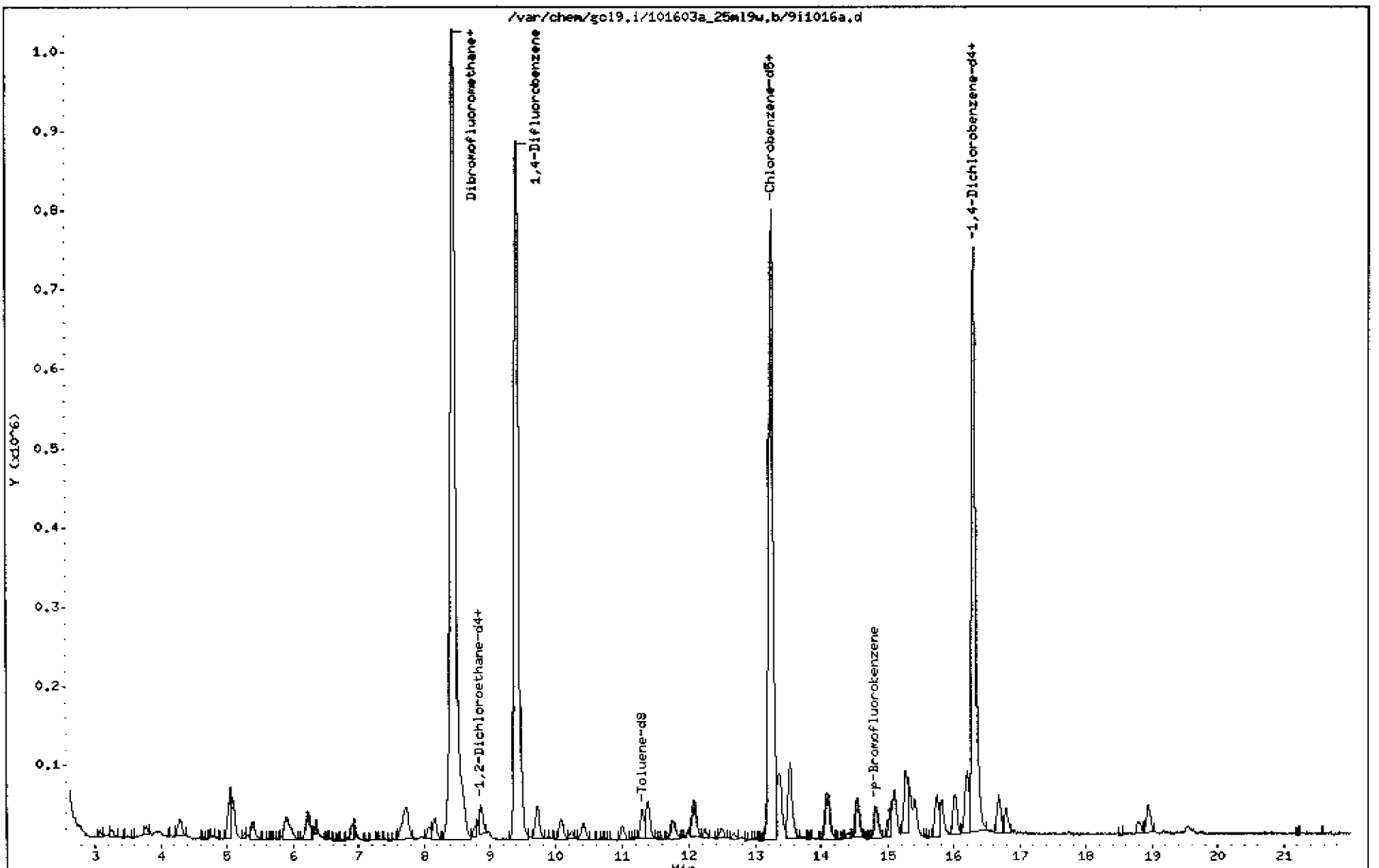
Average %RSD Results.
Calculated Average %RSD = 8.11827850
Maximun Average %RSD = 15
* Passed Average %RSD Test.

Curve	Formula	Units
Averaged	Amt = Rsp/m1	Response
Linear	Amt = b + Rsp/m1	Response
Quad	Amt = b + m1*Rsp + m2*Rsp^2	Response

Data File: /var/chem/gc19.i/101603a_25ml9w.b/9i1016a.d
Date : 16-OCT-2003 19:57
Client ID: VSTD0.5
Sample Info: VSTD0.5
Purge Volume: 25.0
Column phase: Cap

Instrument: gc19.i

Operator: EA
Column diameter: 0.53



VOLATILE REPORT SW846 METHOD 8260B WATERS

Data file : /var/chem/gcl9.i/101603a_25ml9w.b/9i1016a.d
Lab Smp Id: VSTD0.5 Client Smp ID: VSTD0.5
Inj Date : 16-OCT-2003 19:57
Operator : EA Inst ID: gcl9.i
Smp Info : VSTD0.5
Misc Info : VSTD0.5,1,12
Comment : HP 59727, 5890 GC TEKMAR 3000/2016
Method : /var/chem/gcl9.i/101603a_25ml9w.b/25ml9w.m
Meth Date : 30-Oct-2003 17:16 manzanol Quant Type: ISTD
Cal Date : 17-OCT-2003 02:06 Cal File: 9i1016j.d
Als bottle: 12 Calibration Sample, Level: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: 02ICAL1.sub
Target Version: 3.50
Processing Host: manatee

Concentration Formula: Amt * DF * Uf * 1/Vo * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Uf	25.00000	ng unit correction factor
Vo	25.00000	Sample Volume purged (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/L)	AMOUNTS ON-COL (ug/L)
1 Dichlorodifluoromethane	85	2.788	2.788	(0.330)	18335	0.50000	1.149
2 Chloromethane	50	3.086	3.086	(0.365)	17819	0.50000	1.037
3 Vinyl chloride	62	3.267	3.267	(0.387)	19319	0.50000	0.8496
5 Bromomethane	94	3.783	3.783	(0.448)	17611	0.50000	1.470
6 Chloroethane	64	3.955	3.955	(0.468)	14909	0.50000	0.4965(a)
7 Trichlorofluoromethane	101	4.280	4.280	(0.507)	52002	0.50000	0.4558(a)
11 Trichlorotrifluoroethane	101	5.049	5.049	(0.598)	31731	0.50000	0.4896(a)
12 1,1-Dichloroethene	96	5.094	5.094	(0.603)	27366	0.50000	0.5276
19 Methylene chloride	84	5.890	5.890	(0.697)	24854	0.50000	0.6575
20 Methyl-tert-Butyl Ether	73	6.215	6.215	(0.736)	16987	0.50000	0.5323
21 trans-1,2-Dichloroethene	96	6.234	6.234	(0.738)	29704	0.50000	0.5302
25 1,1-Dichloroethane	63	6.912	6.912	(0.818)	47158	0.50000	0.4947(a)
29 cis-1,2-Dichloroethene	96	7.744	7.744	(0.916)	25756	0.50000	0.5490
28 2,2-Dichloropropane	77	7.699	7.699	(0.911)	43461	0.50000	0.4953(a)
33 Bromochloromethane	128	8.069	8.069	(0.955)	7594	0.50000	0.4608(a)

10/20/03

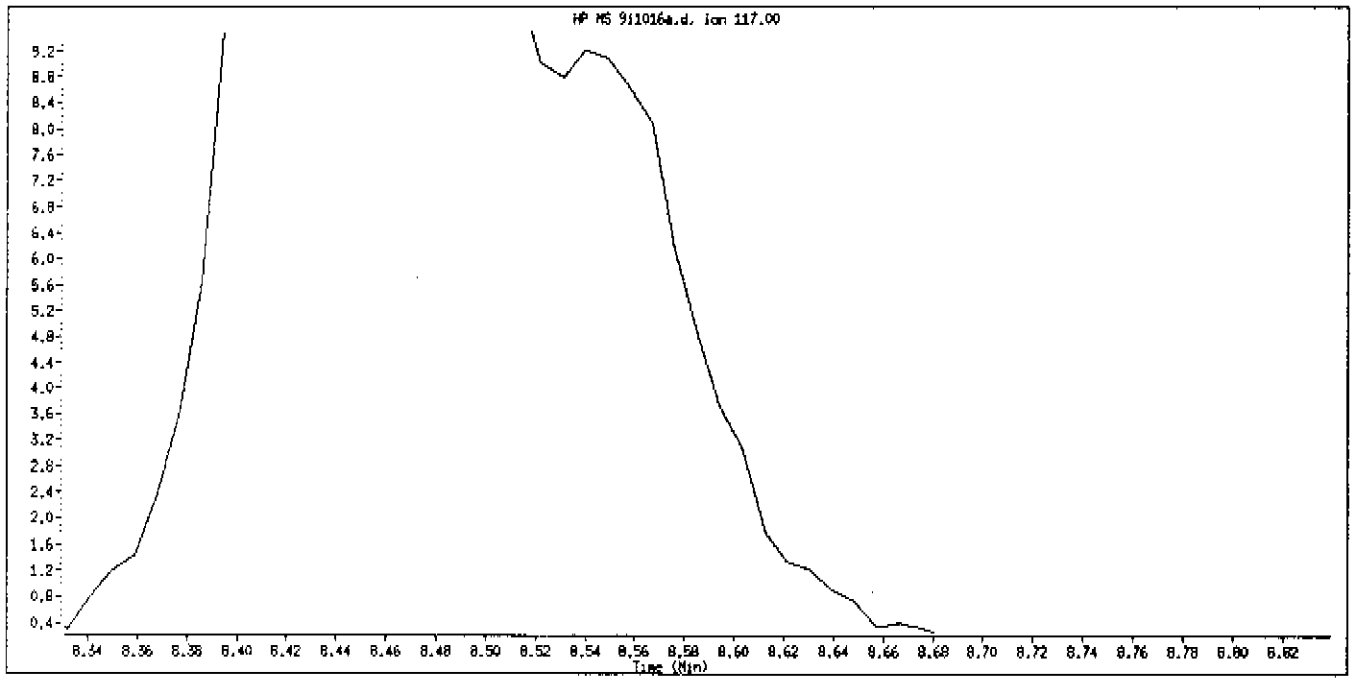
	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/L)	AMOUNTS ON-COL (ug/L)
	36 Chloroform	83	8.169	8.169	(0.967)	45575	0.50000	0.5028
$	40 Dibromofluoromethane	113	8.386	8.386	(0.992)	29629	0.50000	0.4455(a)
*	41 Pentafluorobenzene	168	8.449	8.449	(1.000)	1707621	10.7700	
	39 1,1,1-Trichloroethane	97	8.368	8.368	(0.990)	47521	0.50000	0.4952(a)
	43 1,1-Dichloropropene	75	8.594	8.594	(1.017)	45350	0.50000	0.5231
	42 Carbon tetrachloride	117	8.540	8.540	(0.908)	31433	0.50000	0.3433(aM)
$	46 1,2-Dichloroethane-d4	65	8.874	8.874	(0.943)	11885	0.50000	0.4615(a)
	45 Benzene	78	8.856	8.856	(0.941)	72011	0.50000	0.5368
	47 1,2-Dichloroethane	62	8.983	8.983	(0.955)	15257	0.50000	0.5385(M)
*	50 1,4-Difluorobenzene	114	9.408	9.408	(1.000)	1611058	10.7700	
	52 Trichloroethene	130	9.725	9.725	(1.034)	30057	0.50000	0.5045
	54 1,2-Dichloropropane	63	10.068	10.068	(1.070)	22890	0.50000	0.5202
	56 Dibromomethane	93	10.222	10.222	(1.087)	9805	0.50000	0.4826(aM)
	58 Bromodichloromethane	83	10.412	10.412	(1.107)	29505	0.50000	0.4665(a)
	61 cis-1,3-Dichloropropene	75	11.009	11.009	(1.170)	23768	0.50000	0.4821(a)
$	63 Toluene-d8	98	11.298	11.298	(1.201)	60409	0.50000	0.4455(a)
	64 Toluene	92	11.380	11.380	(1.210)	45396	0.50000	0.5036
	65 trans-1,3-Dichloropropene	75	11.750	11.750	(1.249)	15926	0.50000	0.5214
	68 1,1,2-Trichloroethane	97	11.995	11.995	(1.420)	9851	0.50000	0.5132
	70 1,3-Dichloropropane	76	12.230	12.230	(0.924)	11263	0.50000	0.3697(a)
	69 Tetrachloroethene	166	12.085	12.085	(0.913)	39056	0.50000	0.5284(H)
	72 Dibromochloromethane	129	12.492	12.492	(0.943)	14979	0.50000	0.4391(a)
	73 1,2-Dibromoethane	107	12.664	12.664	(1.346)	11856	0.50000	0.4873(aM)
	74 1-Chlorohexane	91	13.188	13.188	(1.561)	39984	0.50000	0.4907(a)
*	75 Chlorobenzene-d5	117	13.243	13.243	(1.000)	1023433	10.7700	
	76 Chlorobenzene	112	13.279	13.279	(1.003)	48387	0.50000	0.5228
	78 1,1,1,2-Tetrachloroethane	131	13.387	13.387	(1.011)	17498	0.50000	0.4486(a)
	77 Ethylbenzene	106	13.369	13.369	(1.010)	26154	0.50000	0.5111
	79 p,m-Xylene	91	13.541	13.541	(1.023)	149800	1.00000	1.053
	80 o-Xylene	91	14.084	14.084	(1.063)	65167	0.50000	0.5132
	81 Styrene	104	14.111	14.111	(1.066)	39681	0.50000	0.4964(a)
	82 Bromoform	173	14.409	14.409	(1.088)	5267	0.50000	1.061(M)
	83 Isopropylbenzene	105	14.545	14.545	(0.892)	92754	0.50000	0.5122
$	86 p-Bromofluorobenzene	95	14.825	14.825	(1.119)	38936	0.50000	0.5028
	88 1,1,2,2-Tetrachloroethane	83	15.033	15.033	(0.922)	10006	0.50000	0.5098
	87 Bromobenzene	156	15.033	15.033	(0.922)	17639	0.50000	0.4781(a)
	90 1,2,3-Trichloropropane	110	15.115	15.115	(0.927)	2103	0.50000	0.4715(a)
	89 n-Propylbenzene	91	15.106	15.106	(0.927)	111268	0.50000	0.5062
	92 2-Chlorotoluene	91	15.259	15.259	(0.936)	74397	0.50000	0.5150
	93 1,3,5-Trimethylbenzene	105	15.332	15.332	(0.941)	61900	0.50000	0.4844(a)
	94 4-Chlorotoluene	91	15.413	15.413	(0.946)	60829	0.50000	0.4653(a)
M	84 1,2-Dichloroethene (total)	96				55460	1.00000	1.078
	95 tert-Butylbenzene	119	15.739	15.739	(0.966)	69520	0.50000	0.4993(a)
	96 1,2,4-Trimethylbenzene	105	15.820	15.820	(0.971)	56273	0.50000	0.4891(a)
	98 sec-Butylbenzene	105	16.010	16.010	(0.982)	104335	0.50000	0.5041
	100 1,3-Dichlorobenzene	146	16.218	16.218	(0.995)	35029	0.50000	0.5248
	99 p-Isopropyltoluene	119	16.182	16.182	(0.993)	90332	0.50000	0.5777

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/L)	AMOUNTS ON-COL (ug/L)
* 101 1,4-Dichlorobenzene-d4	152	16.299	16.299	(1.000)	459620	10.7700	
102 1,4-Dichlorobenzene	146	16.336	16.336	(1.002)	41045	0.50000	0.5747
103 n-Butylbenzene	91	16.679	16.679	(1.023)	66725	0.50000	0.4547(a)
104 1,2-Dichlorobenzene	146	16.788	16.788	(1.030)	27789	0.50000	0.5534
105 1,2-Dibromo-3-Chloropropane	75	17.764	17.764	(1.090)	2182	0.50000	0.8606(M)
107 1,2,4-Trichlorobenzene	180	18.786	18.786	(1.153)	15923	0.50000	0.5029
108 Hexachlorobutadiene	225	18.940	18.940	(1.162)	19396	0.50000	0.4557(a)
109 Naphthalene	128	19.184	19.184	(1.177)	5984	0.50000	0.7874
110 1,2,3-Trichlorobenzene	180	19.528	19.528	(1.198)	9199	0.50000	0.4178(a)
M 112 Xylene (total)	91				214967	0.50000	1.693

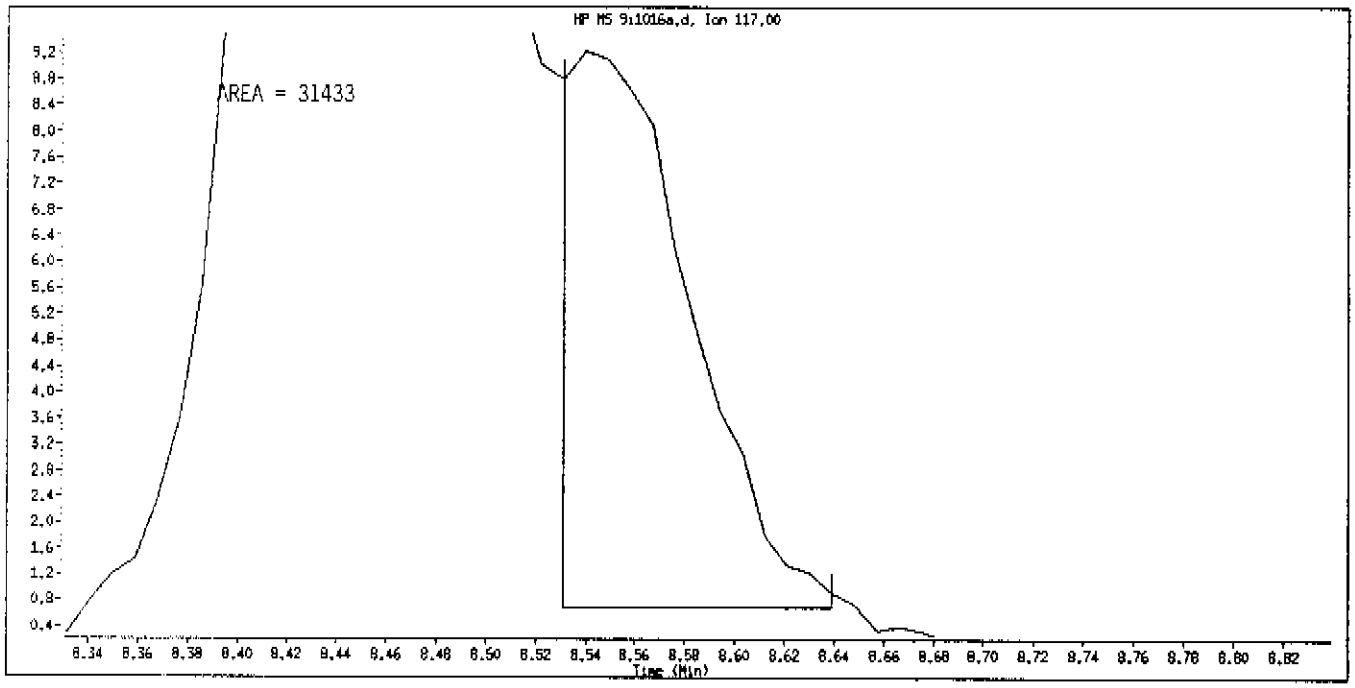
QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).
M - Compound response manually integrated.
H - Operator selected an alternate compound hit.

Data File Name: 9i1016a.d
Inj. Date and Time: 16-OCT-2003 19:57
Instrument ID. gc19.i
Client ID: VSTD0.5
Compound Name: Carbon tetrachloride
CAS #: 56-23-5
Report Date: 10/30/2003



Original Integration

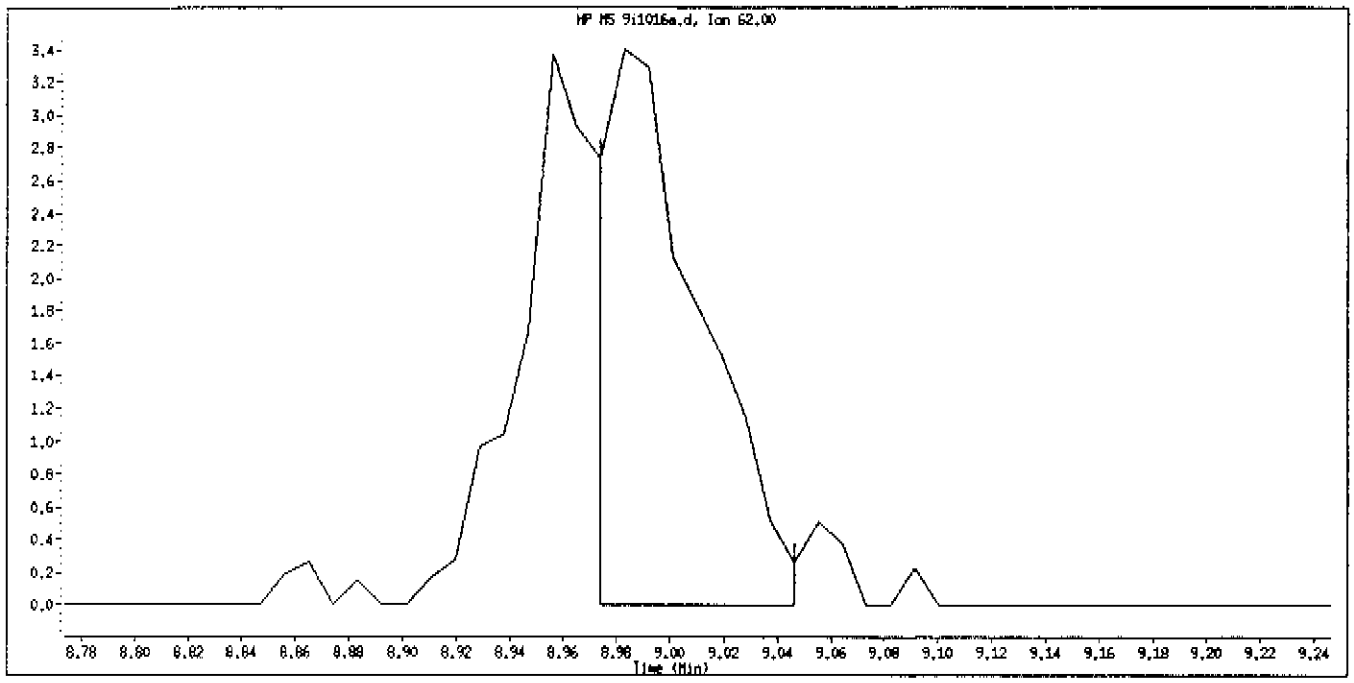


Manual Integration

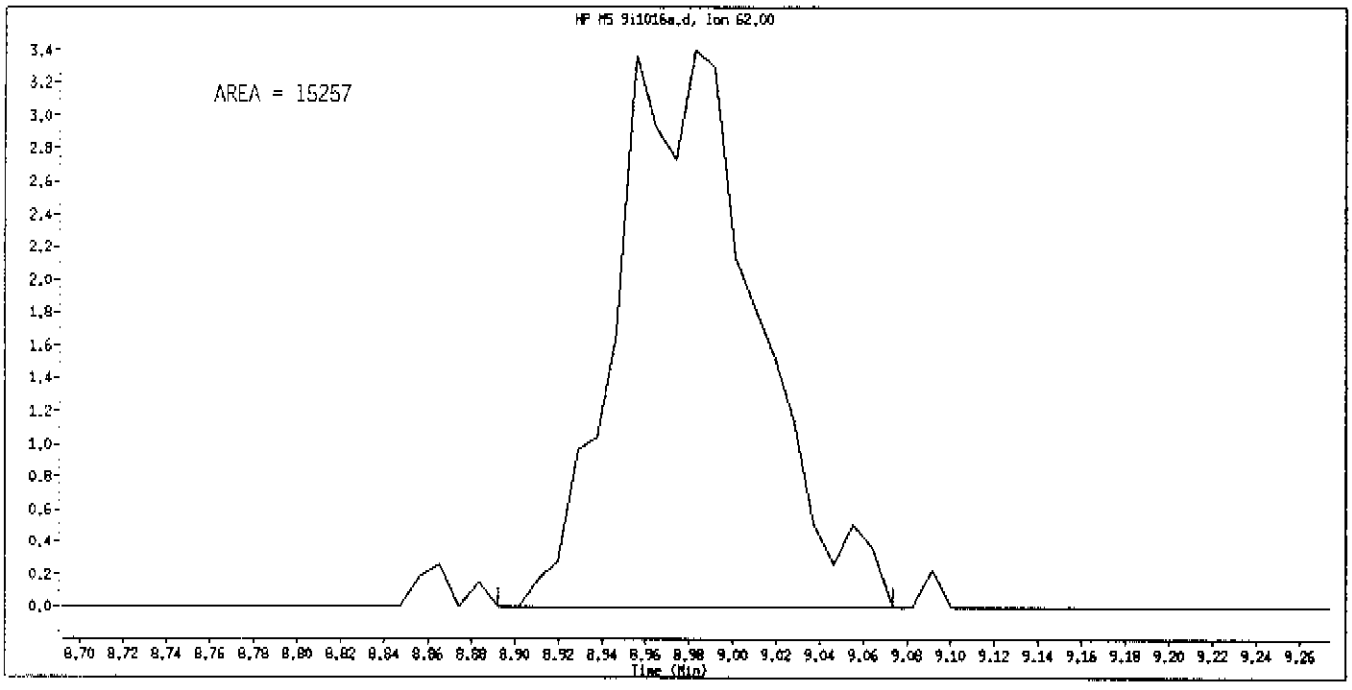
Manually Integrated By: manzanol
Manual Integration Reason: MI Peak missed

10/30/03

Data File Name: 9i1016a.d
Inj. Date and Time: 16-OCT-2003 19:57
Instrument ID: gc19.i
Client ID: VSTD0.5
Compound Name: 1,2-Dichloroethane
CAS #: 107-06-2
Report Date: 10/30/2003



Original Integration

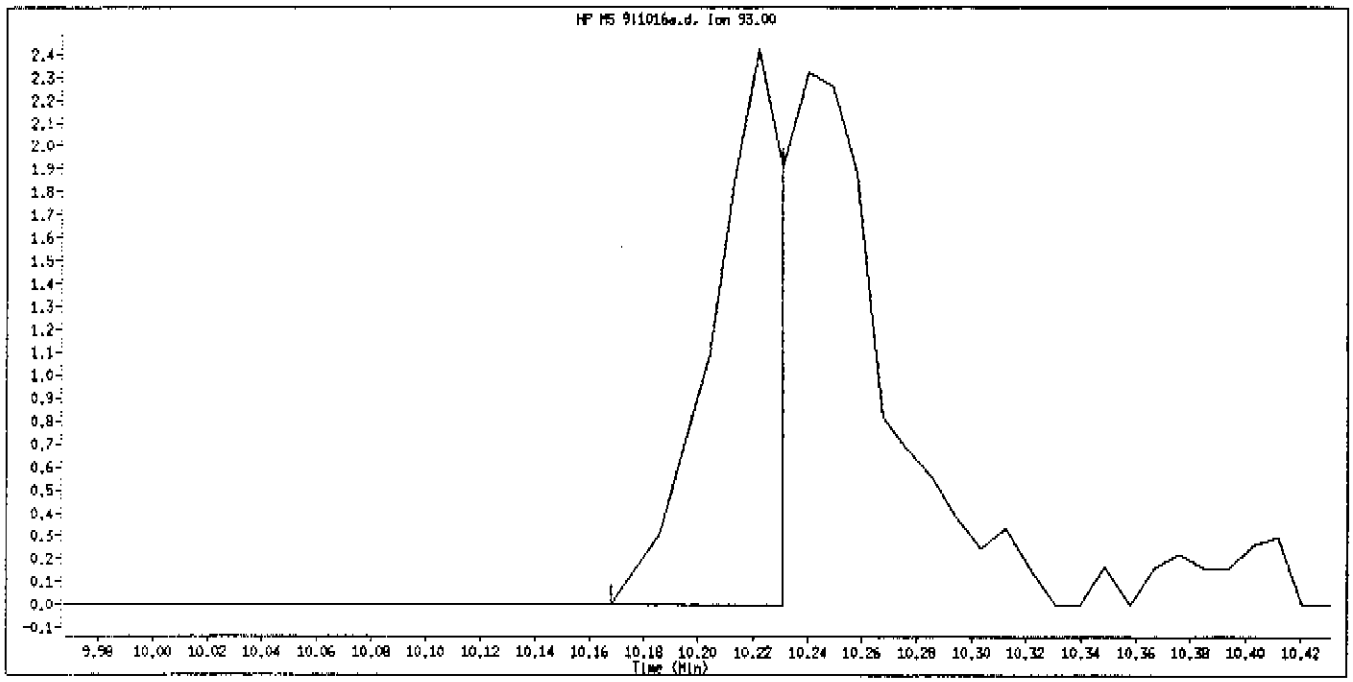


Manual Integration

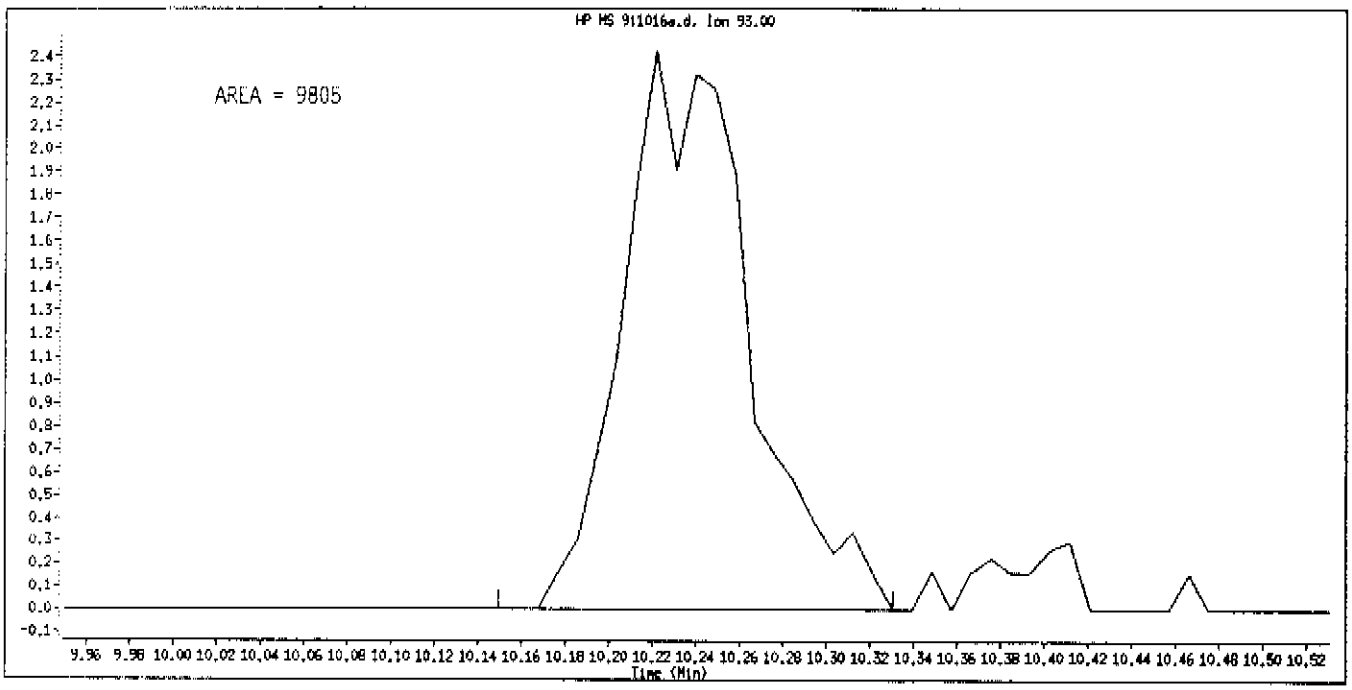
Manually Integrated By: manzanol
Manual Integration Reason: MS Misintegration of peak by the Data System

10/30/03

Data File Name: 9il016a.d
Inj. Date and Time: 16-OCT-2003 19:57
Instrument ID: gc19.i
Client ID: VSTD0.5
Compound Name: Dibromomethane
CAS #: 74-95-3
Report Date: 10/30/2003



Original Integration

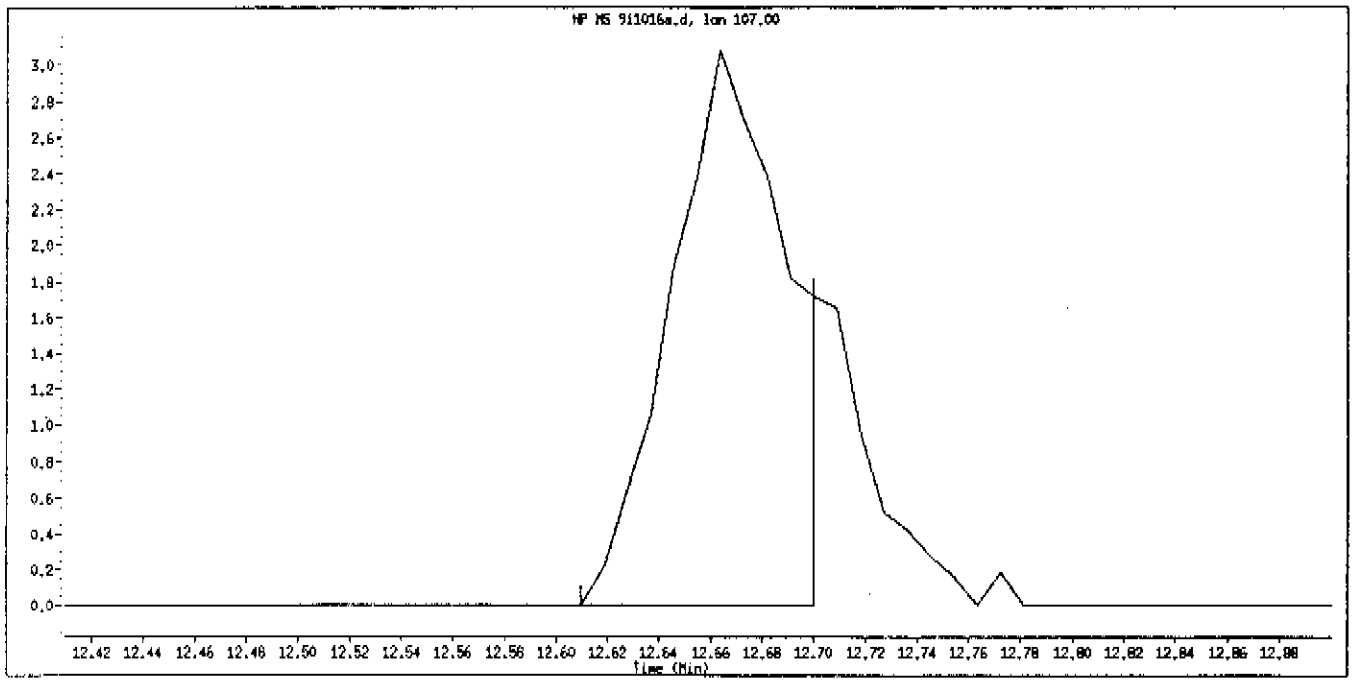


Manual Integration

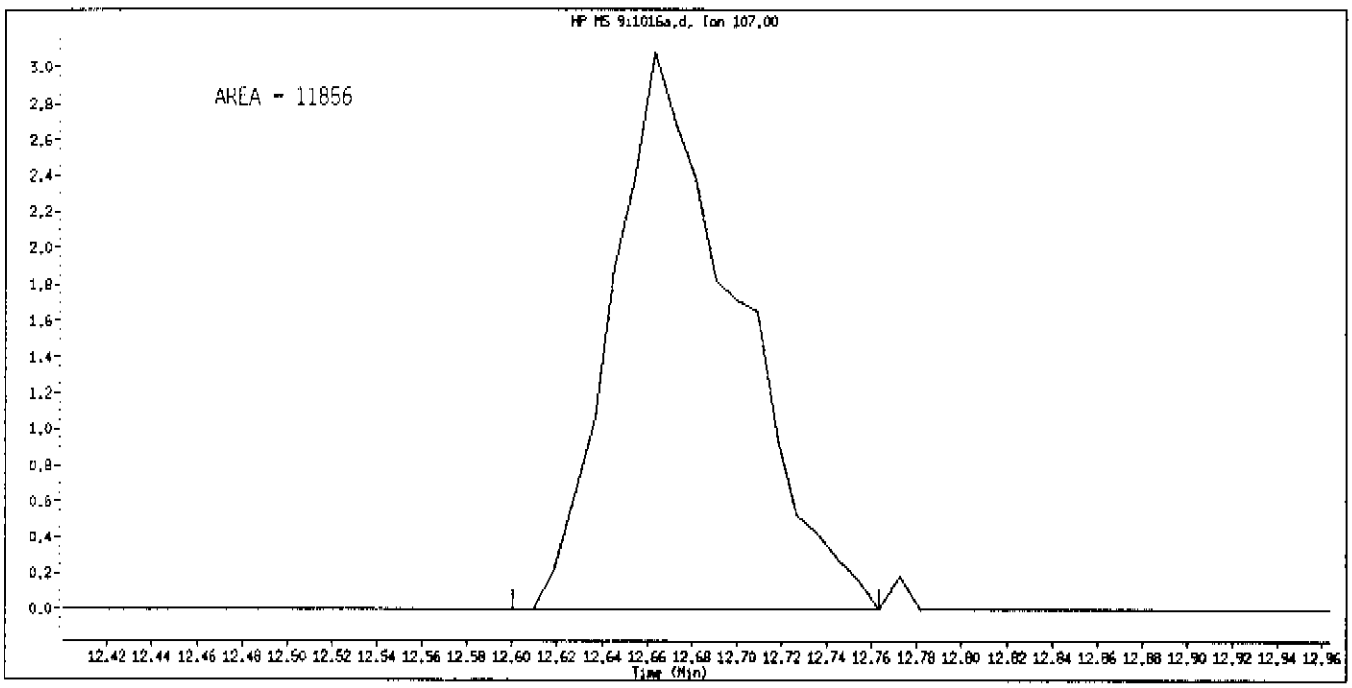
Manually Integrated By: manzanol
Manual Integration Reason: MS Misintegration of peak by the Data System

10/30/03

Data File Name: 9i1016a.d
Inj. Date and Time: 16-OCT-2003 19:57
Instrument ID: gc19.i
Client ID: VSTD0.5
Compound Name: 1.2-Dibromoethane
CAS #: 106-93-4
Report Date: 10/30/2003



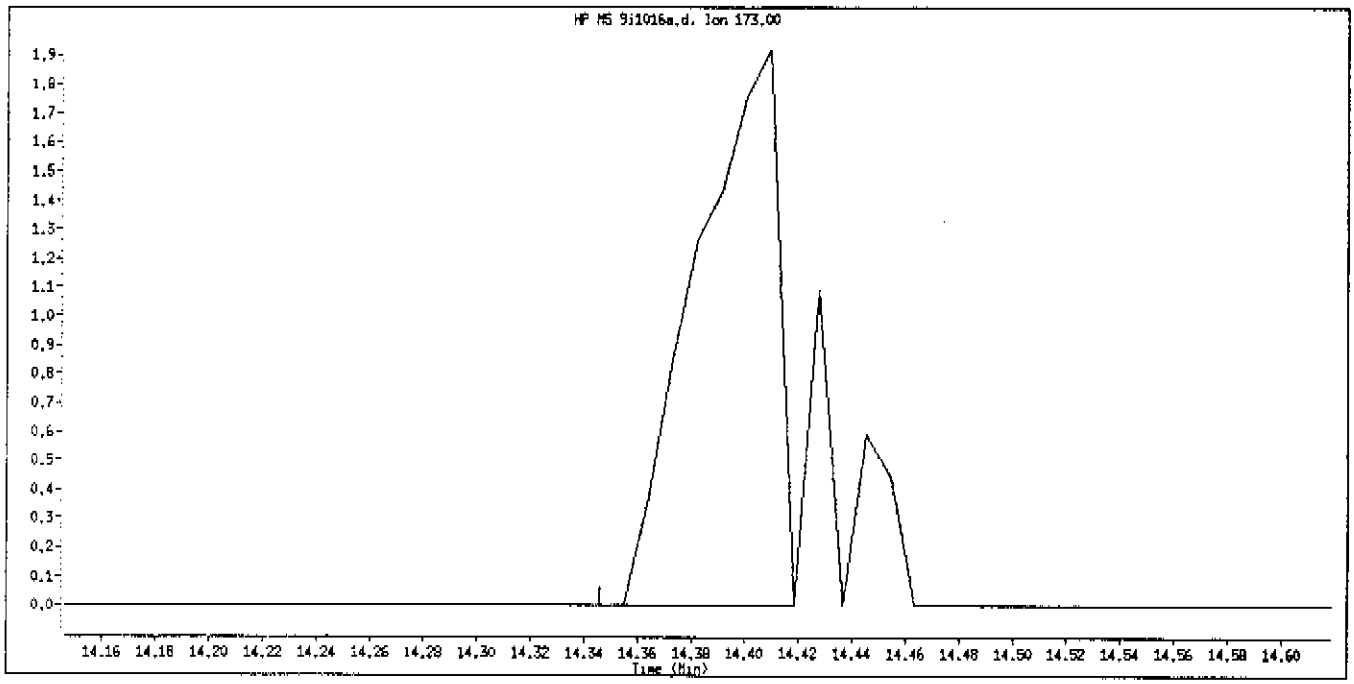
Original Integration



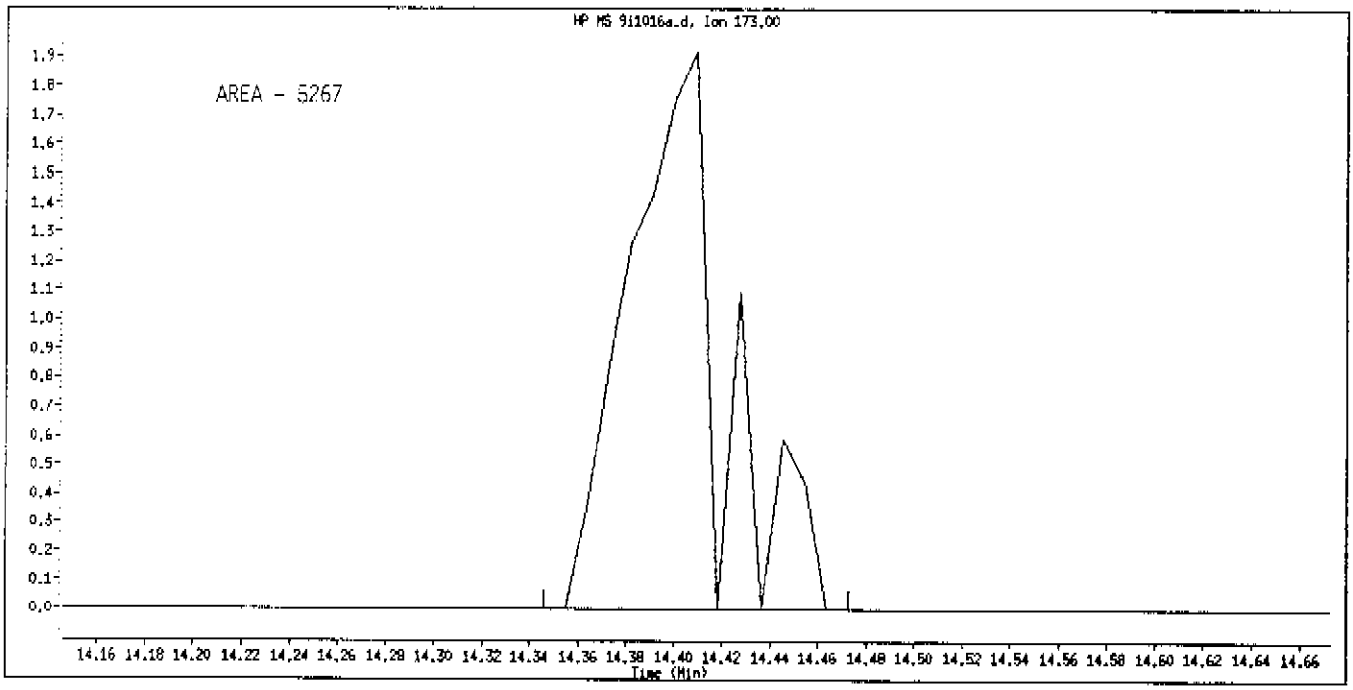
Manual Integration

Manually Integrated By: manzanol
Manual Integration Reason: MS Misintegration of peak by the Data System

Data File Name: 9i1016a.d
Inj. Date and Time: 16-OCT-2003 19:57
Instrument ID: gc19.i
Client ID: VSTD0.5
Compound Name: Bromoform
CAS #: 75-25-2
Report Date: 10/30/2003



Original Integration



Manual Integration

Manually Integrated By: manzanol
Manual Integration Reason: MS Misintegration of peak by the Data System

10/30/03