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February 25, 2014

U.S. Army Engineer District, Nashville
ATTN: CELRN-EC-E (Ms. Paula Coleman)
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Subject: ***Submittal of the Final Former Garage Maintenance Area (Former Sellite Area) Baseline Human Health Risk Assessment and Screening-Level Ecological Risk Assessment***
Former Plum Brook Ordnance Works, Sandusky, Ohio
Contract No. W91278-10-D-0094: Shaw Project Number 141427

Dear Ms. Coleman:

In accordance with the requirements of Delivery Order No. DX01 of Contract No. W91278-10-D-0094 awarded to Shaw Environmental & Infrastructure, Inc., a CB&I company, we are pleased to submit the Final Baseline Human Health Risk Assessment and Screening-Level Ecological Risk Assessment for the Garage Maintenance Area (Former Sellite Area) at the Former Plum Brook Ordnance Works (PBOW) located in Sandusky, Ohio. This report was prepared consistent with other PBOW risk assessment reports, U.S. Environmental Protection Agency guidance, and the Garage Maintenance Area risk assessment work plan.

Enclosed for your review are four copies of this report. Copies have also been sent to those on the distribution list as indicated for their records. As requested, the document was sent to the Center of Expertise (CX) and the Restoration Advisory Board Co-Chair in electronic format only.

Should you have any questions or require additional information regarding this submittal, please do not hesitate to contact me at (865) 694-7496.

Sincerely,

Steven. T. Downey, PE, PMP
Project Manager

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Client Name: U.S. Army Engineer District, Nashville; CELRN-EC-E

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Final
Screening-Level Ecological Risk Assessment
Garage Maintenance Area (Former Sellite Area)
FUDS Project No. G05OH001825

Plum Brook Ordnance Works,

Sandusky, Ohio

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List of Acronyms

ARP	assessment receptor profile
BAF	bioaccumulation factor
BCF	bioconcentration factor
bgs	below ground surface
BSC	background screening concentration
COPEC	chemical of potential ecological concern
CT	central tendency
D&M	Dames and Moore, Inc.
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ES	EnviroScience, Inc.
ESBSNP	Erie Sand Barrens State Nature Preserve
ESCM	ecological site conceptual model
ESV	ecological screening value
FUDS	Formerly Used Defense Sites
HQ	hazard quotient
IAEA	International Atomic Energy Agency
IT	IT Corporation
K_{ow}	octanol-water partition coefficient
LANL	Los Alamos National Laboratory
LOAEL	lowest-observed-adverse-effect level
MDC	maximum detected concentration
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NASA	National Aeronautics and Space Administration
NOAEL	no-observed-adverse-effect level
NWI	National Wetlands Inventory
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
PAH	polycyclic aromatic hydrocarbon
PBOW	Plum Brook Ordnance Works
PCB	polychlorinated biphenyl

List of Acronyms *(Continued)*

RME	reasonable maximum exposure
SCR	site characterization report
Shaw	Shaw Environmental & Infrastructure, Inc.
SLERA	screening-level ecological risk assessment
SU	standard unit
TNT	trinitrotoluene
TNTA	TNT Area A
TNTB	TNT Area B
TNTC	TNT Area C
TRV	toxicity reference value
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
WRS	Wilcoxon Rank Sum

Executive Summary

A screening-level ecological risk assessment (SLERA) was performed to provide an estimate of current and future ecological hazard associated with potential hazardous substance releases within the Garage Maintenance Area (Former Sellite Area) (hereinafter referred to as “the site” or “Former Sellite Area”) at Plum Brook Ordnance Works in Sandusky, Ohio. Although the term “ecological risk assessment” is commonly used in guidance documents and available technical literature, it should be noted that ecological “risk” is not calculated in the SLERA, as no statistical probabilities of toxicological effects are generated in the SLERA. The results of the SLERA contribute to the overall characterization of the site and serve as part of the baseline used to develop, evaluate, and select appropriate remedial alternatives, if necessary. The objective of the SLERA is to present information for risk managers regarding the potential for adverse impacts to occur to ecological receptors as a result of site-related releases. The assessment addresses the potential for adverse effects to the vegetation, wildlife, aquatic life, and endangered and threatened species.

Vegetative communities at the site were classified during two site reconnaissance trips. The site consists primarily of a mixture of upland old fields and shrub thicket. A ditch abuts the site to the east, north, and west. This drainage ditch contains water only intermittently. The ditch and drainage features to the north of the ditch were identified as wetlands during a recent wetland delineation study performed at the facility. Barren areas devoid of vegetation were observed scattered throughout the site. No threatened or endangered species were documented at the site. Based on the site reconnaissance information, the barren areas suggest potential ecological impact associated with historical site use.

The maximum detected concentrations of chemicals in sampled media were compared with risk-based screening ecotoxicity values during an initial screening step. Chemicals that exceeded the screening values or for which no screening values were available and that did not meet additional screening criteria (e.g., comparison with background data, nutrient status, frequency of detection, etc.) were retained as chemicals of potential ecological concern (COPEC) and assessed further. The background screening protocol used for the PBOW sites is based on PBOW Project Delivery Team agreements and differs somewhat from the current Ohio Environmental Protection Agency guidance. Use of this PBOW Project Delivery Team method for the development of background screening concentrations and as part of the COPEC screening process ensures consistency between all of the PBOW Formerly Used Defense Sites project sites. Nine chemicals in soil, 13 chemicals in surface water, and 16 chemicals in sediment were identified as COPECs for further

evaluation. Because the ditch only intermittently conveys water and lacks critical features necessary to support aquatic communities, it was not evaluated as aquatic habitat at this site and potential impacts to representative aquatic receptors were not estimated. Therefore, the evaluation of surface water and sediment stopped after the COPEC stage. For soil COPECs, 95 percent upper confidence limits were calculated and used as their exposure point concentrations during the subsequent stages of the risk assessment, as appropriate.

Seven representative receptor species that are expected to be present at the site were selected as indicator species for the potential effects of the COPECs: six terrestrial birds and mammals (the deer mouse, short-tailed shrew, Eastern cottontail rabbit, marsh wren, white-tailed deer, and red-tailed hawk) and one semiaquatic mammal (raccoon). These seven receptors were selected to represent various trophic levels that may be present at the Former Sellite Area even though their home ranges may be much larger than the site. Due to home range and population density life history characteristics of the selected species, most if not all of the ecological receptors are not spatially relevant to a site the size of the Former Sellite Area.

The assessment endpoints for the site were the protection of long-term survival and reproductive capabilities for terrestrial invertebrates, herbivorous mammals, omnivorous mammals, insectivorous mammals and birds, and carnivorous birds. Measurement assessment endpoints, or measurable responses to stressors, included lowest-observed-adverse-effect levels and no-observed-adverse-effect levels, collectively termed “toxicity endpoint values.”

Measurable responses to stressors, collectively termed toxicity reference values (TRV), were selected as measurement endpoints. The most appropriate measurement endpoints were chosen based on exposure pathways as well as ecotoxicity of the contaminant. An exposure analysis combining the spatial and temporal distribution of the assessment receptors and the COPECs was performed to evaluate potential exposure. The focus of the analysis was dependent on the assessment receptors evaluated and the assessment and measurement endpoints.

The intake estimates were combined with the TRVs to derive estimates of potential adverse ecological effects. The uncertainties associated with the estimation of potential adverse ecological effects were identified, with the degree of uncertainty estimated qualitatively or quantitatively, and the impact of the uncertainty estimated qualitatively (overestimate or underestimate, as appropriate).

Risk characterization integrates information on exposure, exposure-effects relationships, and defined or presumed target populations. The result is an estimate of the severity, and

characteristics of adverse effects to ecological receptors resulting from exposure to environmental stressors present at the site. Qualitative and semiquantitative approaches were taken to provide an estimate of the potential for adverse effects occurring as a result of exposure of the selected site receptors to chemicals.

For the semiquantitative predictive assessment, TRVs and exposure rates were calculated and were used to generate hazard quotients (HQ) by dividing the receptor exposure rate for each chemical by the calculated reference toxicity values. HQs are a means of estimating the potential for adverse effects to organisms at a contaminated site and assessing the potential for toxicological effects to occur.

For soil, terrestrial invertebrates and plants may have elevated hazard based upon the exceedance of ecological benchmarks. However, with the exception of lead, which had a highly elevated hot spot concentration of 4,060 milligrams per kilogram at sample location SB09, detected concentrations in soil were not highly elevated. Fauna communities, including avifauna that rely on both plant (berries) and animal (invertebrates) food sources, appeared to be vigorous, with the expected diversity and abundance given the habitat present at the site. Flora communities were also well established at most of the Former Sellite Area, with the exception of several barren areas scattered throughout the site. Additional sampling of these barren areas revealed that they contained highly acidic soil, but elevated chemical concentrations were not detected. Soils with low pH are associated with increased phytotoxicity in plants. The low pH observed at the Former Sellite Area was limited to the soil. With the exception of one sediment sample that had slightly depressed pH, all sediment and surface water samples collected from the ditch had expected (neutral) pH levels.

Ecological hazards from COPECs in soil were primarily evaluated using food chain models for the selected assessment receptors (i.e., deer mouse, short-tailed shrew, Eastern cottontail rabbit, marsh wren, white-tailed deer, raccoon, and red-tailed hawk). Cadmium, lead, and polychlorinated biphenyls (PCB) in soil resulted in HQs greater than 1 for multiple receptors based on the food chain model. However, with the exception of lead and PCBs, detected concentrations and frequency of occurrence of samples exceeding screening criteria were generally low, and the HQs were not significantly elevated. Lead was detected in five soil samples at concentrations exceeding its toxicological and background screening values, but only one sample (SB09) was highly elevated. If the concentration present in this sample were replaced with the background concentration for lead at PBOW, the 95 percent upper confidence limit for this metal would not exceed naturally occurring concentrations. Elevated concentrations of PCBs were more broadly distributed at the site and were detected near the lead hot spot at location

SB09. PCBs are highly toxic and bioaccumulative compounds that can biomagnify through the food chain.

Based on the findings of the SLERA, the potential for adverse effects to populations of ecological receptors exposed to chemicals in surface water and sediment is expected to be low. Although several COPECs were identified in these media, the ditch is not considered an aquatic habitat due to its intermittent nature, and exposure pathways to aquatic receptors are assumed to be incomplete. However, the presence of several chemical and physical stressors in soil raises some concern. Elevated concentrations of lead and PCBs in soil resulted in elevated HQs for multiple receptors, although HQs may be overestimated due to conservative assumptions used in the food chain modeling (e.g., conservative uptake factors, TRVs, etc.). The highly acidic soils may contribute to phytotoxicity, resulting in the barren areas at the site, and may also contribute to increased toxicity and mobility of site contaminants, particularly metals. The acidic conditions at the site were limited to the sulfur and slag mounds and the associated barren areas. These areas ranged from 110 square feet to 2,410 square feet. Sediment and surface water in the ditch surrounding the Former Sellite Area did not have aberrantly low pH levels. Although the small size of the site precludes regular exposure to site media by populations of most ecological receptors, local populations of small-range receptors may potentially be affected by chemical (particularly lead and PCBs) and physical (i.e., pH) stressors in soil at the Former Sellite Area.

1.0 Introduction

This screening-level ecological risk assessment (SLERA) evaluates the potential for adverse effects posed to ecological receptors from potential releases at the Former Sellite Area, which is part of the Garage Maintenance Area (Former Sellite Area) (hereinafter referred to as “the site” or “Former Sellite Area”) at the former Plum Brook Ordnance Works (PBOW). For administrative purposes, the Former Sellite Area is considered a sub-area of the Garage Maintenance Area.

The approaches used to evaluate the potential for ecological risk are described in the Garage Maintenance Area SLERA work plan (Shaw Environmental & Infrastructure, Inc. [Shaw] [a CB&I company], 2013a). This SLERA is consistent with the ecological risk assessment process described in U.S. Environmental Protection Agency (EPA) guidance (e.g., EPA [1997]), with Ohio Environmental Protection Agency (OEPA) Division of Emergency and Remedial Response guidance (OEPA, 2008), and with the procedures established in previous ecological risk assessments performed at PBOW (e.g., IT Corporation [IT], 2001a; Shaw, 2010), with some adjustments to accommodate current practices in the field of ecological risk assessment.

This work is being conducted by Shaw for the U.S. Army Corps of Engineers (USACE) under the Defense Environmental Restoration Program-Formerly Used Defense Sites (FUDS) and managed by the USACE Huntington District, with technical oversight provided by the USACE Nashville District.

1.1 Facility Description and Location

PBOW is located approximately 4 miles south of Sandusky, Ohio, and 59 miles west of Cleveland (Figure 1-1). Although located primarily in Perkins and Oxford Townships, the eastern edge of the facility extends into Huron and Milan Townships. PBOW is bounded on the north by Bogart Road, on the south by Mason Road, on the west by Patten Tract Road, and on the east by U.S. Highway 250. The areas surrounding PBOW are mostly agricultural and residential. The facility is currently surrounded by a chain-link fence, and the perimeter is regularly patrolled. Access by authorized personnel is limited to established checkpoints. Public access is restricted. Hunting is allowed by permit on portions of PBOW during the annual deer hunting season.

1.2 Facility History and Background

The PBOW facility was constructed on property comprising 9,009 acres in early 1941 as a manufacturing plant for 2,4,6-trinitrotoluene (TNT), 2,4-dinitrotoluene, and pentolite (USACE, 1995). Production of explosives at PBOW began in December 1941 and continued until 1945. It is estimated that more than 1 billion pounds of nitroaromatic explosives were manufactured during the 4-year operating period. The three explosive manufacturing areas were designated TNT Area A (TNTA), TNT Area B (TNTB), and TNT Area C (TNTC). Twelve process lines were used in the manufacture of TNT: four lines at TNTA, three lines at TNTB, and five lines at TNTC.

After plant operations ceased, the manufacturing process lines were decontaminated by the War Department in late 1945. During decontamination, all chemical material was removed, and much of the structures, equipment, and manufacturing debris were either removed and salvaged or removed and burned from late 1945 through the early 1960s. After decontamination, 3,230 acres of the property was initially transferred to the Ordnance Department, then to the War Assets Administration after it was certified by the U.S. Army to be decontaminated. In 1949, PBOW was transferred to the General Services Administration. This transfer did not include the Plum Brook depot areas, which consist of approximately 2,800 acres. The Department of the Army reacquired the 3,230 acres in 1954 and performed remedial efforts from the mid-1950s until 1963. In 1955, the Army completed further decontamination of manufacturing process lines. This effort included removal of contaminated surface and subsurface soil around the building and wooden and ceramic waste disposal lines containing TNT. Thousands of pounds of TNT were discovered in catch basins; this TNT was removed and burned at the burning grounds.

Two property use agreements were entered into by the Army and the National Advisory Committee of Aeronautics, the predecessor of the National Aeronautics and Space Administration (NASA), in 1956 and 1958, respectively. Accountability and custody for the entire portion of the former PBOW property (6,030 acres) that had been under the accountability and custody of the Department of the Army were transferred to NASA on March 15, 1963. NASA performed further decontamination efforts during 1964. The NASA decontamination process included removing contaminated surface soil above the drain tiles, flumes, etc.; destruction of all buildings by fire; and removal of all soil, debris, sumps, and above-grade portions of concrete foundations. Portions of the concrete foundations located below grade were left buried, and some that had been previously slightly above grade were likewise buried. All materials, including the soil in those areas, were flashed. The area was then rough-graded. The decontamination process was also to have included the burning of nitroaromatic-filled flumes that were excavated (Dames and Moore, Inc. [D&M], 1997).

NASA has operated and maintained the former PBOW property since 1963, and the facility is currently the NASA Glenn Research Center, Plum Brook Station. NASA operates the property as a space research facility in support of their John Glenn Research Center at Lewis Field, Cleveland, Ohio. Most of the aerospace testing facilities built in the 1960s at the facility are currently on standby or inactive status. On April 18, 1978, NASA declared approximately 2,152 acres of PBOW as excess. The Perkins Township Board of Education acquired 46 acres of the excess acreage and uses this area as a bus transportation area. The General Services Administration retains ownership of the remaining excess acreage and currently has a use agreement with the Ohio National Guard for 604 acres of this land. The details of land transactions are listed in the site management plan (USACE, 1995).

1.3 Sellite Area Description and History

The Former Sellite Area is located on the north side of Maintenance Road, west of the Unloading Area, in the far western portion of the Garage Maintenance Area (Figure 1-2). The Former Sellite Area was used for the production and storage of sellite used for the TNT washing process (D&M, 1995). Sellite is a solution of sodium sulfite and (possibly) sodium bisulfate used in the purification of TNT.

Review of historical site photographs show that the Former Sellite Area consisted of one building measuring approximately 60 feet by 70 feet, a sulfur storage bin (20 feet by 60 feet) along the east side of the building, and six aboveground storage tanks along the south side of the building (Figure 1-3). Sellite was produced by burning sulfur to produce sulfur dioxide followed by reaction with sodium carbonate. During site visits in 2011 and 2012, it was observed that the shallow surface ditch which receives runoff from the Former Sellite Area is still present and begins southeast of the site and traverses the east, north, and west sides of the site. The horseshoe-shaped access road visible in the aerial photographs is still identifiable as well and consists of a raised path that is covered with grass overlying gravel and possibly asphalt. The primary terrestrial area of investigation for evaluating potential releases associated with the Former Sellite Area is approximately bounded by the ditch that surrounds the former sellite facility to the east, north, and west, and by Maintenance Road to the south. This comprises an area approximately 2 acres in size.

A wetland delineation effort recently performed at PBOW identified the surface ditch at the Former Sellite Area as an ephemeral/intermittent waterway and a linear wetland. Two drainage areas north of the ditch were also identified as wetland areas (EnviroScience, Inc. [ES], 2012). It

is noted that these areas are currently not considered jurisdictional wetlands because USACE verification of the wetlands identified by ES (2012) is still pending.

Extensive barren areas with yellow pieces of sulfur and slag on the ground surface were observed during the 2011 site visits. Fragments of wooden support beams were also present in these areas. The barren areas were also observed at the Former Sellite Area during field reconnaissance by D&M (D&M, 1995). These barren areas are discussed in greater detail in Section 2.1.4 and Chapter 6.0.

1.4 Scope and Objectives

The objective of this SLERA is to provide an estimate of the potential for adverse ecological effects associated with contamination resulting from former PBOW activities at the Former Sellite Area. The results of the SLERA will contribute to the overall characterization of the site and may be used to determine the need for additional investigations or to develop, evaluate, and select appropriate remedial alternatives. Guidance documents used to perform the SLERA include the general guidelines of the *Tri-Service Procedural Guidelines for Ecological Risk Assessments* (Wentsel et al., 1996); *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1997); *Region 5 Biological Technical Assistance Group (BTAG) Ecological Risk Assessment Guidance Bulletin No. 1* (EPA, 1996); and *Ecological Risk Assessment Guidance Document* (OEPA, 2008). The SLERA fits into Steps 1 and 2 of the ecological risk assessment guidance for Superfund process (EPA, 1997), and Level I through a maximum of Level III evaluation using the OEPA (2008) process.

The goal of the SLERA is to evaluate the potential for adverse ecological effects to ecological receptors from site-related contaminants at the Former Sellite Area. This objective is met by characterizing the ecological communities in the vicinity of the site, determining the particular contaminants present, identifying pathways for receptor exposure, and estimating the potential for adverse effects to identified receptors. The SLERA addresses the potential for adverse effects to the vegetation, wildlife, threatened and endangered species, and wetlands or other sensitive habitats associated with the site.

Concentrations of chemicals measured in relevant environmental media were used to perform a SLERA, which includes a problem formulation (Chapter 2.0), exposure characterization (Chapter 3.0), ecological effects characterization (Chapter 4.0), risk characterization (Chapter 5.0), and summary and conclusions (Chapter 6.0). These subtasks are described in greater detail in the following sections.

The SLERA evaluates the chemicals of potential ecological concern (COPEC), the ecosystems and receptors at risk, the ecotoxicity of the contaminants known or suspected to be present, and observed or anticipated ecological effects. This evaluation is conducted in two steps: (1) a screening assessment step and (2) a predictive assessment step. Ecological endpoints to be addressed in both steps are identified. The results and conclusions of the screening assessment determine whether a predictive assessment is needed. The criteria by which the need for a predictive assessment is measured are formalized as null hypotheses to be accepted (in which case a predictive assessment is not needed) or rejected (in which case a predictive assessment is needed).

2.0 Problem Formulation

The screening assessment null hypotheses are stated as follows:

- Potential for adverse ecological effects to ecological entities at the site is minimal or nonexistent due to the lack of viable habitat for potential ecological receptors.
- Potential for adverse ecological effects to ecological entities at the site is minimal or nonexistent due to the lack of potential ecological receptors.
- Potential for adverse ecological effects to ecological entities at the site is minimal or nonexistent due to the lack of potential exposure pathways.
- Potential for adverse ecological effects to ecological entities at the site is minimal or nonexistent due to the lack of potential chemical stressors.

If one or more of these null hypotheses are accepted, a predictive assessment is not triggered. All four null hypotheses must be rejected for a predictive assessment to be triggered. The first three null hypotheses are tested with the results of the ecological site description, the pre-assessment reconnaissance, the documentation of potential receptors of special concern and critical habitats, and the determination of significant ecological threats (Section 2.1). The fourth null hypothesis is tested with the results of COPEC selection (Section 2.2).

If a predictive assessment is triggered, terrestrial and aquatic ecological conceptual site models are developed, as appropriate, and additional problem formulation tasks are performed as described in Sections 2.3 through 2.5.

2.1 Ecological Site Description

This ecological site description includes a general discussion of site background and the area of concern, surface water resources, wetlands, and vegetative communities; a species inventory; and a discussion of threatened and endangered species. Ecological characterization of the study area was based on a compilation of existing ecological information and site reconnaissance activities. A photographic record was made during the site reconnaissance (Figure 2-1). Information was obtained on the presence of state- and federally listed, threatened, and endangered species; species of special concern; and wildlife and fisheries resources. A botanist searched for threatened and endangered plant species during the reconnaissance visits. A checklist of biological species present at the site was developed using existing site investigation reports, environmental data sources mentioned previously, and information gathered during the site

reconnaissance. Information on unique and special-concern habitats, preserves, wildlife refuge parks, and natural areas within the general vicinity was also obtained.

2.1.1 General Site Background

PBOW, approximately 6,400 acres in size, is located within the Eastern Lake Plains physiographic region of the Eastern Huron/Erie Lake Plain Ecoregion (Lafferty, 1979; Omernik, 1986). This region is generally characterized as containing flat plains as the predominant land surface form and having a dominant natural vegetation of elm and ash in undisturbed areas. Approximately two-thirds of Erie County was once covered by a glacial lake that produced features such as beach ridges and wave-cut cliffs. Much of the region is poorly drained due to the flat topography and low stream gradients. Many of the wetlands adjacent to Lake Erie in this region have been preserved by various federal, state, and private organizations (Peterjohn and Rice, 1991), thereby providing important wetland habitat for wildlife.

Across PBOW, the land slopes gently to the north-northeast towards Lake Erie. Elevations range from 675 feet above mean sea level at the southwest edge of the site to 625 feet above mean sea level in the northern portion of the property at Bogart Road, resulting in an average slope of approximately 0.3 percent. The Lake Plains region itself is over 69 percent cropland, 2.7 percent pasture land, and 10.5 percent forest (Ohio Department of Natural Resources [ODNR], 1985). However, since the U.S. Army acquired the site in 1941 and removed the land from agricultural production, undeveloped portions of the former PBOW have become second-generation forest and open fields. This has resulted in PBOW becoming an island of forest and open fields within a sea of agricultural land in north-central Ohio.

The Former Sellite Area is approximately 2 acres in size, with minimal topography. Surface water from the Former Sellite Area drains into an unnamed ditch that originates south of the site. This ditch is only intermittently filled with water (e.g., after a heavy rain event), and runs along the east, north, and western portions of the site, eventually draining into Ransom Brook to the west.

Multiple site reconnaissance visits were performed by Shaw ecologists in the spring, early summer, and late summer/early fall of 2011. A photographic record of the site was prepared and is presented as Figure 2-1. Prior to arrival at the site, Shaw personnel obtained relevant information on the site, including topographic, township, county, or other appropriate maps, and determined the location of potential ecological units such as streams, creeks, ponds, grasslands, forest, and wetlands on or near the site. Biological inventories performed in 1994 and 2001 at PBOW (ODNR, 1995; NASA, 2002) that identify and indicate the locations of threatened and

endangered species at the installation were also reviewed. Shaw personnel completed a checklist similar to EPA's checklist for ecological assessment/sampling (EPA, 1997); also, information from this checklist was used to complete Chapter 2.0. The locations of known or potential contaminant sources affecting the site and the probable gradient of the pathway by which contaminants may be released from the site to the surrounding environment were identified. Shaw personnel also used the reconnaissance to search for any indication of potential effects from contaminant release.

2.1.2 Surface Water

Due to the minimal topography at this site, surface water tends to pool in localized shallow depressions. The area as a whole drains to the unnamed ditch that borders the site to the east, north, and west. This ditch contains water during and following rain events, but also is dry during dry weather patterns (Photos 5 and 6 on Figure 2-1). This ditch is approximately 8 feet wide at the top and relatively shallow, with a maximum depth of approximately 3 feet below the bank elevation in the middle of the ditch.

2.1.3 Wetlands

According to the National Wetland Inventory (NWI) maps for the area (U.S. Fish and Wildlife Service, 2013), there are no designated wetlands at the Former Sellite Area site. The accuracy of NWI maps is somewhat limited, however, especially in relatively flat landscapes such as PBOW, because minor depressions often contain isolated wetlands not easily identified through aerial photograph interpretation (the process used by the U.S. Fish and Wildlife Service in preparing NWI maps). A wetland delineation effort recently performed at PBOW identified the surface ditch at the Former Sellite Area as an ephemeral/intermittent waterway and a linear wetland. Two drainage areas north of the ditch were also identified as wetland areas (ES, 2012). It is noted that these areas are currently not considered jurisdictional wetlands because USACE verification of the wetlands identified by ES (2012) is still pending.

2.1.4 Vegetative Communities

Vegetative communities at the site were classified during the site reconnaissance trips and are documented in the photographic log (Figure 2-1) and vegetation community diagram (Figure 2-2). A list of the plant species identified at the site is presented in Table 2-1. The Former Sellite Area consists mostly of upland old field and shrub thicket habitat, with marsh and wet meadows present on either side of the ditch, and upland old field habitat adjacent to Maintenance Road.

During the site reconnaissance, the study area was examined for vegetative stress, which included looking for plants displaying stunted growth, poor foliage growth, tissue discoloration,

and a loss of leaf coverage. Small, barren areas devoid of vegetation were observed that may be associated with former chemical contamination (Photos 3 and 4 on Figure 2-1). These barren areas were approximately 110 to 2,410 square feet in size and partially covered by sand, ash, and/or slag. Sulfur was also often present in these barren areas (Photo 3 on Figure 2-1). These barren areas were also observed in historical photographs of the Former Sellite Area (Shaw, 2013b) and appear to be related to historical site operations.

2.1.5 Species Inventory

Based on information from ODNR (1995) and collected during the site reconnaissance, species lists were prepared for plants, mammals, birds, reptiles, amphibians, and fish (Tables 2-1 through 2-6). Unless noted in the tables, the species listed in Tables 2-1 through 2-6 apply to the former PBOW as a whole and are not necessarily specific to the Former Sellite Area.

A total of 131 plant species were documented at the Former Sellite Area during the spring and fall vegetation survey (Table 2-1). This comprises approximately 30 percent of the total number of species documented at PBOW during either the 1994 biological inventory (ODNR, 1995) or vegetation surveys at other sites at the former PBOW (Appendix A).

Signs of 4 of the 43 species of mammals that may be found in the region based on species range maps were observed at the Former Sellite Area during site visits (Table 2-2), including opossum, cottontail rabbit, raccoon, and white-tailed deer. Tracks resembling mink were also observed. It is likely that other species are present but were not observed due to the short duration of the field visits.

A total of 130 species of birds are likely to be found in the region based on species range maps and field observations, and 105 species have been recorded at the former PBOW by ODNR during their multiyear studies (Table 2-3). PBOW lies within a major migratory corridor that is used by birds travelling between their southern wintering grounds and their breeding grounds in Canada. Of the species recorded by ODNR, 49 are neotropical migrants and would not be expected to nest at the former PBOW. Of the 18 bird species documented at the Former Sellite Area during the site visits performed by Shaw, 15 were identified as being present during the breeding season (Table 2-3).

Of the 14 species of reptiles that may be found in the region based on species range maps, 10 (71 percent) have been observed at the former PBOW, including turtles and snakes (ODNR, 1995; Table 2-4). No reptiles were observed during the Former Sellite Area site reconnaissance.

Of the 10 species of amphibians likely to be found in the region based on species range maps, 9 (90 percent) have been observed at the former PBOW (ODNR, 1995; Table 2-5), including salamanders, toads, and frogs. No amphibians were observed during the Former Sellite Area site reconnaissance.

According to ODNR (1995), a combination of electroshocking and seining conducted during the field investigation identified 14 species of fish at PBOW. Species observed included suckers, sunfish, minnows, sticklebacks, and bullheads (Table 2-6). Due to the fact that the ditch at the Former Sellite Area only intermittently holds water, sustainable fish populations are unlikely to be present.

2.1.6 Threatened and Endangered Species Information

According to an Ohio Division of Natural Areas and Preserves review of their natural heritage maps and files (ODNR, 2010), there are records of State of Ohio threatened or endangered species within a 2-mile radius of the site. No federally listed species were identified. The state-listed species include the following:

- Bushy aster (*Symphyotrichum dumosum*) – endangered
- Canada St. John's wort (*Hypericum canadense*) – endangered
- Flat-leaved rush (*Juncus platyphyllus*) – endangered
- Rough rattlesnake-root (*Prenanthes aspera*) – endangered
- Ashy sunflower (*Helianthus mollis*) – threatened
- Dwarf bulrush (*Lipocarpha micrantha*) – threatened
- Field sedge (*Carex conoidea*) – threatened
- Greene's rush (*Juncus greenei*) – threatened
- Slender spike-rush (*Eleocharis tenuis*) – threatened
- Southern hairy panic grass (*Panicum meridionale*) – threatened
- Thin-leaved sedge (*Carex cephaloidea*) – threatened
- Tufted fescue sedge (*Carex brevior*) – threatened
- Twisted yellow-eye-grass (*Xyris torta*) – threatened
- Upland sandpiper (*Bartramia longicauda*) – threatened.

In addition, based on information contained in ODNR (1995) and NASA (2002), the following species of threatened or endangered plants, potentially threatened plants, and threatened or endangered birds have been recorded at PBOW (current status as of September 2011, if different, is listed in parentheses):

- Grove sandwort (*Arenaria lateriflora*) – threatened (**not listed**)
- Purple triple-awned grass (*Aristida purpurenscens*) – potentially threatened
- Prairie false indigo (*Baptisia lactea*) – potentially threatened
- Broad-winged sedge (*C. alata*) – potentially threatened

- Round-fruited hedge-hyssop (*Gratiola virginiana*) – potentially threatened
- Tall St. John's wort (*H. majus*) – potentially threatened (**not listed**)
- Least St. John's Wort (*H. gymnanthum*) – endangered
- Rough pennyroyal (*Hedeoma hispidum*) – threatened (**potentially threatened**)
- Butternut (*Juglans cinerea*) – potentially threatened (**not listed**)
- Northern panic-grass (*Panicum boreale*) – threatened (**potentially threatened**)
- Virginia meadow beauty (*Rhexia virginica*) – potentially threatened
- Deer's tongue arrowhead (*Sagittaria rigida*) – threatened (**potentially threatened**)
- Tall nut rush (*Scleria triglomerata*) – potentially threatened
- Pale carrion flower (*Smilax herbacea*) – threatened (**not listed**)
- Lance-leaved violet (*Viola lanceolata*) – potentially threatened
- Cattle egret (*Bublucus ibis*) – endangered
- Bald eagle (*Haliaeatus leucocephalis*) – federally threatened (**state-threatened**)
- Black-crowned night heron (*Nycticorax nycticorax*) – threatened
- Trumpeter swan (*Cygnus buccinator*) – endangered
- Indiana bat (*Mytolis sodalis*) – endangered.

The site reconnaissance included detailed searches performed by a qualified botanist subcontractor during the June and September 2011 site visits. Based on the results of the site reconnaissance, no threatened or endangered plant species were found at the Former Sellite Area.

None of the threatened or endangered bird species are expected to be at the site. The cattle egret, trumpeter swan, and upland sandpiper are all considered rare visitors or migrants at the former PBOW (ODNR, 1995) and have not been documented nesting in the vicinity of the site. Upland sandpipers have been documented approximately 4,500 feet to the southeast of the Former Sellite Area (ODNR, 2010); however, breeding populations of this species are no longer present in this area (PBOW, 2010; NASA, 2002). The black-crowned night heron, an Ohio threatened species, is a regular visitor at ponds, streams, and ditches within the former PBOW, but it does not nest at the former PBOW (ODNR, 1995, 2010; NASA, 2002). The species is typically found near water and wetlands. Since the early 1980s, there has been a nesting colony of approximately 100 pairs located on an island in Sandusky Bay, approximately 10 miles north-northwest of the study area (Peterjohn and Rice, 1991).

The Indiana bat, the only mammal in the list, has widespread records from throughout Ohio, but is more concentrated in the southwestern portion of the state (NASA, 2002). This species has not been documented at the site and is generally not expected at PBOW because its preferred habitat (e.g., caves along streams or trees with exfoliated bark) is absent at the installation and is not present at the Former Sellite Area. Trees with exfoliated bark, such as shagbark or shellbark hickory, are rare or not present at the site, respectively, thereby providing little bat roosting

habitat (Appendix A). No Indiana bats were detected at the installation during the 2001 bat survey at PBOW (NASA, 2002).

With the exception of the Erie Sand Barrens State Nature Preserve (ESBSNP), there are no existing or proposed state nature preserves or scenic rivers near the site. ODNR is unaware of any unique ecological sites, geological features, breeding or nonbreeding animal concentrations, champion trees, state parks, forests, or wildlife areas within a 2-mile radius of the site (ODNR, 2010). The ESBSNP is located to the west-southwest of PBOW, approximately 0.5 mile from Patrol Road. The 32-acre preserve is a remnant sand beach of Lake Warren, the fifth ancestral Lake Erie, that supports many threatened and endangered plant species such as field sedge, Least St. John's wort, dwarf bullrush, twisted yellow-eyed-grass, flat-leaved rush, bushy aster, and Virginia meadow beauty. Many of the preserve's rare plant species thrive in open windswept conditions such as those found on the sand barrens. The Ohio Division of Natural Areas and Preserves actively manages the preserve to ensure that the wind-swept areas remain open and do not become overgrown with woody vegetation.

2.1.7 Pre-Assessment Reconnaissance

Shaw ecological scientists performed site visits to the Former Sellite Area on April 27, June 1, and September 1, 2011. The primary purpose of the April trip was to perform a habitat assessment and fauna inventory at the site, and it was intentionally performed during the period when birds are migrating north to their breeding grounds to ensure that transient species utilizing the site were identified. The primary purposes of the June and September site visits were to perform a summer and early fall walkover to identify plant species (including threatened and endangered species). The June visit was also used as a follow-up to the April fauna visit; during early June, breeding birds are vocalizing as they establish and defend territories, while nonbreeding birds have continued their migration to their breeding grounds further north and moved out of the area. Therefore, bird species identified during the June site visit were assumed be using the site for breeding. The list of plant species observed during the two site walks is presented in Table 2-1. The mammal and bird species observed at the Former Sellite Area are listed in Tables 2-2 and 2-3, respectively.

Information obtained during the reconnaissance trips was used to select representative receptors, refine exposure scenarios for the risk assessment, and identify protected species or habitats of special concern in the study area. Reconnaissance personnel completed a checklist similar to that on EPA's checklist for ecological assessment/sampling (EPA, 1997) and OEPA's ecological risk assessment guidance (OEPA, 2008). The locations of known or potential contaminant sources affecting the site and the probable gradient of the pathway by which contaminants may be

released from the site to the surrounding environment were identified. Reconnaissance personnel used the site visit to evaluate the site for more subtle clues of potential effects from contaminant release.

The methods used to characterize natural resources focused on aquatic and terrestrial resources at the site and within the immediate vicinity. General habitat maps showing the types and extent of vegetation communities present within the immediate vicinity of the site were prepared based on information collected during the site reconnaissance.

2.2 Selection of Chemicals of Potential Ecological Concern

A list of the Former Sellite Area media samples used for the SLERA is presented in Table 2-7. These samples include samples analyzed to determine chemical concentrations (including delineation samples for polychlorinated biphenyls [PCB]) as described in the Former Sellite Area Site Characterization Report (SCR) (Shaw, 2013b). Soil pH was found to be very low within the barren areas at the Former Sellite Area, and additional sampling was performed to delineate soil and sediment pH. These pH sample locations and results are discussed in the SCR (Shaw, 2013b). Although pH is not evaluated in an ecological risk assessment in the same manner as chemical constituents are, elevated or reduced pH levels represent potential nonchemical stressors that may impact ecological populations and communities in a number of different ways. Therefore, the relevance of the pH sampling results to ecological hazards are included in the SLERA summary and conclusions (Chapter 6.0).

Sample locations are presented on Figure 2-3. From the chemical results of samples on this list, a COPEC selection process was performed to develop a subset of chemicals detected at the site that are not naturally occurring or are associated with non-site-related sources. These chemicals are also present at sufficient frequencies, concentrations, and spatial areas to pose a potential risk to ecological receptors. Examples of screening criteria that were used include analytical detection limit, frequency of detection less than 5 percent, comparability with background, status as a nutrient, and comparison with risk-based screening ecotoxicity values. This selection process is described in more detail in Section 2.2.3.

2.2.1 Data Organization

Chemical analytical data, as well as all previous and ongoing investigations, were reviewed and evaluated for quality, usefulness, and uncertainty. Data identified as being of acceptable quality for use in the SLERA were summarized in a manner that presents the pertinent information to be applied in the SLERA. Any data rejected during the data evaluation as a result of the data

evaluation (“R”-qualified data) were identified along with the rejection rationale. All data used in the SLERA were validated.

The data for each chemical were sorted by medium. For ecological impacts, soil from 0 to 6 feet below ground surface (bgs) was considered. The 0 to 6 feet depth interval was selected for three primary reasons: (1) to maintain consistency with other PBOW ecological risk assessments (e.g., IT [2001a]), (2) to include potential exposure to ecological receptors that may be exposed to deeper soil, and (3) to increase the size of the total soil database by including samples collected from up to 6 feet bgs. Therefore, soil COPEC selection was performed for the 0 to 6 feet interval.

Chemicals not detected at least once in a medium were not included in the risk assessment. Available background data were determined for each medium. Potential sources of background information include data from previous and current investigations as well as monitoring wells in areas unaffected by site activities.

The analytical data included qualifiers from the analytical laboratory quality control or from the data validation process that reflect the level of confidence in the data. Some of the data qualifiers reported in the data evaluated for this SLERA and their meanings are as follows (EPA, 1989):

- U - Chemical was analyzed for but not detected; the associated value is the sample quantitation limit.
- J - Value is estimated, concentration reported above the method detection limit (MDL) and below the contract-required quantitation limit.
- R - Quality control indicates that the data are unusable (chemical may or may not be present).
- B - Concentration of chemical in the sample is not sufficiently higher than concentration in the blank. If the concentration in the sample is less than 5 times the blank concentration or less than 10 times the concentration of a common laboratory contaminant, the result is given a “B” qualifier and is not used in the risk assessment. Common laboratory contaminants include acetone, 2-butanone, methylene chloride, toluene, and phthalate esters (EPA, 1989).

"J"-qualified data are used in the risk assessment; "R"- and "B"-qualified data are not. The handling of "U"-qualified data (nondetects) is described in Section 2.2.2.

2.2.2 Descriptive Statistical Calculations

Because of the uncertainty associated with characterizing contamination in environmental media, both the mean and the 95 percent upper confidence limit (UCL) of the mean are usually estimated for chemicals of interest. The EPA ProUCL software (Version 4.1 [EPA, 2011]) was used to estimate UCLs for the data sets of all environmental media represented by at least five samples. If the data set consisted of fewer than five data points, the maximum detected concentration (MDC) was selected as the exposure point concentration (EPC). The MDL was used as the ProUCL input concentration for nondetects.

ProUCL generates a variety of UCL estimates for each data set. Generally, the results of one or two (sometimes more) of the UCL estimates are recommended. This recommendation is based on a variety of factors, including the distribution (i.e., normal, lognormal, gamma, or not discernible) that provides the best fit, number of nondetects, size of the data set, and skewness. Occasionally, ProUCL will recommend the 97.5 or 99 percent UCL on the arithmetic mean estimated by the Chebyshev method. In these cases, the 95 percent UCL estimated by the Chebyshev method was selected as the EPC because this is more consistent with the intent of the reasonable maximum exposure (RME) paradigm as defined by EPA (1989; 2002).

Analytical data from field duplicates were joined with parent sample results to yield one result for use in the generation of mean and UCL concentrations, as follows:

- The average of field duplicate and parent sample was used if both were positive detections or if both were nondetects.
- The detected value was used if one sample was a positive detection and the other was a nondetect.

The UCL generated by the ProUCL protocol described in the preceding paragraphs or the MDC, whichever is lower, is selected as the EPC and is understood to represent a conservative estimate of average for use in the risk assessment. Unusually high detected values were retained in the calculation of the UCL concentration. Inclusion of these high values increases the statistical variability and the overall conservativeness of the hazard estimate.

2.2.3 COPEC Selection Criteria

The criteria used to identify COPECs in the SLERA are described in Sections 2.2.3.1 through 2.2.3.4.

2.2.3.1 Comparison to Ecological Screening Values

MDCs of chemicals detected in various media were compared with ecological screening values (ESV) for ecological endpoints following recommendations received from OEPA and as discussed in EPA *Region 5 Biological Technical Assistance Group (BTAG) Ecological Risk Assessment Bulletin No. 1* (EPA, 1996). Chemicals that exceed the ESVs or for which no ESVs are available were retained as COPECs if other COPEC selection criteria were also met. The following ESVs, or ESV hierarchy (as noted), were used for the ecological evaluation:

- ***Soil.*** Soil screening values were selected using the following hierarchy: (1) EPA ecological soil screening levels (EPA, 2008), (2) *Preliminary Remediation Goals for Ecological Endpoints* (Efroymson et al., 1997a), (3) EPA Region 5 ecological screening levels (EPA, 2003), (4) *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process* (Efroymson et al., 1997b), and (5) *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants* (Efroymson et al., 1997c). It should be noted that effects on heterotrophic processes may not be relevant to ecological receptors of concern at the site.

- ***Surface Water.*** The lowest surface water screening value was selected from the following three sources: (1) OEPA Water Quality Criteria (OAC Chapter 3745-1) for the protection of aquatic life, (2) *Preliminary Remediation Goals for Ecological Endpoints* (Efroymson et al., 1997a), and (3) EPA Region 5 ecological screening levels (EPA, 2003). Although the OEPA Surface Water Quality Criteria are standards to be met in waters of the state and are not screening values, they are used in the COPEC screening step as benchmark values protective of wildlife biota. Because OEPA water quality criteria do not consider food-chain effects, a hierarchy could potentially eliminate important surface water COPECs.

- ***Sediment.*** Sediment screening values were selected using the following hierarchy: (1) Consensus-based threshold effect concentration values (MacDonald et al., 2000), (2) EPA Region 5 ecological screening levels (EPA, 2003), (4) *Preliminary Remediation Goals for Ecological Endpoints* (Efroymson et al., 1997a), and (5) *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario* (Ontario Ministry of the Environment and Energy, 1993).

The development of the ESVs used for the former PBOW SLERAs is presented in Appendix B.

2.2.3.2 Frequency of Detection

Chemicals that are detected infrequently may be artifacts in the data that may not reflect site-related activity or disposal practices. These chemicals are not evaluated further in the risk assessment. Generally, chemicals that are detected only at low concentrations in 5 percent or less of the samples from a given medium (if at least 20 samples are analyzed) are dropped from further consideration, unless their presence is expected based on historical information about the

site. Chemicals detected infrequently at elevated concentrations as compared with applicable risk-based thresholds may identify the existence of “hot spots” and have been retained in the evaluation, unless other information exists to suggest that their presence is unlikely to be related to site activities.

2.2.3.3 Background Evaluation

Chemical concentrations were compared to site-specific background concentrations (see next paragraph for details) as an indication of whether a chemical is present from site-related activity or as natural background. This comparison is generally valid for inorganic chemicals but not for organic chemicals, because inorganic chemicals are naturally occurring and most organic chemicals related to wastewater treatment are not. Statistical techniques are used as tools to aid the exercise of professional judgment in resolving site-related issues for metals, because metals are naturally present in most environmental media. The statistical techniques generally involve comparing the site data with background data. Background data are only available for soil at PBOW. Background soil values were also used to compare to concentrations in sediment from samples collected from the drainage ditch, as the bottom of the ditch is most likely composed of native soil and accumulates sediment as a result of overland runoff from adjacent soils. Background data do not exist for surface water; therefore, a statistical background evaluation for this medium cannot be performed.

The first statistical technique used for the background screen is the comparison of the MDC of the site data set to the PBOW background screening concentration (BSC). The background screening protocol used for the PBOW sites is based on PBOW Project Delivery Team (PDT) agreements (PBOW Project Delivery Team, 2000) and differs somewhat from the current OEPA (2009) guidance. Use of this PBOW PDT method for the development of BSCs and as part of the COPEC screening process ensures consistency between all of the PBOW FUDS project sites. The background data set and derivation of soil BSCs for all PBOW soil investigations are described in IT (1998). The background soil samples were collected from near the property boundary, away from any potential source areas. BSCs were calculated for use at PBOW based on concentrations found in these background soil samples. Each BSC is either the MDC of the concentrations found in these background soil samples or the calculated 95th percent upper tolerance limit of the background data set, whichever value is lower (PBOW Project Delivery Team, 2000). The upper tolerance limit is the concentration, with a probability of 0.95 (or a confidence of 95 percent), that would cover 95 percent of the background population if a larger number of samples were collected. Chemicals with MDCs less than their respective BSCs are consistent with background concentrations and are eliminated from further consideration.

If the MDC of a chemical exceeds the BSC, the chemical is retained as a COPEC, or a more detailed statistical analysis may be performed to determine if the background data and the site data are drawn from the same population. The Wilcoxon Rank Sum (WRS) test is used for this purpose. The WRS test (also known as the Mann-Whitney U test) is described in Appendix M of Shaw (2005). WRS testing is performed for inorganic chemicals in soil whose MDCs exceed their respective BSCs and when the site and background data sets each contain less than 50 percent nondetects. The WRS test is not performed on data sets containing 50 percent or more nondetects because the medians of such data sets are unknown and the test lacks sufficient power to yield reliable results. Likewise, the WRS test is not performed on data sets of size $n < 5$; in such cases, the test lacks sufficient power to identify differences between the two samples. Site data sets are interpreted as being significantly different from PBOW background if the associated p-level is less than 0.05. WRS statistical output and box-and-whisker plots of the various inorganic COPEC data sets are appended to the SLERA for each inorganic data set evaluated against the site background data set. Analytes shown by the WRS results to exceed background (or for which the WRS testing was not run) are assumed to be site related and retained as COPECs. Analytes shown by the WRS results to be drawn from the same population as the background samples are assumed to be naturally occurring and not retained as COPECs. Chemicals that fail the background evaluation are assumed to be site related and are not eliminated at this point of the screening process. Antimony, chromium, lead, mercury, selenium, and vanadium in soil met the criteria for performing the WRS test at the Former Sellite Area.

Concentrations of antimony and selenium in Sellite Area soil were determined to be significantly different from background using the WRS test, but the box plots indicated that the site concentrations were significantly lower than background, rather than higher (Appendix C); therefore, these two chemicals are considered background related. Chromium, lead, mercury, and vanadium had p-values that were above 0.05, which indicates that concentrations detected at the Former Sellite Area are not significantly different from naturally occurring concentrations, and these metals are also considered to be background related. On further examination of these four metals, the MDCs for chromium and vanadium were observed to be slightly above their respective BSCs, but not particularly elevated, and the box-and-whisker plots show strong overlap between site and background concentrations (Appendix C). Lead and mercury, however, had MDCs that were over an order of magnitude greater than their respective BSCs (Table 2-8). The MDC for lead of 4,060 milligrams per kilogram (mg/kg) at FSB-SB09 was highly elevated compared to its next highest detected concentration of 170 mg/kg, detected at FSB-SB05. Similarly, the MDC for mercury of 2.1 mg/kg, which was also detected at FSB-SB09, was also much higher than its next highest concentration of 0.33 mg/kg. Because the WRS test compares two populations using an ordinal ranking system, results that are orders of magnitude greater

than background are treated the same as results that only slightly exceed background. Thus, the WRS is insensitive to hot spots, and a small number of results that vastly exceed background can be a part of a data set that is, as a whole, not statistically different from background according to the WRS test results. Therefore, although the site and background concentrations of lead and mercury were not significantly different, these two metals are retained as COPECs due to a possible hot spot at sample location FSB-SB09. Supporting information for the WRS tests, including box-and-whisker plots, are presented in Appendix C.

2.2.3.4 Essential Nutrients

Evaluating essential nutrients is a special form of risk-based screening applied to certain ubiquitous elements that are generally considered to be required nutrients. Essential nutrients such as calcium, iron, magnesium, potassium, and sodium are usually eliminated as COPECs because they are generally considered to be innocuous in environmental media. Other essential nutrients, including chloride, iodine, and phosphorus, may be eliminated as COPECs, provided that their presence in a particular medium is shown to be unlikely to cause adverse effects to biological health.

2.2.4 Summary of COPEC Selection

The results of the COPEC screening are presented in Tables 2-8 through 2-10 for soil, surface water, and sediment, respectively. The tables present the following information for each medium:

- Chemical name
- Frequency of detection
- Range of detected concentrations
- Range of detection limits
- Arithmetic mean (average) of site concentrations
- Distribution type
- UCL of the mean of the concentration (only for chemicals selected as COPECs)
- Appropriate ESV
- BSC
- COPEC selection conclusion: NO (with rationale for exclusion) or YES (selected).

The selected EPC is also presented for each chemical identified as a COPEC. For soil, two EPC results are presented, a total soil EPC for concentrations in the 0 to 6 feet bgs depth range and a surface soil EPC for concentrations in the 0 to 1 foot bgs depth range. These two sets of EPCs are used to evaluate various ecological receptors that may be exposed to different soil depths associated with their various life history characteristics (Section 3.1).

Footnotes in each table provide the rationale for selecting or rejecting a chemical as a COPEC. In some situations, it is appropriate to reinstate as COPECs chemicals that have been eliminated using one or more of the screening criteria. Examples of these exceptions include potential breakdown products, chemicals known to have been used on site historically, chemicals with detection limits greater than the ESVs, and chemicals with high bioconcentration factors (BCF) and/or bioaccumulation factors (BAF). A qualitative evaluation of the COPEC tables for soil, surface water, and sediment was performed to determine whether any rejected chemicals should be reinstated as COPECs. With the exception of lead and mercury in soil, which were reinstated as COPECs for reasons described in Section 2.2.3.3, no additional chemicals warranted reinstatement as COPECs.

Nine COPECs were selected for total soil (Table 2-8), 13 were selected for surface water (Table 2-9), and 16 were selected for sediment (Table 2-10). As discussed in Section 2.0, the SLERA null hypotheses state that potential for adverse ecological effects is minimal or nonexistent due to the lack of viable habitat, potential ecological receptors, potential exposure pathways, and/or potential chemical stressors. Given the selection of COPECs in multiple media and the finding that viable habitat, potential receptors, and potential exposure pathways exist at the site, none of the null hypotheses are accepted for soil, and a predictive assessment is triggered for potential impacts to terrestrial receptors. However, information obtained from the site reconnaissance visits and remote sensing data indicate that viable aquatic habit is not present at the site. Although the ditch surrounding the Former Sellite Area occasionally contains water (e.g., after significant rain events), key aquatic habitat traits necessary for sustaining populations of aquatic receptors such as a benthic substrate, aquatic vegetation, etc., are not typically present in the ditch. Therefore, the null hypothesis that viable aquatic habitat is absent at the site is accepted, and a predictive assessment is not performed in this SLERA to evaluate aquatic receptors. Chemicals in soil not eliminated using the screening procedures previously presented are considered COPECs and quantitatively evaluated in the predictive SLERA.

2.3 Ecological Endpoint (Assessment and Measurement) Identification

The first step in the predictive SLERA is the identification of assessment and measurement endpoints. The protection of ecological resources, such as habitats and species of plants and animals, is a principal motivation for conducting the SLERA. Key aspects of ecological protection are presented as policy goals. These are general goals established by legislation or regulatory agency policy that are based on societal concern for the protection of certain environmental resources. For example, environmental protection is mandated by a variety of legislation and government agency policies (e.g., the Comprehensive Environmental Response, Compensation, and Liability Act and the National Environmental Policy Act). Other legislation

includes the Endangered Species Act, 16 U.S. Code 1531-1544 (1993, as amended), and the Migratory Bird Treaty Act, 16 U.S. Code 703-711 (1993, as amended). To determine whether these protection goals are met at the site, assessment and measurement endpoints have been formulated to define the specific ecological values to be protected and to define the degree to which each may be protected.

Unlike the human health risk assessment process, which focuses on individual receptors, the SLERA focuses on populations or groups of interbreeding nonhuman, nondomesticated receptors. This is accomplished by selecting measurement endpoints (discussed below) that are related to parameters most likely to result in population-level effects (e.g., survival, growth, or reproduction) and consideration of lowest-observed-adverse-effect levels (LOAEL) in addition to no-observed-adverse-effect level (NOAEL) endpoints (Chapter 4.0). In the SLERA process, risks to individual receptors are assessed only if they are protected under the Endangered Species Act, are species that are candidates for protection, or are species of special concern.

Given the diversity of the biological world and the multiple values placed on it by society, there is no universally applicable list of assessment endpoints. Suggested criteria that may be considered in selecting assessment endpoints suitable for a specific ecological risk assessment are (1) ecological relevance, (2) susceptibility to the contaminant(s), (3) accessibility to prediction and/or measurement, and (4) definability in clear, operational terms (Suter, 1993). Selected assessment endpoints reflect environmental values that are protected by law, are critical resources, or have relevance to ecological functions that may be impaired. Both the entity and attribute are identified for each assessment endpoint.

Assessment endpoints are inferred from effects to one or more measurement endpoints. The measurement endpoint is a measurable response to a stressor that is related to the valued attribute of the chosen assessment endpoint. It serves as a surrogate attribute of the ecological entity of interest (or of a closely related ecological entity) that can be used to draw a predictive conclusion about the potential for effects to the assessment endpoint.

Measurement endpoints for this SLERA are based on toxicity values from the available literature and not statistical or arithmetic summaries of actual field or laboratory observations or measurements. When possible, receptors and endpoints have been concurrently selected by identifying those that are known to be adversely affected by chemicals at the site based on published literature. COPECs for those receptors and endpoints have been identified by drawing on the scientific literature to obtain information regarding potential toxic effects of site chemicals to site species. This process ensures that a conservative approach is taken in selecting endpoints

and evaluating receptors that are likely to be adversely affected by the potentially most toxic chemicals at the site.

2.3.1 Assessment Endpoints

The assessment endpoints for the Former Sellite Area are stated as “the protection of long-term survival and reproductive capabilities for terrestrial invertebrates, herbivorous mammals, omnivorous mammals, insectivorous mammals and birds, and carnivorous birds”. The corresponding null hypothesis for each of the assessment endpoints is stated as “the presence of site contaminants within soil, vegetation, and prey will have no effect on the survival or reproductive capabilities of terrestrial invertebrates, herbivorous mammals, omnivorous mammals, insectivorous mammals and birds, and carnivorous birds.”

The list of assessment receptor species selected for the site is intended to provide a comprehensive representation of the foraging guilds that could be exposed to the site media on a regular, semiregular, or highly infrequent basis. Historical information, the site reconnaissance (performed April 27, June 1, and September 1, 2011), and the availability of toxicological data were used to select terrestrial receptor species. These receptor species are depicted in food web models (Figures 2-4 and 2-5). Food web models are simplified versions of the possible movement of contaminants through the food chain present or potentially present at the site. Due to lack of data for all possible species, key species have been selected to represent broad classes of organisms, or guilds.

The food web conceptual site models were developed to illustrate how the selected terrestrial and aquatic species are ecologically linked within food webs. One species was used to represent each of the major trophic levels and habitats at the site. The decision was made not to complicate the food web models with species names for organisms at the base of the food web (e.g., species names of terrestrial invertebrates). Thus, generic terrestrial invertebrates were used to represent the bottom of the food chain. For terrestrial invertebrates and plants, partitioning coefficients and simple empirical uptake models were employed to estimate COPEC concentrations within tissues (Chapter 3.0). Brief life history descriptions for the selected receptor species are provided in Appendix D.

All trophic levels may be exposed to COPECs, either by direct exposure to contaminated abiotic media or through ingestion of lower trophic level food items. Primary producers (plants) absorb COPECs (as well as nutrients) from soil and/or water. In terrestrial species, bioconcentration occurs in plants and invertebrates, and higher food chain receptors bioaccumulate COPECs through the ingestion of food items.

2.3.2 Measurement Endpoints

Measurement endpoints are frequently numerical expressions of observations (e.g., toxicity test results or community diversity indices) that can be compared statistically to detect adverse responses to a site contaminant. Examples of typical measurement endpoints include mortality, growth, or reproduction parameters in toxicity tests; individual abundance; and species diversity (EPA, 1997).

For assessments, measurable responses to stressors may include LOAELs, NOAELs, lethal concentration to 50 percent of the test population, lethal dose to 50 percent of the test population, or effective concentration for 20 percent of the test population, collectively termed toxicity reference values (TRV) (see Chapter 4.0 for further explanation).

2.4 Selection of Assessment Receptors

In order to focus the exposure characterization portion of the SLERA on species or components that are the most likely to be affected and on those that, if affected, are most likely to result in significant impacts to the on-site ecosystem, the selection of assessment receptors focuses on species, groups of species, or functional groups that are directly related to the previously identified assessment endpoints (Section 2.3.1).

Site biota were organized into major functional groups. For terrestrial communities, the major groups are plants and wildlife, including terrestrial invertebrates, mammals, and birds. Species presence and relative abundance were partly determined during the site reconnaissance.

Primary criteria for selecting appropriate assessment receptors include but are not limited to the following:

- The assessment receptor has a relatively high likelihood of contacting chemicals via direct or indirect exposure.
- The assessment receptor exhibits marked sensitivity to chemicals.
- The assessment receptor is a key component of ecosystem structure or function (e.g., importance in the food web, ecological relevance).
- The assessment receptor may be listed as rare, threatened, or endangered by a governmental organization, or the receptor consists of critical habitat for rare, threatened, or endangered species.

Additional criteria for selection of assessment receptors were used to identify species that offer the most favorable combination of characteristics for determining the implications of on-site contaminants. These criteria included (1) limited home range, (2) role in local nonhuman food chains, (3) potential high abundance and wide distribution at the site, (4) sufficient toxicological information available in the literature for comparative and interpretive purposes, (5) sensitivity to COPECs, (6) relatively high likelihood of occurrence on site following remediation (if required), (7) suitability for long-term monitoring, (8) importance to the stability of the ecological food chain or biotic community of concern, and (9) relatively high likelihood that they will be present at the site or that habitats present at the site could support the species. Assessment receptors are representative species that are modeled for exposure to contaminants via multiple exposure routes. Organisms at the base of the food chain (i.e., plants, invertebrates, etc.) are not evaluated for food chain effects because direct exposure is the primary exposure route of concern for these organisms, and direct exposure effects are evaluated by the ecological benchmark comparison during the initial COPEC screening process. Therefore, these types of organisms are not selected as assessment receptors.

2.4.1 Terrestrial Receptors

Seven representative terrestrial receptor species that are expected or possible in the area of the Former Sellite Area (based on the ecological description of the site presented in Section 2.1) were selected as indicator species for the potential effects of COPECs. These indicator species represent two classes of vertebrate wildlife (mammals and birds) and a range of both body size and food habits and include herbivores, omnivores, and carnivores. The seven terrestrial species selected include the deer mouse (*Peromyscus maniculatus*) (small omnivorous mammal), short-tailed shrew (*Blarina brevicauda*) (small insectivorous mammal), Eastern cottontail rabbit (*Sylvilagus floridanus*) (medium-sized terrestrial herbivorous mammal), marsh wren (*Cistothorus palustris*) (small insectivorous bird), white-tailed deer (*Odocoileus virginianus*) (large herbivorous mammal), raccoon (*Procyon lotor*) (medium-sized omnivorous mammal), and red-tailed hawk (*Buteo jamaicensis*) (large carnivorous bird).

A terrestrial food web is presented on Figure 2-4. Many of the species evaluated, particularly the deer mouse, cottontail rabbit, short-tailed shrew, and marsh wren, have limited home ranges which make them particularly vulnerable to exposure from site contaminants. All of the selected terrestrial receptor species have a potential high abundance and wide distribution at the site; also, sufficient toxicological information (with the exception of some bird species) is available in the literature for comparative and interpretive purposes. All species are considered important to the stability of the local ecological food chain and biotic community. Finally, all the selected species

have readily available exposure data, as summarized in the *Wildlife Exposure Factors Handbook* (EPA, 1993).

Larger mammal species were generally not selected as sensitive receptors due to their large home ranges; however, the red-tailed hawk was retained due to its unique role as a top predator in the food chain and the white-tailed deer was retained due to its high abundance at the site. Small sites such as the Former Sellite Area are unlikely to be spatially relevant for large ranging receptors such as deer, with home ranges of hundreds or even thousands of acres. However, such receptors are included for evaluation in the SLERA to meet administrative requirements and to maintain consistency with prior PBOW SLERAs. Smaller birds were generally not included because most are migratory. Estimated hazards to the selected terrestrial indicator receptors are considered protective of organisms with larger home ranges and/or migratory organisms. Area use factors were set to 100 percent for the mouse, shrew, and wren due to their relatively small home ranges (Section 3.1). However, for the rabbit, deer, hawk, and raccoon, the area use factor was set at 0.26, 0.002, 0.001, and 0.005 (or 26, 0.2, 0.1, and 0.5 percent), respectively, based on these species' relatively large home ranges, compared with the size of the site (approximately 2 acres).

Results of the assessment receptor selection process are presented in detailed biological and ecological descriptions called assessment receptor profiles (ARP). The biologically relevant criteria used to select the seven terrestrial assessment receptors are also discussed and summarized in the ARPs (Appendix D).

2.4.2 Aquatic Receptors

The only aquatic habitat at the site is the drainage ditch that partially surrounds the Former Sellite Area to the east, north, and west. Based on observations made during the site reconnaissance visits and using remote sensing technology, this ditch appears to only be filled with water periodically, such as following significant rain events. Therefore, exposure pathways are typically not complete for aquatic receptors, and no aquatic receptors are selected for further evaluation. One semiaquatic species is evaluated (raccoon) because the raccoon would likely forage in the ditch surrounding the Former Sellite Area. Although benthic organisms are unlikely to inhabit the soil/sediment within the ditch, this exposure route is assumed to be complete for the raccoon, and its ingestion of invertebrates inhabiting the soil/sediment is the primary reason for the inclusion of this receptor. A separate aquatic conceptual site model is not developed for this SLERA because true aquatic habitat does not exist at the site. The raccoon is also evaluated as a terrestrial receptor. The raccoon has been documented at the installation

(Section 2.1) and has a potential high abundance and wide distribution at the site, and sufficient toxicological information is available in the literature for comparative and interpretive purposes.

2.5 Ecological Site Conceptual Model

A pictorial representation of the evaluated terrestrial food web is presented on Figure 2-4. The accompanying text presented in Section 3.1 is intended to clarify the ecological site conceptual models (ESCM), which trace the contaminant pathways through both abiotic components and biotic food web components of the environment. The ESCMs present all potentially complete exposure pathways and have been used as a tool for judging the appropriateness and usefulness of the selected measurement endpoints in evaluating the assessment endpoints and for identifying sources of uncertainty in the exposure characterization.

Because of the small size of the site, the site is not spatially relevant to any significant degree for many of the depicted receptors. However, the site-specific SLERA was performed to satisfy administrative requirements, including FUDS regulations (USACE, 2004).

3.0 Exposure Characterization

An estimate of the nature, extent, and magnitude of potential exposure of assessment receptors to COPECs that are present at or migrating from the site is presented in this section, considering both current and reasonably plausible future use of the site. Exposure characterization is critical in further evaluating the potential hazard associated with chemicals identified as COPECs during the screening process (Section 2.2). The exposure assessment has been conducted by linking the magnitude (concentration) and distribution (locations) of the contaminants detected in the media sampled during the investigation, evaluating pathways by which chemicals may be transported through the environment, and determining the points at which organisms found in the study area may contact contaminants.

3.1 Exposure Analysis

An exposure analysis was performed that combines the spatial and temporal distribution of the ecological receptors with those of the COPECs to evaluate exposure. The exposure analysis focuses on the bioavailable chemicals and the means by which the ecological receptors are exposed (e.g., exposure pathways). The focus of the analysis is dependent on the assessment receptors being evaluated as well as the assessment and measurement endpoints.

Exposure pathways consist of four primary components: source and mechanism of contaminant release, transport medium, potential receptors, and exposure route. A chemical may also be transferred between several intermediate media before reaching the potential receptor. All of these components have been addressed within this SLERA. If any of these components is not complete, then contaminants in the affected media do not constitute an environmental risk at the site. The major fate and transport properties associated with typical site contaminants are described in subsequent sections. These properties directly affect a contaminant's behavior in each of the exposure pathway components.

Ecological routes of exposure for biota may be direct (bioconcentration) or through the food web via the consumption of contaminated organisms (biomagnification). Direct exposure routes include dermal contact, absorption, inhalation, and ingestion. Examples of direct exposure include animals incidentally ingesting contaminated soil or sediment (e.g., during burrowing or dust-bathing activities), animals ingesting surface water, and plants absorbing contaminants by uptake from contaminated sediment or soil. Given the scarcity of available data for wildlife dermal and inhalation exposure pathways, potential hazard from these pathways is not estimated

in this SLERA. In addition, these pathways are generally considered to be incidental for most species, with the possible exceptions of burrowing animals and dust-bathing birds.

Food web exposure can occur when terrestrial fauna consume contaminated biota. Examples of food web exposure include animals at higher trophic levels consuming plants or animals that bioaccumulate contaminants.

Bioavailability is an important contaminant characteristic that influences the degree of chemical-receptor interaction. The bioavailability of a chemical refers to the degree to which a receptor is able to absorb a chemical from the environmental medium. A chemical's bioavailability is a function of several physical and chemical factors such as grain size, organic carbon content, water hardness, and pH. Unless site-specific data are available, bioavailability is conservatively assumed to be 100 percent.

Daily doses of COPECs for vertebrate receptors were calculated using standard exposure algorithms. These algorithms incorporate species-specific natural history parameters (i.e., feeding rates, water ingestion rates, dietary composition, etc.) and also use site-specific area use factors, as follows:

$$Total\ Daily\ Dose = \left(\frac{\left(\left[Soil_j * IR_{soil} \right] + \left[Water_j * IR_{water} \right] + \left[\sum_{i=1}^{N} B_{ji} * P_i * IR_{food} \right] \right)}{Body\ Weight} \right) * AUF \qquad \text{Eq. 3.1}$$

where:

$Soil_j$	=	Concentration of COPEC "j" in soil
$Water_j$	=	Concentration of COPEC "j" in surface water
B_{ji}	=	Concentration of COPEC "j" in food type "i"
IR_{soil}	=	Soil ingestion rate
IR_{water}	=	Surface water ingestion rate
IR_{food}	=	Food ingestion rate
P_i	=	Proportion of food $type_i$ in receptor diet
AUF	=	Area use factor (equal to area of exposure unit/home range of receptor
Body Weight	=	Body weight of receptor.

Sediment may replace soil in Equation 3.1 for semiaquatic receptors.

The first step in estimating exposure rates for terrestrial wildlife involves the calculation of feeding and drinking rates for site receptors. EPA (1993) includes a variety of exposure

information for a number of avian, herptile, and mammalian species. Information regarding feeding and drinking rates and dietary composition are available for many species or may be estimated using allometric equations (Nagy, 1987). Data on incidental ingestion of soil have also been gathered and are incorporated for the receptor species. Literature values for animal-specific sediment ingestion are used if available. However, such values generally are not available in the literature. Where sediment ingestion rates could not be found, the animal-specific incidental soil ingestion rate is used for sediment ingestion as well, if the receptor's life history profile suggests a significant aquatic component (e.g., raccoons' use of surface water in foraging activities). This information is summarized in Table 3-1.

To estimate dose associated with ingested food items, concentrations of COPECs in the vegetation or prey in the species' diet is estimated using BAFs (sometimes referred to as BCFs). BAFs are based on regression models or scalar variables that reflect the potential for the COPECs to be present in food items at concentrations different from (usually greater than) the ambient environment. Differences in concentration are due to chemical-specific properties of the COPEC that affect its tendency to bioaccumulate in tissue, balanced by the innate ability of the species to regulate body burden levels of the chemical via metabolic and excretory processes.

Selection of appropriate BAFs is a critical component of food chain modeling. General approaches for BAF selection have been discussed in Sample and Suter (1994), EPA (1999a), U.S. Army Environmental Center (2005), and EPA (2008). An approach that is consistent with these sources was followed in the selection of BAFs for PBOW. The general hierarchy for selection of BAFs based on types of sources is as follows:

1. Use of regression equations derived from paired field- or laboratory-based measurements

2. Ratio-derived BAFs developed based on paired data of tissue concentrations compared to media concentrations where the BAF is equal to the tissue concentration divided by the concentration in the abiotic medium

3. Modeled equilibrium partitioning-derived BAFs based on physical or chemical characteristics

4. Assumptions based on values common to chemical class.

Both U.S. Army Environmental Center (2005) and EPA (1999a) support the use of ratio BAFs in preference to equilibrium partitioning-based BAFs, which are typically calculated based on

factors such as log octanol-water partition coefficient (K_{ow}) values, fraction of organic carbon in soil, or percent of lipids in invertebrates.

Other general recommendations provided in EPA (2008) were also followed, including the following:

- For selection of ratio-based BAFs, median values are selected over maximum or other high-end BAFs.
- BAFs for polycyclic aromatic hydrocarbon (PAH) accumulation into mammalian prey are assumed to equal zero due to the high metabolic breakdown of PAHs in mammals.

Regression equations used to calculate prey tissue concentrations of a specific chemical typically take the following general equation form:

$$\text{Ln}\ (C_{food}) = \text{slope value x ln}\ (C_{abiotic_media}) + \text{intercept value} \qquad \text{Eq. 3.2}$$

where:

C_{food}	=	Concentration of chemical in food type
$C_{abiotic_media}$	=	Concentration of chemical in abiotic media.

Ratio BAFs can be generally presented as follows:

$$C_{food} = \text{BAF x}\ (C_{abiotic_media}) \qquad \text{Eq. 3.3}$$

where:

C_{food}	=	Concentration of chemical in food type
$C_{abiotic_media}$	=	Concentration of chemical in abiotic media
BAF	=	Bioaccumulation factor.

BAFs calculated based on equilibrium partitioning typically use a physical constant of a chemical to generate a BAF. A generalized form for this calculation would be as follows:

$$\text{Log (BAF)} = \text{slope value x Log}\ (K_{ow}) + \text{intercept value} \qquad \text{Eq. 3.4}$$

where:

Log (BAF)	=	Log of the BAF for chemical in food type
K_{ow}	=	Octanol-water partition coefficient.

BAFs calculated based on equilibrium partitioning are applied in the same fashion as ratio-based BAFs to generate a tissue concentration value. Any K_{ow} values needed for BAFs based on equilibrium partitioning are obtained using the K_{ow} WIN application in EPA's EPI Suite software (http://www.epa.gov/oppt/exposure/pubs/episuite.htm).

Finally, where ratio-based BAFs are missing and where no equilibrium partitioning method has been developed for calculating BAFs, other methods, such as using BAFs for chemicals in the same class as surrogates, may be presented for establishing ratio-based BAFs.

Site-specific soil-to-earthworm and sediment-to-benthic invertebrate BAFs were developed for the Red Water Ponds site at PBOW. These BAFs were developed as part of a Phase II baseline ecological risk assessment (IT, 2001b) based on 28-day bioaccumulation studies performed using the earthworm species *Eisenia foetida* and the invertebrate species *Lumbriculus variegates.* BAFs were calculated after comparing tissue concentrations with concentrations detected in soil or sediment samples collected from the PBOW Red Water Pond areas. For the current SLERA, these PBOW-specific BAFs were used for the Former Sellite Area food chain models as well, when available. Both RME and central tendency (CT) BAFs were estimated in the Red Water Ponds risk assessment. The RME BAFs were based on all tissue concentration results, even if blank related, and the CT BAFs were based on blank-corrected tissue results. Although EPA recommends that median values be selected over maximum or other high-end BAFs, the RME sediment-to-aquatic invertebrate and soil-to-worm BAFs were conservatively selected over the CT BAFs as the BAFs for the Former Sellite Area SLERA, when available.

The hierarchies used to select BAFs specific to the various types of biota are presented below. Chemical-specific BAFs (or the regression equation used to calculate COPEC concentrations) for COPECs selected using the respective hierarchies are presented in Tables 3-2 through 3-5.

Table 3-2 presents the soil-to-plants BAFs for COPECs at the Former Sellite Area. Soil-to-plants BAFs are also used to evaluate sediment-to-plant uptake at PBOW. Soil-to-plants BAFs are selected using the following specific hierarchy of sources:

1. EPA (2008) selected regressions
2. Efroymson et al. (2001) regressions
3. EPA (2008) recommended non-regression BAFs
4. International Atomic Energy Agency (IAEA) (1994) BAFs
5. Baes et al. (1984) BAFs (these values were often updated in the more recent IAEA [1994] publication).

Table 3-3 presents the soil-to-invertebrates (earthworms) BAFs for COPECs at the Former Sellite Area. Soil-to-invertebrates BAFs are selected using the following hierarchy of sources:

1. PBOW site-specific BAFs (IT, 2001b)
2. EPA (2008) selected regressions
3. Sample et al. (1998a) regressions
4. Sample et al. (1998a) median BAFs
5. Equilibrium BAF calculation method in EPA (2008) based on Jager (1998).

Table 3-4 presents the soil-to-mammals BAFs for COPECs at the Former Sellite Area. Soil-to-mammals BAFs are selected using the following hierarchy or sources:

1. EPA (2008) or Sample et al. (1998b) selected regressions
2. EPA (2008) referenced BAFs (Note: per EPA [2008], a BAF of zero is used for all PAHs, TNT, and cyclotrimethylenetrinitramine.)
3. Sample et al. (1998b) median BAFs
4. IAEA (1994) BAFs
5. Baes et al. (1984) BAFs (These values were often updated in the newer IAEA [1994] publication.)
6. EPA (1999b) maximum calculated BAFs/BCFs for feeding guilds.

Table 3-5 presents the sediment-to-aquatic invertebrates BAFs for COPECs at the Former Sellite Area. Sediment-to-aquatic invertebrates BAFs are selected using the following hierarchy of sources:

1. PBOW site-specific BAFs (IT, 2001b)
2. Ratio BAFs from Bechtel Jacobs Company, LLC (1998)
3. Ratio BAFs from EPA (1999b)
4. Ratio BAFs from other literature sources
5. Conservative default based on median BAF for PCBs from Bechtel-Jacobs Company, LLC (1998).

Ingestion rates for receptor species are typically developed as a quantity of wet weight material ingested. Soil analytical data results are typically reported on a dry weight basis. Literature-derived BAFs are often a mixture of dry weight-to-wet weight and dry weight-to-dry weight values. To avoid underestimating or overestimating food concentrations based on confusion over dry weight versus wet weight, final food concentrations are adjusted in the SLERA to report concentrations on a dry weight basis. Although it was not necessary to convert food intake rates from wet weight to dry weight in this SLERA, the moisture contents of the invertebrate and vegetative material in the receptor species' diets from the EPA's *Wildlife Exposure Factors Handbook* (EPA, 1993) can be used for this conversion, as follows:

- Earthworms - 84 percent
- Fruit - 77 percent
- Roots/young grass - 82 percent
- Seeds - 9.3 percent
- Fruit/young grass - 78 percent.

Exposure to four categories of environmental media are addressed in the SLERA:

3.1.1 Soil Exposure Pathway

Soil exposure pathways are potentially important for terrestrial plants and animals at the site. For nonburrowing animals, exposure to soil from a depth of 0 to 1 foot bgs was considered, as this soil depth would represent the depth of regular exposure. For burrowing animals such as the shrew, exposure to soil from a depth of 0 to 6 feet bgs was considered. It is noted that although the shrew itself may not actually burrow to a depth of 6 feet, there may be other burrowing mammals that do burrow this deep. For plants and herbivores that feed on deep-rooted plants (e.g., the white-tailed deer, which is assumed to ingest leaves of trees translocating COPECs from subsoils), exposure to soil from a depth of 0 to 6 feet bgs (or the water table surface) was also evaluated because most feeder roots are located within this depth. Thus, the shrew and the white-tailed deer (Figure 2-4) were evaluated for exposure to deeper (0 to 6 feet bgs) soil. All other receptors exposed to soil were evaluated for exposure to concentrations in surface (0 to 1 foot bgs) soil.

Environmental conditions such as soil moisture, soil pH, and cation exchange capacities significantly influence whether potential soil contaminants remain chemically bound in the soil matrix or can be chemically mobilized (in a bioavailable form) and released for plant absorption. Generally, neutral to alkaline soils (soil pH of 6.5 or greater) restrict the absorption of toxic metals, making pathway completion to plants difficult. The soil in the barren areas at the site was found to have low pH (Section 2.2), which could result in increased mobility of some chemicals present in soil. The potential effects of low pH are discussed in Chapter 6.0.

3.1.2 Sediment Exposure Pathway

Sediment consists of materials precipitated or settled out of suspension in surface water, or native soils underlying flowing or standing surface water bodies. Potential contaminant sources for sediment include overground transport from the Former Sellite Area and contaminated surface water, groundwater, and soil. The release mechanisms include surface water runoff, groundwater discharge, and airborne deposition. Potential receptors of chemicals in contaminated sediment include aquatic flora and fauna. Direct exposure routes for contaminated sediment include contact by benthic-dwelling organisms such as amphipod invertebrates, uptake

by aquatic flora, and ingestion by aquatic fauna. Indirect exposure pathways from sediment include consumption of bioaccumulated contaminants by consumers in the food chain. Chemical bioavailability of many nonpolar organic compounds (e.g., PCBs and pesticides) decreases with increasing concentrations of total organic carbon in the sediment; however, these compounds can still bioaccumulate up the food chain (Landrum and Robbins, 1990).

3.1.3 Groundwater Exposure Pathway

Groundwater represents a potential transport medium for COPECs. Potential contaminant sources for groundwater include leaching of contaminants in soil.

Groundwater itself is not an exposure point in ecological risk assessments, although contaminant transport along the shallow groundwater pathway may be considered an exposure route to wildlife where the groundwater discharges to surface water. This pathway is of importance to aquatic receptors if groundwater is found to be discharging to surface water. Because aquatic habitat is not evaluated at the Former Sellite Area, groundwater was not evaluated in this SLERA.

3.2 Exposure Characterization Summary

The estimated chemical intakes for each exposed receptor group under each exposure pathway and scenario are presented in the risk characterization spreadsheets in Appendix E. These intake estimates are combined with the COPEC toxicity values, discussed in the following chapter, to derive estimates and characterize potential ecological hazard. The chemical data used in the SLERA are presented in Appendix F. The uncertainties associated with the estimation of chemical intake are discussed in Section 5.2.

4.0 Ecological Effects Characterization

The ecological effects characterization primarily describes the development of TRVs, which provide a reference point for the comparison of toxicological effects upon exposure to a contaminant and are compared against calculated receptor doses. For the assessment receptors described in Section 2.4, TRVs are compared to the daily dose of a COPEC the receptor incurs from all relevant exposure pathways to calculate a hazard quotient (HQ) for that chemical. TRVs are not used for evaluating plants or invertebrates, which are evaluated in terms of potential hazards at a community scale rather than a species scale. For these types of receptors, potential hazard associated with direct contact with the medium of concern is evaluated using the original comparison of the COPEC's concentration to ESVs (Section 2.2.3.1), which are generic benchmarks protective of the survival of aquatic and terrestrial organisms. TRV development is described in the following paragraphs.

TRVs focusing on the growth, survival, and reproduction of species and/or populations have been developed for the Former Sellite Area SLERA. TRVs used in PBOW SLERAs were obtained from EPA guidance documents and the open literature, as available, including the following sources:

- *Toxicological Benchmarks for Wildlife* (Sample et al., 1996)
- *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (EPA, 1999b)
- Los Alamos National Laboratory (LANL) ECORISK Database (LANL, 2010)
- U.S. Army Center for Health Promotion and Preventive Medicine Wildlife Toxicity Assessments
- Technical papers published in peer-reviewed journals (e.g., Rigdon and Neal [1963]).

Empirical data are available for the specific receptor-endpoint combinations in some instances. Data on surrogate species and/or on endpoints other than the NOAEL and LOAEL were considered as necessary. The NOAEL is a dose of each COPEC that produced no known adverse effects in the test species. The NOAEL was judged to be an appropriate toxicological endpoint because it would provide the greatest degree of protection to the receptor species. In addition, the LOAEL was used as a point of comparison for risk management decisions. In instances where data are unavailable for a site-associated COPEC, toxicological information for surrogate chemicals or groups of chemical was used. Safety factors were used to adjust for these

differences and extrapolate risks to the site's receptors at the NOAEL and/or LOAEL endpoint. This process is described in the following paragraphs.

Toxicity information pertinent to identified receptors has been gathered for those analytes identified as COPECs. Because the measurement endpoint ranges from the NOAEL to the LOAEL, preference has been given to chronic studies noting concentrations at which no adverse effects were observed and those for which the lowest concentrations associated with adverse effects were observed. Where data are unavailable for the exposure of a receptor to a COPEC, data for a surrogate chemical or group of chemicals were considered for use in the SLERA.

Whenever possible, studies that use the site-specific target wildlife receptors were utilized. When studies for these species were not available, alternative species studies were used. TRVs are not applied across classes under any circumstances (e.g., a TRV for a bird species may not be used to estimate hazard for a mammal species). In instances where TRVs for multiple avian or mammalian species are supported, the TRV for the most similar species to the assessment receptor based on feeding strategy and physiological attributes were used in the SLERA. For example, avian TRVs based on both quail and kestrel test species data are available for lead, which was identified as a COPEC in soil and surface water. The quail TRV was used in the food chain model to evaluate the marsh wren measurement receptor because both the quail and the wren have an insectivorous component to their diet, whereas the kestrel TRV was used for the red-tailed hawk due to closer taxonomic similarity and foraging patterns (i.e., carnivorous). The following TRVs had values for multiple test species available, which were applied to the various assessment receptors according to the following table:

COPEC	TRV Test Species	Assessment Receptor
Lead	quail	Marsh Wren
	kestrel	Red-Tailed Hawk
Mercury	mink	Raccoon
	mouse	Deer Mouse, Short-Tailed Shrew, Cottontail Rabbit, White-Tailed Deer
Selenium	duck	Marsh Wren
	owl	Red-Tailed Hawk
Aroclor 1254, 1260, and 1268	mink	Raccoon
	mouse	Deer Mouse, Short-Tailed Shrew, Cottontail Rabbit, White-Tailed Deer

Using the relevant toxicity information, TRVs were calculated for each of the COPECs. TRVs represent NOAELs and LOAELs with the safety factors presented in Wentsel et al. (1996),

applied to toxicity information that was derived from studies other than no-effects or lowest-effects studies (Figure 4-1).

Because NOAELs and LOAELs for the selected wildlife receptor species are based on data from test species that are usually different from the species of concern, previous ecological risk assessments often applied a mathematical adjustment to the TRVs using a power function of the ratio of species body weights (e.g., Sample et al. [1996]). This practice is often referred to as allometric scaling. Alternately, uncertainty factors have also been used to adjust the TRVs when the toxicity values were based on a different species from the evaluated receptor to account for the potential differences in species' chemical sensitivities. However, in recent years, these practices have been discouraged by most scientific and regulatory groups. Recent reviews of these practices (EPA, 2008; Allard et al., 2009) have concluded that the use of allometric scaling of TRVs does not reflect a sound application of toxicological or ecological risk practices because supporting data for this practice are limited, and the ratio relationships used for the mathematical conversions were developed based on acute (rather than chronic) toxicity data. Allard et al. (2009) also concluded that uncertainty factors based on an arbitrary multiplier should not be used without a scientific basis for their application. Therefore, the use of toxicity data without adjustments as reported in the literature is regarded as the most technically sound approach and adopted for this SLERA. The TRVs used for this SLERA are summarized in Tables 4-1 and 4-2 for mammals and birds, respectively.

5.0 Risk Characterization

The risk characterization phase integrates information on exposure, exposure-effects relationships, and defined or presumed target populations. The result is a determination of the potential, severity, and characteristics of adverse ecological effects to environmental stressors present at a site. Qualitative and semiquantitative approaches were used to estimate the potential for adverse ecological effects occurring as a result of exposure of the selected site receptors to COPECs. Because potential adverse effects to terrestrial and aquatic plants and invertebrates have been qualitatively assessed during the initial COPEC screening step, the risk characterization focuses on potential impacts to the assessment receptors described in Section 2.3.

For the semiquantitative predictive assessment, TRVs and exposure rates were calculated and used to generate HQs (Wentsel et al., 1996). HQs are calculated by summing intake doses across all exposure pathways for each chemical for a given receptor and dividing by the TRV. HQs for those chemicals that have a similar mode of toxicological action are typically summed to account for cumulative effects. In this SLERA, the three PCBs identified as COPECs in soil and sediment were identified as potentially having similar mechanisms of toxicity, and their HQs were summed. HQs are a means of estimating the potential for adverse effects to organisms at a contaminated site and for assessing the potential that toxicological effects will occur among site receptors.

5.1 Hazard Estimation for Terrestrial and Aquatic Wildlife

The hazard estimation was performed through a series of quantitative HQ calculations that compare receptor-specific exposure doses with TRVs. The HQs are compared to HQ guidelines for assessing the hazard posed from contaminants. HQs less than or equal to 1 represent no probable hazard. Uncertainties associated with HQs are discussed in Section 5.2.

Table 5-1 summarizes the NOAEL and LOAEL-based HQs for the seven evaluated assessment receptors. Three metals (aluminum, cadmium, and lead) and three PCBs (Aroclors 1254, 1260, and 1268), as well as summed PCBs, had HQs greater than 1 when rounded to one significant figure. These chemicals are discussed in greater detail in this section.

Aluminum and cadmium had HQs that exceeded 1 for only one (cadmium) or two (aluminum) receptors (Table 5-1). HQ exceedances for aluminum for the deer mouse and short-tailed shrew were associated with ingestion of aluminum in surface water. The HQ exceedance for cadmium for the marsh wren was associated with ingestion of terrestrial invertebrates that had

bioaccumulated cadmium from soil into their tissue. All HQs for these two metals were below 5, and only their NOAEL-based HQs exceeded 1; all of their LOAEL-based HQs were below 1. Because the NOAEL-based HQs were not elevated (i.e., greater than 10) and the LOAEL-based HQs did not exceed 1, there is low concern for ecological toxicity associated with exposure to aluminum in surface water and cadmium in soil.

Lead had HQs greater than 1 for three receptors, including the deer mouse, short-tailed shrew, and marsh wren (Table 5-1). For the two mammalian receptors, the NOAEL-based HQ was less than 10, and the LOAEL-based HQ did not exceed 1. However, for the marsh wren receptor, the NOAEL- and LOAEL-based HQs were both elevated (146 and 14.6, respectively). Lead was a COPEC in both soil and surface water (Tables 2-8 and 2-9). For the deer mouse and short-tailed shrew, the most significant exposure pathway was ingestion of lead in terrestrial invertebrate prey items, which contributed approximately 68 and 73 percent, respectively, of the total hazard (Tables E-1 and E-2 in Appendix E). The ingestion of terrestrial invertebrates that had bioaccumulated lead from soil was also the most significant exposure pathway for the marsh wren, accounting for nearly 90 percent of the total hazard. Surface water pathways contributed less than 1 percent of the hazard for lead (Table E-4 in Appendix E). Lead was detected in all 30 soil samples at concentrations ranging from 4.4 to 4,060 mg/kg (Table 2-8). The MDC of 4,060, detected in the 0 to 1 foot soil interval at location FSB-SB09, was more than an order of magnitude greater than the next highest concentration of 170 mg/kg at FSB-SB05. Aside from the MDC, only four other soil locations had lead concentrations that exceeded the BSC of 48.6 mg/kg: SB01 (57 mg/kg), SB04 (66.4 mg/kg), SB05 (170 mg/kg), and SB06 (63.4 mg/kg). All of these soil sample locations are within approximately 50 feet of SB09 (Figure 2-3). As discussed in Section 2.2.3.3, lead concentrations in site soil were determined not to be significantly different from background concentrations; however, lead was retained as a COPEC in soil due to the hot spot at SB09. Therefore, with the exception of the hot spot at SB09, lead in Sellite Area soil is not considered to be significantly elevated with respect to naturally occurring concentrations. If the SB09 hot spot is replaced with the BSC of 48.6 mg/kg, the resulting 95 percent UCL for lead in site soil is 48.8 mg/kg, which is essentially equal to the BSC. This revised EPC results in LOAEL-based HQs less than 1 for all receptors, and NOAEL-based HQs less than 1 for all receptors except the marsh wren (NOAEL-based HQ = 5; results not shown).

Three PCBs (Aroclor 1254, Aroclor 1260, and Aroclor 1268) were identified as COPECs in soil (Table 2-8) and two of these PCBs (Aroclor 1260 and 1268) were also COPECs in sediment (Table 2-10). All three PCBs (as well as total PCBs) had both NOAEL- and LOAEL-based HQs that were greater than 1 for multiple receptors (Table 5-1). For the Aroclor congeners, NOAEL-based HQs exceeding 1 ranged from 4.91 to 658, and LOAEL-based HQs exceeding 1 ranged

from 4.35 to 58.6. Approximately 95 percent of the hazard for the deer mouse, short-tailed shrew, and marsh wren, the three terrestrial receptors that had HQs greater than 1 using both the NOAEL- and LOAEL-based TRVs, was associated with ingestion of PCBs in terrestrial invertebrate prey items that had bioaccumulated PCBs into their tissues. Uptake of PCBs into terrestrial invertebrates was not based on site-specific empirical data in this SLERA; rather, it was calculated using a model that estimates the partitioning of the chemical into the lipids of the invertebrates from the organic carbon fraction in the surrounding soil (Table 3-3). Aroclor 1268 in sediment also resulted in an HQ greater than 1 for the muskrat; however, only the NOAEL-based HQ exceeded 1 (when rounded), and the potential for adverse impacts to PCBs in sediment to ecological receptors is considered minor.

PCBs in soil were detected at multiple locations at concentrations exceeding their ESVs. The following table lists the soil sample locations where Aroclor 1254, Aroclor 1260, and Aroclor 1268 were identified at concentrations 1) up to 10 times their ESV of 0.37 mg/kg (i.e., from 0.37 mg/kg to 3.7 mg/kg), 2) from 3.7 mg/kg to 10 mg/kg, and 3) at concentrations greater than 10 mg/kg.

	PCB Concentration (mg/kg)		
PCB	**0.37 to 3.7**	**3.7 to 10**	**> 10**
Aroclor 1254	SS27, SB06, SS08, SS24, SS04, SS06, SS25, SS14, SS09, SS18, SS02	SS20, SB04, SS05, SB01, SB09, SB05, SS10, SS07	SS07
Aroclor 1260	SS08, SS27, SS24, SS09, SS06, SS25, SS04, SS03, SS15, SB04	SS18, SS20, SS01, SS14, SB05, SS02, SB01	SS10, SS23, SS05, SB09, SS07
Aroclor 1268	SB15, SS04, SS24, SB05, SB01	SS10, SS02, SS16, SS14, SS03, SS05	SS01, SS18, SS15, SB09, SS07, SS23

Sample location SS07 contained the MDCs for Aroclor 1254 (12.1 mg/kg) and Aroclor 1260 (41.1 mg/kg), and sample location SS23 contained the MDC for Aroclor 1268 of 95.85 mg/kg, which was nearly three times greater than the next highest concentration of this congener. Sample locations SS07 and SS23 are in close proximity to SB09, which was the soil sample location that had the hot spot for lead. SB09 also had PCB concentrations greater than 10 mg/kg for two of the three COPEC congeners (Aroclor 1260 and 1268). PCBs are bioaccumulative and highly toxic compounds, and their wide distribution at the Former Sellite Area is a concern for ecological receptors. PCBs are strongly lipophilic and tend to bind tightly to soil. The detection of several of the congeners in sediment samples and the finding that one aquatic receptor (the

muskrat) had HQs greater than 1 suggest that soil-to-sediment transport pathways (e.g., overland runoff) may be occurring, resulting in the deposition of PCBs into the surrounding ditch.

TRVs were not identified for beryllium and carbazole for birds (Table 4-2). Beryllium was selected as a COPEC in surface water because it was detected in one out of six surface water samples at a concentration of 1.9 µg/L, which exceeded its ESV of 0.66 µg/L (Table 2-9). Beryllium was not a COPEC in soil or sediment, as it was detected in these media at concentrations below the soil BSC (Tables 2-8 and 2-10). Thus, it is unlikely that a release of beryllium has occurred at the site. The detection of beryllium in one out of six surface water samples at a concentration slightly exceeding its conservative ESV is of low concern, and the lack of an avian TRV for beryllium represents a minor uncertainty. Carbazole was selected as a COPEC in sediment because it lacked an ESV (Table 2-10). Carbazole was detected in one out of six sediment samples at an estimated concentration of 0.0407 mg/kg. Soil is not a source medium for carbazole, as it was only detected in 1 out of 30 soil samples (Table 2-8). Carbazole is chemically related to PAHs and was detected at low concentrations that were consistent with PAHs at the site. The single detection of carbazole in sediment likely does not adversely affect ecological populations at the site. Thus, the lack of an avian TRV for carbazole represents a minor uncertainty, and this chemical is unlikely to impact ecological receptors at the site.

5.2 Uncertainty Analysis

A number of factors contribute to the overall variability and uncertainty inherent in ecological risk assessments. Variability is due primarily to measurement error and natural variability of chemical concentrations in environmental media. Laboratory media analyses, sampling design/methods, and receptor study design are the major sources of this kind of error. Uncertainty, on the other hand, is associated primarily with deficiency or irrelevancy of effects, exposure, or habitat data to actual ecological conditions at the site. Species physiology, feeding patterns, and nesting behavior are poorly predictable; therefore, all toxicity information derived from toxicity testing, field studies, or observation have uncertainties associated with them. Laboratory studies conducted to obtain site-specific, measured information often suffer from poor relevance to the actual exposure and uptake conditions on site (i.e., bioavailability, exposure, assimilation, etc., are generally greater under laboratory conditions than under field conditions). Calculating an estimated value based on a large number of assumptions is often the only alternative to the accurate, albeit costly, methods of direct field or laboratory observation, measurement, and/or testing. Finally, habitat- or site-specific species may be misidentified if, for example, the observational assessment results are based on only one or even two brief site reconnaissance surveys.

The uncertainty analysis describes many of the major assumptions made for the SLERA. When discernible, the direction of bias caused by each assumption (i.e., whether the uncertainty results in an overestimate or underestimate of risk) is provided as well. Where possible, a description of recommendations for minimizing the identified uncertainties if the SLERA progresses to higher-level assessment phases is also presented.

The most important uncertainties associated with this SLERA are discussed in the following paragraphs.

5.2.1 Assumptions of Bioavailability

The assumption that COPECs are 100 percent bioavailable likely overestimates the potential for adverse effects. The time that has lapsed since the contaminant release affects bioavailability as the contaminant becomes sequestered or transformed within the environmental media. Sequestration, transformation, and bioavailability are influenced by medium characteristics including pH, temperature, and organic carbon content. Factor interactions and nonlinear relationships among these characteristics increase the complexity in predicting bioavailability at a given site. Further, except for pH, these characteristics have not been extensively measured at the Former Sellite Area. Some of the BAFs used for this site SLERA were based on bioaccumulation studies performed at other sites at the PBOW (Section 3.1). BAFs based on empirical data from a nearby site likely reflect bioavailability in various media more accurately than BAFs calculated from empirical data in other regions or modeled using equations based on chemical properties, such as the log K_{ow}. However, the acidic soil conditions at the Former Sellite Area may result in higher than expected bioavailability for some chemicals, particularly metals. Therefore, the magnitude of the overestimation of the potential for adverse effects resulting from the assumption that COPECs are 100 percent bioavailable is unknown at this site.

5.2.2 Use of Laboratory-Derived or Empirically Estimated Partitioning and Transfer Factors

The use of laboratory-derived transfer factors, or calculated transfer factors that estimate partitioning based on chemical properties (such as the log K_{ow}), to predict COPEC concentrations in plants, invertebrates, and prey species likely overestimates potential hazards. As discussed previously, the incorporation of COPECs into the food chain is influenced by the characteristics of the exposure medium, which likely differs from that used in the laboratory to derive partitioning and transfer factors. Calculated transfer factors are often based on upper limits of regression equations developed using data from other chemicals, and the target chemical's true behavior in the food chain may be significantly different from that predicted by its modeled transfer factor. Transfer factors developed using empirical data (i.e., concentrations

in tissue and from the medium of concern) are typically much more accurate, as they incorporate both the chemical's bioavailability and the organism's uptake and the capacity of the chemical to be retained in its tissues. Site-specific factors (e.g., amount of carbon in site soil) can affect the bioaccumulation potential of a given chemical, and the use of empirically developed BAFs from other sites adds considerable uncertainty. BAFs specific to PBOW were available for some, but not all COPECs in the food chain model. The most significant exposure pathway for the COPECs in soil with the greatest modeled HQs (i.e., lead and PCBs in soil) was the soil-to-terrestrial invertebrate pathway. Uptake of terrestrial invertebrates for these chemicals was estimated using calculated BAFs rather than PBOW-specific BAFs, or BAFs based on observed, empirical data observed at other sites or in a laboratory (Table 3-3).

5.2.3 Use of Laboratory-Derived Toxicity Reference Values

The use of laboratory-derived TRVs may overestimate or underestimate the potential for adverse effects. The method of administration of the contaminant in the laboratory is typically different than that experienced in the wild by the receptors. Also, laboratories typically use "naïve" organisms in their toxicity testing, which are likely to be much more sensitive to toxicants than organisms living in the wild or at the site, which have likely developed resistances or have otherwise adapted to ambient concentrations of chemicals in their environment.

5.2.4 Use of the HQ Method to Estimate Risks to Populations or Communities

The calculation of HQs also introduces uncertainty. The following limitations associated with HQs (Tannenbaum et al., 2003) are noted:

- HQs are not measures of risk.
- HQs are not population based.
- HQs are not linearly scaled.
- HQs are often produced that are unrealistically high and toxicologically impossible (e.g., estimated HQs greater than 1,000, although such highly elevated HQs were not calculated for the Former Sellite Area).
- Trace soil concentrations of inorganic chemicals (including concentrations well below background levels) can lead to HQ threshold exceedances.
- HQs are not linked to a temporal scheme (e.g., any particular HQ value holds the same interpretation for a site of any age).

Therefore, it should be understood that HQs greater than 1 do not mean that adverse ecological effects are occurring or may occur in the future. Although OEPA considers HQs greater than 1 to be potentially significant, the following interpretation of HQ ranges from Wentsel et al. (1996) takes into consideration the uncertainties inherent in HQs and provides a basis for possible recommendations:

- HQs from 1 to less than 10 represent a low potential for environmental effects.
- HQs from 10 to less than 100 represent a significant potential that effects could result from greater exposure.
- HQs greater than 100 represent the highest potential for expected effects.

Although HQs are effective as screening tools in eliminating chemicals from further consideration, the presence of many innocuous chemicals (including chemicals that are naturally occurring) also often have HQs that exceed 1. When interpreting HQs, it can be stated that when HQs are below 1, toxicological effects are unlikely to occur and the potential for adverse ecological effects is minimal. HQs that exceed 1 only indicate that there is the potential for unacceptable risk (Tannenbaum et al., 2003). Therefore, an HQ above 1, even exceedingly so, does not definitively indicate that there is even one individual expressing the toxicological effect(s) associated with a given chemical to which it was exposed (Tannenbaum, 2005; Bartell, 1996).

5.2.5 Sampling and Analytical Limitations

It is not possible to completely characterize the nature and extent of contamination on any site. Uncertainties arise from limits on the number of locations that can be sampled. The sampling protocol used at the Former Sellite Area, however, was designed to optimize efficiency of the sampling effort and reduce uncertainty by providing coverage of the affected area using site process knowledge to focus on the most likely contaminated areas. This approach will bias potential soil contaminant concentrations higher than that for the entire region to provide a more conservative estimate of potential risk. The sampling and analytical data are considered sufficient to conclude that the potential for adverse impacts associated with chemicals present at the site is very low.

5.2.6 Selection and Quantification of Chemicals of Potential Ecological Concern

Uncertainty associated with the processes used to identify COPECs and estimate EPCs arises from the following:

- ***Identifying Background Chemicals.*** Metals are judged to be present at concentrations comparable to background if the MDC does not exceed the BSC or statistical testing demonstrates that the site data and background data are drawn from the same population. Statistical testing of site data versus background data was performed for this SLERA. Some organic chemicals, such as PAHs, may be considered to be anthropogenic background. The inclusion of ambient anthropogenic compounds in the SLERA may impart a conservative bias to the risk assessment. Soil background values were compared with concentrations of metals detected in the Former Sellite Area sediment in this SLERA. The use of soil background values for comparison to concentrations detected in sediment results in some added uncertainty to the SLERA. Naturally occurring levels of metals can differ in soil and sediment because the presence of metals in the sediment matrix can be affected by factors such as pH of the sediment and overlying water, oxidation-reduction conditions, sediment texture, presence/absence of organic matter, dissolved oxygen levels, etc. Although the concentrations of naturally occurring metals in soil and sediment may differ somewhat, soil background values can provide a reasonable point of reference for determining concentrations in sediment that may be associated with contamination and that warrant further consideration. Because concentrations in "true" background sediment may be higher or lower than their equivalent BSCs in soil, the direction of bias is unknown. However, the impact of the bias is considered to be negligible even if the direction of the bias is unknown. Therefore, this uncertainty did not affect the overall conclusions of the assessment provided in Section 5.1.

- ***Estimated EPCs are Uncertain.*** For statistical purposes, if a constituent is positively identified at a site and has at least a single detection, all the samples with nondetects are assumed to have a value equal to the method detection limit and are included in the data set, although identified for the ProUCL software (EPA, 2011) as nondetects. However, actual concentrations may be well below the MDLs and may (particularly for organic chemicals that do not occur naturally) be entirely absent from the sample. Therefore, although the exact concentration of a nondetect chemical is unknown, the use of the MDL as a surrogate concentration likely overestimates the actual concentration and introduces a conservative bias into the risk assessment. Computed 95 percent UCL values are only estimates of the actual UCLs associated with each data set. Examples of factors affecting the uncertainty of these UCL estimates include the number of samples, proportion of nondetects, conformance with an assumed mathematical distribution, imprecision of laboratory data, elevated reporting limits (from dilutions, matrix interference, etc.), and statistical methodology. For some data sets, the MDC was used as the EPC. The following uncertainties are associated with the statistical determination of EPCs for the COCs in each medium:

  – A limited number of samples may not completely characterize the site because they provide less information about the population from which they are drawn than do larger sample sets. Accordingly, small data sets tend to have a greater variability, which results in the calculation of wider confidence intervals on the mean concentration and higher EPCs. The MDC was used as the EPC for some chemicals in surface water and sediment at the Former Sellite Area because their

calculated UCLs exceeded the chemical's MDC. The use of the MDC likely overestimated the true average concentration for these chemicals.

- Biased soil sampling is a common practice at contaminated sites to identify nature and extent of contamination and to reduce the potential for Type I errors when performing environmental investigations (i.e., concluding that a site is clean when it really is not). The biased sampling approach likely overestimates average chemical concentrations, resulting in greater chemical concentrations and predicted hazard. The Former Sellite Area sampling strategy was not strongly biased, however, and this uncertainty is considered minor for this particular SLERA.

- The selected SW-846 laboratory analytical methods have a degree of uncertainty associated with them. These uncertainties are documented by using data qualifiers to reflect the degree of certainty of measurement. For example, some data were estimated (e.g., J-qualified). The direction of bias is unclear.

In summary, the use of the 95 percent UCL as the EPC is likely to impart an overall conservative bias to the risk assessment. The biased sampling approach may further add to the conservativeness of the EPC.

6.0 Risk Summary and Conclusions

Chemicals detected in soil, surface water, and sediment were screened against conservative benchmark values and other criteria to identify COPECs in media present at the Former Sellite Area. Because of the small size of the site (approximately 2 acres), the site is not spatially relevant to any significant degree for many of the evaluated receptors. However, the site-specific SLERA was performed to satisfy administrative requirements, including FUDS regulations (USACE, 2004).

Summary of Hazards Associated with Chemicals in Site Media. Nine chemicals in soil, 13 chemicals in surface water, and 16 chemicals in sediment were identified as COPECs for further evaluation. A food chain model was used to evaluate the potential hazard associated with exposure to these chemicals by representative measurement receptors. The food chain model focused on terrestrial transfer pathways due to the lack of true aquatic habitat at the site. The results of the food chain model revealed that three metals (aluminum, cadmium, and lead) and three PCBs (Aroclors 1254, 1260, and 1268) had HQs greater than 1 when rounded. Although some of these chemicals were COPECs in more than one medium, most of the hazard was associated with soil exposure routes with the exceptions of aluminum, which was associated with surface water ingestion. However, the hazards associated with these two metals were very low (less than 5 using a NOAEL-based TRV and less than 1 using a LOAEL-based TRV). Therefore, hazard associated with exposure of ecological receptors to COPECs in surface water and sediment is considered minor at the Former Sellite Area. COPECs in soil that were responsible for HQs greater than 1 are discussed in the following paragraphs.

Cadmium in soil had a NOAEL-based HQ below 5 for a single receptor (marsh wren). Thus, concern for adverse ecological impacts associated with exposure to this metal is low. However, lead had HQs for multiple receptors that exceeded 1, including the marsh wren, which had both NOAEL and LOAEL-based HQs greater than 10. Although most of the lead in Former Sellite Area soil appears to be present at concentrations similar to background (a WRS test found no significant differences between site and background concentration populations), a highly elevated concentration of lead at sample location SB09 (4,060 mg/kg) was responsible for a site-wide EPC for lead that resulted in elevated HQs. Several sample locations in the vicinity of this hot spot, including SB01 (57 mg/kg), SB04 (66.4 mg/kg), SB05 (170 mg/kg), and SB06 (63.4 mg/kg), also had lead concentrations that were slightly elevated compared to the BSC of 48.6 mg/kg. If the MDC at SB09 were replaced with the BSC, the resulting EPC for lead in the Former Sellite Area would equal the BSC.

PCBs in Former Sellite Area soil also resulted in multiple receptor HQs exceeding 1. The concentrations of Aroclors 1254, 1260, and 1268 all resulted in multiple receptors (deer mouse, short-tailed shrew, and marsh wren) having both NOAEL- and LOAEL-based HQs that exceeded 1. NOAEL-based HQs exceeding 1 ranged from 4.91 to 658, and LOAEL-based HQs exceeding 1 ranged from 4.35 to 58.6. Nearly the entire (approximately 95 percent) hazard for the deer mouse, short-tailed shrew, and marsh wren was associated with PCBs in soil that are estimated to bioaccumulate into the tissue of terrestrial invertebrate prey items. These HQs may be overestimated because uptake of PCBs into terrestrial invertebrates was not based on site-specific empirical data; rather, it was calculated using a model that estimates the partitioning of the chemical into the lipids of the invertebrates from the organic carbon fraction in the surrounding soil. The MDCs for Aroclor 1254 (12.1 mg/kg) and Aroclor 1260 (41.1 mg/kg) were detected at sample location SS07, and sample location SS23 had a concentration of Aroclor 1268 of 95.85 mg/kg, which was nearly three times greater than the next highest concentration of this congener. SS07 and SS23 are in close proximity to SB09, where the hot spot for lead was located. SB09 also had PCB concentrations greater than 10 mg/kg for two of the three COPEC congeners (Aroclor 1260 and 1268). Because PCBs are highly bioaccumulative, the potential for food chain effects to impact receptors that are either present at the site or that ingest prey items that use the site is a concern. Because the small size of the site represents a relatively insignificant portion of large-range receptors' foraging area, the area use factors for the receptors selected to represent these species (i.e., white-tailed deer, raccoon, red-tailed hawk) was very low, and their HQs for PCBs were accordingly low (Table 5-1). The primary concern, therefore, is for small-ranged receptors such as the deer mouse, short-tailed shrew, and marsh wren, which had HQs above 1. The small size of the site reduces concern for ecological effects, though, because the Former Sellite Area may not support enough individuals to represent a local population of these types of receptors.

Summary of Hazards Associated with pH. In addition to the chemical contamination described and assessed in the SLERA risk characterization, soil acidity was also investigated at the Former Sellite Area, as described in the SCR (Shaw, 2013b). Surface soil samples from 186 locations were collected and analyzed in the field for pH. Samples were also sent to a laboratory for confirmation. Background pH samples were also collected from unimpacted areas similar to the Former Sellite Area. The results of the surface soil sampling identified areas of low pH (less than 5.6 standard units [SU]) in the vicinity of all of the barren areas and more typical pH readings (5.6 to 7.8 SU) across the remainder of the site. Typically, the lowest pH readings (1.13 to 2.5 SU) were identified near the center of each of the barren areas, with pH values trending upward toward the perimeter of the barren areas (Figure 5-8, Shaw [2013b]). During soil

sampling for the vertical extent of soil pH, low pH concentrations (less than 5.6 SU) were encountered at depths ranging from 1 to 5 feet bgs, with an average depth of 3.5 feet bgs across all the borings. The results of the background surface soil pH sampling indicated pH concentrations ranging from 6.24 to 8.09 SU, and all were within the range considered typical for the soils in the area.

The depressed pH at the Former Sellite Area was limited to the upland/terrestrial portions of the site and did not appear to affect the semiaquatic habitat represented by the drainage features surrounding the site. Sediment pH was neutral overall, with slightly depressed pH identified near the barren area at the northern end of the site (Shaw, 2013b). Although surface water pH data were not planned for collection at the Former Sellite Area (Shaw, 2011), surface water pH data were collected in the field and documented on the sample collection logs, which are included in Appendix A of the Former Sellite Area SCR (Shaw, 2013b). As indicated in the SCR forms, surface water pH at the Former Sellite Area ranged from 7.27 to 7.63. The OEPA Water Quality Standards provide an acceptable criteria range for pH in water of 6.5 to 9 (Appendix B); therefore, the water present in the Former Sellite Area ditch meets this criterion..

Highly acidic soil can have ramifications for the ecological communities present at a site, both directly and indirectly. Typical soils consist of a mixture of parent material, organic matter, inorganic minerals, and organic compounds bound to the soil matrix. Increased acidity in soils can result in substances previously bound to clays becoming more mobile as protons displace metals bound to the clays. The release of the metals from the soil matrix results in increased bioavailability, which increases the potential for a contaminant to be assimilated as a toxicant into the body when ingested. Bioavailability has a significant impact on the overall toxicity of a given concentration of many inorganic and organic compounds. For example, studies have shown that toxicity to aluminum is poorly reflected by generic concentration levels in bulk soil, i.e., concentration and toxicological responses are poorly correlated (EPA, 2008). Aluminum primarily exists in soil as aluminosilicates. Aluminum is released from the silicate layer by inputs of acids, forming aluminum hydroxide. As pH is lowered further, the concentration of soluble aluminum, which is toxic, increases. The toxic effects of aluminum to plants associated with soluble aluminum include reduced root growth rates and development. Thus, the bioavailability of aluminum for plant uptake and toxicity is strongly associated with the pH, since aluminum is soluble and biologically available in acidic soils, but biologically inactive in neutral to alkaline soils. Because of the strong relationship between aluminum toxicity and pH, EPA (2008) actually recommends that a pH level of 5.5 (i.e., the pH when dissolved aluminum could occur in the environment) be used as a screening value for this metal, rather than bulk soil concentrations. Strongly acidic soils increase plant uptake and potential for phytotoxicity for

other cationic metals, as well (e.g., copper, zinc, and nickel). Thus, it is likely that the low pH is a causative factor for the barren areas devoid of vegetation at the Former Sellite Area.

Acidic soils can also affect transport pathways at a site. When bound to the soil matrix, many inorganic and organic chemicals are relatively immobile. However, in acidic conditions, these chemicals and compounds more readily dissociate from the soil matrix and become soluble. This can result in increased mobility both vertically and horizontally via percolation or lateral runoff pathways. A relatively high number of COPECs were identified in surface water and sediment media (Tables 2-9 and 2-10, respectively) at the Former Sellite Area. Although speculative, this could at least partially be due to the increased mobility of contaminants associated with the acidic conditions at the site.

Overall Summary and Conclusions. In general, concern regarding exposure to chemicals at the Former Sellite Area is relatively low for most ecological receptors because considerations such as the home range size and density characteristics of various species of concern make it unlikely that multiple individuals of a given species (i.e., local populations) would be exposed to media at the 2-acre Former Sellite Area site on a regular basis. The ecological HQs presented in this SLERA were computed to satisfy administrative requirements, including FUDS requirements, and to present an estimate of potential hazard to ecological receptors that is consistent with previous PBOW SLERAs. Because of the small size of the site, it would be reasonable to conclude the site is protective for ecological receptors even without performing an investigation due to spatial considerations alone (e.g., number of animals present; time spent contacting the site, etc.). This is particularly true for large-range receptors. However, the potential for adverse impacts to small-range receptors cannot be entirely discounted, as discussed in the following paragraphs.

The presence of lead and PCBs in soil (particularly in the vicinity of soil sample location SB09) at elevated concentrations does represent a potential threat to individual ecological receptors, and possibly to local populations of receptors with very small home ranges. The results of this SLERA indicate that localized impacts to terrestrial receptors that are non-mobile or have limited mobility (e.g., plants and terrestrial invertebrates), and to receptors with small home ranges (e.g., rodents and small songbirds) cannot be completely discounted. Further, there is potential for lipophilic contaminants that are present on site (i.e., PCBs) to accumulate in the tissues of small mammals and birds that may then be ingested as prey items by off-site predators. In other words, prey items may act as vectors for contamination to reach higher trophic level organisms off site. The small size of the site compared to the relatively large home range of most predatory organisms reduces the concern for this potential pathway for populations of upper trophic level

organisms, however, as a vast majority of prey consumed by even a single predator would likely have had little or no exposure to the Former Sellite Area.

Acidic soil conditions were also observed at the site, and the lowest soil pH levels occurred at the barren areas, with pH levels of 1 to 2 occurring near the center of the bare patches of soil and gradually increasing to normal (i.e., background) conditions away from the barren areas. Low pH in soils can result in increased bioavailability, toxicity, and mobility of soil contaminants, particularly for metals. Soil samples from the barren areas were also analyzed for chemical contaminants, and elevated concentrations of most COPECs did not coincide with the barren areas. In general, the elevated concentrations of significant COPECs (i.e., lead and PCBs) occurred within the boundary of the former perimeter road, and the barren/low pH areas were along or just outside of the former perimeter road.

In summary, although the small size of the site precludes the potential for adverse effects to most ecological receptors, the presence of elevated concentrations of lead and PCBs in soil may present a hazard to some small range ecological receptors. Additionally, the low soil pH increases the potential for contaminants to be mobilized off site, and also increases the potential for toxicity of contaminants present at the site due to increased bioavailability of contaminants. Phytotoxicity associated with the highly acidic conditions is a possible cause of the lack of vegetation at the barren areas observed at the site.

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TABLES

Table 2-1

Plant Species Observed at the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Scientific Name	Common Name
Vegetation observed during the June 1 ,2011 site walk	
Acer rubrum	red maple
Achillea millefolium	yarrow
Agrimonia parviflora	small-flowered groovebur
Alisma plantago-aquatica	water plantain
Allium canadense	wild garlic
Andropogon virginicus	broom sedge
Antennaria neglecta	field pussytoes
Anthoxanthum odoratum	sweet vernal grass
Apocynum sp.	dogbane
Arabis glabra	tower mustard
Asclepias incarnata	swamp milkweed
Aster umbellatus	flat-topped aster
Bidens frondosa	devil's beggar ticks
Brassica nigra	yellow rocket
Bromus inermis	smooth brome
Caarduus nutans	musk thistle
Carex aggregata	glomerate sedge
Carex albursina	white bear sedge
Carex amphibola var. turgida	eastern narrowleaf sedge
Carex blanda	eastern woodland sedge
Carex aggregata	glomerate sedge
Carex frankii	Frank's sedge
Carex scoparia	broom sedge
Cinna arundinacea	common wood reed
Cirisum arvense	creeping thistle
Convolvulus arvensis	hedge bindweed
Cornus racemosa	gray dogwood
Coronilla varia	crownvetch
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Dioscorea villosa	yam root
Dipsacus sylvestris	teasel
Eleagnus angustifolia	autumn olive
Eleocharis palustris	spike rush
Equisetum arvense	field horsetail
Equisetum hyemale	scouring rush
Erigeron annuus	fleabane
Eupatorium perfoliatum	boneset
Euthamia graminifolia	fragrant flat-topped goldenrod
Festuca arundinacea	fescue
Fraxinus pennsylvanica	green ash
Galium aparine	cleavers
Geum laciniatum	rough avens
Hackelia virginiana	Virginia stickseed

Table 2-1

Plant Species Observed at the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Scientific Name	Common Name
Hieracium pratense	field hawkweed
Juglans nigra	black walnut
Juncus acuminatus	sharp-fruited rush
Juncus effusus	soft rush
Juncus tenuis	path rush
Lonicera tatarica	Tartarian honeysuckle
Lycopodium complanatum	club moss
Lycopus americana	American horehound
Medicago lupulina	black medick
Melilotus officinalis	yellow sweet clover
Monarda sp.	bee balm
Onoclea sensibilis	sensitive fern
Osmunda cinnamonea	cinnamon fern
Oxalis stricta	sorrel
Panicum clandestinum	deer tongue witchgrass
Parthenocissus quinquefolia	Virginia creeper
Penstemon digitalis	foxglove beard tongue
Phalaris arundinacea	reed canary grass
Phragmites australis	common reed
Plantago lanceolata	English plantain
Plantago major	common plantain
Poa pratensis	Kentucky bluegrass
Podophyllum peltatum	mayapple
Populus deltoides	cottonwood
Potentilla simplex	old field cinquefoil
Prunus americana	wild plum
Prunus serotina	black cherry
Quercus palustris	pin oak
Robinia pseudoacacia	black locust
Rosa multiflora	multiflora rose
Rubus allegheniensis	Allegheny blackberry
Rubus flagellaris	dewberry
Rumex acetosella	sheep sorrel
Rumex crispus	curly dock
Salix amygdaloides	peachleaf willow
Salix exigua	sandbar willow
Sambucus canadensis	American elder
Schoenoplectus tabernaemontani	soft stem bulrush
Scirpus atrovirens	green bulrush
Scirpus cyperinus	wool grass
Scirpus polyphyllus	leafy bulrush
Solidago canadensis	Canada goldenrod
Taraxacum officinale	dandelion
Toxicodendron radicans	poison ivy
Tradescantia ohioensis	Ohio spiderwort

Table 2-1

Plant Species Observed at the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Scientific Name	Common Name
Tragopogon porrifolius	salsify
Trifolium hybridum	alsike clover
Trifolium pratense	red clover
Trifolium repens	white clover
Triosteum aurantiacum	wild coffee
Typha sp.	cattail
Urtica dioicia	stinging nettle
Verbascum thapsus	woolly mullein
Viola papilionacea	blue violet
Vitis riparia	riverbank grape
Vegetation observed during the September 1, 2011 site walk	
Acalypha rhomboidea	rhombic three-seeded mercury
Acer rubrum	red maple
Achillea millefolium	yarrow
Agrimonia parviflora	small-flowered groovebur
Agrostis gigantea	redtop
Alisma plantago-aquatica	water plantain
Amphicarpa bracteata	American hog peanut
Andropogon virginicus	broom sedge
Anemone canadensis	Canada anemone
Antennaria neglecta	field pussytoes
Anthoxanthum odoratum	sweet vernal grass
Apocynum sp.	dogbane
Asclepias incarnata	swamp milkweed
Aster umbellatus	flat-topped aster
Bidens frondosa	devil's beggar ticks
Boehmeria cylindrica	false nettle
Bromus inermis	smooth brome
Caarduus nutans	musk thistle
Carex frankii	Frank's sedge
Carex scoparia	broom sedge
Carex vulpinoidea	fox sedge
Cinna arundinacea	common wood reed
Cirisum arvense	creeping thistle
Convolvulus arvensis	hedge bindweed
Cornus racemosa	gray dogwood
Coronilla varia	crownvetch
Cyperus erythrorhizos	red-rooted umbrella sedge
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Desmodium paniculatum	tick trefoil
Dioscorea villosa	yam root
Dipsacus sylvestris	teasel
Echinochloa muricata	rough barnyard grass
Eleagnus angustifolia	autumn olive

Table 2-1

Plant Species Observed at the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Scientific Name	Common Name
Eleocharis palustris	spike rush
Elytrigia repens	quack grass
Equisetum arvense	field horsetail
Equisetum hyemale	scouring rush
Erechtites hieraciifolia	pilewort
Erigeron annuus	fleabane
Eupatorium perfoliatum	boneset
Euthamia graminifolia	fragrant flat-topped goldenrod
Festuca arundinacea	fescue
Fraxinus pennsylvanica	green ash
Gerardia tenuifolia	slender gerardia
Geum laciniatum	rough avens
Glyceria septentrionalis	eastern manna grass
Gnathalium obtusifolium	catfoot
Hackelia virginiana	Virginia stickseed
Hieracium pratense	field hawkweed
Hypericum canadense	Canadian St. John's wort
Juglans nigra	black walnut
Juncus acuminatus	sharp-fruited rush
Juncus effusus	soft rush
Juncus tenuis	path rush
Juncus torreyi	Torrey's rush
Leptochloa fascicularis	bearded sprangletop
Lespedeza capitata	round-head bushclover
Lonicera tatarica	Tartarian honeysuckle
Lycopodium complanatum	club moss
Lycopus americana	American horehound
Medicago lupulina	black medick
Melilotus officinalis	yellow sweet clover
Mentha spicata	spearmint
Monarda sp.	bee balm
Onoclea sensibilis	sensitive fern
Osmunda cinnamonea	cinnamon fern
Oxalis stricta	sorrel
Panicum clandestinum	deer tongue witchgrass
Panicum virgatum	switch grass
Parthenocissus quinquefolia	Virginia creeper
Penstemon digitalis	foxglove beard tongue
Phalaris arundinacea	reed canary grass
Phleum pratense	timothy
Phragmites australis	common reed
Plantago lanceolata	English plantain
Plantago major	common plantain
Poa pratensis	Kentucky bluegrass
Podophyllum peltatum	mayapple

Table 2-1

Plant Species Observed at the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Scientific Name	Common Name
Polygala sanguinea	milkwort
Populus deltoides	cottonwood
Potentilla simplex	old field cinquefoil
Prunus americana	wild plum
Prunus serotina	black cherry
Pycnanthemum tenuifolium	slender mountain mint
Quercus palustris	pin oak
Robinia pseudoacacia	black locust
Rosa multiflora	multiflora rose
Rubus allegheniensis	Allegheny blackberry
Rubus flagellaris	dewberry
Rumex acetosella	sheep sorrel
Rumex crispus	curly dock
Salix amygdaloides	peachleaf willow
Salix exigua	sandbar willow
Salix nigra	black willow
Sambucus canadensis	American elder
Satureja vulgaris	basil
Schoenoplectus tabernaemontani	soft stem bulrush
Scirpus atrovirens	green bulrush
Scirpus cyperinus	wool grass
Scirpus pendulus	drooping bulrush
Scirpus polyphyllus	leafy bulrush
Scutellaria lateriflora	mad dog skullcap
Senna hebecarpa	wild senna
Solidago canadensis	Canada goldenrod
Solidago rugosa	wrinkled goldenrod
Spiranthes cernua	nodding ladies' tresses
Taraxacum officinale	dandelion
Teucrium canadense	American germander
Toxicodendron radicans	poison ivy
Tradescantia ohioensis	Ohio spiderwort
Tragopogon porrifolius	salsify
Trifolium hybridum	alsike clover
Trifolium pratense	red clover
Trifolium repens	white clover
Triosteum aurantiacum	wild coffee
Typha sp.	cattail
Urtica dioicia	stinging nettle
Verbascum thapsus	woolly mullein
Vernonia gigantea	ironweed
Vitis aestivalus	summer grape
Vitis riparia	riverbank grape

Table 2-2

Mammals Observed On Site and Likely to Be Found in Erie County, Ohio
Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name	Scientific Name	Common Name	Observed On Site [a]
Didelphidae	*Didelphis virginiana*	Virginia opossum	X
Talpidae	*Condylura cristata*	star-nosed mole (**T**)	
	Parascalops breweri	hairy-tailed mole	
	Scalopus aquaticus	Eastern mole	
Verspertilionidae	*Myotis keenii*	Keen's bat	
	M. lucifugus	little brown bat	
	M. sodalis	Indiana bat **(E*)**	
	Eptesicus fuscus	big brown bat	
	Lasionycteris noctivagans	silver-haired bat	
	Lasiurus borealis	red bat	
	L. cinereus	hoary bat	
	Nycticeius humeralis	evening bat	
	Pipistrellus subflavus	Eastern pipistrelle	
Leporidae	*Sylvilagus floridanus*	cottontail rabbit	X
Sciuridae	*Glaucomys volans*	Southern flying squirrel	
	Marmota monax	woodchuck	
	Sciurus carolinensis	gray squirrel	
	S. niger	fox squirrel	
	Spermophilus tridecemlineatus	thirteen-lined ground squirrel	
	Tamias striatus	Eastern chipmunk	
	Tamiasciurus hudsonicus	red squirrel	
	Blarina brevicauda	short-tailed shrew	
	Cryptotis parva	least shrew	
	Sorex cinereus	masked shrew	

Table 2-2

Mammals Observed On Site and Likely to Be Found in Erie County, Ohio
Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name	Scientific Name	Common Name	Observed On Site [a]
Castoridae	*Castor canadensis*	beaver	
Cricetidae	*Microtus pennsylvanicus*	meadow vole	
	Mus musculus	house mouse	
	Ondatra zibethicus	muskrat	
	Peromyscus leucopus	white-footed mouse	
	P. maniculatus	deer mouse	
	Rattus norvegicus	Norway rat	
	Synaptomys cooperi	Southern bog lemming	
	Zapus hudsonius	meadow jumping mouse	
Procyonidae	*Procyon lotor*	raccoon	X
Mustelidae	*Mephitis mephitis*	striped skunk	
	Mustela frenata	long-tailed weasel	
	M. nivalis	least weasel	
	M. vison	mink	
	Taxidea taxus	Badger (**T**)	
Canidae	*Canis latrans*	coyote	
	Urocyon cinereoargenteus	gray fox	
	Vulpes vulpes	red fox	
Cervidae	*Odocoileus virginianus*	white-tailed deer	X

Mammals likely to be found in Erie County based on information presented in:
Gottschang, J. L., 1981, *A Guide to the Mammals of Ohio*, Ohio State University Press, 176 pages.
T - Ohio threatened species.
E* - Federally endangered species.

[a] Shaw Site Reconnaissance, April 27, June 1, and September 1, 2011.

Table 2-3

Birds Observed On Site and/or Likely to be Breeding in Erie County, Ohio Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name[a]	Scientific Name[b]	Common Name[c]	Status and Frequency
Ardeidae	*Ardea herodias*	great blue heron	(1) Regular visitor at ponds, streams, and ditches.
	Bublucus ibis	cattle egret (**E**)	(1) Rare visitor in short grass areas
	Butorides striatus	green heron	(1) Confirmed breeder, rare at ponds, streams.
	Casmerodius albus	great egret	(1) Regular visitor at ponds, streams, and ditches.
	Nycticorax nycticorax	black-crowned night heron (**T**)	(1) Regular visitor at ponds, streams, and ditches.
Anserinae	*Branta canadensis*	Canada goose	(1) Confirmed breeder; uncommon around ponds.
Anatinae	*Aix sponsa*	Wood duck	(1) Confirmed breeder, uncommon around ponds.
	Anas discors	blue-winged teal	Confirmed and/or probable breeder in county.
	A. platyrhynchos	mallard	(1) Confirmed breeder, uncommon at ponds, streams.
	A. rubripes	American black duck	(1) Possible breeder, rare at ponds, streams, ditches.
Merginae	*Lophodytes cucullatus*	hooded merganser	Confirmed and/or probable breeder in county.
Accipitrinae	*Accipiter striatus*	sharp-shinned hawk	Confirmed and/or probable breeder in county.
Buteoninae	*Buteo jamaicensis*	red-tailed hawk	Confirmed and/or probable breeder in county.
	B. lineatus	red-shouldered hawk	Confirmed and/or probable breeder in county.
	B. platypterus	broad-winged hawk	Confirmed and/or probable breeder in county.
	Haliaeetus leucocephalus	bald eagle (**T**)	Confirmed and/or probable breeder in county.
Anatidae	*Cygnus buccinator*	Trumpeter swan (**E**)	(1) Rare migrant seen flying toward lake.
Falconinae	*Falco sparverius*	American kestrel	Confirmed and/or probable breeder in county.
Phasianidae	*Colinus virginianus*	Northern bobwhite quail	Confirmed and/or probable breeder in county.
	Phasianus colchicus	ring-necked pheasant	Confirmed and/or probable breeder in county.

Table 2-3

Birds Observed On Site and/or Likely to be Breeding in Erie County, Ohio Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name[a]	Scientific Name[b]	Common Name[c]	Status and Frequency
Rallidae	*Gallinula chloropus*	common moorhen	Confirmed and/or probable breeder in county.
	Porzana carolina	Sora	Confirmed and/or probable breeder in county.
Cathartidae	*Cathartes aura*	turkey vulture	Possible breeder in county.
Charadriidae	*Charadrius vociferus*	killdeer	(2*) Confirmed and/or probable breeder in county.
Scolopacidae	*Actitis macularia*	spotted sandpiper	Confirmed and/or probable breeder in county.
	Bartramia longicauda	upland sandpiper (**T**)	(1) Confirmed breeder, rare in grassy areas.
	Gallinago gallinago	common snipe	Confirmed and/or probable breeder in county.
	Scolopax minor	American woodcock	(1) Confirmed breeder, uncommon in moist woodlots.
Larinae	*Larus argentatus*	herring gull	(1) Regular visitor.
	L. delawarensis	ring-billed gull	(1) Regular visitor.
Columbidae	*Columba livia*	rock dove	(1) Confirmed breeder, very common.
	Zenaida macroura	mourning dove	(1) (2*) Confirmed breeder, very common.
Cuculidae	*Coccyzus americanus*	yellow-billed cuckoo	(1) Confirmed breeder, uncommon in woodlots, shrubs.
	C. erythropthalmus	black-billed cuckoo	(1) Probable breeder, rare in woodlots & shruby areas.
Tytonidae	*Bubo virginianus*	great horned owl	(1) Confirmed breeder, uncommon in woodlots.
	Otus asio	Eastern screech-owl	(1) Confirmed breeder, common in woodlots, shrubs.
	Strix varia	barred owl	Confirmed and/or probable breeder in county.
Caprimulgidae	*Chordeiles minor*	common nighthawk	(1) Possible breeder, rare.
Apodidae	*Chaetura pelagica*	chimney swift	(1) Confirmed breeder, uncommon.
Trochilidae	*Archilochus colubris*	ruby-throated hummingbird	(1) Confirmed breeder, uncommon in woodlots, shrubs.
Alcedinidae	*Ceryle alcyon*	belted kingfisher	(1) Confirmed breeder, rare around ponds, streams.

Table 2-3

Birds Observed On Site and/or Likely to be Breeding in Erie County, Ohio
Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name[a]	Scientific Name[b]	Common Name[c]	Status and Frequency
Picidae	*Colaptes auratus*	Northern flicker	(1) Confirmed breeder, common in woodlots.
	Dryocopus pileatus	pileated woodpecker	Confirmed and/or probable breeder in county.
	Melanerpes carolinus	red-bellied woodpecker	(1) (2*) Confirmed breeder, common in mature woods.
	M. erythrocephalus	red-headed woodpecker	(1) Confirmed breeder, uncommon in mature woods.
	Picoides pubescens	downy woodpecker	(1) Confirmed breeder, common in woodlots.
	P. villosus	*hairy woodpecker*	(1) Confirmed breeder, uncommon in large woodlots.
Tyrannidae	*Contopus virens*	Eastern wood-pewee	(1) Confirmed breeder, very common in large woodlots.
	Empidonax alnorum	alder flycatcher	(1) Possible breeder, rare in shrubby wet areas.
	E. minimus	least flycatcher (**T**)	(1) Probable breeder, rare in shrubby areas.
	E. traillii	willow flycatcher	(1) (2*) Confirmed breeder, very common in shrubby areas.
	E. virescens	Acadian flycatcher	(1) Confirmed breeder, uncommon in mature woodlots.
	Myiarchus crinitus	great crested flycatcher	(1) Confirmed breeder, common in large woodlots.
	Sayornis phoebe	Eastern phoebe	(1) Confirmed breeder, common near stream bridges.
	Tyrannus tyrannus	Eastern kingbird	(1) Confirmed breeder, very common - open shrub area.
Alaudidae	*Eremophila alpestris*	horned lark	(1) Probable breeder, rare in grassland, cultiv. fields.
Hirundinidae	*Hirundo pyrrhonota*	cliff swallow	Confirmed and/or probable breeder in county.
	H. rustica	barn swallow	(1) Confirmed breeder, very common near vacant bldgs.
	Progne subis	purple martin	(1) Probable breeder, rare.
	Riparia riparia	bank swallow	(1) Rare migrant or visitor.
	Stelgidopteryx seripennis	Northern rough-winged swallow	(1) Confirmed breeder, rare along streams, ditches.

Table 2-3

Birds Observed On Site and/or Likely to be Breeding in Erie County, Ohio Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name[a]	Scientific Name[b]	Common Name[c]	Status and Frequency
Hirundinidae (continued)	*Tachycineta bicolor*	tree swallow	(1) (2*) Confirmed breeder, rare around ponds.
Corvidae	*Corvus brachyrhynchos*	American crow	(1) Confirmed breeder, very common in woodlots.
	Cyanocitta cristata	blue jay	(1) Confirmed breeder, abundant in woods.
Paridae	*Parus atricapillus*	black-capped chickadee	(1) Confirmed breeder, common in woodlots.
	P. bicolor	tufted titmouse	(1) Confirmed breeder, common in woodlots.
Sittidae	*Sitta carolinensis*	white-breasted nuthatch	(1) Confirmed breeder, uncommon in woodlots.
Troglodytidae	*Cistothorus palustris*	marsh wren	(1) Possible breeder, rare in wetlands with cattails.
	C. platensis	sedge wren	(1) Confirmed breeder, common in old grassy fields.
	Thryothorus ludovicianus	Carolina wren	(1) Probable breeder, rare in shrubby areas & woodlots.
	Troglodytes aedon	house wren	(1) Confirmed breeder, abundant in shrubby areas.
	T. troglodytes	winter wren	(1) Rare migrant.
Mimidae	*Dumetella carolinensis*	gray catbird	(1) (2*) Confirmed breeder, abundant in shrubby areas.
	Mimus polyglottos	Northern mockingbird	(1) Confirmed breeder, rare in shrubby areas.
	Toxostoma rufum	brown thrasher	(1) (2*) Confirmed breeder, common in shrubby areas.
Turdidae	*Catharus fuscescens*	veery	(1) Confirmed breeder, uncommon in large woodlots.
	Hylocichla mustelina	wood thrush	(1) Confirmed breeder, very common in large woodlots.
	Sialia sialis	Eastern bluebird	(1) Confirmed breeder, common in openfields & edges.
	Turdus migratorius	American robin	(1) (2*) Confirmed breeder, abundant everywhere.
Sylviidae	*Polioptila caerulea*	blue-gray gnatcatcher	(1) Confirmed breeder, uncommon in woodlots.
	Regulus calendula	ruby-crowned kinglet	(1) Rare migrant.
Bombycillidae	*Bombycilla cedrorum*	cedar waxwing	(1) Confirmed breeder, very common everywhere.

Table 2-3

Birds Observed On Site and/or Likely to be Breeding in Erie County, Ohio
Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name[a]	Scientific Name[b]	Common Name[c]	Status and Frequency
Sturnidae	*Sturnus vulgaris*	European starling	(1) Confirmed breeder, abundant everywhere.
Vireonidae	*Vireo bellii*	Bell's vireo	Confirmed and/or probable breeder in county.
	V. flavifrons	yellow-throated vireo	(1) Confirmed breeder, uncommon in mature woodlots.
	V. gilvus	warbling vireo	(1) Confirmed breeder, common in large woodlots.
	V. griseus	white-eyed vireo	(1) Confirmed breeder, uncommon in shrubby areas.
	V. olivaceus	red-eyed vireo	(1) Confirmed breeder, very common in woodlots.
Parulidae	*Dendroica cerulea*	cerulean warbler	(1) Possible breeder, rare in mature woodlots.
	D. coronata	yellow-rumped warbler	Probable breeder, uncommon in shrubby areas.
	D. dominica	yellow-throated warbler	(1) Confirmed and/or probable breeder in county.
	D. palmarum	palm warbler	(1) (2) Probable migrant, uncommon in spruce bogs, sandy pine planes.
	D. pensylvanica	chestnut-sided warbler	(1) Probable breeder, uncommon in shrubby areas.
	D. petechia	yellow warbler	(1) (2*) Confirmed breeder, abundant in shrubby areas.
	D. virens	black-throated green warbler	(1) Possible breeder, rare in mature woodlots.
	Geothylpis trichas	common yellowthroat	(1) (2) Confirmed breeder, abundant in shrub areas, fields.
	Icteria virens	yellow-breasted chat	(1) Confirmed breeder, uncommon in shrubby areas.
	Mniotilta varia	black and white warbler	(1) Possible breeder, rare in mature woodlots.
	Oporornis formosus	Kentucky warbler	(1) Possible breeder, rare in mature woodlots.
	Protonotaria citrea	prothonotary warbler	Confirmed and/or probable breeder in county.
	Seiurus aurocapillus	overbird	(1) Probable breeder, rare in mature woodlots.
	S. motacilla	Louisiana waterthrush	Confirmed and/or probable breeder in county.
	Setophaga ruticilla	American redstart	(1) Probable breeder, rare in shrubby areas & woodlots.

Table 2-3

Birds Observed On Site and/or Likely to be Breeding in Erie County, Ohio Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name[a]	Scientific Name[b]	Common Name[c]	Status and Frequency
Parulidae (continued)	*Vermivora leucobronchialis*	Brewster's warbler	(1) Possible breeder, rare in shrubby areas and edges.
	V. pinus	blue-winged warbler	(1) Confirmed breeder, common in shrubby areas.
	Vermivora ruficapilla	Nashville warbler	Possible breeder, rare in mature woodlots.
	Wilsonia citrina	hooded warbler	Confirmed and/or probable breeder in county.
Icteridae	*Agelaius phoeniceus*	red-winged blackbird	(1) (2*) Confirmed breeder, abund. in grasslands, streams.
	Dolichonyx oryzivorus	bobolink	(1) Confirmed breeder, uncommon in grasslands.
	Icterus galbula	Northern oriole	(1) Confirmed breeder, uncommon in open woods.
	I. spurius	orchard oriole	(1) Confirmed breeder, common in open woods & edges.
	Molothrus ater	brown-headed cowbird	(1) (2) Confirmed breeder, abundant everywhere.
	Quiscalus quiscula	common grackle	(1) Confirmed breeder, abundant everywhere.
	Sturnella magna	Eastern meadowlark	(1) Confirmed breeder, common in grasslands.
Ploceidae	*Passer domesticus*	house sparrow	(1) Confirmed breeder, uncommon near buildings.
Thraupidae	*Piranga olivacea*	scarlet tanager	(1) Possible breeder, rare on open woods.
	P. ruba ruba	summer tanager	(1) Confirmed breeder, common in mature woodlots.
Fringillidae	*Ammodramus henslowii*	Henslow's sparrow	(1) Probable breeder, rare in old fields.
	A. savannarum	grasshopper sparrow	(1) Confirmed breeder, common in grasslands.
	Cardinalis cardinalis	Northern cardinal	(1) Confirmed breeder, abundant everywhere.
	Carduelis tristis	American goldfinch	(1)(2*) Confirmed breeder, abundant in shrubby areas.
	Carpodacus mexicanus	house finch	(1) Confirmed breeder, uncommon around buildings.
	Melospiza georgiana	swamp sparrow	(1) Confirmed breeder, rare in wet fields and ditches.

Table 2-3

Birds Observed On Site and/or Likely to be Breeding in Erie County, Ohio Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name[a]	Scientific Name[b]	Common Name[c]	Status and Frequency
Fringillidae (continued)	*M. melodia*	song sparrow	(1) (2*) Confirmed breeder, abundant everywhere.
	Passerculus sandwichensis	Savannah sparrow	(1) Confirmed breeder, common in grasslands.
	Passerina cyanea	indigo bunting	(1) Confirmed breeder, abundant everywhere.
	Pheucticus ludovicianus	rose-breasted grosbeak	(1) Confirmed breeder, common in woodlots & edges.
	Pipilo erythrophthalmus	Eastern towhee	(1) (2*) Confirmed breeder, very common in woodlots, edges.
	Pooecetes gramineus	vesper sparrow	(1) Confirmed breeder, uncommon in grassland & fields.
	Spiza amercana	dickcissel	Confirmed and/or probable breeder in county.
	Spizella passerina	chipping sparrow	(1) Confirmed breeder, common in open woods & lawns.
	S. pusilla	field sparrow	(1) (2*) Confirmed breeder, abundant in grasslands, shrubs.
	Zonotrichia albicollis	white-throated sparrow	(1) Late migrant, rare.

[a] Family names from: Peterson, R. T., 1947, *A Field Guide to the Birds*, Sponsored by the National Audubon Society, Houghton Mifflin Company, Boston, Massachusetts.

[b] Peterjohn, B. G. and D. L. Rice, 1991, *The Ohio Breeding Bird Atlas*, The Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Columbus, Ohio, 416 pages.

[c] E - Ohio Endangered species; T - Ohio Threatened species.

Observation References:

(1) *Biological Inventory of Plum Brook Station* (Ohio Department of Natural Resources, 1994).

(2) Observed during Shaw Site Reconnaissance on April 27 or June 1, 2011. An asterisk (*) indicates the species was detected during the June site visit, and is likely using the site for breeding.

Table 2-4

Reptiles Observed On Site and Likely to be Found at Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name	Scientific Name	Common Name	Observed On Site
Chelydridae	*Chelydra serpentina*	snapping turtle	(1)
Kinosternidae	*Sternotherus odoratus*	musk turtle	
Emydidae	*Chrysemys picta*	painted turtle	(1)
	Emys blandingii	Blanding's turtle	(1)
	Terrapene carolina	box turtle	(1)
Colubridae	*Elaphe vulpina*	fox snake	(1)
	Heterodon platyrhinos	hog-nosed snake	
	Nerodia septemvittata	queen snake	
	N. sipedon sipedon	water snake	(1)
	Opheodrys vernalis	green snake	(1)
	Storeria dekayi	Dekay's brown snake	(1)
	Thamnophis butleri	Butler's garter snake	(1)
	T. sauritus	ribbon snake	
	T. sirtalis	common garter snake	(1)

References:

Conant, R. and J. T. Collins, 1991, *Reptiles and Amphibians, Eastern/Central North America*, Peterson Field Guide, Third Edition, Houghton Mifflin Company, Boston.
Pfingsten, R. A. and F. L. Downs (eds.), 1989, *Salamanders of Ohio*, Ohio Biological Survey Bulletin, New Series, Vol. 7, No. 2, 315 pages, 29 pls.
Wright, A. H. and A. A. Wright, 1957, *Handbook of Snakes of the United States and Canada*, Volumes I and II, Comstock Publishing Associates, Ithaca and London, 1105 pages.
Reference for on-site observation:
(1) *Biological Inventory of Plum Brook Station* (Ohio Department of Natural Resources, 1995).

Table 2-5

Amphibians Observed On Site and Likely to be Found at Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name	Scientific Name	Common Name	Observed On Site
Ambystomatidae	*Ambystoma texanum*	smallmouth salamander	(1)
	Plethodon cinereus	redback salamander	(1)
Bufonidae	*Bufo americanus*	American toad	(1)
Hylidae	*Acris gryllus*	cricket frog	(1)
	Hyla versicolor	gray treefrog	(1)
	Pseudacris crucifer	spring peeper	(1)
	P. triseriata	chorus frog	(1)
Ranidae	*Rana catesbeiana*	bullfrog	(1)
	R. clamitans	green frog	(1)
	R. pipiens	Northern leopard frog	(1)

References:

Conant, R. and J. T. Collins, 1991, *Reptiles and Amphibians, Eastern/Central North America* , Peterson Field Guide, Third Edition, Houghton Mifflin Company, Boston.

Pfingsten, R. A. and F. L. Downs (eds.), 1989, *Salamanders of Ohio* , Ohio Biological Survey Bulletin, New Series, Vol. 7, No. 2, 315 pages, 29 pls.

Reference for on-site observation:

(1) *Biological Inventory of Plum Brook Station* (Ohio Department of Natural Resources, 1995).

Table 2-6

Fish Species Observed at
Former Plum Brook Ordnance Works, Sandusky, Ohio

Family Name	Scientific Name	Common Name	Observed On Site	Habitat[a]
Catostomidae	*Catostomus commersoni*	white sucker	(1)	lotic
Centrarchidae	*Lepomis cyanellus*	green sunfish	(1)	lentic, lotic
	Lepomis species	green sunfish hybrid	(1)	lentic
	L. gibbosus	pumpkinseed sunfish	(1)	lentic
	L. macrochirus	bluegill	(1)	lentic
	Micropterus salmoides	largemouth bass	(1)	lentic
Cyprinidae	*Campostoma anomalum*	central stoneroller	(1)	lotic
	Carassius auratus	goldfish	(1)	lentic
	Luxilus chrysocephalus	striped shiner	(1)	lotic
	Pimephales notatus	bluntnose minnow	(1)	lotic
	P. promelas	fathead minnow	(1)	lotic
	Semotilus atromaculatus	creek chub	(1)	lotic
Gasterosteidae	*Culaea inconstans*	brook stickleback	(1)	lotic
Ichtaluridae	*Ameiurus melas*	black bullhead	(1)	lentic

[a] Lotic - Flowing water such as brooks, ditches, and creeks.
Lentic - Still waters such as ponds and lakes.

Reference for on-site observation:
(1) *Biological Inventory of Plum Brook Station* (Ohio Department of Natural Resources, 1994).

Table 2-7

Summary of Samples Evaluated in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Location	Sample Number	Sample Purpose	Sample Date	Depth (ft)	Analyses
Surface Soil					
FSB-SB01	FSB0001	REG	19-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB01	FSB0017	REG	19-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB01	FSB0018	FD	19-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB02	FSB0002	REG	17-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB02	FSB0020	REG	17-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB03	FSB0003	REG	20-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB03	FSB0004	FD	20-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB03	FSB0021	REG	20-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB04	FSB0006	REG	16-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB04	FSB0022	REG	16-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB05	FSB0007	REG	20-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB05	FSB0023	REG	20-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB06	FSB0008	REG	16-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB06	FSB0024	REG	16-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB07	FSB0009	REG	16-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB07	FSB0025	REG	16-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB08	FSB0010	REG	17-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB08	FSB0026	REG	17-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB09	FSB0011	REG	20-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB09	FSB0027	REG	20-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB10	FSB0012	REG	20-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB10	FSB0028	REG	20-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB10	FSB0029	FD	20-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB11	FSB0013	REG	17-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB11	FSB0031	REG	17-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB12	FSB0014	REG	17-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB12	FSB0032	REG	17-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB13	FSB0015	REG	17-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB13	FSB0033	REG	17-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB14	FSB0016	REG	17-May-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB14	FSB0034	REG	17-May-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB15	FSB0051	REG	30-Jun-11	0 - 1	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SB15	FSB0052	REG	30-Jun-11	3 - 5	Explosives, Gen Chem, Metals, PCB, SVOC, VOC
FSB-SS01	FSB0055	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS02	FSB0056	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS03	FSB0057	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS04	FSB0058	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS05	FSB0059	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS05	FSB0060	FD	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS06	FSB0061	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS07	FSB0062	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS08	FSB0063	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS09	FSB0064	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS10	FSB0065	REG	25-Aug-11	0 - 1	Gen Chem, PCB
FSB-SS14	FSB0070	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS15	FSB0071	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS16	FSB0072	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS17	FSB0073	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS18	FSB0074	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS19	FSB0075	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS20	FSB0076	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS21	FSB0077	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS22	FSB0078	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS23	FSB0079	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS23	FSB0080	FD	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS24	FSB0082	REG	8-Nov-11	0 - 1	Gen Chem, PCB
FSB-SS25	FSB0083	REG	20-Dec-11	0 - 1	Gen Chem, PCB
FSB-SS26	FSB0084	REG	20-Dec-11	0 - 1	Gen Chem, PCB
FSB-SS27	FSB0085	REG	20-Dec-11	0 - 1	Gen Chem, PCB

Table 2-7

Summary of Samples Evaluated in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Location	Sample Number	Sample Purpose	Sample Date	Depth (ft)	Analyses
Sediment Samples					
FSB-SD01	FSB1001	REG	31-Aug-11	0 - 0.3	Explosives, Gen Chem, Metals, PCB, SVOC
FSB-SD02	FSB1002	REG	31-Aug-11	0 - 0.1	Explosives, Gen Chem, Metals, PCB, SVOC
FSB-SD02	FSB1003	FD	31-Aug-11	0 - 0.1	Explosives, Gen Chem, Metals, PCB, SVOC
FSB-SD03	FSB1005	REG	31-Aug-11	0 - 0.1	Explosives, Gen Chem, Metals, PCB, SVOC
FSB-SD04	FSB1006	REG	31-Aug-11	0 - 0.2	Explosives, Gen Chem, Metals, PCB, SVOC
FSB-SD05	FSB1007	REG	31-Aug-11	0 - 0.2	Explosives, Gen Chem, Metals, PCB, SVOC
FSB-SD06	FSB1008	REG	31-Aug-11	0 - 0.2	Explosives, Gen Chem, Metals, PCB, SVOC
Surface Water Samples					
FSB-SW01	FSB2000	REG	9-Jan-12	NA	Explosives, Gen Chem, Metals, SVOC
FSB-SW02	FSB2001	REG	9-Jan-12	NA	Explosives, Gen Chem, Metals, SVOC
FSB-SW02	FSB2002	FD	9-Jan-12	NA	Explosives, Gen Chem, Metals, SVOC
FSB-SW03	FSB2004	REG	9-Jan-12	NA	Explosives, Gen Chem, Metals, SVOC
FSB-SW04	FSB2005	REG	9-Jan-12	NA	Explosives, Gen Chem, Metals, SVOC
FSB-SW05	FSB2006	REG	9-Jan-12	NA	Explosives, Gen Chem, Metals, SVOC
FSB-SW06	FSB2007	REG	9-Jan-12	NA	Explosives, Gen Chem, Metals, SVOC

FD - Field duplicate.
Exp - Explosives.
Gen Chem - General chemistry parameters.
Pest - Organochlorine pesticides.
PCB - Polychlorinated biphenyls.
REG - Regular sample.
SVOC - Semivolatile organic compounds.
VOC - Volatile organic compounds.

Table 2-8

Statistical Summary and COPEC Selection of Chemicals Detected in Soil (0 to 6 Feet bgs)
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Method Detection Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	ESV [b] mg/kg	COPC? [c,d]		95% UCL [e] mg/kg	EPC [f] mg/kg	MDC 0-1' soil depth [g] (mg/kg)	UCL 0-1' soil depth [g] (mg/kg)	EPC 0-1' soil depth [g] (mg/kg)
Inorganics																		
Aluminum	30 / 30	100	4.24E+02		1.35E+04		9.40E-01	2.40E+01	6.47E+03	1.55E+04	pH Dependent	N (b)						
Antimony	4 / 30	13	5.20E-01	J	1.17E+01		4.30E-02	1.00E+00	7.19E-01	9.30E+00	0.27	N (d)						
Arsenic	30 / 30	100	4.00E-01	J	2.15E+01		4.30E-02	1.00E+00	7.59E+00	3.65E+01	18	N (b)						
Barium	30 / 30	100	1.44E+01		1.13E+02		4.70E-02	4.10E+00	5.71E+01	8.26E+02	330	N (b)						
Beryllium	27 / 30	90	8.00E-02	J	7.40E-01	J	4.30E-03	1.00E-01	3.21E-01	1.00E+00	21	N (b)						
Cadmium	14 / 30	47	7.55E-02	J	6.60E+00	J	4.30E-03	1.00E-01	4.12E-01	NA	0.36	Y		9.59E-01	9.59E-01	6.60E+00	1.55E+00	1.55E+00
Calcium	30 / 30	100	4.92E+02		9.94E+04		2.20E+00	5.10E+01	1.98E+04	5.23E+04	Nutrient	N (c)						
Chromium	30 / 30	100	7.90E-01		3.99E+01		4.30E-02	1.00E+00	1.22E+01	2.90E+01	26	N (d)						
Cobalt	29 / 30	97	5.70E-01	J	3.10E+01	J	4.30E-02	1.00E+00	6.08E+00	1.16E+02	13	N (b)						
Copper	30 / 30	100	7.60E-01	J	3.75E+01		4.30E-02	1.00E+00	1.41E+01	5.62E+01	28	N (b)						
Iron	30 / 30	100	4.31E+02		3.36E+04		1.00E+00	2.30E+01	1.54E+04	2.34E+05	pH Dependent	N (b)						
Lead	30 / 30	100	4.40E+00		4.06E+03		4.30E-02	2.20E+00	1.57E+02	4.86E+01	11	Y	h	7.44E+02	7.44E+02	4.06E+03	2.97E+03	2.97E+03
Magnesium	30 / 30	100	5.86E+01	J	1.75E+04		2.20E+00	5.10E+01	4.82E+03	1.04E+04	Nutrient	N (c)						
Manganese	30 / 30	100	4.10E+00		1.38E+03		4.30E-02	1.00E+00	3.63E+02	3.51E+03	220	N (b)						
Mercury	30 / 30	100	1.00E-02	J	2.10E+00		6.30E-03	7.30E-02	1.15E-01	8.50E-02	0.00051	Y	h	4.17E-01	4.17E-01	2.10E+00	7.97E-01	7.97E-01
Nickel	30 / 30	100	2.60E-01	J	4.48E+01		4.30E-02	1.00E+00	1.55E+01	5.51E+01	38	N (b)						
Potassium	30 / 30	100	1.48E+02	J	2.36E+03		2.20E+00	5.10E+01	6.62E+02	3.39E+03	Nutrient	N (c)						
Selenium	13 / 30	43	1.90E-01	J	2.40E+00		8.70E-02	2.00E+00	5.56E-01	2.00E+00	0.52	N (d)						
Silver	3 / 30	10	6.30E-02	J	1.60E-01	J	4.30E-02	1.00E+00	1.54E-01	1.11E+01	4.2	N (b)						
Sodium	14 / 30	47	6.27E+01	J	3.81E+02	J	3.50E+01	8.70E+02	1.57E+02	NA	Nutrient	N (c)						
Vanadium	30 / 30	100	1.20E+00	J	6.71E+01		4.30E-02	1.00E+00	1.91E+01	4.09E+01	7.8	N (d)						
Zinc	30 / 30	100	8.10E-01	J	1.71E+02		4.30E-02	1.00E+00	4.40E+01	3.22E+02	46	N (b)						
Polychlorinated biphenyls (PCB)																		
Aroclor 1254	31 / 54	57	1.16E-02	J	1.21E+01	J	7.60E-03	5.80E+00	1.38E+00		0.371	Y		1.84E+00	1.84E+00	1.21E+01	2.49E+00	2.49E+00
Aroclor 1260	35 / 54	65	1.37E-02	J	4.11E+01	J	7.60E-03	5.80E+00	2.89E+00		0.371	Y		4.47E+00	4.47E+00	4.11E+01	9.27E+00	9.27E+00
Aroclor 1268	26 / 33	79	1.05E-02	J	9.59E+01	J	7.60E-03	5.80E+00	8.02E+00		0.371	Y		2.13E+01	2.13E+01	9.59E+01	2.56E+01	2.56E+01
Semivolatile Organic Compounds																		
Acenaphthene	1 / 30	3	3.64E-02	J	3.64E-02	J	1.80E-02	2.20E-02	2.09E-02		29	N (a)						
Acenaphthylene	2 / 30	7	2.52E-02	J	1.96E-01		1.80E-02	2.20E-02	2.65E-02		29	N (a)						
Anthracene	3 / 30	10	2.25E-02	J	5.90E-01		1.80E-02	2.20E-02	4.13E-02		29	N (a)						
Benzo(a)anthracene	5 / 30	17	3.17E-02	J	1.06E+00		1.80E-02	2.20E-02	5.89E-02		1.1	N (a)						
Benzo(a)pyrene	5 / 30	17	2.73E-02	J	8.85E-01		1.80E-02	2.20E-02	5.32E-02		1.1	N (a)						
Benzo(b)fluoranthene	7 / 30	23	2.02E-02	J	1.15E+00		1.80E-02	2.20E-02	6.52E-02		1.1	Y		1.33E-01	1.33E-01	1.32E-01	5.63E-02	5.63E-02
Benzo(ghi)perylene	3 / 30	10	4.60E-02	J	4.11E-01		1.80E-02	2.20E-02	3.54E-02		1.1	N (a)						
Benzo(k)fluoranthene	4 / 30	13	1.97E-02	J	4.39E-01		1.80E-02	2.20E-02	3.54E-02		1.1	N (a)						
Bis(2-ethylhexyl)phthalate	1 / 30	3	2.30E-01	J	2.30E-01	J	7.40E-02	8.80E-02	8.65E-02		0.925	N (a)						
Carbazole	1 / 30	3	9.42E-02	J	9.42E-02	J	1.80E-02	2.20E-02	2.29E-02		NSV	N (e)						
Chrysene	7 / 30	23	2.06E-02	J	8.85E-01		1.80E-02	2.20E-02	5.39E-02		1.1	N (a)						
Dibenz(a,h)anthracene	1 / 30	3	1.16E-01	J	1.16E-01	J	1.80E-02	2.20E-02	2.36E-02		1.1	N (a)						
Dibenzofuran	1 / 30	3	5.65E-02	J	5.65E-02	J	1.80E-02	2.20E-02	2.16E-02		NSV	N (e)						
Fluoranthene	9 / 30	30	2.18E-02	J	1.99E+00		1.80E-02	2.20E-02	9.86E-02		1.1	Y		2.33E-01	2.33E-01	1.79E-01	6.64E-02	6.64E-02
Fluorene	1 / 30	3	1.91E-01		1.91E-01		1.80E-02	2.20E-02	2.61E-02		1.1	N (a)						
Indeno(1,2,3-cd)pyrene	5 / 30	17	2.16E-02	J	5.13E-01		1.80E-02	2.20E-02	3.93E-02		1.1	N (a)						
Phenanthrene	5 / 30	17	2.66E-02	J	1.52E+00		1.80E-02	2.20E-02	7.38E-02		29	N (a)						
Pyrene	8 / 30	27	2.06E-02	J	1.85E+00		1.80E-02	2.20E-02	9.21E-02		1.1	Y		2.21E-01	2.21E-01	1.78E-01	6.15E-02	6.15E-02
Volatile Organic Compounds																		
Acetone	12 / 17	71	1.83E-02	J	9.85E-02	J	1.30E-02	1.90E-02	3.96E-02		2.5	N (a)						
Benzene	6 / 30	20	1.10E-03	J	4.20E-03		7.70E-04	1.70E-03	1.36E-03		0.255	N (a)						
Butanone, 2-	1 / 27	4	5.35E-03	J	5.35E-03	J	3.90E-03	7.00E-03	4.98E-03		89.6	N (a)						
Ethylbenzene	2 / 30	7	1.30E-03	J	2.60E-03	J	5.10E-04	1.20E-03	8.76E-04		5.16	N (a)						
Hexanone, 2-	4 / 30	13	2.03E-02		5.56E-02		2.80E-03	6.20E-03	8.25E-03		12.6	N (a)						
Methylene chloride	19 / 23	83	4.20E-03	J	9.00E-03		2.90E-03	4.30E-03	5.29E-03		4.05	N (a)						
Toluene	13 / 30	43	9.40E-04	J	1.01E-02		6.10E-04	1.40E-03	1.66E-03		200	N (a)						
Xylenes, total	2 / 30	7	3.40E-03	J	4.90E-03	J	1.60E-03	3.70E-03	2.66E-03		10	N (a)						

bgs - Below ground surface.
BSC - Background screening concentration.
COPEC - Chemical of potential ecological concern.
ESV - Ecological screening value.

Table 2-8

Statistical Summary and COPEC Selection of Chemicals Detected in Soil (0 to 6 Feet bgs)
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Method Detection Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	ESV [b] mg/kg	COPC? [c,d]	95% UCL [e] mg/kg	EPC [f] mg/kg	MDC 0-1' soil depth [g] (mg/kg)	UCL 0-1' soil depth [g] (mg/kg)	EPC 0-1' soil depth [g] (mg/kg)

J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed
mg/kg - Milligrams per kilogram.
UCL - Upper confidence limit.
VQ - Validation qualifier.

[a] IT Corporation (IT), 1998, ***Site Investigation of Acid Areas*** , Plum Brook Ordnance Works, Sandusky, Ohio, August.
[b] ESVs and their sources are in Appendix B.
[c] N = Chemical is not identified as a COPEC:
(a) = maximum detected concentration is less than the ESV.
(b) = maximum detected concentration is less than the BSC.
(c) = essential nutrient.
(d) = statistical test shows background and site data to be the same; see Appendix C.
(e) = infrequently detected (fewer than 5 percent of all samples)
[d] Y = Chemical is identified as a COPEC.
[e] 95% UCL determined using ProUCL Version 4.1 (EPA, 2011, *ProUCL Version 4.1.01* , Technical Support Center, Office of Science Policy, Atlanta, Georgia, July, http://www.epa.gov/osp/hstl/tsc/software.htm).
[f] Concentration used in risk assessment equal to 95% UCL or maximum detected concentration, whichever is lower.
[g] The EPC for the COPEC at the 0-1 foot soil depth range is used as the exposure concentration for some ecological receptors.
[h] Although the results of the statistical analysis indicate that this metal was not significantly different from background, it is retained as a COPEC due to a possible hot spot at sample location FSB-SB09.

Table 2-9

Statistical Summary and COPEC Selection for Chemicals Detected in Surface Water
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent hits	Range of values, µg/L: Detected Concentration Minimum	VQ	Detected Concentration Maximum	VQ	Method Detection Limits Minimum	Method Detection Limits Maximum	Arithmetic Mean µg/L	ESV [a] µg/L	COPEC? [b,c]	95% UCL [d] µg/L	EPC [e] µg/L
Inorganics													
Aluminum	6 / 6	100	4.20E+01	J	2.73E+04		2.00E+01	2.00E+01	5.41E+03	87	Y	9.11E+04	2.73E+04
Arsenic	2 / 6	33	6.00E+00	J	9.90E+00	J	1.00E+00	1.00E+00	3.32E+00	3.1	Y	8.34E+00	8.34E+00
Barium	6 / 6	100	3.53E+01	J	2.73E+02		1.00E+00	1.00E+00	8.50E+01	4	Y	2.01E+02	2.01E+02
Beryllium	1 / 6	17	1.90E+00	J	1.90E+00	J	1.00E-01	1.00E-01	4.00E-01	0.66	Y	NA	1.90E+00
Calcium	6 / 6	100	1.08E+05		1.29E+05		5.00E+01	5.00E+01	1.16E+05	Nutrient	N (b)		---
Chromium	3 / 6	50	2.70E+00	J	4.03E+01		1.00E+00	1.00E+00	8.28E+00	42	N (a)		---
Cobalt	3 / 6	50	1.80E+00	J	2.16E+01	J	1.00E+00	1.00E+00	5.87E+00	23	N (a)		---
Copper	3 / 6	50	3.70E+00	J	6.12E+01		1.00E+00	1.00E+00	1.21E+01	1.58	Y	6.00E+01	6.00E+01
Iron	6 / 6	100	5.55E+01	J	4.11E+04		3.40E+01	3.40E+01	1.10E+04	Nutrient	N (b)		---
Lead	3 / 6	50	3.50E+00	J	6.08E+01		1.00E+00	1.00E+00	1.20E+01	1.17	Y	5.96E+01	5.96E+01
Magnesium	6 / 6	100	2.55E+04		3.25E+04		5.00E+01	5.00E+01	2.89E+04	Nutrient	N (b)		---
Manganese	6 / 6	100	1.92E+01	J	1.90E+03		1.00E+00	1.00E+00	6.00E+02	120	Y	2.55E+03	1.90E+03
Mercury	1 / 6	17	1.20E-01	J	1.20E-01	J	7.10E-02	7.10E-02	7.92E-02	0.0028	Y	9.70E-02	9.70E-02
Nickel	3 / 6	50	4.40E+00	J	6.01E+01		1.00E+00	1.00E+00	1.22E+01	28.9	Y	6.01E+01	6.01E+01
Potassium	6 / 6	100	6.39E+02	J	3.15E+03	J	5.00E+01	5.00E+01	1.58E+03	Nutrient	N (b)		---
Selenium	1 / 6	17	2.30E+00	J	2.30E+00	J	2.00E+00	2.00E+00	2.05E+00	0.39	Y	2.16E+00	2.16E+00
Sodium	6 / 6	100	4.95E+03	J	8.32E+03	J	7.50E+02	7.50E+02	7.15E+03	Nutrient	N (b)		---
Vanadium	3 / 6	50	4.80E+00	J	5.48E+01		1.00E+00	1.00E+00	1.14E+01	12	Y	3.20E+01	3.20E+01
Zinc	3 / 6	50	1.23E+01	J	1.90E+02		1.00E+00	1.00E+00	4.05E+01	65.7	Y	1.12E+02	1.12E+02
Semivolatile Organics													
Bis(2-ethylhexyl)phthalate	1 / 6	17	3.10E+00	J	3.10E+00	J	1.00E+00	1.10E+00	1.41E+00	0.12	Y	2.15E+00	2.15E+00

ESV - Ecological screening value.
EPC - Exposure point concentration.
COPEC - Chemical of potential ecological concern.
µg/L - Micrograms per liter.
VQ - Validation qualifier.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyzed.

[a] ESVs and their sources are in Appendix B.
[b] N = Chemical is not identified as a COPEC:
(a) = maximum detected concentration is less than the ESV.
(b) = essential nutrient.
[c] Y = Chemical is identified as a COPEC.
[d] 95% UCL determined using ProUCL Version 4.1 (EPA, 2011, *ProUCL Version 4.1.01* , Technical Support Center, Office of Science Policy, Atlanta, Georgia, July, http://www.epa.gov/osp/hstl/tsc/software.htm).
[e] Concentration used in risk assessment equal to 95% UCL or maximum detected concentration, whichever is lower.

Table 2-10

Statistical Summary and COPEC Selection for Chemicals Detected in Sediment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Detection Frequency	Percent Detection	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Method Detection Limits Minimum	Maximum	Mean mg/kg	BSC [a] mg/kg	ESV [b] mg/kg	COPC? [c,d]	95% UCL [e] mg/kg	EPC [f] mg/kg
Inorganics														
Aluminum	6 / 6	100	7.42E+03		1.44E+04	J	5.20E+00	8.10E+00	1.01E+04	1.55E+04	NSV	N (b)		---
Arsenic	6 / 6	100	4.60E+00		1.85E+01		2.20E-01	3.40E-01	9.51E+00	3.65E+01	9.79E+00	N (b)		---
Barium	6 / 6	100	4.68E+01		1.22E+02		8.70E-01	1.30E+00	7.78E+01	8.26E+02	NSV	N (b)		---
Beryllium	5 / 6	83	3.85E-01	J	8.20E-01	J	2.20E-02	3.40E-02	4.95E-01	1.00E+00	NSV	N (b)		---
Cadmium	4 / 6	67	1.17E-01	J	1.20E+00		2.20E-02	3.40E-02	3.85E-01	NA	9.90E-01	Y	7.79E-01	7.79E-01
Calcium	6 / 6	100	3.94E+03		1.27E+04	J	1.05E+01	1.70E+01	7.54E+03	5.23E+04	Nutrient	N (c)		---
Chromium	6 / 6	100	1.12E+01		1.81E+01	J	2.20E-01	3.40E-01	1.37E+01	2.90E+01	4.34E+01	N (b)		---
Cobalt	6 / 6	100	4.70E+00	J	1.51E+01	J	2.20E-01	3.40E-01	7.35E+00	1.16E+02	5.00E+01	N (b)		---
Copper	6 / 6	100	1.36E+01		2.58E+01		2.20E-01	3.40E-01	1.95E+01	5.62E+01	3.16E+01	N (b)		---
Iron	6 / 6	100	1.29E+04		3.80E+04		5.00E+00	7.80E+00	2.07E+04	2.34E+05	Nutrient	N (c)		---
Lead	6 / 6	100	1.36E+01		3.45E+01		4.35E-02	6.70E-02	2.29E+01	4.86E+01	3.58E+01	N (b)		---
Magnesium	6 / 6	100	1.14E+03	J	5.29E+03	J	1.05E+01	1.70E+01	2.65E+03	1.04E+04	Nutrient	N (c)		---
Manganese	6 / 6	100	1.11E+02		8.19E+02	J	2.20E-01	3.40E-01	2.91E+02	3.51E+03	4.60E+02	N (b)		---
Mercury	6 / 6	100	5.35E-02	J	1.10E-01	J	6.60E-03	8.30E-03	8.38E-02	8.50E-02	1.80E-01	N (a)		---
Nickel	6 / 6	100	1.00E+01	J	2.93E+01	J	2.20E-01	3.40E-01	1.82E+01	5.51E+01	2.27E+01	N (b)		---
Potassium	6 / 6	100	6.70E+02	J	1.36E+03	J	1.05E+01	1.70E+01	9.69E+02	3.39E+03	Nutrient	N (c)		---
Selenium	4 / 6	67	6.75E-01	J	3.30E+00	J	4.35E-01	6.70E-01	1.53E+00	2.00E+00	NSV	Y	2.46E+00	2.46E+00
Vanadium	6 / 6	100	1.85E+01		2.85E+01		2.20E-01	3.40E-01	2.32E+01	4.09E+01	NSV	N (b)		---
Zinc	6 / 6	100	4.08E+01		9.32E+01	J	2.20E-01	3.40E-01	6.02E+01	3.22E+02	1.21E+02	N (b)		---
Polychlorinated Biphenyls (PCBs)														
Aroclor 1260	6 / 6	100	1.41E-02	J	1.03E+00	J	7.90E-03	2.00E-01	1.91E-01		5.98E-02	Y	6.75E+00	1.03E+00
Aroclor 1268	4 / 4	100	1.32E-02	J	5.17E+00	J	7.90E-03	2.00E-01	1.35E+00		5.98E-02	Y	NA	5.17E+00
Semivolatiles Organic Compounds														
Acenaphthylene	1 / 6	17	1.19E-01	J	1.19E-01	J	2.00E-02	7.90E-02	4.88E-02		5.87E-03	Y	1.21E-01	1.19E-01
Anthracene	1 / 6	17	1.30E-01	J	1.30E-01	J	2.00E-02	7.90E-02	5.06E-02		5.72E-02	Y	1.30E-01	1.30E-01
Benzo(a)anthracene	3 / 6	50	5.12E-02	J	3.96E-01		2.00E-02	7.90E-02	1.08E-01		1.08E-01	Y	2.41E-01	2.41E-01
Benzo(a)pyrene	5 / 6	83	2.41E-02	J	4.46E-01		2.00E-02	7.90E-02	1.21E-01		1.50E-01	Y	4.13E-01	4.13E-01
Benzo(b)fluoranthene	6 / 6	100	3.18E-02	J	7.99E-01		2.00E-02	7.90E-02	2.05E-01		1.04E+01	N (a)		---
Benzo(ghi)perylene	4 / 6	67	2.31E-02	J	3.98E-01		2.00E-02	7.90E-02	1.07E-01		1.70E-01	Y	2.31E-01	2.31E-01
Benzo(k)fluoranthene	3 / 6	50	4.76E-02	J	3.15E-01		2.00E-02	7.90E-02	8.93E-02		2.40E-01	Y	3.15E-01	3.15E-01
Carbazole	1 / 6	17	4.07E-02	J	4.07E-02	J	2.00E-02	7.90E-02	3.58E-02		NSV	Y	5.41E-02	4.07E-02
Chrysene	6 / 6	100	2.69E-02	J	5.92E-01		2.00E-02	7.90E-02	1.56E-01		1.66E-01	Y	4.91E-01	4.91E-01
Dibenz(a,h)anthracene	1 / 6	17	9.96E-02	J	9.96E-02	J	2.00E-02	7.90E-02	4.56E-02		3.30E-02	Y	1.07E-01	9.96E-02
Fluoranthene	6 / 6	100	4.19E-02	J	5.88E-01		2.00E-02	7.90E-02	1.81E-01		4.23E-01	Y	4.81E-01	4.81E-01
Indeno(1,2,3-cd)pyrene	4 / 6	67	2.47E-02	J	3.91E-01		2.00E-02	7.90E-02	1.09E-01		2.00E-01	Y	2.30E-01	2.30E-01
Phenanthrene	3 / 6	50	3.99E-02	J	1.16E-01	J	2.00E-02	7.90E-02	6.10E-02		2.04E-01	N (a)		---
Pyrene	6 / 6	100	3.39E-02	J	5.92E-01		2.00E-02	7.90E-02	1.64E-01		1.95E-01	Y	4.83E-01	4.83E-01

BSC - Background screening concentration. The soil BSC is used for sediment in this evaluation. See text for details
COPEC - Chemical of potential ecological concern.
EPC - Exposure point concentration.
ESV - Ecological screening value.
J - The compound/analyte was positively identified; the reported result is the estimated concentration of the compound/analyte detected in the sample analyze

Table 2-10

Statistical Summary and COPEC Selection for Chemicals Detected in Sediment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

mg/kg - Milligrams per kilogram.
NA - Not available.
NSV - No screening value available.
VQ - Validation qualifier.

[a] Soil background screening concentrations are used for sediment. See text for details.
[b] ESVs and their sources are in Appendix B.
[c] N = Chemical is not identified as a COPEC:
(a) = maximum detected concentration is less than the ESV
(b) = maximum detected concentration is less than the BSC
(c) = essential nutrient.
[d] Y = Chemical is identified as a COPEC.
[e] 95% UCL determined using ProUCL Version 4.1 (EPA, 2011, *ProUCL Version 4.1.01*, Technical Support Center, Office of Science Policy, Atlanta, Georgia, July, http://www.epa.gov/osp/hstl/tsc/software.htm).
[f] Concentration used in risk assessment equal to 95% UCL or maximum detected concentration, whichever is lower.

Table 3-1

Data Used to Model Exposure in the Indicator Wildlife Species
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Indicator Species	Class/ Order	Average Body Weight [a] (kg)	Average Home Range [a] (ha)	Dietary Intake [a] (kg[dw]/day)	Soil/Sed. Intake (kg[dw]/day)	Water Intake (L/day) [b]	Trophic Level	Dietary Composition [a] (percent)
Deer mouse (*Peromyscus maniculatus*)	Mammalia/ Rodentia	0.0148	0.062	0.0028 [d]	0.000056 (2%)	0.0022	Omnivore	Terr. Inverts. : 39 Plants: 61
Eastern cottontail *(Sylvilagus floridanus)*	Mammalia/ Lagomorpha	1.132	3.1	0.096 [d]	0.006 (6.3%)	0.11	Herbivore	Plants: 100
Short-tailed shrew *(Blarina brevicauda)*	Mammalia/ Insectivora	0.015	0.39	0.0022 [d]	0.00023 (10.4%)	0.0023	Insectivore	Terr. Inverts.: 100
White-tailed deer (*Odocoileus virginianus*)	Mammalia/ Artiodactyla	61[c]	518[c]	2.0 [d]	0.04 (2%)	4	Herbivore	Plants: 100
Marsh wren (*Cistothorus palustris*)	Aves/ Passeriformes	0.01	0.054	0.0029 [d]	0.000058 (2%)	0.0027	Insectivore	Terr. Inverts.: 100
Red-tailed hawk (*Buteo jamaicensis*)	Aves/ Falconiformes	0.957	842	0.057 [d]	0.00114 (2%)	0.057	Carnivore	Rabbits: 25.3 Shrews: 25.3 Mice: 25.3 Birds: 24
Raccoon (*Procyon lotor*)	Mammalia/ Carnivora	5.1	156	0.26 [d]	0.024 (9.4%) (assumed 50% soil and 50% sediment)	0.43	Omnivore	Aq. Inverts.: 22 Terr. Inverts.: 30 Mice: 5 Plants: 42 (50% terrestrial, 50% aquatic)

[a] From EPA (1993), except as noted.

[b] Allometric equations for mammals and birds from EPA (1993), as follows:

Mammals: WI (water ingestion; L/day) = 0.099 $Wt^{0.90}$ (kg), where Wt = body weight.

Birds: WI (L/day) = 0.059 $Wt^{0.67}$ (kg).

[c] Information is from *A Guide to the Mammals of Ohio* (Gottschang, 1981).

[d] Allometric equation for mammals: FI (kg/day) = 0.0687 $Wt^{0.822}$ for shrew, deer, and raccoon; FI (g/day) = 0.621 $Wt^{0.564}$ for rodents (deer mouse); and FI (g/day) = 0.577 $Wt^{0.727}$ for small herbivores (cottontail).
Allometric equation for birds: FI (kg/day) = 0.0582 Wt0.651 (EPA, 1993), where FI = food ingestion (dry weight) and Wt = body weight. Allometric equations from EPA (1993).

References

U.S. Environmental Protection Agency (EPA), 1993, Wildlife Exposure Factors Handbook, Vols. I and II, Office of Research and Development, Washington, DC, EPA/600/R-93/187a.

Table 3-2

Bioaccumulation Factors or Regression
Equations Utilized for the Soil-to-Plant and Sediment-to-Aquatic Plant Pathways
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

COPEC in Soil or Sediment	EPA, 2008	Efroymson et al., 2001 Minimum BAF/BCF	Median BAF/BCF	90th Percentile BAF/BCF[b]	Maximum BAF/BCF	Other BAF/BCF (1)		Regression Equation (2)	Recommended BAF/BCF (3)	Source
Inorganics										
Cadmium	ln (AGP)=0.546(ln[soil])-0.475	0.0087	0.59	3.3	23	0.35	a	ln (AGP)=0.55(ln[soil])-0.48	Eco-SSL Regression	EPA (2008), Table 4a
Lead	ln (AGP)=0.561(ln[soil])-1.328	0.00011	0.039	0.47	11	0.0011	c	--	Eco-SSL Regression	EPA (2008), Table 4a
Mercury	--	0.0015	0.65	5	12	0.55	a	ln (AGP)=0.54(ln[soil])-1.00	Regression Equation	Efroymson et al. (2001)
Selenium	ln (AGP)=1.104(ln[soil])-0.677	0.02	0.67	3	77	0.025	a	ln (AGP)=0.56(ln[soil])+1.58	Eco-SSL Regression	EPA (2008), Table 4a
PCBs										
Aroclor 1254	--	--	--	--	--	--		Log (BCF)=-0.578(Log[Kow])+1.588	0.009	Travis & Arms Kow Regression Eq.
Aroclor 1260	--	--	--	--	--	--		Log (BCF)=-0.578(Log[Kow])+1.588	0.0045	Travis & Arms Kow Regression Eq.
Aroclor 1268	--	--	--	--	--	--		Log (BCF)=-0.578(Log[Kow])+1.588	0.53	Travis & Arms Kow Regression Eq.
Semivolatile Organics										
Acenaphthylene	ln (AGP)=0.791(ln[soil])-1.144	--	--	--	--	--		--	Eco-SSL Regression	EPA (2008), Table 4b
Anthracene	ln (AGP)=0.7784(ln[soil])-0.9887	--	--	--	--	--		--	Eco-SSL Regression	EPA (2008), Table 4b
Benzo(a)anthracene	ln (AGP)=0.5944(ln[soil])-2.7078	--	--	--	--	--		--	Eco-SSL Regression	EPA (2008), Table 4b
Benzo(a)pyrene	ln(AGP) = 0.975(ln[soil])-2.0615	--	--	--	--	--		--	Eco-SSL Regression	EPA (2008), Table 4b
Benzo(b)fluoranthene	0.31	--	--	--	--	0.31	b	--	0.31	EPA (2008), Table 4b
Benzo(ghi)perylene	ln(AGP) = 1.1829(ln[soil])-0.9313	--	--	--	--	--		--	Eco-SSL Regression	EPA (2008), Table 4b
Benzo(k)fluoranthene	ln(AGP) = 0.8595(ln[soil])-2.1579	--	--	--	--	--		--	Eco-SSL Regression	EPA (2008), Table 4b
Carbazole	--	--	--	--	--	--		Log (BCF)=-0.578(Log[Kow])+1.588	0.53	Travis & Arms Kow Regression Eq.
Chrysene	ln (AGP)=0.5944(ln[soil])-2.7078	--	--	--	--	--		--	Eco-SSL Regression	EPA (2008), Table 4b
Dibenz(a,h)anthracene	0.13	--	--	--	--	0.13	b	--	0.13	EPA (2008), Table 4b
Fluoranthene	0.5	--	--	--	--	0.5	b	--	0.5	EPA (2008), Table 4b
Indeno(1,2,3-cd)pyrene	0.11	--	--	--	--	0.11	b	--	0.11	EPA (2008), Table 4b
Pyrene	0.72	--	--	--	--	0.72	b	--	0.72	EPA (2008), Table 4b

Notes:

1. For inorganic chemicals without BAF/BCF data, BAF/BCFs were derived from the Baes et al. (1984) and IAEA (1994) data.
2. Efroymson, R.A., et. al., 2001, *Uptake of Inorganic Chemicals from Soil by Plant Leaves: Regressions of Field Data*, Environ. Tox. Chem., 20:2561-2571 for AGP (above ground plant tissue concentration) and Travis and Arms (1988) for BCF.
3. For the values estimated using Travis and Arms (1988) Kow regression equation, Kow values were obtained using the Kow WIN application in EPA's EPI Suite software (http://www.epa.gov/oppt/exposure/pubs/episuite.htm).

[a] Average of the vegetative and reproductive transfer factors presented in Baes et al. (1984); note: value from this reference used if no appropriate value available from IAEA (1994).
[b] From EPA (2008).
[c] IAEA (1994); note: value from this reference used, compared with Baes et al. (1984), as IAEA (1994) is more current.
International Atomic Energy Agency (IAEA), 1994, Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Temperate Environments, Technical Report Series No. 364, Vienna.

References:

Baes, C. F., 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, September.
Efroymson, R.A., et. al., 2001, *Uptake of Inorganic Chemicals from Soil by Plant Leaves: Regressions of Field Data*, Environ. Tox. Chem., 20:2561-2571
EPA, 2008, *Guidance for Developing Ecological Soil Screening Levels (Eco-SSL)*, Office of Solid Waste and Emergency Response, OSWER 9285.7-55, November.
Travis, C.C., and A.D. Arms, 1988, *Bioconcentration of Organics in Beef, Milk, and Vegetation*, Enironmental Science and Technology 22(3): 271-274.

Table 3-3

Bioaccumulation Factors or Regression Equations
Utilized for the Soil-to-Earthworm Pathway
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Constituent	PBOW Site-Specific BCF [a]	Sample, et al. 1998			Beyer, 1990 BAF/BCF	Regression Equation	Recommended BAF/BCF	Source of BAF/BCF	Rationale for BAF/BCF
		Median BAF/BCF	90th Percentile BAF/BCF	Maximum BAF/BCF					
Inorganics									
Cadmium	--	7.708	40.69	190	--	ln (EW)=0.795(ln[soil])+2.114	Regression Equation	EPA 2008, Table 4a	Chemical-specific regression equation
Lead	--	0.266	1.522	228.261	--	ln (EW)=0.807(ln[soil])-0.218	Regression Equation	EPA 2008, Table 4a	Chemical-specific regression equation
Mercury	--	1.693	20.625	33	--	ln (EW)=0.33(ln[soil])+0.078	Regression Equation	Sample et al. 1998	Chemical-specific regression equation
PCBs									
Aroclor 1254	--	--	--	--	--	Calculated; see footnote b	16.01	See footnote b	
Aroclor 1260	--	--	--	--	--	Calculated; see footnote b	17.3	See footnote b	
Aroclor 1268	--	--	--	--	--	Calculated; see footnote b	14.2	See footnote b	
Semivolatile Organics									
Benzo(b)fluoranthene	0.21	--	--	--	0.319	--	0.21	Site field study	Plum Brook site-specific BAF (IT, 2001)
Fluoranthene	0.21	--	--	--	0.079	--	0.21	Site field study	Plum Brook site-specific BAF (IT, 2001)
Pyrene	0.45	--	--	--	0.092	--	0.45	Site field study	Plum Brook site-specific BAF (IT, 2001)

-- indicates that a BAF/BCF or regression equation is not available.
BAF - Bioaccumulation factor.
BCF - Bioconcentration factor.
EW - Earthworm tissue concentration
PAH - Polynuclear aromatic hydrocarbon

[a] IT Corporation (IT), 2001, *Redwater Pond Areas Baseline Ecological Risk Assessment, Plum Brook Ordnance Works, Sandusky, Ohio*, prepared for U.S. Army Corps of Engineers, Nashville District, April.

[b] For Organics: Ecological Soil Screening Level (SSL) Guidance, EPA, 2008 (Section 3.2.2 in Appendix 4-1, given site-specific soil total organic carbon [TOC]).
The biota/soil water partitioning coefficient of $10^{(logKow-0.6)}$ was replaced with Equation 3 from Jager (1998) of F_{lipid} x Kow. The F_{water} variable of Equation 3 was not included, since it only improves the model fit for extremely hydrophilic compounds (i.e. chemicals with log Kow < 2, approximately).

$$BAF - \frac{Flipid * Kow}{FOC * 10^{(0.983 * logKow + 0.00028)}}$$

Flipid = 0.079 The lipid content in insects was estimated at 3.1 percent fresh weight (Taylor, 1975), which is 7.9 percent of dry weight, using a value of 61 percent water content in beetles (EPA, 1993), calculated as follows: 0.031/(1-0.61) = 0.079, or 7.9 percent.

Kow values obtained from EPA EPI Suite Version 4.0, http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm

References:

Beyer, W. N., 1990, *Evaluating Soil Contamination, Biological Report 90(2)*, U.S. Department of the Interior, U.S. Fish and Wildlife Service.
EPA, 1993, *Wildlife Exposure Factors Handbook, Volume I of II*, EPA 600/R-93/187a.
EPA, 2008, *Guidance for Developing Ecological Soil Screening Levels (Eco-SSL)*, Office of Solid Waste and Emergency Response, Directive 92857.7-55, Washington, D.C.
IT Corporation (IT), 2001, *Redwater Pond Areas Baseline Ecological Risk Assessment, Plum Brook Ordnance Works, Sandusky, Ohio*, prepared for U.S. Army Corps of Engineers, Nashville District, April.
Jager, T., 1998, *Mechanistic Approach for Estimating Bioconcentration of Organic Chemicals in Earthworms (Oligochaeta)*, Environmental Toxicology and Chemistry 17: 2080-2090.
Sample, B. E, et. al., 1998, *Development and Validation of Bioaccumulation Models for Earthworms*, ES/ER/TM-220.
Taylor, R. L., 1975, Butterflies in My Stomach, Woodbridge Press Publishing Company, Santa Barbara, California.

Table 3-4

Bioaccumulation Factors or Regression Equations Utilized for the
Soil-to-Mammal/Bird[a] Pathway
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, OH

Constituent	Sample et al., (1998)						EPA (1999)	Other BAF		Regression Equation	Recommended BAF	Rationale for Recommended BAF
	Insectivore Median BAF	Herbivore Median BAF	Omnivore Median BAF	General[b] Median BAF	General[b] Maximum BAF	General[b] 90th percentile BAF	Maximum BAF Avian or Mammal					
Inorganics												
Cadmium	2.105	0.1258	0.1217	0.3333	69.561	3.9905	0.0044	--	--	ln (M)=0.4723(ln[soil]) -1.2571	Regression	EPA (2008)-Attach 4-1, Table 4a
Lead	0.1601	0.0522	0.0659	0.1054	2.659	0.2864	--	--	--	ln (M)=0.4422(ln[soil]) +0.0761	Regression	EPA (2008)-Attach 4-1, Table 4a
Mercury	1.046	0.0239 d	0.0543	0.0543	1.046	0.192	--	--	--	--	0.192	"General: 90th Percentile" used because of uncertainties regarding the type of mammalian prey items.
PCBs												
Aroclor 1254	--	--	--	--	--	--	1.32E-03	--	--	--	0.00132	EPA (1999), max for any taxa in Table D-3
Aroclor 1260	--	--	--	--	--	--	1.32E-03	--	--	--	0.00132	EPA (1999), max for any taxa in Table D-3
Aroclor 1268	--	--	--	--	--	--	1.32E-03	--	--	--	0.00132	EPA (1999), max for any taxa in Table D-3
Semivolatile Organics												
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	0	EPA (2008) recommendation for PAHs
Benzo(ghi)perylene	--	--	--	--	--	--	--	--	--	--	0	EPA (2008) recommendation for PAHs
Fluoranthene	--	--	--	--	--	--	--	--	--	--	0	EPA (2008) recommendation for PAHs
Pyrene	--	--	--	--	--	--	--	--	--	--	0	EPA (2008) recommendation for PAHs

-- indicates that a BAF is not available.
BAF = Bioaccumulation factor
M = Mammal (or bird) tissue concentration
[a] Bird BAF values were based on the recommended small mammal BAF values, as bird uptake values are not readily available.
[b] "General" indicates that the combination dataset used for insectivore, herbivore, and omnivore receptors was used to estimate a "general" receptor BAF value.
[c] The median BAF of 1.1 for dioxin (TCDD) from Sample et al. (1998) is used as a conservative surrogate for organic chemicals.

References:

EPA, 2008, *Guidance for Developing Ecological Soil Screening Levels (Eco-SSL)* , Office of Solid Waste and Emergency Response, Directive 92857.7-55, Washington, D.C.
EPA, 1999, *Screening level ecological risk assessment protocol for hazardous waste combustion facilities* , August, EPA530-D-99-001A.
Sample et al., 1998, *Development and Validation of Bioaccumulation Models for Small Mammals,* ES/ER/TM-219.

Table 3-5

Bioaccumulation Factors Utilized
for the Sediment-to-Benthic Invertebrate Pathway
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Constituent	PBOW Site-Specific BCFs [a]	Bechtel Jacobs (1998)			EPA (1999) BAF/BCF	Other BAF/BCF	Recommended BAF/BCF	Rationale for Recommended BAF/BCF
		Median BAF/BCF	90th Percentile BAF/BCF	Maximum BAF/BCF				
		(dry weight)	(dry weight)	(dry weight)	(dry weight)	(dry weight)	(dry weight)	
Inorganics								
Cadmium	--	0.6	7.99	41.55	17	--	0.6	Median Bechtel (1998) BAF based on empirical data
Selenium	--	--	--	--	5.39 [a]	--	5.39	EPA, 1999
Polychlorinated Biphenyls (PCBs)								
Aroclor 1260	--	4.67	21.89	51.31	3.2	--	3.2	EPA (1999) BAF based on empirical data; based on Aroclor 1254
Aroclor 1268	--	4.67	21.89	51.31	3.2	--	3.2	EPA (1999) BAF based on empirical data; based on Aroclor 1254
Semivolatiles Organic Compounds								
Acenaphthylene	--	--	--	--	--	1.95 [b]	1.95	Maruya et al. (1997) BAF based on empirical data; based on acenapthene
Anthracene	--	--	--	--	--	0.18 [b]	0.18	Maruya et al. (1997) BAF based on empirical data
Benzo(a)anthracene	--	--	--	--	1.45	0.34 [b]	1.45	EPA (1999) BAF based on empirical data; based on benzo(a)pyrene
Benzo(a)pyrene	--	--	--	--	1.59	0.12 [b]	1.59	EPA (1999) BAF based on empirical data
Benzo(ghi)perylene	--	--	--	--	--	0.21 [b]	0.21	Maruya et al. (1997) BAF based on empirical data
Benzo(k)fluoranthene	--	--	--	--	1.61	0.22 [b]	1.61	EPA (1999) BAF based on empirical data; based on benzo(a)pyrene
Carbazole	--	--	--	--	--	--	--	
Chrysene	--	--	--	--	8.27	0.19 [b]	8.27	EPA (1999) BAF based on empirical data
Dibenz(a,h)anthracene	--	--	--	--	1.61	0.14 [b]	1.61	EPA (1999) BAF based on empirical data; based on benzo(a)pyrene
Fluoranthene	--	--	--	--	--	0.2 [b]	0.2	Maruya et al. (1997) BAF based on empirical data
Indeno(1,2,3-cd)pyrene	--	--	--	--	1.61	0.048 [b]	1.61	Maruya et al. (1997) BAF based on empirical data
Pyrene	--	--	--	--	--	0.42 [b]	0.42	Maruya et al. (1997) BAF based on empirical data

"--" indicates that a BAF/BCF or regression equation is not available.
BAF - Bioaccumulation factor.
BCF - Bioconcentration factor.

[a] Empirical data not available in EPA, 1999. Value presented is based on the mean of 6 recommended values for metals with empirical data as presented in Table C-6 (EPA, 1999).

[b] Maruya, K. A., R. W. Risebrough, and A. J. Horne, 1997, *The bioaccumulation of polynuclear aromatic hydrocarbons by benthic invertebrates in an intertidal marsh*, Environmental Toxicology and Chemistry, 16: 1087 - 1097. The polycyclic aromatic hydrocarbon (PAH) biota-sediment accumulation factors (BSAF) for polychaetes or clams (naphthalene; indeno[1,2,3]perylene]) were averaged. The averaged values were then adjusted using the average percent lipid content in the study (polychaetes = 1.6%, clams = 1.1%) and an assumed organic carbon content of 10% for site sediments (if site specific data not available). An adjustment was also made for converting the BSAFs from wet weight to dry weight, assuming 83.3% moisture content. The final dry weight BAFs were calculated using the following equation:
$BSAF_{DW}$ = BSAF x (Flipid/Foc) x 1/(1- % moisture/100)

References:

Bechtel Jacobs Company LLC, 1998, *Biota Sediment Accumulation Factors for Invertebrates: Review and Recommendations for the Oak Ridge Reservation*, BJC/OR-112. (Depurated and nondepurated results used).
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Table 4-1

Toxicity Reference Values for Mammals
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference
Inorganics								
Aluminum	--	1.93	mouse	Sample, et al. (1996)	--	19.30	mouse	Sample, et al. (1996)
Arsenic	--	0.126	mouse	Sample, et al. (1996)	--	1.26	mouse	Sample, et al. (1996)
Barium	--	5.1	rat	Sample, et al. (1996)	--	19.8	rat	Sample, et al. (1996)
Beryllium	--	0.66	rat	Sample, et al. (1996)	0.66 (NOAEL)	3.3	rat	Sample, et al. (1996)
Cadmium	--	1	rat	Sample, et al. (1996)	--	10	rat	Sample, et al. (1996)
Copper	--	11.7	mink	Sample, et al. (1996)	--	15.14	mink	Sample, et al. (1996)
Lead	--	8	rat	Sample, et al. (1996)	--	80	rat	Sample, et al. (1996)
Manganese	--	88	rat	Sample, et al. (1996)	--	284	rat	Sample, et al. (1996)
Mercury (mink)	--	1	mink	Sample, et al. (1996)	1.0 (NOAEL)	5	mink	Sample, et al. (1996)
Mercury (mouse)	--	13.2	mouse	Sample, et al. (1996)	--	132	mouse	Sample, et al. (1996)
Nickel	--	40	rat	Sample, et al. (1996)		80	rat	Sample, et al. (1996)
Selenium	--	0.2	rat	Sample, et al. (1996)	--	0.33	rat	Sample, et al. (1996)
Vanadium	--	0.21	rat	Sample, et al. (1996)	--	2.1	rat	Sample, et al. (1996)
Zinc	--	160	rat	Sample, et al. (1996)	--	320	rat	Sample, et al. (1996)
PCBs								
Aroclor-1254 (mink)	--	0.140	mink	Sample, et al. (1996)	--	0.69	mink	Sample, et al. (1996)
Aroclor-1254 (mouse)	--	0.068	mouse	Sample, et al. (1996)	--	0.68	mouse	Sample, et al. (1996)
Aroclor-1260	--	0.068	mouse	Aroclor-1254 as surrogate; Sample, et al. (1996)	--	0.68	mouse	Sample, et al. (1996)
Aroclor-1268	--	0.068	mouse	Aroclor-1254 as surrogate; Sample, et al. (1996)	--	0.68	mouse	Sample, et al. (1996)
Semivolatile Organics								
Acenaphthylene	--	100	Rat	Sample, et al. (1996)	--	500	Rat	Sample, et al. (1996)
Anthracene	--	70	Mouse	LANL (2012)	--	700	Mouse	LANL (2012)
Benzo(a)anthracene	--	0.17	mouse	LANL (2010)	--	0.85	mouse	LANL (2010)
Benzo(a)pyrene	--	1	mouse	Sample, et al. (1996)	--	10	mouse	Sample, et al. (1996)
Benzo(b)fluoranthene	40 (Chronic LOAEL)	4	rodent	LANL (2010)	--	20	rodent	LANL (2010)
Benzo(ghi)perylene	72 (Chronic LOAEL)	7.2	rodent	LANL (2010)	--	72	rodent	LANL (2010)
Benzo(k)fluoranthene	72 (Chronic LOAEL)	7.2	rodent	LANL (2010)	--	72	rodent	LANL (2010)
Bis(2-ethylhexyl)phthalate	--	18.3	mouse	Sample, et al. (1996)	--	183		Sample, et al. (1996)
Carbazole	0.00023 (Chronic LOAEL)	22.8	mouse	LANL (2012)	--	228	mouse	LANL (2012)
Chrysene	--	0.17	mouse	LANL (2010)	--	0.85	mouse	LANL (2010)
Dibenz(a,h)anthracene	13.3 (Chronic LOAEL)	1.33	mouse	LANL (2010)	--	13.3	mouse	LANL (2010)
Fluoranthene	125 (subchronic NOAEL)	12.5	mouse	LANL (2010)	--	62.5	mouse	LANL (2010)
Indeno(1,2,3-cd)pyrene	72 (chronic LOAEL)	7.2	rodent	LANL (2010)	--	36	rodent	LANL (2010)
Pyrene	75 (subchronic NOAEL)	7.5	mouse	LANL (2010)	--	37.5	mouse	LANL (2010)

NA - No toxicity data available.

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Table 4-2

Toxicity Reference Values for Birds
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

COPEC	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference
Inorganics								
Aluminum	--	110	ringed dove	Sample, et al. (1996)	--	1100	ringed dove	Sample, et al. (1996)
Arsenic	--	5.14	mallard duck	Sample, et al. (1996)	--	12.84	mallard duck	Sample, et al. (1996)
Barium	--	20.8	chicks	Sample, et al. (1996)	--	41.7	chicks	Sample, et al. (1996)
Beryllium	NA							
Cadmium	--	1.45	mallard duck	Sample, et al. (1996)	--	20	mallard duck	Sample, et al. (1996)
Copper	--	47	chicks	Sample, et al. (1996)	--	61.7	chicks	Sample, et al. (1996)
Lead (quail)	--	1.13	Japanese quail	Sample, et al. (1996)	--	11.3	Japanese quail	Sample, et al. (1996)
Lead (kestrel)	--	3.85	Am. Kestrel	Sample, et al. (1996)	--	38.50	Am. Kestrel	Sample, et al. (1996)
Manganese	--	977	Japanese quail	Sample, et al. (1996)	--	9770	Japanese quail	Sample, et al. (1996)
Mercury	--	0.45	Japanese quail	Sample, et al. (1996)	--	0.9	Japanese quail	Sample, et al. (1996)
Nickel	--	77.4	mallard duck	Sample, et al. (1996)	--	107.0	mallard duck	Sample, et al. (1996)
Selenium (duck)	--	0.5	mallard duck	Sample, et al. (1996)	--	1	mallard duck	Sample, et al. (1996)
Selenium (owl)	--	0.44	screech owl	Sample, et al. (1996)	--	1.5	screech owl	Sample, et al. (1996)
Vanadium	--	11.38	mallard duck	Sample, et al. (1996)		113.8	mallard duck	Sample, et al. (1996)
Zinc	--	14.5	hens	Sample, et al. (1996)	--	131	hens	Sample, et al. (1996)
PCBs								
Aroclor-1254	--	0.18	ring neck pheasant	Sample, et al. (1996)	--	1.8	ring neck pheasant	Sample, et al. (1996)
Aroclor-1260	--	0.18	ring neck pheasant	Aroclor-1254 as surrogate; Sample, et al. (1996)	--	1.8	ring neck pheasant	Aroclor-1254 as surrogate; Sample, et al. (1996)
Aroclor-1268	--	0.18	ring neck pheasant	Aroclor-1254 as surrogate; Sample, et al. (1996)	--	1.8	ring neck pheasant	Aroclor-1254 as surrogate; Sample, et al. (1996)
Semivolatile Organics								
Acenaphthylene	--	1.0	chicken	BaP as surrogate; EPA (1999)	--	5	chicken	BaP as surrogate; EPA (1999)
Anthracene	--	1.0	chicken	BaP as surrogate; EPA (1999)	--	5	chicken	BaP as surrogate; EPA (1999)
Benzo(a)anthracene	7 (subchronic NOAEL)	0.7	Bobwhite quail	LANL (2010)	--	3.5	Bobwhite quail	LANL (2010)
Benzo(a)pyrene	--	1	chicken	EPA (1999)	--	5	chicken	EPA (1999)
Benzo(b)fluoranthene	--	0.14	chicken	EPA (1999)	--	0.7	chicken	EPA (1999)
Benzo(ghi)perylene	--	1	chicken	BaP as surrogate; EPA (1999)	--	5	chicken	BaP as surrogate; EPA (1999)
Benzo(k)fluoranthene	--	1	chicken	BaP as surrogate; EPA (1999)	--	5	chicken	BaP as surrogate; EPA (1999)
Bis(2-ethylhexyl)phthalate	--	1	ringed dove	Sample, et al. (1996)	--	11	ringed dove	Sample, et al. (1996)
Carbazole	NA							
Chrysene	--	1	chicken	BaP as surrogate; EPA (1999)	--	5	chicken	BaP as surrogate; EPA (1999)
Dibenz(a,h)anthracene	--	1	chicken	BaP as surrogate; EPA (1999)	--	5	chicken	BaP as surrogate; EPA (1999)
Fluoranthene	--	39.5	chicken	Rigdon and Neal, 1963	--	395	chicken	Rigdon and Neal, 1963
Indeno(1,2,3-cd)pyrene	--	1	chicken	EPA (1999)	--	5	chicken	EPA (1999)
Pyrene	--	39.5	chicken	Rigdon and Neal (1963)	--	395	chicken	Rigdon and Neal (1963)

NA - No toxicity value available.

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Table 5-1

Wildlife Hazard Quotients for all Assessment Receptors
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

	Deer Mouse		Short-tailed Shrew		Cottontail Rabbit		Marsh Wren		White-tailed Deer		Raccoon		Red-Tailed Hawk	
COPEC	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Metals														
Aluminum	**2.10E+00**	2.10E-01	**2.17E+00**	2.17E-01	3.59E-01	3.59E-02	6.70E-02	6.70E-03	1.45E-03	1.45E-04	6.20E-03	6.20E-04	1.42E-05	1.42E-06
Arsenic	9.84E-03	9.84E-04	1.02E-02	1.02E-03	1.68E-03	1.68E-04	4.38E-04	1.75E-04	6.78E-06	6.78E-07	2.90E-05	2.90E-06	9.29E-08	3.72E-08
Barium	5.85E-03	1.51E-03	6.03E-03	1.55E-03	9.98E-04	2.57E-04	2.61E-03	1.30E-03	4.03E-06	1.04E-06	1.72E-05	4.44E-06	5.53E-07	2.76E-07
Beryllium	4.28E-04	8.56E-05	4.41E-04	8.83E-05	7.30E-05	1.46E-05	NA	NA	2.95E-07	5.90E-08	1.26E-06	2.52E-07	NA	NA
Cadmium	9.65E-01	9.65E-02	1.19E+00	1.19E-01	1.97E-02	1.97E-03	**2.36E+00**	1.71E-01	3.21E-05	3.21E-06	1.07E-03	1.07E-04	1.51E-05	1.09E-06
Copper	7.62E-04	5.89E-04	7.86E-04	6.08E-04	1.30E-04	1.01E-04	3.45E-04	2.63E-04	5.25E-07	4.06E-07	2.25E-06	1.74E-06	7.31E-08	5.57E-08
Lead	**6.46E+00**	6.46E-01	**4.48E+00**	4.48E-01	5.84E-01	5.84E-02	**1.46E+02**	**1.46E+01**	1.65E-04	1.65E-05	9.93E-03	9.93E-04	1.44E-03	1.44E-04
Manganese	3.21E-03	9.94E-04	3.31E-03	1.03E-03	5.48E-04	1.70E-04	5.25E-04	5.25E-05	2.21E-06	6.85E-07	9.46E-06	2.93E-06	1.11E-07	1.11E-08
Mercury	8.68E-03	8.68E-04	9.48E-03	9.48E-04	6.30E-04	6.30E-05	6.57E-01	3.28E-01	9.23E-07	9.23E-08	1.10E-04	2.20E-05	2.15E-05	1.08E-05
Nickel	2.23E-04	1.12E-04	2.30E-04	1.15E-04	3.81E-05	1.91E-05	2.10E-04	1.52E-04	1.54E-07	7.70E-08	6.58E-07	3.29E-07	4.45E-08	3.22E-08
Selenium	1.60E-03	9.73E-04	1.66E-03	1.00E-03	2.74E-04	1.66E-04	1.17E-03	5.83E-04	1.11E-06	6.70E-07	4.41E-03	2.67E-03	2.81E-07	8.24E-08
Vanadium	2.27E-02	2.27E-03	2.34E-02	2.34E-03	3.87E-03	3.87E-04	7.60E-04	7.60E-05	1.56E-05	1.56E-06	6.68E-05	6.68E-06	1.61E-07	1.61E-08
Zinc	1.04E-04	5.18E-05	1.07E-04	5.35E-05	1.77E-05	8.85E-06	2.08E-03	2.30E-04	7.15E-08	3.57E-08	3.06E-07	1.53E-07	4.41E-07	4.88E-08
PCBs														
Aroclor 1254	**4.35E+01**	**4.35E+00**	**6.39E+01**	**6.39E+00**	5.83E-02	5.83E-03	**6.44E+01**	**6.44E+00**	4.00E-05	4.00E-06	2.29E-02	4.64E-03	1.69E-05	1.69E-06
Aroclor 1260	**1.75E+02**	**1.75E+01**	**1.68E+02**	**1.68E+01**	2.04E-01	2.04E-02	**2.59E+02**	**2.59E+01**	8.27E-05	8.27E-06	9.33E-02	1.89E-02	6.29E-05	6.29E-06
Aroclor 1268	**4.19E+02**	**4.19E+01**	**6.58E+02**	**6.58E+01**	**4.91E+00**	4.91E-01	**5.86E+02**	**5.86E+01**	8.78E-03	8.78E-04	2.22E-01	4.51E-02	1.74E-04	1.74E-05
All PCBs (summed)	**6.37E+02**	**6.37E+01**	**8.90E+02**	**8.90E+01**	**5.17E+00**	5.17E-01	**9.09E+02**	**9.09E+01**	8.90E-03	8.90E-04	3.38E-01	6.87E-02	2.53E-04	2.53E-05
Semivolatile Organics														
Acenaphthylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-07	1.03E-08	0.00E+00	0.00E+00
Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-04	2.94E-05	0.00E+00	0.00E+00
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-04	2.94E-05	0.00E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.64E-05	4.64E-06	0.00E+00	0.00E+00
Benzo(b)fluoranthene	7.75E-04	1.55E-04	1.53E-03	3.06E-04	1.16E-04	2.32E-05	2.68E-02	5.36E-03	5.62E-07	1.12E-07	6.53E-07	1.31E-07	4.61E-07	9.21E-08
Benzo(ghi)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-06	1.33E-07	0.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.98E-06	4.98E-07	0.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	1.74E-05	1.74E-06	1.80E-05	1.80E-06	2.97E-06	2.98E-07	5.80E-04	5.27E-05	1.20E-08	1.20E-09	5.13E-08	5.14E-09	1.23E-07	1.12E-08
Carbazole	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.42E-07	2.42E-08	NA	NA
Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-03	2.88E-04	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.49E-06	8.49E-07	0.00E+00	0.00E+00
Fluoranthene	4.09E-04	8.18E-05	8.58E-04	1.72E-04	6.62E-05	1.32E-05	1.12E-04	1.12E-05	4.97E-07	9.93E-08	2.30E-06	4.60E-07	1.93E-09	1.93E-10
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.59E-06	7.18E-07	0.00E+00	0.00E+00
Pyrene	9.85E-04	1.97E-04	2.39E-03	4.79E-04	1.42E-04	2.84E-05	2.12E-04	2.12E-05	1.12E-06	2.23E-07	5.68E-06	1.14E-06	1.78E-09	1.78E-10

COPEC - Chemical of potential ecological concern
LOAEL - Lowest observed adverse effect level
NA - No toxicity data available; hazard quotients not calculated.
NOAEL - No observed adverse effect level

Shaded cells indicate a hazard quotient greater than 1, when rounded.

FIGURES

FIGURE 1-1
PBOW VICINITY MAP

FORMER SELLITE AREA SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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NOTES:

1. SNAKE ROAD BURNING GROUND AREA WAS ALSO REFERRED TO AS "SNAKE ROAD BURN PIT", "SCHEID ROAD BURNING GROUNDS", AND "DISPOSAL AREA THREE".
2. FORMER REACTOR FACILITY CONSTRUCTED BY NASA POST WWII AND IS IDENTIFIED FOR LOCATION PURPOSES ONLY. DEMOLITION OF THE REACTOR WAS COMPLETED BY NASA IN 2012.

LEGEND:

- AREA OF CONCERN
- APPROXIMATE LOCATION OF SEWER LINES
- POND
- CREEK, DITCH, CONVEYANCE
- FORMER RAILROAD
- ROAD
- FENCE
- FACILITY BOUNDARY

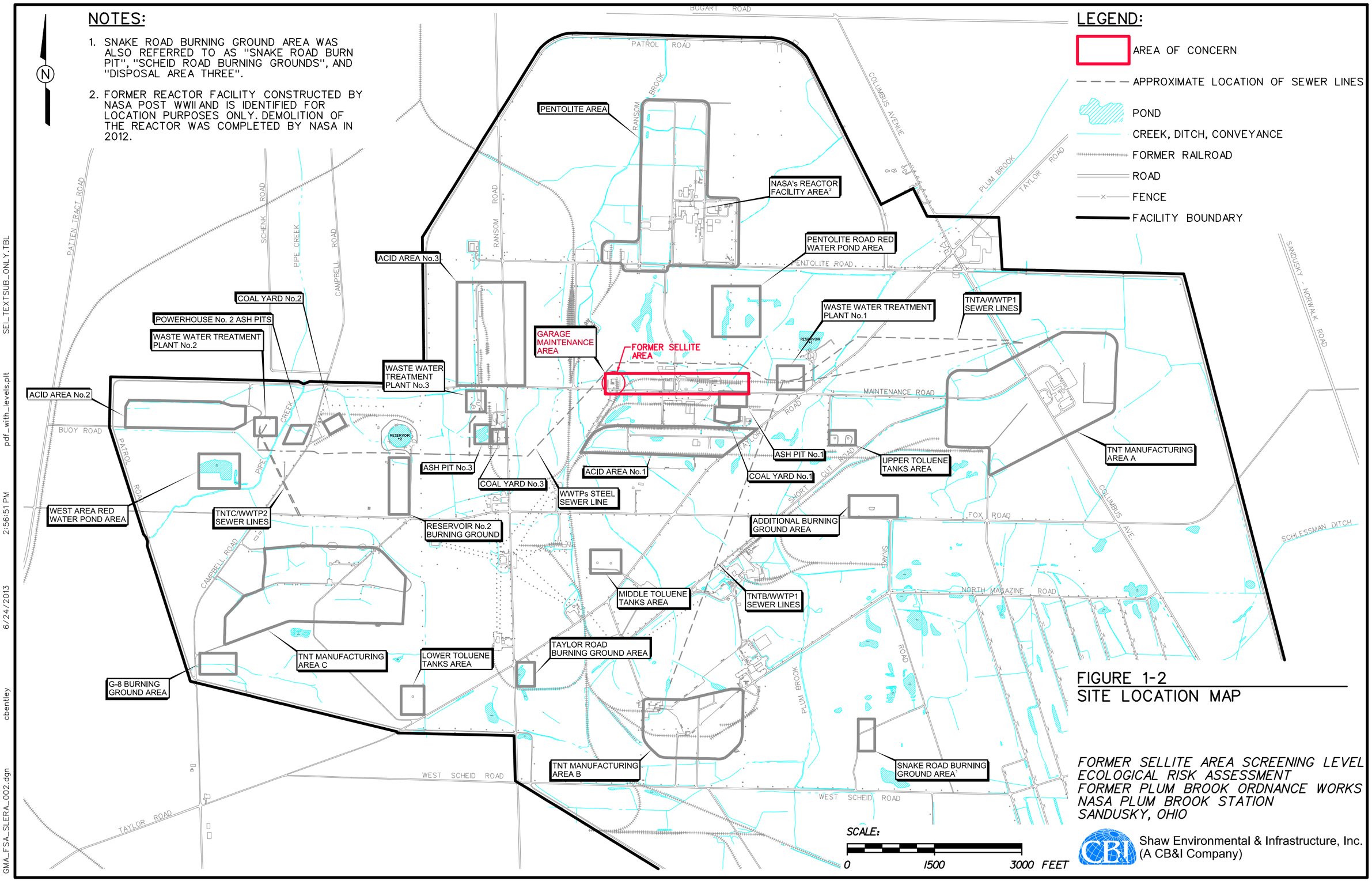

FIGURE 1-2
SITE LOCATION MAP

FORMER SELLITE AREA SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

Shaw Environmental & Infrastructure, Inc.
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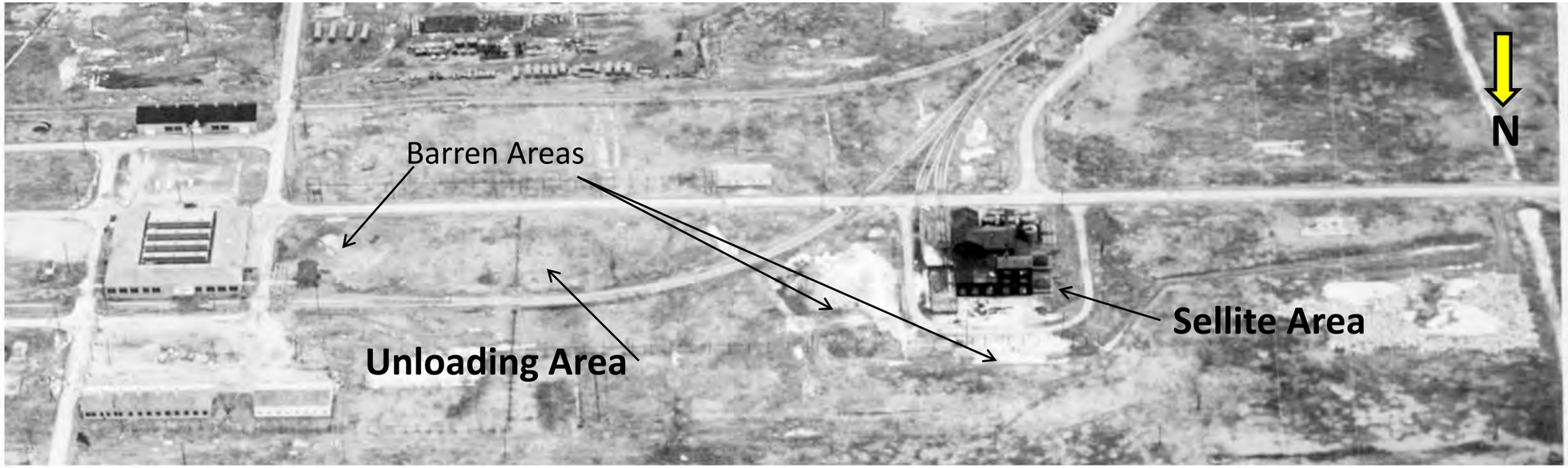
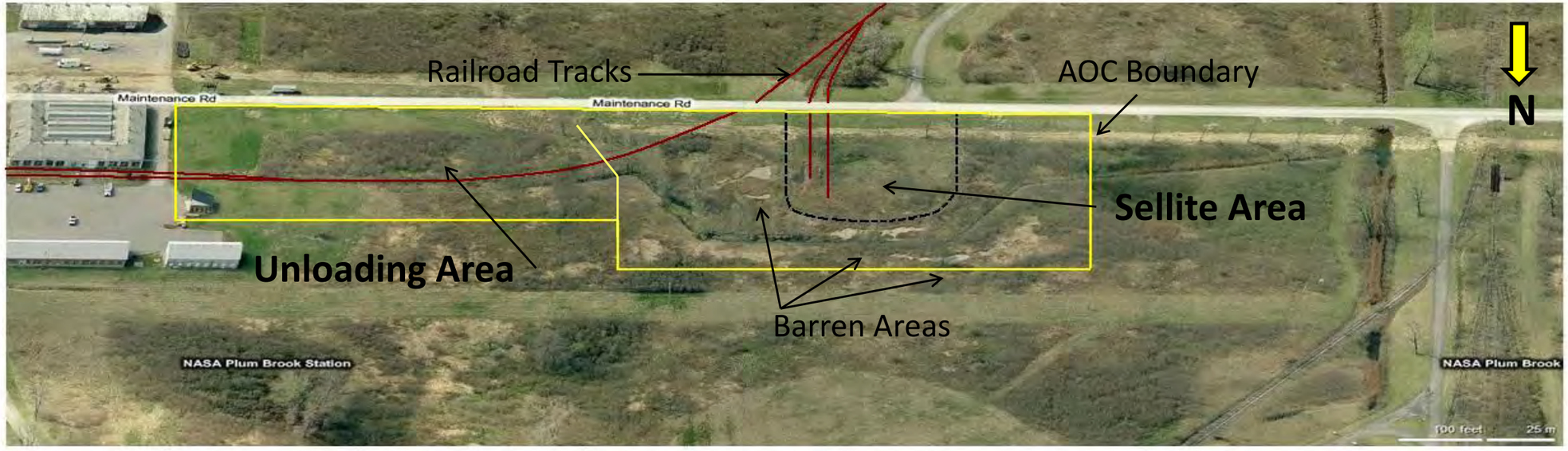


Circa 1958
(View is
southward)



Circa 2009
(View is
southward)

Figure 1-3
Former Sellite Area Aerial Photographs

Figure 2-1

Photographic Log of the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Photo 1. Grassy vegetation covering the Former Sellite Area.

Photo 2. Muddy area near the former perimeter road.

Figure 2-1

Photographic Log of the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Photo 3. Barren area with sulfur and slag present.

Photo 4. Sandy barren area with sulfur present.

Figure 2-1

Photographic Log of the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Photo 5. Ditch adjacent to the Former Sellite Area during a dry weather pattern.

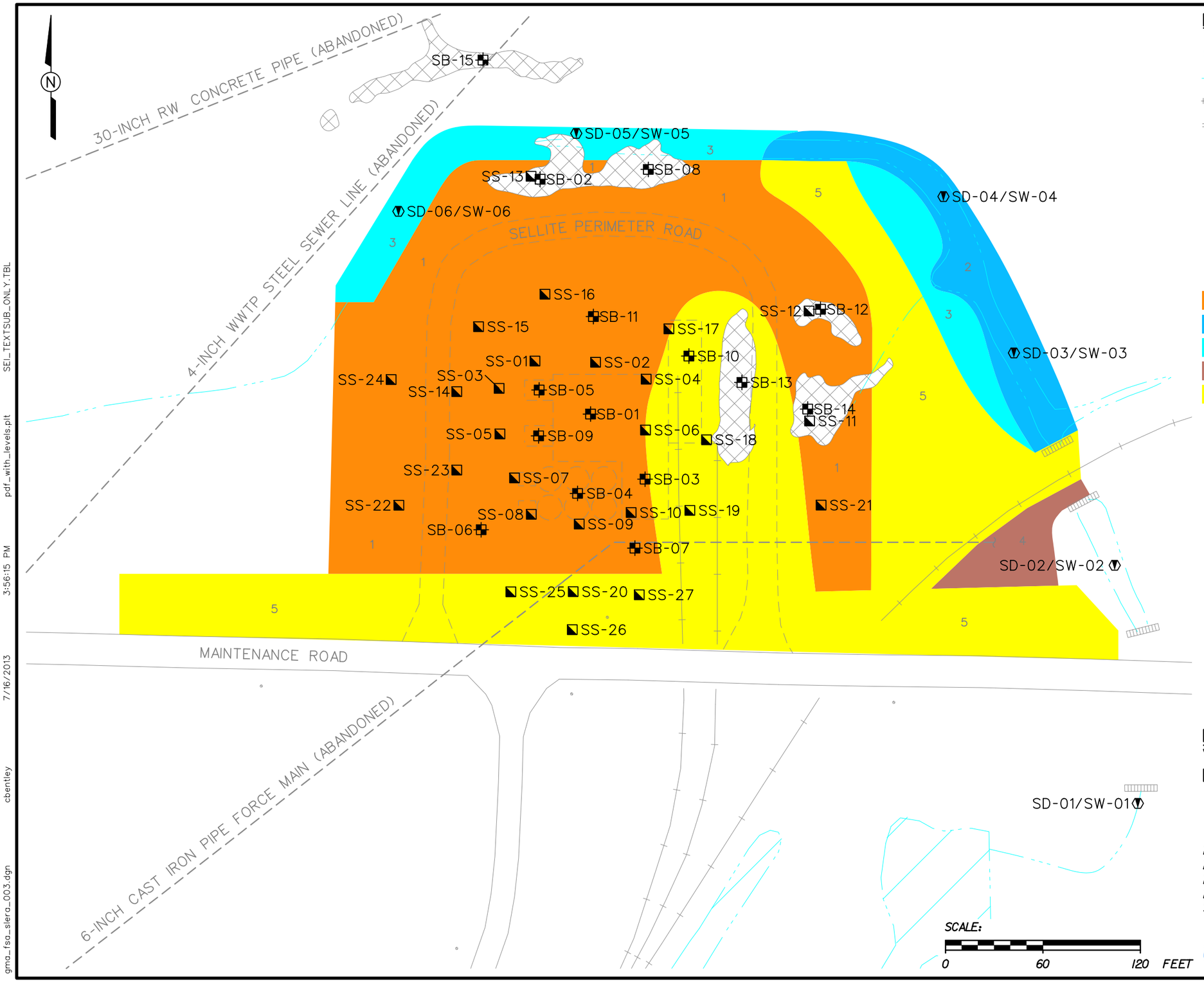
Photo 6. Ditch adjacent to the Former Sellite Area filled with water after a rain event.

Figure 2-1

Photographic Log of the Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Photo 7. Sandy area with deer tracks.

Photo 8. Shrubby vegetation at the site during the September site visit.



LEGEND:

- POND
- CREEK, DITCH, CONVEYANCE
- FORMER RAILROAD
- ROAD
- APPROXIMATE LOCATION OF FORMER STRUCTURES AND ROADS
- BARREN AREA
- SURFACE SOIL SAMPLE
- SOIL BORING
- SURFACE WATER / SEDIMENT SAMPLE
- 1 UPLAND OLD FIELD AND SHRUB THICKET
- 2 MARSH
- 3 WET MEADOW
- 4 SHRUB THICKET
- 5 UPLAND OLD FIELD

FIGURE 2-2
VEGETATION COMMUNITIES AT THE FORMER SELLITE AREA

FORMER SELLITE AREA SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

Shaw Environmental & Infrastructure, Inc.
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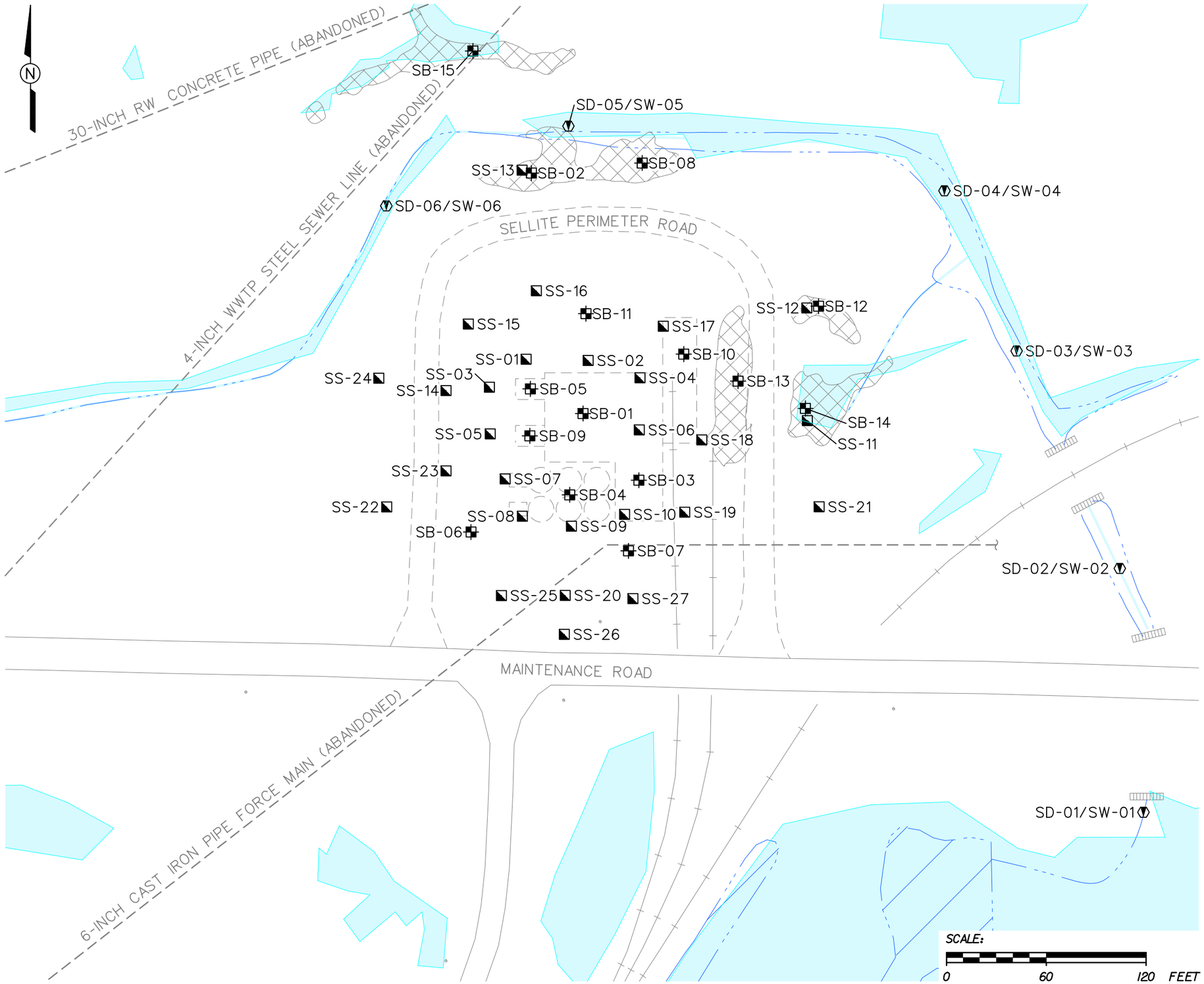

LEGEND:

- SURFACE SOIL SAMPLE
- SOIL BORING
- SURFACE WATER / SEDIMENT SAMPLE
- POND
- CREEK, DITCH, CONVEYANCE
- LINEAR WATERWAY (ENVIROSCIENCE, 2012) (NOTE 1)
- WETLAND AREA (ENVIROSCIENCE, 2012) (NOTE 1)
- FORMER RAILROAD
- ROAD
- APPROXIMATE LOCATION OF FORMER STRUCTURES AND ROADS
- BARREN AREA (NOTE 2)

NOTES:

1. THE LINEAR WATERWAYS AND WETLAND AREAS ARE PRELIMINARY IN NATURE, AND ARE PENDING APPROVAL BY THE UNITED STATES ARMY CORPS OF ENGINEERS. THEREFORE, THEY DO NOT REPRESENT JURISDICTIONAL WETLANDS, AND ARE PRESENTED FOR INFORMATIONAL PURPOSES ONLY.

2. PILES OF SULFER AND/OR SLAG TYPICALLY CO-OCCUR WITH THE BARREN AREA LOCATIONS.

FIGURE 2-3
SAMPLE LOCATIONS AT THE FORMER SELLITE AREA

FORMER SELLITE AREA SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO

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Figure 2-4

Simplified Terrestrial Food Web Conceptual Site Model
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

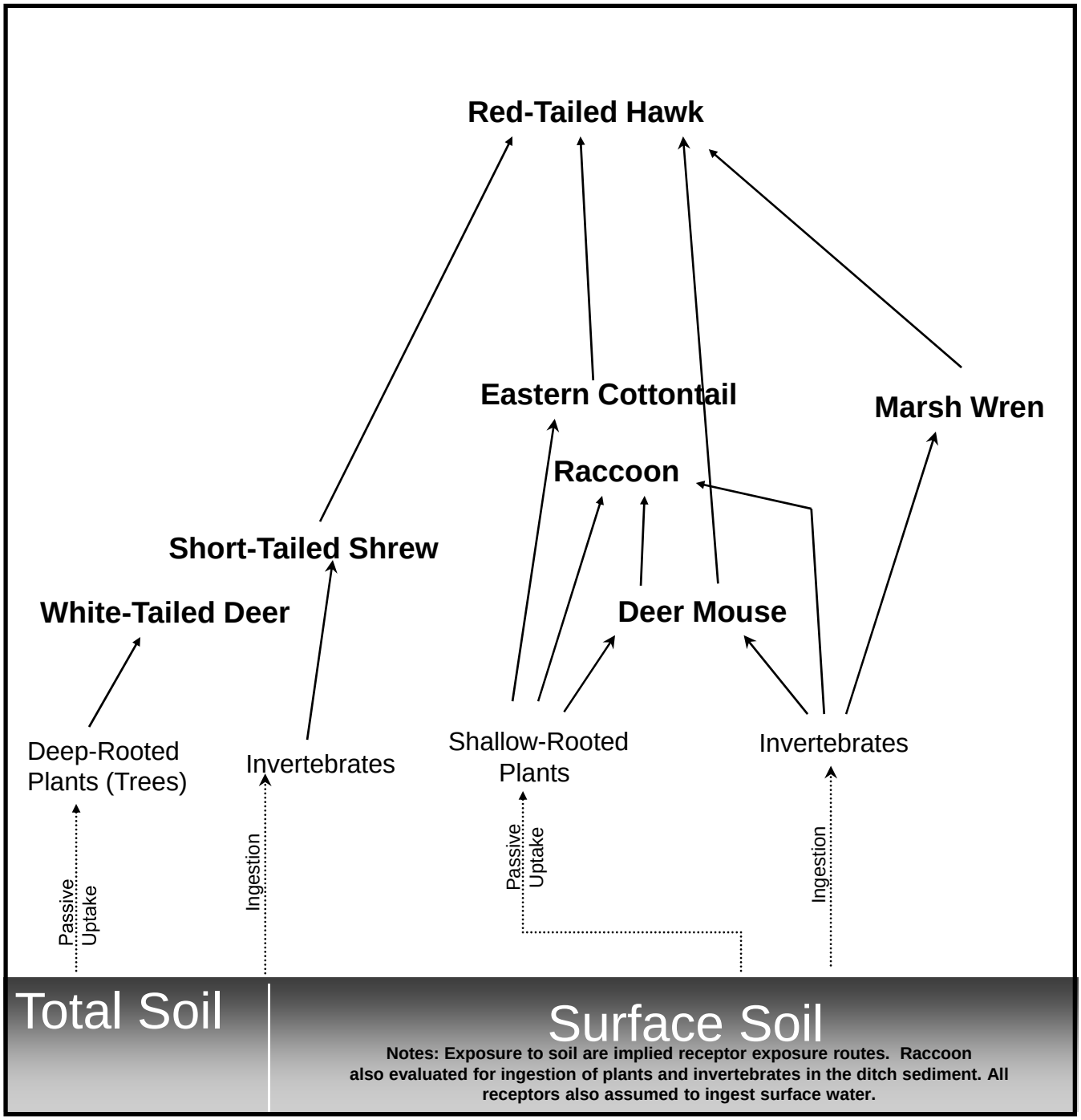
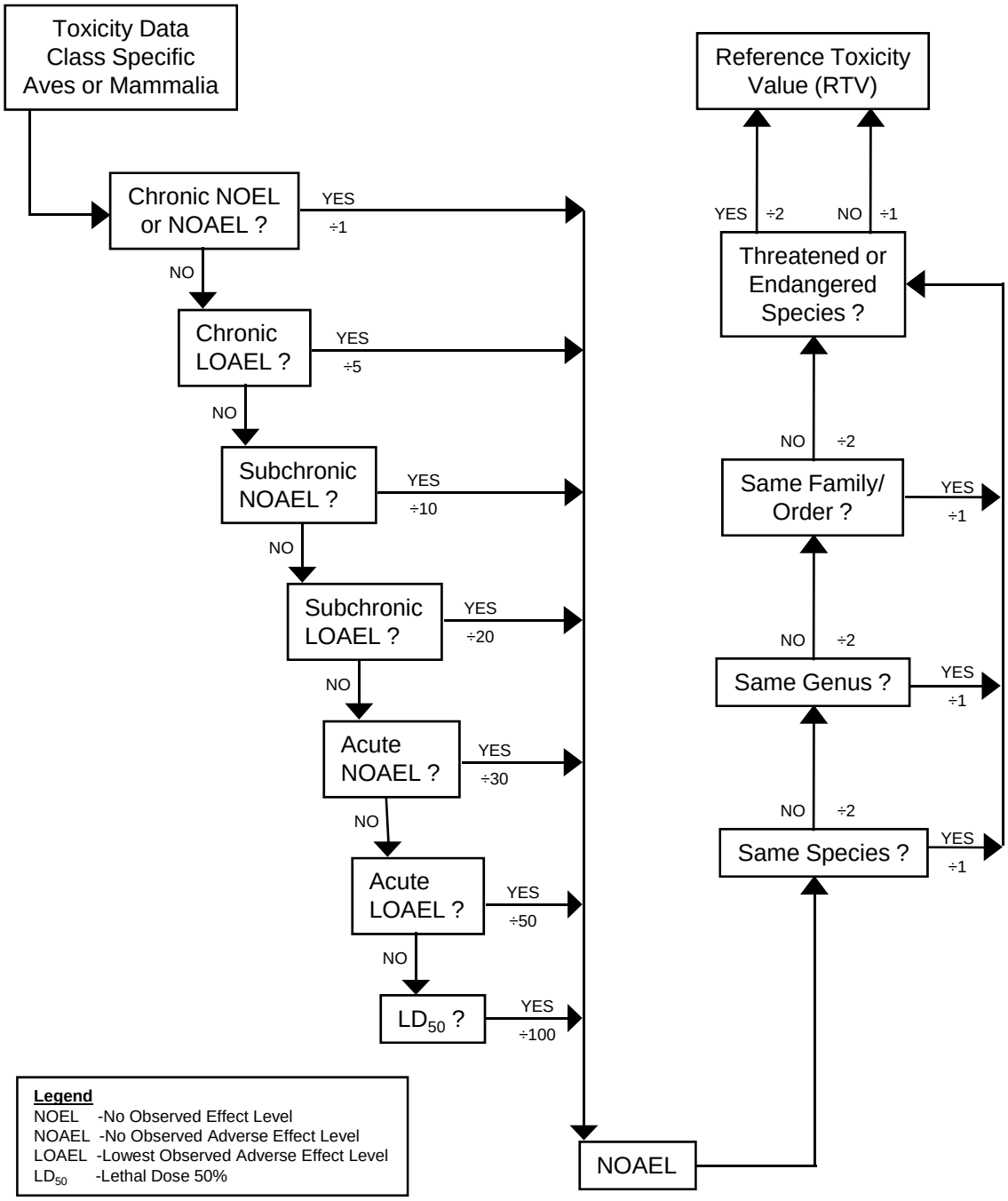


Figure 4-1

Procedural Flow Chart for Deriving Toxicity Reference Values (TRV) from Class-Specific Toxicity Data Former Plum Brook Ordnance Works, Sandusky, Ohio



Credit: Adapted from Ford et al. (1992) in *Tri-Service Procedural Guidelines for Ecological Risk Assessments*, 1996

APPENDIX A

VASCULAR PLANT SPECIES DOCUMENTED ON SITE

Appendix A

Vascular Plant Species Documented On Site
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

	Scientific Name	Common Name	Relative Frequency[(a)]	Rank[(b)]	Habitat	Observed On Site[(c)]
	Acalypha rhomboidea	Three-seeded mercury	NA		NA	2
	Acer negundo	box-elder maple	Frequent		Stream banks, ditches, and moist woods	1,3
*	*Acer platanoides*	Norway maple	Occasional		Disturbed woods	1
	Acer rubrum	red maple	Common		Dry to moist woods	1,2
	Acer saccharinum	Silver maple	Rare		Dry to moist woods	3
	Acer saccharum	Sugar maple	Occasional		Dry to moist woods	3
*	*Achillea millefolium*	Yarrow	Frequent		Dry fields, roadsides, and about buildings	1,2
	Acorus calamus	Sweet flag	Rare		Wet ditches	3
	Agalinis purpurea	purple false-foxglove	Frequent		Moist openings and ditches	1
	Agrimonia gryposepala	agrimony	NA		NA	3
	Agrimonia parviflora	southern agrimony	Frequent		Moist fields and ditches	1,2
	Agrimonia parviflora	small-flowered groovebur	NA		NA	3
*	*Agropyron repens*	Quack grass	Frequent		Old fields and roadsides	3
	Agrostis alba	Redtop	NA		NA	3
*	*Agrostis gigantea*	Redtop	Common		Moist fields, ditches, and roadsides	1,2
	Agrostis hyemalis	Ticklegrass	Occasional		Dry, grassy fields and shaley openings	1
	Agrostis perennans	autumn bent-grass	Frequent		Dry woods and borders on shale	1
	Ailanthus altissima	tree of heaven	NA		NA	3
	Alisma subcordatum	water-plantain	Occasional		Ponds and ditches	1,2
*	*Alliaria petiolata*	garlic mustard	Frequent		Dry to moist wood lots	1,2
	Allium canadense	Wild garlic	Occasional		Successional woods	2
	Allium vineale	Field garlic	NA		NA	3
	Ambrosia artemisiifolia	common ragweed	Frequent, occasional		Dry fields and roadsides	1,3
	Ambrosia trifida	giant ragweed	Occasional		Dry fields and roadsides	1,3
	Amphicarpa bracteata	hog peanut	NA		NA	2
	Andropogon gerardii	big bluestem	Frequent, Occasional		Dry to moist fields and roadsides	1,3
*	*Andropogon virginicus*	broom-sedge	Occasional, frequent		Dry fields and roadsides	1,2
	Anemone virginiana	Thimbleweed	NA		NA	3
	Antennaria neglecta	field pussytoes	NA		NA	2
	Antennaria parlinii	pussy-toes	Occasional		Dry fields and openings, especially on shale	1
	Antennaria plantaginifolia	plantain leaved pussytoes	NA		NA	3
*	*Anthoxanthum odoratum*	vernal-grass	Occasional		Dry fields and openings, especially on shale	1,2
	Apios americana	Groundnut	NA		NA	3
	Apocynum androsaemifolium	spreading leaf dogbane	NA		NA	3
	Apocynum cannabinum	Dogbane	Frequent		Dry to moist fields and roadsides	1,2
	Apocynum cannabinum	Indian hemp	NA		NA	3
*	*Arabidopsis thaliana*	mouse-ear cress	Occasional		Road berms and about buildings	1
	Arabis glabra	tower mustard	NA		NA	2
*	*Arctium minus*	Burdock	Occasional		Disturbed fields and about buildings	1
	Arenaria lateriflora	grove sandwort	Rare	T	Woods along Ransom Brook north of reactor	1
	Arisaema triphyllum	Jack-in-the-pulpit	Rare		Moist to dry woods	3
	Aristida dichotoma	Churchmouse grass	Occasional		Dry fields and openings	1
	Aristida longespica	slimspike triple-awned grass	Common		Dry fields and openings	1
	Aristida oligantha	prairie triple-awned grass	Occasional		Dry openings and roadsides	1
*	*Artemisia ludoviciana var. gnaphaloides*	white sage	Occasional		Grassy roadsides	1
	Asclepias hirtella	prairie milkweed	Common		Dry to moist openings	1
	Asclepias incarnata	Swamp milkweed	Occasional		Wet ditches	2
	Asclepias sullivantii	Sullivant's milkweed	Rare		Moist field along Patrol Road south of Scheid Road	1
	Asclepias syriaca	common milkweed	Frequent		Dry to moist fields and roadsides	1,3
	Asclepias tuberosa	butterfly-weed	Occasional		Dry openings and roadsides	1
	Asparagus officinalis	asparagus	NA		NA	3
	Asplenium platyneuron	ebony spleenwort	NA		NA	3
	Aster ericoides	white heath aster	Rare, frequent		Grassy strip along Patrol Road southeast of Taft Road	1
	Aster laevis	smooth aster	Rare		White oak grove on Taft Road	1
	Aster lateriflorus	calico aster	Common, frequent		Moist woods and thickets	1,3
	Aster novae-angliae	New England aster	Occasional		Dry fields and roadsides	1,3
	Aster pilosus	common white aster	Common		Dry fields, roadsides, and about buildings	1
	Aster sagittifolius	Arrow-leaved aster	Frequent		Woods and fields	3
	Aster umbellatus	flat-top aster	Frequent, rare		Dry to moist fields and roadsides	1,2
	Atriplex patula	orach	NA		NA	3
	Baptisia lactea	prairie false indigo	Occasional	P	Dry openings in bunker area	1
	Baptisia tinctoria	yellow false indigo	Occasional		Dry openings in bunker area	1
	Berberis thunbergii	Barberry	NA		NA	3

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Vascular Plant Species Documented On Site
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

	Scientific Name	Common Name	Relative Frequency[a]	Rank[b]	Habitat	Observed On Site[c]
*	*Berberis thunbergii*	Japanese barberry	Occasional, rare		Woodland borders	1,3
	Bidens coronata	northern tickseed-sunflower	Common		Moist fields and ditches	1
	Bidens frondosa	Beggar ticks	Rare		Ditches	2
	Blephilia sp.	wood mint	NA		NA	3
	Boehmeria cylindrica	false nettle	Occasional		Ponds and ditches	1,2
	Botrychium sp.	Grape fern	NA		NA	3
	Botrychium virginianum	Rattlesnake fern	Occasional		Successional woods	3
*	*Brassica nigra*	black mustard	Occasional		Roadsides	1,2
*	*Bromus inermis*	smooth brome	Frequent		Dry to moist fields and roadsides	1,2
	Bromus pubescens	Brome	Occasional		Dry fields	3
*	*Bromus tectorum*	downy chess	Occasional		Dry openings and roadsides on shale	1
	Cacalia atriplicifolia	pale Indian-plantain	Occasional		Dry fields and roadsides; woods	1
	Calamagrostis canadensis	blue-joint	Occasional		Moist fields and ditches	1
	Callitriche heterophylla	water-starwort	Occasional		Pond margins and seasonally-moist depressions	1
	Calystegia sepium	Hedge bindweed	Occasional		Fields	3
*	*Campsis radicans*	trumpet-vine	Occasional		Disturbed openings and roadsides	1
*	*Capsella bursa-pastoris*	shepherd's-purse	Occasional		Roadsides and about buildings	1,3
*	*Cardamine hirsuta*	bitter-cress	Occasional		Roadsides and about buildings	1
	Cardamine pratensis	Cuckooflower	NA		NA	3
*	*Carduus nutans*	musk-thistle	Occasional, frequent		Dry fields and roadsides	1,2
	Carex aggregata	Glomerate sedge	NA		NA	2
	Carex aggregata	sedge	Occasional		Moist woods	3
	Carex alata	broad-winged sedge	Rare	P	Grassy field along Patrol Road south of Scheid Road, also in grassy strip between Patrol Road and artificial pond southeast of Taft Road	1
	Carex albursina	White bear sedge	NA		NA	2
	Carex amphibola	Eastern narrowleaf sedge	Occasional		Thickets and woods borders	2
	Carex annectens var. annectens	NA	Occasional		Moist, grassy fields	1
	Carex annectens var. xanthocarpa	yellow-fruited sedge	Occasional		Moist, grassy fields	1
	Carex blanda	eastern woodland sedge	Frequent		Moist woods	1,2
	Carex bromoides	Brome-like sedge	NA		NA	3
	Carex cephaloidea	thin-leaf sedge	Rare	E	Woods border along Pentolite Road west of reactor	1
	Carex complanata var. hirsutella	NA	Frequent		Dry fields and woods borders	1
	Carex conoidea	field sedge	Rare	T	Grassy depression along Taft Road south of North Magazine Road	1
	Carex cristatella	NA	Occasional		Moist fields and ditches	1
	Carex festucacea	fescue sedge	Occasional		Moist, grassy fields	1
	Carex frankii	Frank's sedge	NA		NA	2
	Carex gracillima	NA	Occasional		Moist woods	1
	Carex granularis	meadow sedge	Common		Moist, grassy fields and ditches	3
	Carex hirtifolia	NA	Rare		Disturbed oak woods along angling road	1
	Carex hystericina	Bottlebrush sedge	Rare		Moist depression along Taft Road	1
	Carex lurida	lurid sedge	NA		NA	3
	Carex pensylvanica	Pennsylvania sedge	Common		Dry woods	1
	Carex radiata	Eastern star sedge	NA		NA	3
	Carex rosea	NA	Frequent		Dry to moist woods	1
	Carex scoparia	NA	Frequent		Moist, grassy fields	1,2
	Carex shortiana	Short's sedge	NA		NA	3
	Carex sp.	sedges	NA		NA	3
	Carex sparganoides	Bur-reed sedge	NA		NA	3
	Carex stipata	NA	Frequent		Moist fields and ditches	1
	Carex stricta	tussock sedge	Occasional		Moist fields and ditches	1
	Carex swanii	Swan's sedge	Occasional		Dry, grassy fields	1
	Carex tribuloides	Blunt broom sedge	Occasional		Moist, grassy fields and ditches	1,3
	Carex umbellata	NA	Occasional		Well-drained, grassy fields on sandy soil	1
	Carex vulpinoidea	fox sedge	Common		Moist fields, ditches, and about ponds	1,2
	Carya cordiformis	Bitternut hickory	NA		NA	3
	Carya glabra	pignut hickory	NA		NA	3
	Carya ovata	shagbark hickory	Rare		Sandy soil along fence at far southeast boundary	1,3
	Catalpa speciosa	Catalpa	NA		NA	3
	Celastrus orbiculatus	Bittersweet	Occasional		Thickets and woods borders	3
	Celtis occidentalis	Hackberry	Occasional		dry to moist woods and borders	1,3
	Cephalanthus occidentalis	Buttonbush	Occasional		Moist depressions and ditches	1,3

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Vascular Plant Species Documented On Site
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	Scientific Name	Common Name	Relative Frequency[a]	Rank[b]	Habitat	Observed On Site[c]
	Cerastium arvense	field chickweed	Rare		White oak grove along Taft Road	1
*	*Cerastium fontanum*	mouse-ear chickweed	Frequent		Road berms and about buildings	1,3
*	*Cerastium semidecandrum*	NA	Occasional		Road berms and about buildings	1
*	*Chaenorrhinum minus*	dwarf snapdragon	Occasional		Road berms and about buildings	1
	Chamaecrista fasciculata	partridge-pea	Occasional		Dry openings on shale	1
	Chenopodium album	lamb's quarters	NA			3
*	*Chrysanthemum leucanthemum*	ox-eye daisy	Frequent		Dry to moist fields and roadsides	1,3
*	*Cichorium intybus*	Chicory	Occasional		Roadsides	1,3
	Cicuta maculata	spotted cow parsnip	NA		NA	3
	Cinna arundinacea	Wood reed grass	Occasional		Woods	2
	Circaea lutetiana	Southern broad-leaved enchanter's nightshade	Frequent		Woods	1,3
*	*Cirsium arvense*	Canada thistle	Common		Disturbed fields and roadsides	1,2
	Cirsium arvense	creeping thistle	NA		NA	2
	Cirsium discolor	prairie thistle	Frequent, occasional		Grassy fields and roadsides	1
	Cirsium muticum	Swamp thistle	NA		NA	3
*	*Cirsium vulgare*	bull thistle	Frequent		Disturbed fields and roadsides	1,3
	Clematis virginiana	Virgin's bower	NA		NA	3
	Clinopodium vulgaris	wild basil	Occasional		Dry roadsides and openings	1,3
*	*Confolvulus arvensis*	field bindweed	Occasional		Disturbed fields and roadsides	1,3
*	*Convallaria majalis*	lilly-of-the-valley	Rare		Grassy field along Columbus Avenue	1,3
	Convolvulus arvensis	Hedge bindweed	NA		NA	2
	Conyza canadensis	Horseweed	Frequent		Dry fields and roadsides	1,3
	Cornus amomum	swamp dogwood	Frequent, occasional		Moist fields and thickets	1,3
	Cornus drummondii	rough-leaved dogwood	Frequent		Moist borders, thickets, and roadsides	1,3
	Cornus florida	flowering dogwood	Occasional		Woodland borders and roadsides	1
	Cornus racemosa	gray dogwood	Frequent		Dry fields and roadsides	1,2
*	*Coronilla varia*	crown-vetch	Occasional, common		Grassy fields and roadsides	1,2
	Crataegus mollis	downy hawthorn	Frequent		Thickets and woodland borders	1
	Crataegus punctata	dotted hawthorn	Frequent		Thickets and woodland borders	1
	Cryptotaenia canadensis	honewort	Occasional, rare		Dry to moist woods	1,3
	Cuscuta gronovii	dodder	Frequent		Moist fields and ditches	1,3
	Cyperus erythrorhizos	redroot flatsedge	NA		NA	2
	Cyperus esculentus	Chufa	NA		NA	3
*	*Cyperus esculentus*	yellow nutgrass	Occasional, frequent		Moist, disturbed openings	1
	Cyperus flavescens	Umbrella sedge	occasional		Old fields and waste places	3
	Cyperus strigosus	umbrella-sedge	Frequent		Moist openings, ponds, and ditches	1,3
*	*Dactylis glomerata*	orchard-grass	Occasional		Dry to moist fields and roadsides	1,2
	Danthonia spicata	poverty-grass	Occasional		Dry openings over shale	1
	Datura stramonium	jimson-weed	Occasional		Disturbed openings and roadsides	1
*	*Daucus carota*	wild carrot	Frequent		Dry fields and roadsides	1,2
	Desmodium canescens	Tick trefoil	Occasional		Fields	2
*	*Dianthus armeria*	Deptford pink	Occasional, rare		Dry openings and roadsides on shale	1
	Dichanthelium clandestinum	Deertongue	NA		NA	3
	Dichanthelium dichotomum	cypress panic grass	NA		NA	3
	Digitaria cognatum (Leptoloma cognatum)	NA	Occasional		Old fields	3
	Digitaria ischaemum	smooth crabgrass	NA		NA	3
	Digitaria sanguinalis	Crabgrass	NA		NA	3
	Diodia teres	buttonweed	Occasional		Dry openings over shale	1
	Dioscorea villosa	Yam root	NA		NA	2
*	*Dipsacus fullonum*	common teasel	Frequent		Dry, disturbed openings and roadsides	1
	Dipsacus sylvestris	teasel	NA			2
*	*Draba verna*	early whitlow-wort	Occasional		Dry roadsides and about buildings	1
	Dryopteris carthusiana	spinulose woodfern	Frequent		Moist woods and shaded borders	1
	Dryopteris sp.	shield fern	NA		NA	3
	Echinochloa muricata	barnyard grass	NA		NA	2
	Echinocystis lobata	bur cucumber	NA		NA	3
*	*Eleagnus umbellata*	autumn-olive	Occasional		Roadsides and woodland borders	1,2
	Eleocharis acicularis	needle spikerush	Frequent		Margins of artificial pond	1
	Eleocharis calva	bald spikerush	NA		NA	3
	Eleocharis erythropoda	red-footed spikerush	Occasional		Moist openings and ditches	1
	Eleocharis obtusa	NA	Common		Moist openings and ditches	1
	Eleocharis smallii	Small's spikerush	Frequent		Margins of artificial pond	1
	Eleocharis sp.	Spike rush	NA		NA	2

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Scientific Name	Common Name	Relative Frequency[a]	Rank[b]	Habitat	Observed On Site[c]
Eleocharis tenuis	NA	Frequent		Moist openings and ditches	1
Elymus sp.	Rye grass	NA		NA	3
Elymus virginica	Wild rye	Occasional		Moist to dry woods	3
* *Elytrigia repens*	quack-grass	Frequent		Dry fields and roadsides	1,2
Epilobium coloratum	purple-leaved willow herb	NA		NA	1,3
Equisetum arvense	horsetail	Frequent		Moist openings, roadsides, and ditches	1,2
Equisetum hyemale	scouring-rush	Occasional		Moist roadsides and ditches	1,2
Eragrostis frankii	NA	Occasional		Moist openings and ditches	1
Eragrostis spectabilis	showy lovegrass	Occasional		Dry to moist fields	1
Erechtites hieracifolia	Pilewort	Common		Disturbed woods, borders, and roadsides	1,2
Erigeron anuus	Fleabane	NA		NA	2
Erigeron philadelphicus	Philadelphia fleabane	Frequent, occasional		Roadsides and borders	1,3
Erigeron strigosus	smooth fleabane	Occasional		Dry openings and roadsides	1
Eupatorium maculatum	spotted Joe Pye weed	NA		NA	3
Eupatorium perfoliatum	Boneset	Occasional, frequent		Moist fields, ponds, and ditches	1,2
Eupatorium purpureum	purple joe-pye-weed	Occasional		Borders of moist woods, fields	1,3
Eupatorium rugosum	White snake root	Common		Woods and fields	3
Eupatorium sessilifolium	Upland boneset				3
Euphorbia corollata	Flowering spurge	Occasional		Dry fields	1,3
Euphorbia maculata	Prostrate spurge	Occasional		Dry openings, road berms, and about buildings	1,3
Euphorbia supina	Milk purslane	NA		NA	3
Euthamia graminifolia	grass-leaved goldenrod	Common		Dry to moist fields and roadsides	1,2
* *Festuca elatior*	tall fescue	Occasional		Roadsides and grassy fields	1
* *Festuca obtusa*	Fescue	Common		Old fields	2
Fragaria virginiana	wild strawberry	Frequent		Dry to moist fields and roadsides	1,3
Fraxinus americana	white ash	Frequent		Dry to moist woods and borders	1
Fraxinus pensylvanica	green ash	Frequent, common		Moist woods and stream banks	1,2
Galine aparine	Cleavers	Occasional		Moist woods and borders	1,2
Galium asperellum	Rough bedstraw	NA		NA	3
Galium circaezans	wild licorice	Rare		Dry woods	1
Galium tinctorium	Southern bedstraw	Rare		Moist depression along Taft Road	1,3
Gentiana clausa	closed gentian	NA		NA	3
Gentiana sp.	gentian	NA		NA	3
Gentianopsis crinita	Fringed gentian	Occasional	P	Old fields along ditch banks, small groups and scattered individuals in northeast portion of TNT area A	3
Geranium maculatum	Wild geranium	Occasional		Successional woods	3
Gerardia tenuifolia	Slender gerardia	Frequent		Disturbed fields	2
Geum laciniatum	Rough avens	NA		NA	2
Geum vernum	spring avens	Occasional		Moist woods and borders	1
Geum virginianum	white avens	Occasional		Woods borders and roadsides	1,3
* *Glecoma hederacea*	ground-ivy	Frequent		Moist openings, roadsides, and about buildings	1,3
Gleditsia triacanthos	honey-locust	Occasional, rare		Dry to moist woods and borders	1,3
Glyceria septentrionalis	eastern manna grass	NA		NA	2
Glyceria striata	manna-grass	Occasional		Moist woods and about ponds	1,3
Gnaphalium obtusifolium	Catfoot	NA		NA	2
Gnaphalium obtusifolium	Cudweed	Frequent, occasional		Dry openings on shale, fields	1,3
Gratiola virginiana	round-fruited hedge-hyssop	Rare	P	ca 20 plants; moist, shaded ground by pond west of Snake Road	1
Hackelia virginiana	Virginia stickseed	Rare		Woods	2
Hedyotis caerula	Bluets	Occasional		Dry openings and roadsides on shale	1
Helenium autumnale	Sneezeweed	Occasional		Disturbed fields	3
Helenium flexuosum	Southern sneezeweed	Occasional		Moist, open ground and ditches	1
Helianthus mollis	ashy sunflower	Rare	T	ca 200 plants in grassy field south and southwest of junction of Fox and Patrol Roads; the exact number of individuals in this population is uncertain since excessive browsing by deer has reduced the plants to leafy tufts	1
Helianthus tuberosus	Jerusalem artichoke	Occasional		Old fields	3
Hemerocallus fulva	Daylily	NA		NA	3
Hesperis matronalis	Dame's rocket	NA		NA	3
Hibiscus moscheutos	rose-mallow	Rare		Moist swale along Ransom Road	1
* *Hieracium piloselloides*	king-devil	Frequent		Dry openings on shale, fields	1
Hieracium pratense	field hawkweed	NA		NA	2
Hypericum canadense	Canadian St. John's wort	NA		NA	2
Hypericum gentianoides	orange-grass	Frequent		Dry openings	1

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	Scientific Name	Common Name	Relative Frequency[(a)]	Rank[(b)]	Habitat	Observed On Site[(c)]
	Hypericum gymnanthum	least St. John's-wort	Rare	E	ca 50 plants; moist, open ground along Patrol Road south of Fox Road	1
	Hypericum majus	tall St. John's-wort	Rare	P	Moist, shaded ground by pond west of Snake Road	1
	Hypericum mutilum	little St. John's-wort	Frequent		Moist openings, ponds, and ditches	1,3
*	*Hypericum perforatum*	dotted St. John's-wort	Frequent		Disturbed fields and roadsides	1
	Hypericum punctatum	St. Johns wort	Rare		Fields	3
	Hypoxis hirsuta	yellow-eyed-grass	Occasional		Grassy fields	1
	Hystrix patula	Bottlebrush grass	Occasional		Woods	3
	Impatiens capensis	Jewelweed	NA		NA	3
*	*Inula helenium*	Elecampane	Rare		Moist roadside along Taft Road	1
	Ipomoea pandurata	wild sweet-potato	Occasional		Dry openings over shale	1
	Ipomoea purpurea	common morning glory	NA		NA	3
	Iris sp.	Iris	NA		NA	3
	Iris versicolor	Northern blue flag	Occasional		Moist woods and ditches	3
	Isanthus brachiatus	false pennyroyal	Rare		Moist opening on limestone, west of Snake Road and south of North Magazine Road	1
	Juglans nigra	black walnut	Rare		A few young trees at edge of grassy field southwest of junction of Fox and Patrol Roads, woods (2b)	1,2
	Juncus acuminatus	sharp-fruited rush	NA		NA	2
	Juncus acuminatus	NA	Common		Moist openings and ditches	1,2
	Juncus biflorus	NA	Occasional		Moist openings and ditches	1
	Juncus brachycarpus	NA	Occasional		Moist openings	1
	Juncus bufonius	toad rush	NA		NA	3
	Juncus canadensis	Canada rush	Frequent		Moist openings	1
	Juncus dudleyi	Dudley's rush	Frequent		Moist openings	1
	Juncus effusus	Common rush	Frequent		Moist openings, ponds, and ditches	1,2
	Juncus marginatus	NA	Occasional		Moist openings	1
	Juncus nodosus	rush	Occasional		Old fields and ditches	3
	Juncus tenuis	path rush	Frequent, occasional		Dry openings, road berms, and about buildings	1,2
	Juncus torreyi	Torrey's rush	Occasional		Moist fields	2
	Juniperus virginiana	Red cedar	NA		NA	3
*	*Lamium purpureum*	dead-nettle	Frequent		Disturbed fields, roadsides, and about buildings	1
	Laportea Canadensis	Wood nettle	NA		NA	3
	*Lathyrus latifolius**	Everlasting pea	Occasional		Old fields	3
	Leersia oryzoides	rice cutgrass	Occasional		Moist fields and ditches	1,3
	Leersia virginica	White grass	NA		NA	3
	Lemna minor	Lesser duckweed	Occasional		Ponds and standing water	1,3
	Lepidium campestre	field peppergrass	NA		NA	3
*	*Lepidium campestre*	field-cress	Occasional		Roadsides and about buildings	1
	Lepidium virginicum	poor man's pepper	Frequent		Roadsides, disturbed openings, and about buildings	1
	Leptochloa fascicularis	sprangetop	NA		NA	2
	Leptoloma cognatum	fall witch grass	NA		NA	3
	Lespedeza capitata	bush-clover	Occasional		Dry fields	1,2
	Leucospora multifida	NA	Rare		Moist opening on limestone, west of Snake Road and south of North Magazine Road	1
	Liatris scariosa var. novae-angliae	northern blazing-star	Rare		Dry ground along Patrol Road at Olemacher Ditch	1
	Liatris spicata	spiked blazing-star	Occasional		Moist openings	1
*	*Linaria vulgaris*	butter-and-eggs	Occasional		Roadsides and about buildings	1
	Lindernia dubia	false pimpernel	Occasional		Moist openings, ditches, and pond margins	1
	Linum medium	wild flax	Frequent		Dry to moist openings	1
	Linum virginianum	Virginia flax	Rare		About pond in northern bunker area	1
	Lobelia siphilitica	Great lobelia	Frequent		Moist fields	3
	Lolium perenne	perennial ryegrass	NA		NA	3
	Lonicera japonica	Japanese honeysuckle	Occasional		Fields and disturbed areas	3
*	*Lonicera maackii*	Amur honeysuckle	Rare		Roadsides and thickets along Columbus Avenue near Scheid Ditch	1
*	*Lonicera morrowii*	Asiatic honeysuckle	Frequent		Thickets, borders, and roadsides	1
*	*Lonicera tatarica*	Tatarian honeysuckle	Frequent, common		Thickets, borders, and roadsides	1,2
*	*Lotus corniculatus*	bird's-foot trefoil	Occasional		Grassy fields and road berms	1,3
	Ludwigia alternifolia	rattlebox	Occasional		Ponds and ditches	1,3
	Ludwigia palustris	water-purslane	Frequent, occasional		Ponds and ditches	1,3
	Ludwigia polycarpa	NA	Rare		Moist, shaded ground by pond on Snake Road	1
	Lychnis alba	White campion	NA		NA	3
	Lycopodium complanatum	club moss	NA		NA	2

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	Scientific Name	Common Name	Relative Frequency[(a)]	Rank[(b)]	Habitat	Observed On Site[(c)]
	Lycopus americana	American bugleweed	NA		NA	2
	Lycopus americanus	American water-horehound	Frequent		Ponds and ditches	1,3
	Lycopus uniflorus	northern water-horehound	Frequent		Moist woods and shaded borders	1
	Lycopus virginicus	Virginia bugleweed	NA		NA	3
	Lysimachia ciliata	fringed loosestrife	NA		NA	3
	Lysimachia terrestris	swamp loosestrife	Occasional		Moist openings	1,3
	Lythrum alatum	prairie loosestrife	Occasional		Moist openings	1
	Lythrum salicaria	Purple loosestrife	NA		NA	3
	Maclura pomifera	osage-orange	Occasional		Disturbed woods and borders	1,3
*	*Matricaria matricarioides*	pineapple-weed	Occasional		Roadsides and about buildings	1
*	*Medicago lupulina*	Black medic	Occasional		Old fields and disturbed areas	2
*	*Melilotus alba*	white sweet-clover	Occasional, frequent		Disturbed fields and roadsides	1,3
*	*Melilotus officinalis*	yellow sweet-clover	Occasional		Disturbed fields and roadsides	1,2
	Melilotus sp.	Sweet clover	NA		NA	3
	Mentha piperita	peppermint	NA		NA	3
	Mentha spicata	Spearmint	Occasional		Moist fields	2
	Mimulus ringens	monkey-flower	Occasional, rare		Moist openings and ditches	1,3
	Monarda fistulosa	bergamont	Occasional		Grassy fields	1
	Monarda sp.	bee balm	NA		NA	2
	Morus alba	Mulberry	Occasional		Fields and thickets	3
	Muhlenbergia frondosa	muhly grass	Frequent		Moist fields and ditches	1
	Myrica pensylvanica	Bayberry	Rare	E	One individual in old field in northern portion of area	3
	Najas flexilis	northern naiad	Occasional		Artificial ponds	1
*	*Najas minor*	Eurasian naiad	Frequent		Artificial ponds	1,3
*	*Nepeta cataria*	catnip	Occasional, frequent		Roadsides and weedy openings	1,3
	Nyssa sylvatica	blackgum	Occasional		Thickets and woods borders	1
	Oenothera biennis	evening-primrose	Frequent		Dry fields, roadsides, and about buildings	1,3
	Oenothera tetragona	northern sundrops	Frequent		Moist, grassy fields	1
	Onoclea sensibilis	Sensitive fern	frequent		Wet areas	2
	Osmunda cinnamomea	cinnamon fern	Rare		Depressions in moist woods along angling road	1,2
	Osmunda regalis	royal fern	Occasional		Depressions in moist woods	1,3
*	*Oxalis europea*	Sorrel	Common		Old fields and disturbed areas	2
	Oxalis violacea	purple wood-sorrel	Occasional		Drier oak woods and borders on shale	1
	Panicum capillare	witchgrass	NA		NA	3
	Panicum clandestinum	deer tongue grass	NA		NA	2
	Panicum dichotomiflorum	Panic grass	Frequent		Fields	3
	Panicum dichotomum	witch grass	NA		NA	3
	Panicum flexile	wiry witch-grass	Rare		Moist opening on limestone, west of Snake Road and south of North Magazine Road	1
	Panicum lanuginosum	hairy panic-grass	common		Dry, grassy fields and roadsides	1
	Panicum oligosanthes	sand panic-grass	Occasional		Dry, grassy fields	1
	Panicum rigidulum	stiff panic-grass	Frequent		Moist openings and ditches	1
	Panicum virgatum	switch-grass	Occasional		Dry fields	1,2
	Parietaria pensylvanica	pellitory	Occasional		Dry, disturbed wood lots and borders	1
	Paronychia fastigata	forked chickweed	Occasional		Dry woods and borders on shale	1
	Parthenocissus quinquefolia	Virginia-creeper	Occasional		Dry to moist woods borders and thickets	1,2
	Parthenocissus vitacea	grape-woodbine	Rare		Dry opening north of Center Magazine Road	1
*	*Pastinaca sativa*	wild parsnip	Occasional		Roadsides	1
	Penstemon digitalis	tall white beard-tongue	Frequent		Grassy fields and roadsides	1,2
	Penthorum sedoides	ditch stonecrop	NA		NA	3
	Phalaris arundinacea	reed canary-grass	Common		Moist fields and ditches	1,2
*	*Phleum pratense*	timothy	Frequent		Disturbed fields and roadsides	1,2
	Phragmites australis	reed-grass	Occasional, rare		Moist openings and ditches	1,2
	Phryma leptostachya	lopseed	Rare		Edge of woods along Scheid Ditch near Columbus Avenue; successional woods	1
	Phytolacca americana	pokeberry	Occasional, rare		Moist woods and borders	1,3
	Pilea pumila	clearweed	NA		NA	3
*	*Plantago lanceolata*	English plantain	Frequent		Disturbed openings and about buildings	1,2
*	*Plantago major*	broad-leaved plantain	Frequent		Road berms and about buildings (1) disturbed areas and old fields (2a)	1,2
	Platanthera lacera	ragged fringe-orchid	Rare		Ditch along south Patrol Road	1
	Platanus occidentalis	sycamore	Occasional, frequent		Moist woods and stream banks, fields and waste areas	1,3
*	*Poa annua*	early bluegrass	Common		Road berms and about buildings	1
*	*Poa compressa*	Canada bluegrass	Frequent		Dry openings, especially on shale, and roadsides	1,3
	Poa pratensis	Kentucky bluegrass	NA		NA	2

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Scientific Name	Common Name	Relative Frequency[a]	Rank[b]	Habitat	Observed On Site[c]
Podophyllum peltatum	may-apple	Occasional		Dry to moist woods	1,2
Polygala sanguinea	blood milkwort	Frequent		Moist openings	1,2
Polygala verticillata	whorled milkwort	Occasional		Moist openings	1
* *Polygonum caespitosum*	NA	Rare		Moist, shaded ground in bunker area	1,3
Polygonum hydropiper	Smartweed	NA		NA	3
* *Polygonum hydropiper*	water-pepper	Occasional		Margins of ponds	1,3
Polygonum hydropiperoides	false water-pepper	Occasional		Wet ditches and pond margins	1
Polygonum pennsylvanicum	Pennsylvania smartweed	NA		NA	3
Polygonum sagittatum	arrow-leaved tearthumb	Occasional		Moist thickets and ditches	1
Polygonum scandens	climbing false buckwheat	Occasional		Thickets and roadsides	1,3
Polygonum sp.	Smartweed	NA		NA	3
Polygonum virginianum	Virginia knotweed	Common		Moist to dry woods	3
Populus deltoides	cottonwood	Frequent, common		Moist woods, borders, and stream banks	1,2
Potamogeton diversifolius	snailseed pondweed	Frequent		Artificial ponds	1
Potamogeton foliosus	leafy pondweed	Occasional		Artificial ponds	1
Potamogeton nodosus	longleaf pondweed	Occasional		Artificial ponds	1,3
Potamogeton pectinatus	Sago pondweed	NA		NA	3
Potentilla norvegica	Norwegian cinquefoil	NA		NA	3
Potentilla simplex	cinquefoil	Frequent		Dry openings and roadsides on shale	1,2
Prunella vulgaris	self-heal	Occasional, frequent		Roadsides and about buildings	1,2
Prunus americana	wild plum	Occasional		Thickets and roadsides	1,2
Prunus serotina	wild black cherry	Frequent, common		Dry to moist woods and borders	1,2
Pycnanthemum tenuifolium	narrow-leaved mountain-mint	Frequent, common		Moist openings, especially on shale, old fields	1,2
Pycnanthemum virginianum	Virginia mountain-mint	Occasional		Moist openings and ditches	1
Pyrus coronaria	crab-apple	Frequent		Thickets and borders	1,3
Quercus alba	white oak	Occasional		Dry woods and sandy ridges; a small grove on Taft Road has an unusually pure stand of this species	1
Quercus bicolor	swamp white oak	Frequent		Moist woodlands	1
Quercus imbricaria	shingle oak	Frequent, occasional		Moist to dry woodlands	1,3
Quercus macrocarpa	bur oak	Rare		ca 5 trees on sandy ridge in bunker area south of North Magazine Road; a few trees in area 2a	1
Quercus palustris	pin oak	Common, frequent		Moist woods	1,2
Ranunculus acris	Field buttercup	NA		NA	3
Ranunculus recurvatus	Hooked crowfoot	NA		NA	3
Ranunculus sceleratus	cursed crowfoot	NA		NA	3
Ratibida pinnata	green-headed coneflower	Occasional, frequent		Roadsides and dry fields	1
Rhexia virginica	Virginia meadow-beauty	Occasional	P	Moist openings and pond margins, south of North Magazine Road and along the angling road	1
Ribes americanum	American currant	NA		NA	3
Ribes cynosbati	Gooseberry	Rare		Woods	3
Riccia sp.	liverwort	NA		NA	3
Robinia pseudoacacia	Black locust	Rare		Old fields and thickets	2
Rosa carolina	pasture rose	Occasional		Dry fields	1
* *Rosa multiflora*	multiflora rose	Occasional		Disturbed openings, borders, and thickets	1,2
Rosa setigera	prairie rose	Rare		Grassy roadside and thickets along Patrol Road at Olemacher Ditch	1,3
Rotala ramosior	toothcup	Occasional		Moist openings and about ponds	1
Rubus allegheniensis	blackberry	Common		Woods, fields, and borders	2
Rubus flagellaris	dewberry	Frequent, common		Dry openings and roadsides on shale, old fields	1,2
Rubus occidentalis	Black raspberry	common		Dry woods, and borders	3
Rudbeckia hirta	black-eyed susan	Frequent		Dry fields and roadsides	1,3
* *Rumex acetosella*	red sorrel	Occasional		Dry openings over shale	1
Rumex acetosella	sheep sorrel	NA		NA	2
* *Rumex crispus*	curly dock	Occasional		Roadsides and about buildings	1,2
Rumex verticillatus	Swamp dock	Rare		Ditches	3
Sagittaria latifolia	broad-leaved arrowhead	Occasional		Ponds and ditches	1
Salix amygdaloides	peachleaf willow	Occasional		Ditches and about ponds	1,2
Salix discolor	pussy willow	Occasional		Moist openings, ponds, and ditches	1,3
Salix exigua	narrowleaf willow	NA		NA	3
Salix exigua	sandbar willow	Frequent		Moist openings, stream banks, and ditches	1,2
Salix nigra	black willow	Common		Moist woods, stream banks, and ditches	1,3
Salix sp.	Willow				3
Sambucus canadensis	elder-berry	Frequent, occasional		Moist openings, stream banks, and ditches	1,2
* *Saponaria officinalis*	soapwort	Frequent, occasional		Dry fields, roadsides, and about buildings	1
Sassafras albidum	sassafras	Occasional		Dry woods and borders	1

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Scientific Name	Common Name	Relative Frequency[a]	Rank[b]	Habitat	Observed On Site[c]
Satureja vulgaris	basil	NA		NA	2
Schizachyrium scoparium	little bluestem	Frequent		Dry fields and roadsides	1,3
Scirpus acutus	hardstem bulrush	Rare		Moist depression west of Taft Road	1
Scirpus americanus	Three square	rare		Ditches	3
Scirpus atrovirens	dark green bulrush	Common, occasional		Moist openings, roadsides, and ditches	1,2
Scirpus cyperinus	woolgrass	Occasional		About artificial ponds	1,2
Scirpus fluviatilis	River bulrush	NA		NA	1,3
Scirpus pendulus	NA	Occasional		Moist openings	1,2
Scirpus polyphyllus	Leafy bulrush				2
Scirpus validus	softstem bulrush	Occasional		Moist openings, ponds, and ditches	1,2
Scleria triglomerata	tall nut-rush	Rare	P	Moist swale in northern bunker area	1
Scutellaria lateriflora	mad-dog skullcap	Occasional		Moist depressions and ditches	1,2
Senecio aureus	golden ragwort	Occasional		Moist woods borders	1
Senna hebecarpa	wild senna	NA		NA	2
Setaria faberi	foxtail	NA		NA	3
* *Setaria faberi*	nodding foxtail-grass	Occasional, common		Grassy roadsides in the bunker area	1,3
Setaria glauca	Yellow foxtail-grass	NA		NA	3
* *Setaria viridis*	green foxtail-grass	Frequent, common		Dry roadsides and about buildings	1
Silphium terebinthinaceum	prairie-dock	Rare		Dry openings at crossing of Patrol Road and Olemacher Ditch	1
Sisirhynchium angustifolium	blue eyed grass	NA		NA	3
Sisyrinchium albidum	prairie blue-eyed-grass	Frequent		Grassy fields	1
Sisyrinchium angustifolium	common blue-eyed-grass	Frequent		Grassy fields	1
Smilacina stellata	star-flowered solomon's seal	NA		NA	3
* *Solanum caroliniense*	horse-nettle	Occasional, common		Dry openings and roadsides	1,3
* *Solanum dulcamara*	bittersweet-nightshade	Occasional		Roadsides, ditches, thickets, and about buildings	1,3
Solanum nigrum	Black nightshade	Occasional		Fields and waste areas	3
Solidago canadensis	Canada goldenrod	Common		Grassy fields	1,2
Solidago juncea	early goldenrod	Frequent		Dry to moist fields and roadsides	1
Solidago juncea	Early goldenrod	NA		NA	3
Solidago nemoralis	gray goldenrod	Common		Dry fields and roadsides	1
Solidago riddellii	Riddell's goldenrod	Rare		Moist opening over limestone, west of Snake Road and south of North Magazine Road	1
Solidago rugosa	rough leaved goldenrod	NA		NA	2
Sorghastrum nutans	Indian grass	NA		NA	3
Sparganium eurycarpum	giant bur-reed	Rare		Wet ditch along Ransom Road	1
Spartina pectinata	prairie cord-grass	Frequent, occasional		Moist depressions, fields, and ditches	1,3
Spenopholis intermedia	slender wedgescale	NA		NA	3
Spiranthes cernua var. *cernua*	nodding ladies' tresses	NA		NA	2
Spiranthes ochroleuca	creamy ladies'-tresses	Occasional, rare		Ditches and moist openings	1
Sporobolus asper	tall dropseed	Rare		A single stand in dry opening along angling road	1
Sporobolus neglectus	NA	Frequent		Dry openings and road berms	1
Stachys tenuifolia	Hedge nettle	Occasional		Fields	3
Stellaria longifolia	long-leaved stitchwort	Occasional		Moist, grassy fields	1,3
* *Stellaria media*	chickweed	Common		Road berms and about buildings	1
Symphoricarpos orbiculatus	coralberry	Occasional		Thickets, woods borders, and roadsides	1
Symphyotrichum pilosum	hairy white old field aster	NA		NA	3
* *Taraxacum officinalis*	dandelion	Frequent, occasional		Roadsides and about buildings	1,2
Teucrium canadense	American germander	Occasional		Moist openings	1,2
Thalictrum polygamum	tall meadow rue	NA		NA	2
Thelypteris palustris	marsh fern	Occasional, frequent		Moist depressions and roadsides	1
Toxicodendron radicans	Poison ivy	Frequent		Upland and facultative woods, old fields	2
Tradescantia ohioensis	Ohio spiderwort	Occasional		Old fields	2
Tragopogon porrifolius	salsify	NA		NA	2
* *Tragopogon pratensis*	Yellow goatsbeard	Rare		Old fields	3
Triadenum virgnianum	pink St. John's-wort	Rare		Moist swale in northern bunker area	1
Tridens flavus	purpletop	Occasional		Moist fields and roadsides	1
Trifolium hybridum	Alsike clover	Occasional		Fields	2
* *Trifolium pratense*	red clover	Occasional		Grassy fields and roadsides	1,2
* *Trifolium repens*	common white clover	Common		Grassy roadsides and about buildings	1,2
Triosteum perfoliatum	Wild coffee	Rare		Fields	2
Tussilago farfara	coltsfoot	NA		NA	3
Typha angustifolia	Narrow-leaved cattail	frequent		Ditches	3
Typha latifolia	broad-leaved cattail	Frequent		Moist openings, ponds, and ditches	1,2
Ulmus americana	American elm	Occasional		Moist woods and stream banks	1,3

Appendix A

Vascular Plant Species Documented On Site
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

Scientific Name	Common Name	Relative Frequency[a]	Rank[b]	Habitat	Observed On Site[c]
Ulmus rubra	slippery elm	Occasional		Moist woods and stream banks	1
Urtica dioica var. procera	American stinging nettle	Occasional, common		Moist fields and openings	1
Urtica dioicia	stinging nettle	NA		NA	2
* *Verbascum blattaria*	moth-mullein	Occasional, rare		Disturbed fields and roadsides	1,3
* *Verbascum thapsus*	common mullein	Frequent, occasional		Disturbed fields	1,2
Verbena hastata	purple vervain	Frequent		Moist fields, stream banks, and ditches	1,3
Verbena simplex	prairie vervain	Rare		A single stand in dry opening along angling road	1
Verbena stricta	Vervain	Occasional		Fields	3
Verbena urticifolia	white vervain	Occasional, frequent		Moist woods borders and roadsides	1,3
Verbesina alternifolia	wingstem	Frequent, occasional		Moist woods borders, stream banks, and ditches	1,3
Vernonia gigantea	tall ironweed	Occasional, frequent		Dry to moist fields	1,2
* *Veronica officinalis*	common speedwell	Occasional		Dry openings on shale	1
* *Veronica serpyllifolia*	thyme-leaved speedwell	Occasional		Roadsides and about buildings	1
Viburnum lentago	nannyberry	Frequent		Moist thickets and borders	1
Vicia americana	American vetch	Rare		Old field	3
Vicia tetrasperma	vetch	NA		NA	3
Viola canadensis	Canada violet	NA		NA	3
Viola cucullata	violet	NA		NA	3
Viola lanceolata	lance-leaved violet	Frequent	P	Ditches and moist openings	1
Viola papilionacea	blue violet	NA		NA	2
Viola sagittata	arrow-leaved violet	Frequent		Grassy fields and dry banks	1
Viola sororia	common blue violet	Common, occasional		Grassy fields, roadsides, and about buildings	1,3
Vitis aestivalis	summer grape	NA		NA	2
Vitis riparia	riverbank grape	Frequent		Woods borders, thickets, and stream banks	1,2
Vitis vulpina	fox grape	Occasional		Woods borders and thickets	1
Wolffia columbiana	Columbian water meal	NA		NA	3
Xanthium strumarium	Cockle bur	NA		NA	3
Zanichellia palustris	horned pondweed	Rare		Artificial pond west of Snake Road	1
Zizia aurea	Golden alexanders	Rare		Old fields	3

[a] Common - Species which occur in large numbers throughout.
Frequent - Species regularly encountered, but occurring in lesser numbers than common ones.
Occasional - Species found in several places, but never present in large numbers.
Rare - Species found in few places and in low numbers.

[b] T = Ohio Threatened Species. P = Ohio Potentially Threatened Species. E = Ohio Endangered Species.

[c] 1 - Biological Inventory of Plum Brook Station (Ohio Department of Natural Resources, 1994).
2 - Observed at TNT Area A/Waste Water Treatment Plant 1 Sewer Lines during at least one of the site reconnaissance trips.
3 - Observed during a site reconnaissance at another Plum Brook site.

NA – Not available.

* Non-native species.

APPENDIX B

ECOLOGICAL SCREENING VALUES

Table B-1

Ecological Screening Values for Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	CAS No.	EPA Eco-SSLs [a] (mg/kg)	Eco Endpoints PRGs [b] (mg/kg)	EPA Region V ESL [c] (mg/kg)	Tox. Benchmark [d] (earthworm only) (mg/kg)	Tox Benchmarks [e] Terrestrial Plants (mg/kg)	Selected ESV (mg/kg)
Inorganic Analytes							
Aluminum	7429-90-5	pH Dependent	NSV	NSV	NSV	50	pH Dependent
Antimony	7440-36-0	0.27	5	0.142	NSV	5	0.27
Arsenic	7440-38-2	18	9.9	5.7	60	10	18
Barium	7440-39-3	330	283	1.04	NSV	500	330
Beryllium	7440-41-7	21	10	1.06	NSV	10	21
Cadmium	7440-43-9	0.36	4	0.00222	20	4	0.36
Calcium	7440-70-2	NSV	NSV	NSV	NSV	NSV	Nutrient
Chromium	7440-47-3	26	0.4	0.4	0.4	1	26
Chromium, hexavalent	18540-29-9	81	NSV	NSV	NSV	NSV	81
Cobalt	7440-48-4	13	20	0.14	NSV	20	13
Copper	7440-50-8	28	60	5.4	50	100	28
Iron	7439-89-6	pH Dependent	NSV	NSV	NSV	NSV	pH Dependent
Lead	7439-92-1	11	40.5	0.0537	500	50	11
Magnesium	7439-95-4	NSV	NSV	NSV	NSV	NSV	Nutrient
Manganese	7439-96-5	220	NSV	NSV	NSV	500	220
Mercury	7439-97-6	NSV	0.00051	0.1	0.1	0.3	0.00051
Nickel	7440-02-0	38	30	13.6	200	30	38
Potassium	7440-09-7	NSV	NSV	NSV	NSV	NSV	Nutrient
Selenium	7782-49-2	0.52	0.21	0.0276	70	1	0.52
Silver	7440-22-4	4.2	2	4.04	NSV	2	4.2
Sodium	7440-23-5	NSV	NSV	NSV	NSV	NSV	Nutrient
Thallium	7440-28-0	NSV	1	0.0569	NSV	1	1
Vanadium	7440-62-2	7.8	2	1.59	NSV	2	7.8
Zinc	7440-66-6	46	8.5	6.62	200	50	46
Cyanide							
Cyanide, Total	57-12-5	NSV	NSV	1.33	NSV	NSV	1.33
Polychlorinated Biphenyls							
Aroclor 1016	12674-11-2	NSV	0.371 [f]	0.000332 [f]	NSV	40 [f]	0.371
Aroclor 1221	11104-28-2	NSV	0.371 [f]	0.000332 [f]	NSV	40 [f]	0.371
Aroclor 1232	11141-16-5	NSV	0.371 [f]	0.000332 [f]	NSV	40 [f]	0.371
Aroclor 1242	53469-21-9	NSV	0.371 [f]	0.000332 [f]	NSV	40 [f]	0.371
Aroclor 1254	11097-69-1	NSV	0.371 [f]	0.000332 [f]	NSV	40 [f]	0.371
Aroclor 1260	11096-82-5	NSV	0.371 [f]	0.000332 [f]	NSV	40 [f]	0.371
Aroclor 1268	11100-14-4	NSV	0.371 [f]	0.000332 [f]	NSV	40 [f]	0.371
Organochlorine Pesticides							
4,4'-DDE	72-55-9	0.021 [g]	NSV	0.596	NSV	NSV	0.021
4,4'-DDT	50-29-3	0.021 [g]	NSV	0.0035	NSV	NSV	0.021
Methoxychlor	72-43-5	NSV	NSV	0.0199	NSV	NSV	0.0199

Table B-1

Ecological Screening Values for Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	CAS No.	EPA Eco-SSLs [a] (mg/kg)	Eco Endpoints PRGs [b] (mg/kg)	EPA Region V ESL [c] (mg/kg)	Tox. Benchmark [d] (earthworm only) (mg/kg)	Tox Benchmarks [e] Terrestrial Plants (mg/kg)	Selected ESV (mg/kg)
Nitroaromatics							
Amino-2,6-dinitrotoluene, 4-	19406-51-0	NSV	NSV	0.0328 [i]	NSV	NSV	0.0328
Amino-4,6-dinitrotoluene, 2-	35572-78-2	NSV	NSV	0.0328 [i]	NSV	NSV	0.0328
Dinitrobenzene, 1,3-	99-65-0	NSV	NSV	0.655	NSV	NSV	0.655
Dinitrotoluene, 2,4-	121-14-2	NSV	NSV	1.28	NSV	NSV	1.28
Dinitrotoluene, 2,6-	606-20-2	NSV	NSV	0.0328	NSV	NSV	0.0328
RDX	121-82-4	NSV	NSV	NSV	NSV	NSV	NSV
Tetryl	479-45-8	NSV	NSV	NSV	NSV	NSV	NSV
Trinitrobenzene, 1,3,5-	99-35-4	NSV	NSV	0.376	NSV	NSV	0.376
Trinitrotoluene, 2,4,6-	118-96-7	NSV	NSV	NSV	NSV	NSV	NSV
Semivolatile Organic Compounds							
Acenaphthene	83-32-9	29	20	682	NSV	20	29
Acenaphthylene	208-96-8	29	NSV	682	NSV	NSV	29
Anthracene	120-12-7	29	NSV	1480	NSV	NSV	29
Benzo(a)anthracene	56-55-3	1.1	NSV	5.21	NSV	NSV	1.1
Benzo(a)pyrene	50-32-8	1.1	NSV	1.52	NSV	NSV	1.1
Benzo(b)fluoranthene	205-99-2	1.1	NSV	59.8	NSV	NSV	1.1
Benzo(ghi)perylene	191-24-2	1.1	NSV	119	NSV	NSV	1.1
Benzo(k)fluoranthene	207-08-9	1.1	NSV	148	NSV	NSV	1.1
Benzoic acid	65-85-0	NSV	NSV	NSV	NSV	NSV	NSV
Benzyl alcohol	100-51-6	NSV	NSV	65.8	NSV	NSV	65.8
bis(2-Ethylhexyl)phthalate	117-81-7	NSV	NSV	0.925	NSV	NSV	0.925
Carbazole	86-74-8	NSV	NSV	NSV	NSV	NSV	NSV
Chrysene	218-01-9	1.1	NSV	4.73	NSV	NSV	1.1
Dibenz(a,h)anthracene	53-73-3	1.1	NSV	18.4	NSV	NSV	1.1
Dibenzofuran	132-64-9	NSV	NSV	NSV	NSV	NSV	NSV
Di-n-butyl phthalate	84-74-2	NSV	200	0.15	NSV	200	200
Fluoranthene	206-44-0	1.1	NSV	122	NSV	NSV	1.1
Fluorene	86-73-7	1.1	NSV	122	30	NSV	1.1
Indeno(1,2,3-cd)pyrene	193-39-5	1.1	NSV	109	NSV	NSV	1.1
Methylnaphthalene, 2-	91-57-6	29	NSV	3.24	NSV	NSV	3.24
Naphthalene	91-20-3	29	NSV	0.0994	NSV	NSV	29
Nitroaniline, 3-	99-09-2	NSV	NSV	3.16	NSV	NSV	3.16
Phenanthrene	85-01-8	29	NSV	45.7	NSV	NSV	29
Pyrene	129-00-0	1.1	NSV	78.5	NSV	NSV	1.1

Table B-1

Ecological Screening Values for Soil
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	CAS No.	EPA Eco-SSLs [a] (mg/kg)	Eco Endpoints PRGs [b] (mg/kg)	EPA Region V ESL [c] (mg/kg)	Tox. Benchmark [d] (earthworm only) (mg/kg)	Tox Benchmarks [e] Terrestrial Plants (mg/kg)	Selected ESV (mg/kg)
Volatile Organic Compounds							
Acetone	67-64-1	NSV	NSV	2.5	NSV	NSV	2.5
Benzene	71-43-2	NSV	NSV	0.255	NSV	NSV	0.255
Bromomethane	74-83-9	NSV	NSV	0.235	NSV	NSV	0.235
Butanone, 2-	78-93-3	NSV	NSV	89.6	NSV	NSV	89.6
Carbon disulfide	75-15-0	NSV	NSV	0.0941	NSV	NSV	0.0941
Dichloroethane, 1,1-	75-34-3	NSV	NSV	20.1	NSV	NSV	20.1
Dichloroethene, 1,1-	75-35-4	NSV	NSV	8.28	NSV	NSV	8.28
Dichloroethene, cis-1,2-	156-59-2	NSV	NSV	0.784 [h]	NSV	NSV	0.784
Ethylbenzene	100-41-4	NSV	NSV	5.16	NSV	NSV	5.16
Hexanone, 2-	591-78-6	NSV	NSV	12.6	NSV	NSV	12.6
Methylene chloride	75-09-2	NSV	NSV	4.05	NSV	NSV	4.05
Toluene	108-88-3	NSV	200	5.45	NSV	200	200
Trichloroethane, 1,1,1-	79-00-5	NSV	NSV	29.8	NSV	NSV	29.8
Trichloroethene	79-01-6	NSV	NSV	12.4	NSV	NSV	12.4
Trimethylbenzene, 1,2,4-	95-63-6	NSV	NSV	NSV	NSV	NSV	NSV
Xylene, Total	1330-20-7	NSV	NSV	10	NSV	NSV	10

EPA - U.S. Environmental Protection Agency.
ESV - Ecological screening value.
NSV - No screening value available.
mg/kg - Milligrams per kilogram.

Priority for Selection of ESVs:
1) EPA Eco-SSL
2) PRG for Eco Endpoints, (Efroymson et.al, 1997a)
3) EPA Region 5 Ecological Screening Levels
4) Efroymson, 1997b
5) Efroymson, 1997c

[a] EPA, 2008, Ecological Soil Screening Level (SSL) guidance. On-line at: http://www.epa.gov/ecotox/ecossl/index.html
[b] Efroymson, 1997a, *Preliminary Remediation Goals for Ecological Endpoints* . www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf .
[c] Screening value based on: EPA , 2003, *Region 5 Ecological Screening Level (ESL)* , Website version last updated August 22, 2003: http://www.epa.gov/Region5/rcraca/edql.htm.
[d] Efroymson, R.A., M.E. Will, G.W. Suter, 1997b, Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, ES/ER/TM-126/R2 (microbial screening values are not included). http://www.esd.ornl.gov/programs/ecorisk/documents/tm126r21.pdf.
[e] Efroymson, R.A., M.E. Will, G.W. Suter, 1997c, Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision, ES/ER/TM-85/R3. http://www.esd.ornl.gov/programs/ecorisk/documents/tm85r3.pdf
[f] Based on the screening value for total PCBs.
[g] Based on the screening value for DDT and metabolites.
[h] Based on the screening value for dichloroethylene [trans-1,2].
[i] Based on the screening value for 2,6-dinitrotoluene.

Table B-2

Ecological Screening Values for Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	CAS No.	Ohio Water Quality Criteria [a] µg/L		Eco PRG [b] µg/L	EPA Region 5 ESV [c] µg/L	Selected Surface Water ESV [d] µg/L
Inorganic Analytes						
Aluminum	7429-90-5	NSV		87	NSV	87
Arsenic	7440-38-2	150	f	3.1	148	3.1
Barium	7440-39-3	220		4	220	4
Beryllium	7440-41-7	100	e	0.66	3.6	0.66
Calcium	7440-70-2	NSV		NSV	NSV	Nutrient
Chromium	7440-47-3	270	e,f	210	42	42
Cobalt	7440-48-4	24		23	24	23
Copper	7440-50-8	30	e,f	12	1.58	1.58
Iron	7439-89-6	NSV		1000	NSV	1000
Lead	7439-92-1	37	e,f	3.2	1.17	1.17
Magnesium	7439-95-4	NSV		NSV	NSV	Nutrient
Manganese	7439-96-5	NSV		120	NSV	120
Mercury	7439-97-6	0.91		0.0028	0.0013	0.0028
Nickel	7440-02-0	170	e,f	160	28.9	28.9
Potassium	7440-09-7	NSV		NSV	NSV	Nutrient
Selenium	7782-49-2	5	f	0.39	5	0.39
Sodium	7440-23-5	NSV		NSV	NSV	Nutrient
Vanadium	7440-62-2	44		20	12	12
Zinc	7440-66-6	390	e,f	110	65.7	65.7
Semivolatile Organic Compounds						
bis(2-Ethylhexyl)phthalate	117-81-7	8.4		0.12	0.3	0.12
3-Methylphenol and 4-Methylphenol	65794-96-9	53	g	NSV	NSV	53
Phenol	108-95-2	160		110	180	160
Volatile Organic Compounds						
Dichloroethane, 1,1-	75-34-3	410		47	47	47
Dichloroethene, cis-1,2-	156-59-2	970		590	970	590
Trichloroethane, 1,1,1-	71-55-6	76		11	76	11
Other Parameters						
pH	NA	6.5 - 9 (unitless)				

COPEC - Chemical of potential ecological concern.
ESV - Ecological screening value.
µg/L = Microgram per liter.
NSV - No screening value available.

[a] Ohio Environmental Protection Agency (OEPA, 2002), Division of Surface Water, Water Quality Standards, Chapter 3745-1 of the Ohic

Table B-2

Ecological Screening Values for Surface Water
Former Plum Brook Ordnance Works, Sandusky, Ohio

Administrative Code, Dec 30. http://www.epa.state.oh.us/dsw/rules/3745-1.html. Value is the Outside Mixing Zone Average value.

[b] *Preliminary Remediation Goals (PRG) for Ecological Endpoints*, (Efroymson et. al., 1997).

[c] Screening value based on: EPA , 2003, *Region 5 Ecological Screening Level (ESL)*, Website version last updated August 22, 2003: http://www.epa.gov/Region5/rcraca/edql.htm.

[d] Surface water ESVs are selected by choosing the minimum screening value based on the three sources provided

[e] Hardness dependent value (see Table 7-9 in the OAC Chapters 3741-1 and 3791-2). Screening values using a hardness of 400 mg/L $CaCO_3$ were selected, based on a site-specific water hardness of 464 mg/L $CaCO_3$.

[f] Total Recoverable (TR) value is used, per Ohio Administrative Code Chapter 3745-2-04

[g] The lower value was selected from Ohio EPA for 3-methylphenol and 4-methylphenol

Table B-3

Ecological Screening Values for Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	CAS No.	TEC [a] mg/kg	EPA Region 5 ESV [b] mg/kg	Ecological PRG [c] mg/kg	Ontario Sediment Quality Guidelines [d] mg/kg	Selected ESV [e] mg/kg
Inorganic Analytes						
Aluminum	7429-90-5	NSV	NSV	NSV	NSV	NSV
Antimony	7440-36-0	NSV	NSV	NSV	NSV	NSV
Arsenic	7440-38-2	9.79	9.79	42	6	9.79
Barium	7440-39-3	NSV	NSV	NSV	NSV	NSV
Beryllium	7440-41-7	NSV	NSV	NSV	NSV	NSV
Cadmium	7440-43-9	0.99	0.99	4.2	0.6	0.99
Calcium	7440-70-2	NSV	NSV	NSV	NSV	Nutrient
Chromium	7440-47-3	43.4	43.4	159	26	43.4
Cobalt	7440-48-4	NSV	50	NSV	50	50
Copper	7440-50-8	31.6	31.6	77.7	16	31.6
Iron	7439-89-6	NSV	NSV	NSV	NSV	Nutrient
Lead	7439-92-1	35.8	35.8	110	31	35.8
Magnesium	7439-95-4	NSV	NSV	NSV	NSV	Nutrient
Manganese	7439-96-5	NSV	NSV	NSV	460	460
Mercury	7439-97-6	0.18	0.174	0.7	0.2	0.18
Nickel	7440-02-0	22.7	22.7	38.5	16	22.7
Potassium	7440-09-7	NSV	NSV	NSV	NSV	Nutrient
Selenium	7782-49-2	NSV	NSV	NSV	NSV	NSV
Silver	7440-22-4	NSV	0.5	1.8	0.5	0.5
Sodium	7440-23-5	NSV	NSV	NSV	NSV	Nutrient
Thallium	7440-28-0	NSV	NSV	NSV	NSV	NSV
Vanadium	7440-62-2	NSV	NSV	NSV	NSV	NSV
Zinc	7440-66-6	121	121	270	120	121
Nitroaromatics						
2,4,6-Trinitrotoluene	118-96-7	NSV	NSV	NSV	NSV	NSV
2,6-Dinitrotoluene	606-20-2	NSV	0.0398	NSV	NSV	0.0398
Polychlorinated Biphenyls						
Aroclor 1254	11097-69-1	0.0598	0.0598	72	0.07	0.0598
Aroclor 1260	11096-82-5	0.0598	0.0598	63	0.07	0.0598
Aroclor 1268	11100-14-4	0.0598	0.0598	NSV	0.07	0.0598
Semivolatile Organic Compounds						
Acenaphthylene	208-96-8	NSV	0.00587	0.13	NSV	0.00587
Anthracene	120-12-7	0.0572	0.0572	0.25	0.22	0.0572
Benzo(a)anthracene	56-55-3	0.108	0.108	0.69	0.32	0.108
Benzo(a)pyrene	50-32-8	0.15	0.15	0.394	0.37	0.15
Benzo(b)fluoranthene	205-99-2	NSV	10.4	NSV	NSV	10.4
Benzo(ghi)perylene	191-24-2	NSV	0.17	6.3	0.17	0.17

Table B-3

Ecological Screening Values for Sediment
Former Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	CAS No.	TEC [a] mg/kg	EPA Region 5 ESV [b] mg/kg	Ecological PRG [c] mg/kg	Ontario Sediment Quality Guidelines [d] mg/kg	Selected ESV [e] mg/kg
Benzo(k)fluoranthene	207-08-9	NSV	0.24	NSV	0.24	0.24
Carbazole	86-74-8	NSV	NSV	NSV	NSV	NSV
Chrysene	218-01-9	0.166	0.166	0.85	0.34	0.166
Dibenz(a,h)anthracene	53-70-3	0.033	0.033	0.0282	0.06	0.033
Dibenzofuran	132-64-9	NSV	0.449	0.42	NSV	0.449
Di-n-butyl phthalate	84-74-2	NSV	1.114	240	NSV	1.114
Fluoranthene	206-44-0	NSV	0.423	0.834	0.75	0.423
Indeno(1,2,3-cd)pyrene	193-39-5	NSV	0.2	0.837	0.2	0.2
Methylnaphthalene, 2-	91-57-6	NSV	0.0202	NSV	NSV	0.0202
Naphthalene	91-20-3	0.176	0.176	0.39	NSV	0.176
Phenanthrene	85-01-8	0.204	0.204	0.54	0.56	0.204
Pyrene	129-00-0	0.195	0.195	1.4	0.49	0.195
Volatiles Organic Compounds						
Acetone	67-64-1	NSV	0.0099	0.0091	NSV	0.0099
Carbon disulfide	75-15-0	NSV	0.0239	0.00086	NSV	0.0239
Methylene chloride	75-09-2	NSV	0.159	18	NSV	0.159

ESV - Ecological screening value.
mg/kg - Milligrams per kilogram.
NSV - No screening value available.

Priority for Selection of ESVs:

1. Threshold effect concentrations (MacDonald et al., 2000)
2. EPA Region 5 ESLs (EPA, 2003)
3. Sediment PRGs (Efroymson, 1997)
4. Sediment quality criteria (OME, 1993).

[a] Threshold Effect Concentrations (TECs), MacDonald, et al., 2000, *Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems,* Arch Environ Contam Toxicol 39:20-31.

[b] Screening value based on: EPA , 2003, *Region 5 Ecological Screening Level (ESL)* , Website version last updated August 22, 2003: http://www.epa.gov/Region5/rcraca/edql.htm.

[c] Efroymson,et. al., 1997, *Preliminary Remediation Goals for Ecological Endpoints* .

[d] Ontario Ministry of the Environment, 1993 (OME, 1993). Persaud, et al. *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario,* August.

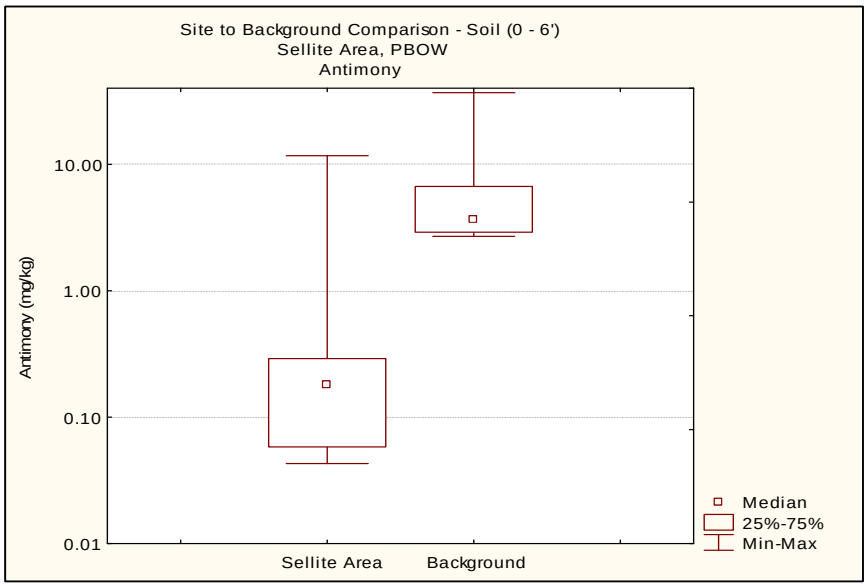
APPENDIX C

WILCOXON RANK SUM TEST RESULTS AND BOX PLOTS FOR METALS IN SOIL

Appendix C

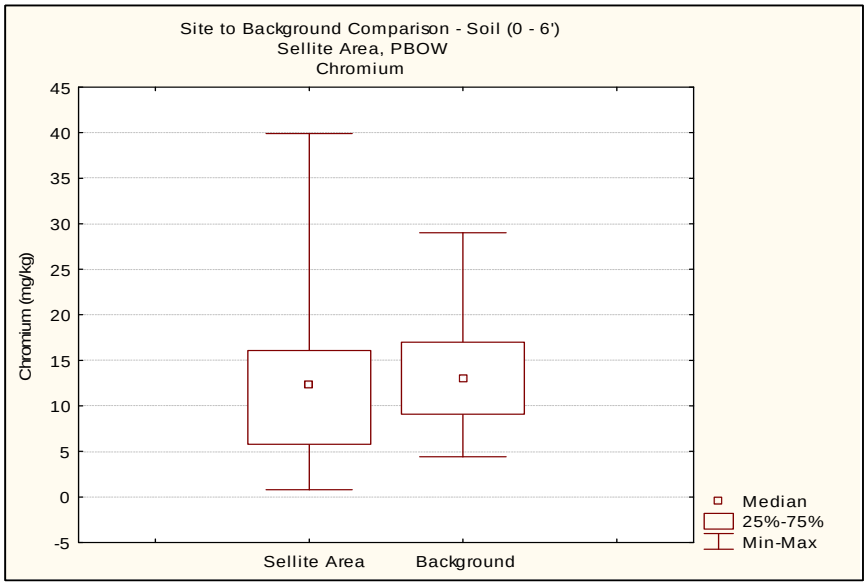
Wilcoxon Rank Sum Test Results and Box Plots for Metals in Soil
Plum Brook Ordnance Works, Sandusky, Ohio

Wilcoxon Rank Sum Test Results and Box Plots for Soil Concentrations of Antimony in Background Vs. Sellite Area Soil Samples



	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided
Antimony	1098.000	498.0000	33.0000	5.86508	< 0.001	5.86619	< 0.001	26	30	0.000000

Wilcoxon Rank Sum Test Results and Box Plots for Soil Concentrations of Chromium in Background Vs. Sellite Area Soil Samples

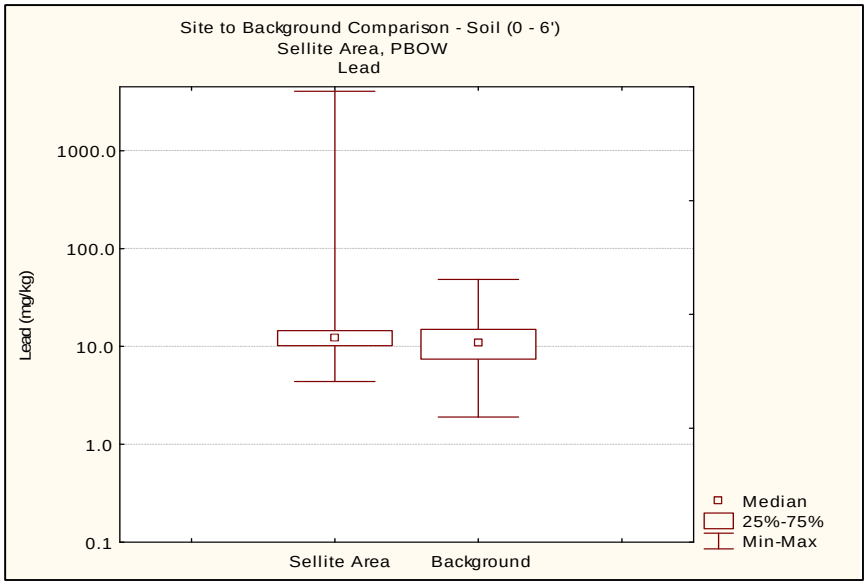


	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided
Chromium	790.500	805.5000	340.5000	0.81323	0.416089	0.81339	0.415994	26	30	0.419080

Appendix C

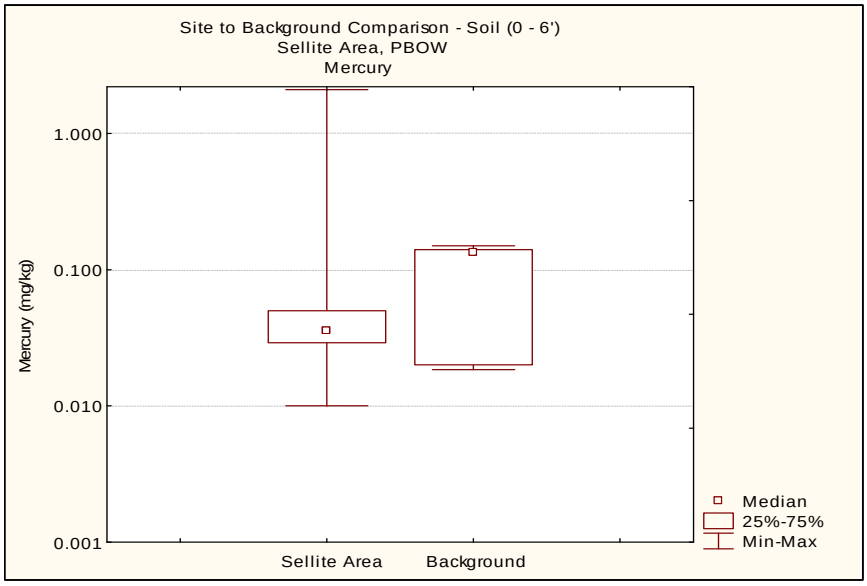
Wilcoxon Rank Sum Test Results and Box Plots for Metals in Soil
Plum Brook Ordnance Works, Sandusky, Ohio

Wilcoxon Rank Sum Test Results and Box Plots for Soil Concentrations of Lead in Background Vs. Sellite Area Soil Samples



	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided
Lead	650.500	945.5000	299.5000	-1.48681	0.137067	-1.48772	0.136825	26	30	0.137930

Wilcoxon Rank Sum Test Results and Box Plots for Soil Concentrations of Mercury in Background Vs. Sellite Area Soil Samples

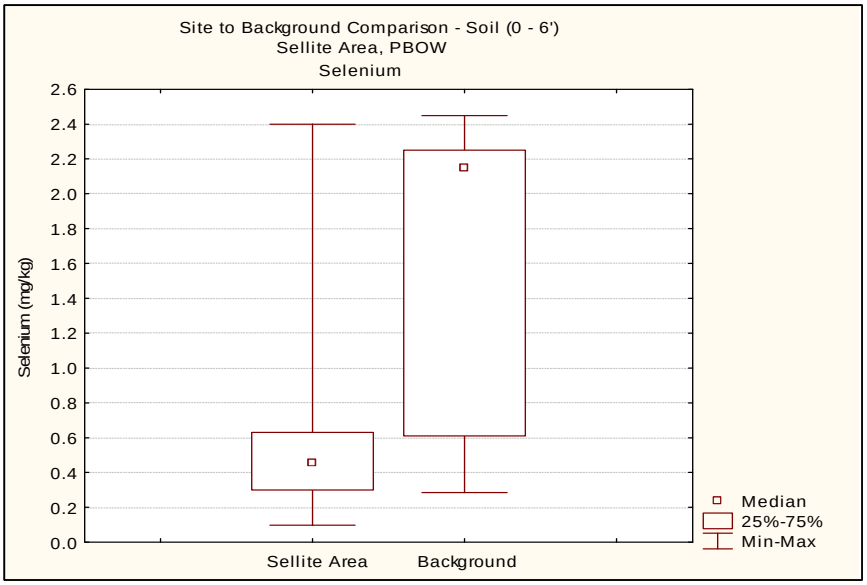


	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided
Mercury	844.000	752.0000	287.0000	1.69217	0.090615	1.69414	0.090240	26	30	0.092341

Appendix C

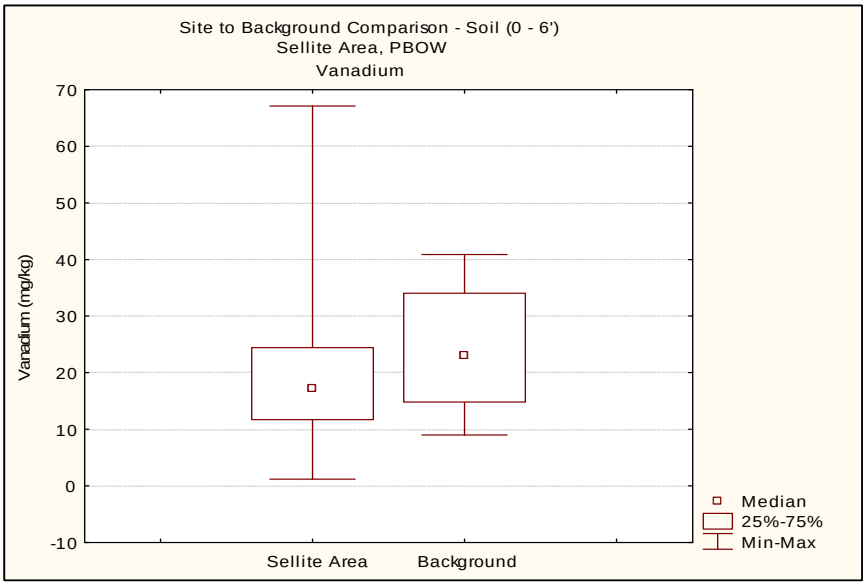
Wilcoxon Rank Sum Test Results and Box Plots for Metals in Soil
Plum Brook Ordnance Works, Sandusky, Ohio

Wilcoxon Rank Sum Test Results and Box Plots for Soil Concentrations of Selenium in Background Vs. Sellite Area Soil Samples



	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided
Selenium	906.500	633.5000	168.5000	3.49049	< 0.001	3.49231	< 0.001	25	30	0.000327

Wilcoxon Rank Sum Test Results and Box Plots for Soil Concentrations of Vanadium in Background Vs. Sellite Area Soil Samples



	Rank Sum	Rank Sum	U	Z	p-level	Z	p-level	Valid N	Valid N	2*1sided
Vanadium	319.500	583.5000	118.5000	1.71230	0.086842	1.71244	0.086817	12	30	0.086949

APPENDIX D

ASSESSMENT RECEPTOR PROFILES

Appendix D

Assessment Receptor Profiles

Eastern Cottontail (Sylvilagus floridanus). These medium-size grazing herbivores are found over most of the eastern half of the United States and southern Canada, and have been widely introduced into the western U.S. Environmental Protection Agency (EPA, 1993). The eastern cottontail is unique to the genus because of the large variety of habitats that it occupies, including glades and woodlands, deserts, swamps, prairies, hardwood forests, rain forests, and boreal forests (EPA, 1993). Open grassy areas are generally used for grazing at night, whereas dense, heavy cover typically is used for shelter during the day (EPA, 1993). During the summer seasons these rabbits consume herbaceous plants (e.g. grasses, clover, timothy, and alfalfa), whereas winter diet typically consists of woody vines, shrubs and trees (e.g.. birch, maple, and apple) (EPA, 1993). Home range is 3 to 20 acres, with larger ranges in the summer and smaller ranges in the winter (Burt and Grossenheider, 1980). Populations fluctuate from 1 to 4 cottontail per four acres to several per acre in winter conditions (Burt and Grossenheider, 1980). The eastern cottontail breeds from February through September and usually produces 3 to 4 litters per year of 1 to 9 young (usually 4 to 5); however, this rabbit's' death rate vies with its birth rate, and few rabbits live for more than one year (Whitaker, 1995). The average longevity is 1.25 years (EPA, 1993).

References:

Burt, W. H. and R. P. Grossenheider, 1980, "A Field Guide to Mammals," ***Peterson Field Guide Series***, Hougton Mifflin Co., Boston.

U.S. Environmental Protection Agency (EPA), 1993, ***Wildlife Exposure Factors Handbook***, Office of Health and Environmental Assessment, Office of Research and Development, EPA/600/R93/187a.

Whitaker Jr., J. O., 1995, ***The Audubon Society Field Guide to North American Mammals***, Alfred A. Knopf, Inc., New York.

Deer Mouse (Peromyscus maniculatus). This medium-sized mouse is found in the eastern United States from the Hudson Bay to Pennsylvania, the southern Appalachians, central Arkansas, and central Texas. In the west, it is found from Mexico to the south Yukon and northwest territories (Whitaker, 1995). Deer mice habitat includes nearly every dry land habitat within its range, including forest, grasslands, or a mixture of the two (Burt and Grossenheider, 1980). Nocturnal and active year-round, these mice construct nests in the ground, trees, stumps, and buildings (Burt and Grossenheider, 1980). Omnivorous, the deer mouse feeds on nuts and seeds (e.g., jewel weed and black cherry pits), fruits, beetles, caterpillars, and other insects. Deer mice may cache their food during the fall and winter in the more northern parts of their range (EPA, 1993). Home range is 0.15 to 3 acres (Burt and Grossenheider, 1980; EPA, 1993). Density of populations is 4 to 12 mice per acre, and average life span is 2 years in the wild (Burt and Grossenheider, 1980). The breeding season is from February to November, depending on latitude. Three to five young are born in each of two to four litters per year (Burt and Grossenheider, 1980). They are greyish to reddish-brown with a white belly, with a distinctly short-haired, bicolor tail (Whitaker, 1995). Weight range is 14.8 (EPA, 1993) to 33 grams (Whitaker, 1995).

References:

Burt, W. H. and R. P. Grossenheider, 1980, "A Field Guide to Mammals," ***Peterson Field Guide Series***, Hougton Mifflin Co., Boston.

U.S. Environmental Protection Agency (EPA), 1993, ***Wildlife Exposure Factors Handbook***, Office of Health and Environmental Assessment, Office of Research and Development, EPA/600/R93/187a.

Whitaker Jr., J. O., 1995, ***The Audubon Society Field Guide to North American Mammals***, Alfred A. Knopf, Inc., New York.

Red-Tailed Hawk (Buteo jamacensis). This carnivorous hawk is one of the most common and widespread members of the genus *Buteo* in the continental United States and Canada (Brown and Amadon, 1968). Red-tailed hawks live in a variety of habitats, such as farmlands, woodlands, mountains, and deserts, as long as there is open country interdispersed with woods, bluffs, or streamside trees. They are primarily carnivorous, feeding on (greater than 85 percent) small rodents, as well as fish. Other prey items include amphibians, reptiles, crayfish, and other birds (Adamcik, et al., 1979; Ehrlich, et al., 1988). Home range has been reported as approximately 66.8 acres, with a population density of 0.16 pairs per acre (Janes, 1984), although EPA (1993) reports an average territory size of 842 hectares (2,080 acres). Breeding population density is one nest per 0.009 acre or one individual per 0.004 acre. Body weight for male red-tails is 1,028.6 to 1,142.9 grams, and for females 1,371.4 to 1,600 grams (Brown and Amadon, 1968), although EPA (1993) reports an average body weight of 957 grams. They typically mate for life or until one of the pair dies, with pairs clinging to territories year after year (Austing, 1964).

References:

Adamcik, R. S., A. W. Todd, and L. B. Keith, 1979, "Demographic and Dietary Responses of Red-Tailed Hawks During a Snowshoe Hare Fluctuation," ***Canadian Field Naturalist***, Vol. 93, pp. 16-27.

Austing, G. R., 1964, ***The World of the Red-Tailed Hawk***, J. B. Lippincott Co., Philadelphia.

Brown, L. and D. Amadon, 1968, ***Eagles, Hawks, and Falcons of the World***, Vol. 1, McGraw-Hill Book Company, New York.

Ehrlich, P. R., D. S. Dobkin, and D. Wheye, 1988, ***The Birder's Handbook: A field guide to the Natural History of North American Birds***, Simon and Shuster, Inc., New York.

Janes, S. W., 1984, "Influences of Territory Composition and Interspecific Competition on Red-Tailed Hawk Reproductive Success," ***Ecology***, 65:862-870.

U.S. Environmental Protection Agency (EPA), 1993, ***Wildlife Exposure Factors Handbook***, Office of Health and Environmental Assessment, Office of Research and Development, EPA/600/R93/187a.

Raccoon (Procyon lotor). Raccoons are native only in the Americas. Their range extends from the southern edge of the southern provinces of Canada and most of the United States, except for portions of the Rocky Mountain states, central Nevada, and Utah (Whitaker, 1995). The raccoon weighs from 3 to 15 kilograms (Merritt, 1987; EPA, 1993) and has a head and body length of 46 to 71 centimeters and a tail length of 20 to 30 centimeters (Burt and Grossenheider, 1980). The raccoon is nocturnal and solitary, except when breeding or caring for its young. During particularly cold spells, the raccoon may sleep for several days at a time but does not hibernate (Whitaker, 1995). The raccoon is found along lakes near wooded areas or rock cliffs (Burt and Grossenheider, 1980), but prefers wooded streams (Whitaker, 1995). The raccoon is highly omnivorous and is an opportunistic feeder, consuming virtually any animal or plant matter that is available (Merritt, 1987; EPA, 1993). Animal matter predominates the diet during the spring and early summer; plant matter predominates during late summer, autumn, and winter (Merritt, 1987; EPA, 1993). The home range of the raccoon extends up to 3.2 kilometers across, but usually it is less than 1.6 kilometers. Population densities range from one per acre (highest) to one per 15 acres (considered high) (Burt and Grossenheider, 1980). Captive raccoons live for approximately 14 years (Burt and Grossenheider, 1980). Average body weight is 5.1 kilograms (EPA, 1993).

References:

Burt, W. H., and R. P. Grossenheider, 1980, "A Field Guide to Mammals," ***Peterson Field Guide Series***, Hougton Mifflin Co., Boston.

Merritt, J. F., 1987, ***Guide to the Mammals of Pennsylvania***, University of Pittsburgh Press, Pennsylvania.

U.S. Environmental Protection Agency (EPA), 1993, ***Wildlife Exposure Factors Handbook, Volume I of II***, Office of Health and Environmental Assessment, Office of Research and Development, EPA/600/R93/187a.

Whitaker Jr., J. O., 1995, ***The Audubon Society Field Guide to North American Mammals***, Alfred A. Knopf, Inc., New York.

Short-tailed Shrew (Blarina brevicauda). This shrew is the largest found in North America. It is solid grey above and below, with a short tail, and weighs between 15 and 29 grams (Whitaker, 1995). Total length of this shrew is 76 to 102 millimeters (Burt and Grossenheider, 1980). The range of this shrew extends from southeastern Canada and the northeastern U.S. to Nebraska, Missouri, Kentucky, and in the mountains to Alabama (Whitaker, 1995). Preferable habitat for the shrew includes forests, grasslands, marshes, and brushy areas. It will make a nest of dry leaves, grass, and hair beneath logs, stumps, rocks, or debris (Burt and Grossenheider, 1980). This underground tunneler may burrow as deep as 6 feet, and has a voracious appetite, eating one half of its own body weight per day of earthworms, other terrestrial vertebrates, and sometimes young mice (Whitaker, 1995). Mean population densities range from 5.7 in the winter, to 28 per acre in the summer (EPA, 1993). Their home range varies from 0.5 to 1 acre (Burt and Grossenheider, 1980). Longevity is typically around 20 months (EPA, 1993), with five to eight young born to each of two to three litters (Burt and Grossenheider, 1980).

References:

Burt, W. H. and R. P. Grossenheider, 1980, "A Field Guide to Mammals," ***Peterson Field Guide Series***, Hougton Mifflin Co., Boston.

U.S. Environmental Protection Agency (EPA), 1993, ***Wildlife Exposure Factors Handbook***, Office of Health and Environmental Assessment, Office of Research and Development, EPA/600/R93/187a.

Whitaker Jr., J. O., 1995, ***The Audubon Society Field Guide to North American Mammals***, Alfred A. Knopf, Inc., New York.

White-tailed Deer (Odocoileus virginianus). The white-tailed deer is a member of the Family Cervidae. They are large, even-toed, hoofed mammals with long legs. Their coat is predominantly light brown or chestnut colored, with the underparts being white. Deer are primarily herbivorous grazers and browsers, constantly moving from one food source to the next. The deer's diet changes seasonally. When available, farm crops such as winter wheat, corn, alfalfa, soy beans, and hay are important components of the species diet. Other top food items include wild crab apples, sumac, grasses, green briar, clover, jewelweed, acorns, and dogwood. In regions where the climate varies from season to season, deer may make annual migrations of 10 to 20 miles in the search for food. However, in Ohio, deer typically have rather small home ranges (2 to 3 square miles) and are reluctant to leave this range. The average weight for the species is 88 kilograms for males and 61 kilograms for females. Breeding season ranges from November through February, with the young offspring born in May and early June. Virtually all yearling and adult does conceive each year, and in Ohio usually carry twins. Triplets and quadruplets have also been recorded Gottschang (1981).

References:

Gottschang, J. L., 1981, ***A Guide to the Mammals of Ohio***, The Ohio State University Press, pp. 143-149.

Marsh Wren (Cistothorus palustris). The marsh wren is a small bird (4 to 4.5 inches in length) which inhabits freshwater cattail marshes and salt marshes. Nesting pairs are not likely to occupy other habitats and the species avoids the wet meadow and sedge meadow habitats preferred by sedge wrens. Marsh wrens breed throughout most of the northern half of the United States and in coastal areas as far south as Florida. The species eats mostly insects, and occasionally snails and other invertebrates. The average body weight is 0.01 kilograms, and the average home range for the species is 0.054 hectares. Because the species is polygamous, there may be more females than males inhabiting a breeding marsh. Densities as high as 120 birds per hectare have been recorded (EPA, 1993). Marsh wrens' nests are globular structures placed at heights of 2 to 5 feet in dense vegetation. The males commonly build dummy nests in addition to the one where the eggs will be laid (Peterjohn and Rice, 1991).

References:

U.S. Environmental Protection Agency (EPA), Office of Research and Development, 1993, ***Wildlife Exposure Factors Handbook***, EPA/600/R-93/187a.

Peterjohn, B. G., and Rice, D. L., 1991, ***The Ohio Breeding Bird Atlas***, The Ohio Department of Natural Resources.

APPENDIX E

FOOD CHAIN MODEL EXPOSURE DOSES AND HAZARD QUOTIENTS

Table E-1
Chemicals of Potential Concern
Exposure Doses and Hazard Quotients for the Deer Mouse
Former Sellite Area
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Surface Soil Exposure Point Concentration	Units	Soil BAF	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Aq. Plant BAF	Terr. Plant BAF	Mammal BAF	Bird BAF	EED Surface Water	EED Sediment	EED Soil	EED Fish	EED Aq. Invert.	EED Terr. Invert.	EED Aq. Plants	EED Terr. Plants	EED Mammals	EED Birds	Total EED	TRV NOAEL	HQ NOAEL	TRV LOAEL	HQ LOAEL
							----------Unitless----------								mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	
Metals																													
Aluminum	2.73E+01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.06E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+00	1.93E+00	2.10E+00	1.93E+01	2.10E-01
Arsenic	8.34E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-03	1.26E-01	9.84E-03	1.26E+00	9.84E-04
Barium	2.01E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.98E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.98E-02	5.10E+00	5.85E-03	1.98E+01	1.51E-03
Beryllium	1.90E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.82E-04	6.60E-01	4.28E-04	3.30E+00	8.56E-05
Cadmium	0.00E+00	mg/L	7.79E-01	mg/kg	1.55E+00	mg/kg	1.00E+00		6.00E-01	7.57E+00	6.97E-01	5.09E-01	2.25E-01	2.25E-01	0.00E+00	0.00E+00	5.88E-03	0.00E+00	0.00E+00	8.67E-01	0.00E+00	9.13E-02	0.00E+00	0.00E+00	9.65E-01	1.00E+00	9.65E-01	1.00E+01	9.65E-02
Copper	6.00E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.92E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.92E-03	1.17E+01	7.62E-04	1.51E+01	5.89E-04
Lead	5.96E-02	mg/L	0.00E+00	mg/kg	2.97E+03	mg/kg	1.00E+00			1.72E-01	NA	7.92E-03	1.25E-02	1.25E-02	8.86E-03	0.00E+00	1.13E+01	0.00E+00	0.00E+00	3.77E+01	NA	2.72E+00	0.00E+00	0.00E+00	5.17E+01	8.00E+00	6.46E+00	8.00E+01	6.46E-01
Manganese	1.90E+00	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.82E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.82E-01	8.80E+01	3.21E-03	2.84E+02	9.94E-04
Mercury	9.70E-05	mg/L	0.00E+00	mg/kg	7.97E-01	mg/kg	1.00E+00			1.26E+00	NA	4.08E-01	1.92E-01	1.92E-01	1.44E-05	0.00E+00	3.02E-03	0.00E+00	0.00E+00	7.40E-02	NA	3.76E-02	0.00E+00	0.00E+00	1.15E-01	1.32E+01	8.68E-03	1.32E+02	8.68E-04
Nickel	6.01E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.93E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.93E-03	4.00E+01	2.23E-04	8.00E+01	1.12E-04
Selenium	2.16E-03	mg/L	2.46E+00	mg/kg	0.00E+00	mg/kg	1.00E+00		5.39E+00		5.58E-01	NA			3.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	3.21E-04	2.00E-01	1.60E-03	3.30E-01	9.73E-04
Vanadium	3.20E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.76E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.76E-03	2.10E-01	2.27E-02	2.10E+00	2.27E-03
Zinc	1.12E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.66E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-02	1.60E+02	1.04E-04	3.20E+02	5.18E-05
PCBs																													
Aroclor 1254	0.00E+00	mg/L	0.00E+00	mg/kg	2.49E+00	mg/kg	1.00E+00			1.60E+01	8.84E-03	8.84E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	9.43E-03	0.00E+00	0.00E+00	2.94E+00	0.00E+00	2.54E-03	0.00E+00	0.00E+00	2.96E+00	6.80E-02	4.35E+01	6.80E-01	4.35E+00
Aroclor 1260	0.00E+00	mg/L	1.03E+00	mg/kg	9.27E+00	mg/kg	1.00E+00		3.20E+00	1.73E+01	4.55E-03	4.55E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	3.51E-02	0.00E+00	0.00E+00	1.18E+01	0.00E+00	4.86E-03	0.00E+00	0.00E+00	1.19E+01	6.80E-02	1.75E+02	6.80E-01	1.75E+01
Aroclor 1268	0.00E+00	mg/L	5.17E+00	mg/kg	2.56E+01	mg/kg	1.00E+00		3.20E+00	1.42E+01	5.26E-01	5.26E-01	1.32E-03	1.32E-03	0.00E+00	0.00E+00	9.68E-02	0.00E+00	0.00E+00	2.68E+01	0.00E+00	1.55E+00	0.00E+00	0.00E+00	2.85E+01	6.80E-02	4.19E+02	6.80E-01	4.19E+01
Semivolatile Organics																													
Acenaphthylene	0.00E+00	mg/L	1.19E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.95E+00		4.97E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+02	0.00E+00	5.00E+02	0.00E+00
Anthracene	0.00E+00	mg/L	1.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.80E-01		5.85E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.00E+01	0.00E+00	7.00E+02	0.00E+00
Benzo(a)anthracene	0.00E+00	mg/L	2.41E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.45E+00		1.19E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Benzo(a)pyrene	0.00E+00	mg/L	4.13E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.59E+00		1.30E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	1.00E+01	0.00E+00
Benzo(b)fluoranthene	0.00E+00	mg/L	0.00E+00	mg/kg	5.63E-02	mg/kg	1.00E+00			2.10E-01	3.10E-01	3.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-04	0.00E+00	0.00E+00	8.72E-04	0.00E+00	2.01E-03	0.00E+00	0.00E+00	3.10E-03	4.00E+00	7.75E-04	2.00E+01	1.55E-04
Benzo(ghi)perylene	0.00E+00	mg/L	2.31E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		2.10E-01		3.01E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Benzo(k)fluoranthene	0.00E+00	mg/L	3.15E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.36E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	2.15E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-04	1.83E+01	1.74E-05	1.83E+02	1.74E-06
Carbazole	0.00E+00	mg/L	4.07E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		5.30E-01	5.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E+01	0.00E+00	2.28E+02	0.00E+00
Chrysene	0.00E+00	mg/L	4.91E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		8.27E+00		8.90E-02	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	mg/L	9.96E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.30E-01	1.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+00	0.00E+00	1.33E+01	0.00E+00
Fluoranthene	0.00E+00	mg/L	4.81E-01	mg/kg	6.64E-02	mg/kg	1.00E+00		2.00E-01	2.10E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.51E-04	0.00E+00	0.00E+00	1.03E-03	0.00E+00	3.83E-03	0.00E+00	0.00E+00	5.11E-03	1.25E+01	4.09E-04	6.25E+01	8.18E-05
Indeno(1,2,3-cd)pyrene	0.00E+00	mg/L	2.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.10E-01	1.10E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	3.60E+01	0.00E+00
Pyrene	0.00E+00	mg/L	4.83E-01	mg/kg	6.15E-02	mg/kg	1.00E+00		4.20E-01	4.50E-01	7.20E-01	7.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E-04	0.00E+00	0.00E+00	2.04E-03	0.00E+00	5.11E-03	0.00E+00	0.00E+00	7.38E-03	7.50E+00	9.85E-04	3.75E+01	1.97E-04

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi\, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EED = Estimated Exposure Dose
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box):
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or N See appropriate text tables for equations.
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors		
Terrestrial plant diet fraction =	0.61	unitless
Aquatic plant diet fraction =	0	unitless
Plant root diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0.39	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.000056	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.0028	kg/d
Body weight =	0.0148	kg
Home range =	0.153	acres
Water intake rate =	0.0022	L/d
Site Area =	2	acres
Area Use Factor (AUF) =	1	unitless
Exposure Frequency (EF) =	1	unitless

Table E-2
Chemicals of Potential Concern
Exposure Doses and Hazard Quotients for the Short-Tailed Shrew
Former Sellite Area
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Total Soil Exposure Point Concentration	Units	Soil BAF	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Aq. Plant BAF	Terr. Plant BAF	Mammal BAF	Bird BAF	EED Surface Water	EED Sediment	EED Soil	EED Fish	EED Aq. Invert.	EED Terr. Invert.	EED Aq. Plants	EED Terr. Plants	EED Mammals	EED Birds	Total EED	TRV NOAEL	HQ NOAEL	TRV LOAEL	HQ LOAEL
							----------Unitless----------								mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d
Metals																													
Aluminum	2.73E+01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.19E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.19E+00	1.93E+00	2.17E+00	1.93E+01	2.17E-01
Arsenic	8.34E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.28E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-03	1.26E-01	1.02E-02	1.26E+00	1.02E-03
Barium	2.01E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.08E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.08E-02	5.10E+00	6.03E-03	1.98E+01	1.55E-03
Beryllium	1.90E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-04	6.60E-01	4.41E-04	3.30E+00	8.83E-05
Cadmium	0.00E+00	mg/L	7.79E-01	mg/kg	9.59E-01	mg/kg	1.00E+00		6.00E-01	8.35E+00	6.97E-01	6.34E-01	2.91E-01	2.91E-01	0.00E+00	0.00E+00	1.46E-02	0.00E+00	0.00E+00	1.17E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E+00	1.00E+00	1.19E+00	1.00E+01	1.19E-01
Copper	6.00E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								9.20E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.20E-03	1.17E+01	7.86E-04	1.51E+01	6.08E-04
Lead	5.96E-02	mg/L	0.00E+00	mg/kg	7.44E+02	mg/kg	1.00E+00			2.24E-01	NA	1.45E-02	2.70E-02	2.70E-02	9.14E-03	0.00E+00	1.13E+01	0.00E+00	0.00E+00	2.45E+01	NA	0.00E+00	0.00E+00	0.00E+00	3.58E+01	8.00E+00	4.48E+00	8.00E+01	4.48E-01
Manganese	1.90E+00	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.91E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-01	8.80E+01	3.31E-03	2.84E+02	1.03E-03
Mercury	9.70E-05	mg/L	0.00E+00	mg/kg	4.17E-01	mg/kg	1.00E+00			1.94E+00	NA	5.50E-01	1.92E-01	1.92E-01	1.49E-05	0.00E+00	6.36E-03	0.00E+00	0.00E+00	1.19E-01	NA	0.00E+00	0.00E+00	0.00E+00	1.25E-01	1.32E+01	9.48E-03	1.32E+02	9.48E-04
Nickel	6.01E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								9.22E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.22E-03	4.00E+01	2.30E-04	8.00E+01	1.15E-04
Selenium	2.16E-03	mg/L	2.46E+00	mg/kg	0.00E+00	mg/kg	1.00E+00		5.39E+00		5.58E-01	NA			3.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	3.31E-04	2.00E-01	1.66E-03	3.30E-01	1.00E-03
Vanadium	3.20E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.91E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.91E-03	2.10E-01	2.34E-02	2.10E+00	2.34E-03
Zinc	1.12E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.71E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-02	1.60E+02	1.07E-04	3.20E+02	5.35E-05
PCBs																													
Aroclor 1254	0.00E+00	mg/L	0.00E+00	mg/kg	1.84E+00	mg/kg	1.00E+00			1.60E+01	8.84E-03	8.84E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	2.81E-02	0.00E+00	0.00E+00	4.32E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E+00	6.80E-02	6.39E+01	6.80E-01	6.39E+00
Aroclor 1260	0.00E+00	mg/L	1.03E+00	mg/kg	4.47E+00	mg/kg	1.00E+00		3.20E+00	1.73E+01	4.55E-03	4.55E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	6.82E-02	0.00E+00	0.00E+00	1.13E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E+01	6.80E-02	1.68E+02	6.80E-01	1.68E+01
Aroclor 1268	0.00E+00	mg/L	5.17E+00	mg/kg	2.13E+01	mg/kg	1.00E+00		3.20E+00	1.42E+01	5.26E-01	5.26E-01	1.32E-03	1.32E-03	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	4.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.48E+01	6.80E-02	6.58E+02	6.80E-01	6.58E+01
Semivolatile Organics																													
Acenaphthylene	0.00E+00	mg/L	1.19E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.95E+00		4.97E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+02	0.00E+00	5.00E+02	0.00E+00
Anthracene	0.00E+00	mg/L	1.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.80E-01		5.85E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.00E+01	0.00E+00	7.00E+02	0.00E+00
Benzo(a)anthracene	0.00E+00	mg/L	2.41E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.45E+00		1.19E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Benzo(a)pyrene	0.00E+00	mg/L	4.13E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.59E+00		1.30E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	1.00E+01	0.00E+00
Benzo(b)fluoranthene	0.00E+00	mg/L	0.00E+00	mg/kg	1.33E-01	mg/kg	1.00E+00			2.10E-01	3.10E-01	3.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-03	0.00E+00	0.00E+00	4.10E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.13E-03	4.00E+00	1.53E-03	2.00E+01	3.06E-04
Benzo(ghi)perylene	0.00E+00	mg/L	2.31E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		2.10E-01		3.01E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Benzo(k)fluoranthene	0.00E+00	mg/L	3.15E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.36E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	2.15E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.29E-04	1.83E+01	1.80E-05	1.83E+02	1.80E-06
Carbazole	0.00E+00	mg/L	4.07E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		5.30E-01	5.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E+01	0.00E+00	2.28E+02	0.00E+00
Chrysene	0.00E+00	mg/L	4.91E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		8.27E+00		8.90E-02	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	mg/L	9.96E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.30E-01	1.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+00	0.00E+00	1.33E+01	0.00E+00
Fluoranthene	0.00E+00	mg/L	4.81E-01	mg/kg	2.33E-01	mg/kg	1.00E+00		2.00E-01	2.10E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.55E-03	0.00E+00	0.00E+00	7.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-02	1.25E+01	8.58E-04	6.25E+01	1.72E-04
Indeno(1,2,3-cd)pyrene	0.00E+00	mg/L	2.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.10E-01	1.10E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	3.60E+01	0.00E+00
Pyrene	0.00E+00	mg/L	4.83E-01	mg/kg	2.21E-01	mg/kg	1.00E+00		4.20E-01	4.50E-01	7.20E-01	7.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.37E-03	0.00E+00	0.00E+00	1.46E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-02	7.50E+00	2.39E-03	3.75E+01	4.79E-04

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi\,x\,Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EED = Estimated Exposure Dose
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box):
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or N See appropriate text tables for equations.
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors		
Terrestrial plant diet fraction =	0	unitless
Aquatic plant diet fraction =	0	unitless
Plant root diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	1	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.0002288	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.0022	kg/d
Body weight =	0.015	kg
Home range =	0.96	acres
Water intake rate =	0.0023	L/d
Site Area =	2	acres
Area Use Factor (AUF) =	1	unitless
Exposure Frequency (EF) =	1	unitless

Table E-3
Chemicals of Potential Concern
Exposure Doses and Hazard Quotients for the Cottontail Rabbit
Former Sellite Area
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Surface Soil Exposure Point Concentration	Units	Soil BAF	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Aq. Plant BAF	Terr. Plant BAF	Mammal BAF	Bird BAF	EED Surface Water	EED Sediment	EED Soil	EED Fish	EED Aq. Invert.	EED Terr. Invert.	EED Aq. Plants	EED Terr. Plants	EED Mammals	EED Birds	Total EED	TRV NOAEL	HQ NOAEL	TRV LOAEL	HQ LOAEL
							----------Unitless----------								mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	
Metals																													
Aluminum	2.73E+01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								6.93E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.93E-01	1.93E+00	3.59E-01	1.93E+01	3.59E-02
Arsenic	8.34E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.12E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-04	1.26E-01	1.68E-03	1.26E+00	1.68E-04
Barium	2.01E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								5.09E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.09E-03	5.10E+00	9.98E-04	1.98E+01	2.57E-04
Beryllium	1.90E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.82E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.82E-05	6.60E-01	7.30E-05	3.30E+00	1.46E-05
Cadmium	0.00E+00	mg/L	7.79E-01	mg/kg	1.55E+00	mg/kg	1.00E+00		6.00E-01	7.57E+00	6.97E-01	5.09E-01	2.25E-01	2.25E-01	0.00E+00	0.00E+00	2.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-02	0.00E+00	0.00E+00	1.97E-02	1.00E+00	1.97E-02	1.00E+01	1.97E-03
Copper	6.00E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.52E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-03	1.17E+01	1.30E-04	1.51E+01	1.01E-04
Lead	5.96E-02	mg/L	0.00E+00	mg/kg	2.97E+03	mg/kg	1.00E+00			1.72E-01	NA	7.92E-03	1.25E-02	1.25E-02	1.51E-03	0.00E+00	4.15E+00	0.00E+00	0.00E+00	0.00E+00	NA	5.21E-01	0.00E+00	0.00E+00	4.67E+00	8.00E+00	5.84E-01	8.00E+01	5.84E-02
Manganese	1.90E+00	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.82E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.82E-02	8.80E+01	5.48E-04	2.84E+02	1.70E-04
Mercury	9.70E-05	mg/L	0.00E+00	mg/kg	7.97E-01	mg/kg	1.00E+00			1.26E+00	NA	4.08E-01	1.92E-01	1.92E-01	2.46E-06	0.00E+00	1.11E-03	0.00E+00	0.00E+00	0.00E+00	NA	7.21E-03	0.00E+00	0.00E+00	8.32E-03	1.32E+01	6.30E-04	1.32E+02	6.30E-05
Nickel	6.01E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.52E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-03	4.00E+01	3.81E-05	8.00E+01	1.91E-05
Selenium	2.16E-03	mg/L	2.46E+00	mg/kg	0.00E+00	mg/kg	1.00E+00		5.39E+00		5.58E-01	NA			5.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	5.48E-05	2.00E-01	2.74E-04	3.30E-01	1.66E-04
Vanadium	3.20E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.12E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.12E-04	2.10E-01	3.87E-03	2.10E+00	3.87E-04
Zinc	1.12E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.83E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.83E-03	1.60E+02	1.77E-05	3.20E+02	8.85E-06
PCBs																													
Aroclor 1254	0.00E+00	mg/L	0.00E+00	mg/kg	2.49E+00	mg/kg	1.00E+00			1.60E+01	8.84E-03	8.84E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	3.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-04	0.00E+00	0.00E+00	3.96E-03	6.80E-02	5.83E-02	6.80E-01	5.83E-03
Aroclor 1260	0.00E+00	mg/L	1.03E+00	mg/kg	9.27E+00	mg/kg	1.00E+00		3.20E+00	1.73E+01	4.55E-03	4.55E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.33E-04	0.00E+00	0.00E+00	1.39E-02	6.80E-02	2.04E-01	6.80E-01	2.04E-02
Aroclor 1268	0.00E+00	mg/L	5.17E+00	mg/kg	2.56E+01	mg/kg	1.00E+00		3.20E+00	1.42E+01	5.26E-01	5.26E-01	1.32E-03	1.32E-03	0.00E+00	0.00E+00	3.57E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.98E-01	0.00E+00	0.00E+00	3.34E-01	6.80E-02	4.91E+00	6.80E-01	4.91E-01
Semivolatile Organics																													
Acenaphthylene	0.00E+00	mg/L	1.19E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.95E+00		4.97E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+02	0.00E+00	5.00E+02	0.00E+00
Anthracene	0.00E+00	mg/L	1.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.80E-01		5.85E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.00E+01	0.00E+00	7.00E+02	0.00E+00
Benzo(a)anthracene	0.00E+00	mg/L	2.41E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.45E+00		1.19E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Benzo(a)pyrene	0.00E+00	mg/L	4.13E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.59E+00		1.30E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	1.00E+01	0.00E+00
Benzo(b)fluoranthene	0.00E+00	mg/L	0.00E+00	mg/kg	5.63E-02	mg/kg	1.00E+00			2.10E-01	3.10E-01	3.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.85E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.86E-04	0.00E+00	0.00E+00	4.65E-04	4.00E+00	1.16E-04	2.00E+01	2.32E-05
Benzo(ghi)perylene	0.00E+00	mg/L	2.31E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		2.10E-01		3.01E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Benzo(k)fluoranthene	0.00E+00	mg/L	3.15E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.36E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	2.15E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								5.45E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.45E-05	1.83E+01	2.97E-06	1.83E+02	2.98E-07
Carbazole	0.00E+00	mg/L	4.07E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		5.30E-01	5.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E+01	0.00E+00	2.28E+02	0.00E+00
Chrysene	0.00E+00	mg/L	4.91E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		8.27E+00		8.90E-02	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	mg/L	9.96E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.30E-01	1.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+00	0.00E+00	1.33E+01	0.00E+00
Fluoranthene	0.00E+00	mg/L	4.81E-01	mg/kg	6.64E-02	mg/kg	1.00E+00		2.00E-01	2.10E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.26E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E-04	0.00E+00	0.00E+00	8.28E-04	1.25E+01	6.62E-05	6.25E+01	1.32E-05
Indeno(1,2,3-cd)pyrene	0.00E+00	mg/L	2.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.10E-01	1.10E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	3.60E+01	0.00E+00
Pyrene	0.00E+00	mg/L	4.83E-01	mg/kg	6.15E-02	mg/kg	1.00E+00		4.20E-01	4.50E-01	7.20E-01	7.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.58E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.80E-04	0.00E+00	0.00E+00	1.07E-03	7.50E+00	1.42E-04	3.75E+01	2.84E-05

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi\,x\,Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EED = Estimated Exposure Dose
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box):
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or N See appropriate text tables for equations.
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors		
Terrestrial plant diet fraction =	1	unitless
Aquatic plant diet fraction =	0	unitless
Plant root diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.006048	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.096	kg/d
Body weight =	1.132	kg
Home range =	7.66	acres
Water intake rate =	0.11	L/d
Site Area =	2	acres
Area Use Factor (AUF) =	0.26109661	unitless
Exposure Frequency (EF) =	1	unitless

Table E-4
Chemicals of Potential Concern
Exposure Doses and Hazard Quotients for the Marsh Wren
Former Sellite Area
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Surface Soil Exposure Point Concentration	Units	Soil BAF	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Aq. Plant BAF	Terr. Plant BAF	Mammal BAF	Bird BAF	EED Surface Water	EED Sediment	EED Soil	EED Fish	EED Aq. Invert.	EED Terr. Invert.	EED Aq. Plants	EED Terr. Plants	EED Mammals	EED Birds	Total EED	TRV $_{NOAEL}$	HQ $_{NOAEL}$	TRV $_{LOAEL}$	HQ $_{LOAEL}$
							----------Unitless----------								mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d
Metals																													
Aluminum	2.73E+01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								7.37E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.37E+00	1.10E+02	6.70E-02	1.10E+03	6.70E-03
Arsenic	8.34E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.25E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-03	5.14E+00	4.38E-04	1.28E+01	1.75E-04
Barium	2.01E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								5.42E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.42E-02	2.08E+01	2.61E-03	4.17E+01	1.30E-03
Beryllium	1.90E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								5.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.13E-04	NA	NA	NA	NA
Cadmium	0.00E+00	mg/L	7.79E-01	mg/kg	1.55E+00	mg/kg	1.00E+00		6.00E-01	7.57E+00	6.97E-01	5.09E-01	2.25E-01	2.25E-01	0.00E+00	0.00E+00	9.01E-03	0.00E+00	0.00E+00	3.41E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.42E+00	1.45E+00	2.36E+00	2.00E+01	1.71E-01
Copper	6.00E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.62E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-02	4.70E+01	3.45E-04	6.17E+01	2.63E-04
Lead	5.96E-02	mg/L	0.00E+00	mg/kg	2.97E+03	mg/kg	1.00E+00			1.72E-01	NA	7.92E-03	1.25E-02	1.25E-02	1.61E-02	0.00E+00	1.72E+01	0.00E+00	0.00E+00	1.48E+02	NA	0.00E+00	0.00E+00	0.00E+00	1.65E+02	1.13E+00	1.46E+02	1.13E+01	1.46E+01
Manganese	1.90E+00	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								5.13E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.13E-01	9.77E+02	5.25E-04	9.77E+03	5.25E-05
Mercury	9.70E-05	mg/L	0.00E+00	mg/kg	7.97E-01	mg/kg	1.00E+00			1.26E+00	NA	4.08E-01	1.92E-01	1.92E-01	2.62E-05	0.00E+00	4.62E-03	0.00E+00	0.00E+00	2.91E-01	NA	0.00E+00	0.00E+00	0.00E+00	2.96E-01	4.50E-01	6.57E-01	9.00E-01	3.28E-01
Nickel	6.01E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.62E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-02	7.74E+01	2.10E-04	1.07E+02	1.52E-04
Selenium	2.16E-03	mg/L	2.46E+00	mg/kg	0.00E+00	mg/kg	1.00E+00		5.39E+00		5.58E-01	NA			5.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	5.83E-04	5.00E-01	1.17E-03	1.00E+00	5.83E-04
Vanadium	3.20E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.65E-03	1.14E+01	7.60E-04	1.14E+02	7.60E-05
Zinc	1.12E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.01E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.01E-02	1.45E+01	2.08E-03	1.31E+02	2.30E-04
PCBs																													
Aroclor 1254	0.00E+00	mg/L	0.00E+00	mg/kg	2.49E+00	mg/kg	1.00E+00			1.60E+01	8.84E-03	8.84E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	1.45E-02	0.00E+00	0.00E+00	1.16E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+01	1.80E-01	6.44E+01	1.80E+00	6.44E+00
Aroclor 1260	0.00E+00	mg/L	1.03E+00	mg/kg	9.27E+00	mg/kg	1.00E+00		3.20E+00	1.73E+01	4.55E-03	4.55E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	5.38E-02	0.00E+00	0.00E+00	4.65E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.66E+01	1.80E-01	2.59E+02	1.80E+00	2.59E+01
Aroclor 1268	0.00E+00	mg/L	5.17E+00	mg/kg	2.56E+01	mg/kg	1.00E+00		3.20E+00	1.42E+01	5.26E-01	5.26E-01	1.32E-03	1.32E-03	0.00E+00	0.00E+00	1.48E-01	0.00E+00	0.00E+00	1.05E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E+02	1.80E-01	5.86E+02	1.80E+00	5.86E+01
Semivolatile Organics																													
Acenaphthylene	0.00E+00	mg/L	1.19E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.95E+00		4.97E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Anthracene	0.00E+00	mg/L	1.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.80E-01		5.85E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Benzo(a)anthracene	0.00E+00	mg/L	2.41E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.45E+00		1.19E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.00E-01	0.00E+00	3.50E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	mg/L	4.13E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.59E+00		1.30E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	mg/L	0.00E+00	mg/kg	5.63E-02	mg/kg	1.00E+00			2.10E-01	3.10E-01	3.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.27E-04	0.00E+00	0.00E+00	3.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.76E-03	1.40E-01	2.68E-02	7.00E-01	5.36E-03
Benzo(ghi)perylene	0.00E+00	mg/L	2.31E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		2.10E-01		3.01E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	mg/L	3.15E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.36E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	2.15E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								5.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.80E-04	1.00E+00	5.80E-04	1.10E+01	5.27E-05
Carbazole	0.00E+00	mg/L	4.07E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		5.30E-01	5.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA
Chrysene	0.00E+00	mg/L	4.91E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		8.27E+00		8.90E-02	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	mg/L	9.96E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.30E-01	1.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Fluoranthene	0.00E+00	mg/L	4.81E-01	mg/kg	6.64E-02	mg/kg	1.00E+00		2.00E-01	2.10E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.85E-04	0.00E+00	0.00E+00	4.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.43E-03	3.95E+01	1.12E-04	3.95E+02	1.12E-05
Indeno(1,2,3-cd)pyrene	0.00E+00	mg/L	2.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.10E-01	1.10E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Pyrene	0.00E+00	mg/L	4.83E-01	mg/kg	6.15E-02	mg/kg	1.00E+00		4.20E-01	4.50E-01	7.20E-01	7.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.57E-04	0.00E+00	0.00E+00	8.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.38E-03	3.95E+01	2.12E-04	3.95E+02	2.12E-05

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi\,xCij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EED = Estimated Exposure Dose
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box):
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or N See appropriate text tables for equations.
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Terrestrial plant diet fraction =	0	unitless
Aquatic plant diet fraction =	0	unitless
Plant root diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	1	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.000058	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.0029	kg/d
Body weight =	0.01	kg
Home range =	0.13	acres
Water intake rate =	0.0027	L/d
Site Area =	2	acres
Area Use Factor (AUF) =	1	unitless
Exposure Frequency (EF) =	1	unitless

Table E-5
Chemicals of Potential Concern
Exposure Doses and Hazard Quotients for the White-Tailed Deer
Former Sellite Area
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Total Soil Exposure Point Concentration	Units	Soil BAF	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Aq. Plant BAF	Terr. Plant BAF	Mammal BAF	Bird BAF	EED Surface Water	EED Sediment	EED Soil	EED Fish	EED Aq. Invert.	EED Terr. Invert.	EED Aq. Plants	EED Terr. Plants	EED Mammals	EED Birds	Total EED	TRV NOAEL	HQ NOAEL	TRV LOAEL	HQ LOAEL
							----------Unitless----------								mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	
Metals																													
Aluminum	2.73E+01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.80E-03	1.93E+00	1.45E-03	1.93E+01	1.45E-04
Arsenic	8.34E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.55E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.55E-07	1.26E-01	6.78E-06	1.26E+00	6.78E-07
Barium	2.01E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-05	5.10E+00	4.03E-06	1.98E+01	1.04E-06
Beryllium	1.90E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.95E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-07	6.60E-01	2.95E-07	3.30E+00	5.90E-08
Cadmium	0.00E+00	mg/L	7.79E-01	mg/kg	9.59E-01	mg/kg	1.00E+00		6.00E-01	8.35E+00	6.97E-01	6.34E-01	2.91E-01	2.91E-01	0.00E+00	0.00E+00	9.83E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.11E-05	0.00E+00	0.00E+00	3.21E-05	1.00E+00	3.21E-05	1.00E+01	3.21E-06
Copper	6.00E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								6.15E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.15E-06	1.17E+01	5.25E-07	1.51E+01	4.06E-07
Lead	5.96E-02	mg/L	0.00E+00	mg/kg	7.44E+02	mg/kg	1.00E+00			2.24E-01	NA	1.45E-02	2.70E-02	2.70E-02	6.11E-06	0.00E+00	7.62E-04	0.00E+00	0.00E+00	0.00E+00	NA	5.54E-04	0.00E+00	0.00E+00	1.32E-03	8.00E+00	1.65E-04	8.00E+01	1.65E-05
Manganese	1.90E+00	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.95E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-04	8.80E+01	2.21E-06	2.84E+02	6.85E-07
Mercury	9.70E-05	mg/L	0.00E+00	mg/kg	4.17E-01	mg/kg	1.00E+00			1.94E+00	NA	5.50E-01	1.92E-01	1.92E-01	9.94E-09	0.00E+00	4.27E-07	0.00E+00	0.00E+00	0.00E+00	NA	1.18E-05	0.00E+00	0.00E+00	1.22E-05	1.32E+01	9.23E-07	1.32E+02	9.23E-08
Nickel	6.01E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								6.16E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.16E-06	4.00E+01	1.54E-07	8.00E+01	7.70E-08
Selenium	2.16E-03	mg/L	2.46E+00	mg/kg	0.00E+00	mg/kg	1.00E+00		5.39E+00		5.58E-01	NA			2.21E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	2.21E-07	2.00E-01	1.11E-06	3.30E-01	6.70E-07
Vanadium	3.20E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.28E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.28E-06	2.10E-01	1.56E-05	2.10E+00	1.56E-06
Zinc	1.12E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.14E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-05	1.60E+02	7.15E-08	3.20E+02	3.57E-08
PCBs																													
Aroclor 1254	0.00E+00	mg/L	0.00E+00	mg/kg	1.84E+00	mg/kg	1.00E+00			1.60E+01	8.84E-03	8.84E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	1.88E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.33E-07	0.00E+00	0.00E+00	2.72E-06	6.80E-02	4.00E-05	6.80E-01	4.00E-06
Aroclor 1260	0.00E+00	mg/L	1.03E+00	mg/kg	4.47E+00	mg/kg	1.00E+00		3.20E+00	1.73E+01	4.55E-03	4.55E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	4.58E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-06	0.00E+00	0.00E+00	5.62E-06	6.80E-02	8.27E-05	6.80E-01	8.27E-06
Aroclor 1268	0.00E+00	mg/L	5.17E+00	mg/kg	2.13E+01	mg/kg	1.00E+00		3.20E+00	1.42E+01	5.26E-01	5.26E-01	1.32E-03	1.32E-03	0.00E+00	0.00E+00	2.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.75E-04	0.00E+00	0.00E+00	5.97E-04	6.80E-02	8.78E-03	6.80E-01	8.78E-04
Semivolatile Organics																													
Acenaphthylene	0.00E+00	mg/L	1.19E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.95E+00		4.97E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+02	0.00E+00	5.00E+02	0.00E+00
Anthracene	0.00E+00	mg/L	1.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.80E-01		5.85E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.00E+01	0.00E+00	7.00E+02	0.00E+00
Benzo(a)anthracene	0.00E+00	mg/L	2.41E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.45E+00		1.19E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Benzo(a)pyrene	0.00E+00	mg/L	4.13E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.59E+00		1.30E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	1.00E+01	0.00E+00
Benzo(b)fluoranthene	0.00E+00	mg/L	0.00E+00	mg/kg	1.33E-01	mg/kg	1.00E+00			2.10E-01	3.10E-01	3.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E-06	0.00E+00	0.00E+00	2.25E-06	4.00E+00	5.62E-07	2.00E+01	1.12E-07
Benzo(ghi)perylene	0.00E+00	mg/L	2.31E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		2.10E-01		3.01E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Benzo(k)fluoranthene	0.00E+00	mg/L	3.15E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.36E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	7.20E+01	0.00E+00
Bis(2-ethylhexyl)phthalate	2.15E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E-07	1.83E+01	1.20E-08	1.83E+02	1.20E-09
Carbazole	0.00E+00	mg/L	4.07E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		5.30E-01	5.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E+01	0.00E+00	2.28E+02	0.00E+00
Chrysene	0.00E+00	mg/L	4.91E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		8.27E+00		8.90E-02	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.70E-01	0.00E+00	8.50E-01	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	mg/L	9.96E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.30E-01	1.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+00	0.00E+00	1.33E+01	0.00E+00
Fluoranthene	0.00E+00	mg/L	4.81E-01	mg/kg	2.33E-01	mg/kg	1.00E+00		2.00E-01	2.10E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.97E-06	0.00E+00	0.00E+00	6.21E-06	1.25E+01	4.97E-07	6.25E+01	9.93E-08
Indeno(1,2,3-cd)pyrene	0.00E+00	mg/L	2.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.10E-01	1.10E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.20E+00	0.00E+00	3.60E+01	0.00E+00
Pyrene	0.00E+00	mg/L	4.83E-01	mg/kg	2.21E-01	mg/kg	1.00E+00		4.20E-01	4.50E-01	7.20E-01	7.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.15E-06	0.00E+00	0.00E+00	8.38E-06	7.50E+00	1.12E-06	3.75E+01	2.23E-07

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi\,xCij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EED = Estimated Exposure Dose
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box):
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or N See appropriate text tables for equations.
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Terrestrial plant diet fraction =	1	unitless
Aquatic plant diet fraction =	0	unitless
Plant root diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.04	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	2	kg/d
Body weight =	61	kg
Home range =	1280	acres
Water intake rate =	4	L/d
Site Area =	2	acres
Area Use Factor (AUF) =	0.0015625	unitless
Exposure Frequency (EF) =	1	unitless

Table E-6
Chemicals of Potential Concern
Exposure Doses and Hazard Quotients for the Raccoon
Former Sellite Area
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Surface Soil Exposure Point Concentration	Units	Soil BAF	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Aq. Plant BAF	Terr. Plant BAF	Mammal BAF	Bird BAF	EED Surface Water	EED Sediment	EED Soil	EED Fish	EED Aq. Invert.	EED Terr. Invert.	EED Aq. Plants	EED Terr. Plants	EED Mammals	EED Birds	Total EED	TRV $_{NOAEL}$	HQ $_{NOAEL}$	TRV $_{LOAEL}$	HQ $_{LOAEL}$
							----------Unitless----------								mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	
Metals																													
Aluminum	2.73E+01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.20E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-02	1.93E+00	6.20E-03	1.93E+01	6.20E-04
Arsenic	8.34E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.65E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.65E-06	1.26E-01	2.90E-05	1.26E+00	2.90E-06
Barium	2.01E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.79E-05	5.10E+00	1.72E-05	1.98E+01	4.44E-06
Beryllium	1.90E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.32E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.32E-07	6.60E-01	1.26E-06	3.30E+00	2.52E-07
Cadmium	0.00E+00	mg/L	7.79E-01	mg/kg	1.55E+00	mg/kg	1.00E+00		6.00E-01	7.57E+00	6.97E-01	5.09E-01	2.25E-01	2.25E-01	0.00E+00	9.70E-06	1.93E-05	0.00E+00	2.72E-05	9.34E-04	3.02E-05	4.40E-05	4.64E-06	0.00E+00	1.07E-03	1.00E+00	1.07E-03	1.00E+01	1.07E-04
Copper	6.00E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.63E-05	1.17E+01	2.25E-06	1.51E+01	1.74E-06
Lead	5.96E-02	mg/L	0.00E+00	mg/kg	2.97E+03	mg/kg	1.00E+00			1.72E-01	NA	7.92E-03	1.25E-02	1.25E-02	2.61E-05	0.00E+00	3.70E-02	0.00E+00	0.00E+00	4.06E-02	NA	1.31E-03	4.91E-04	0.00E+00	7.94E-02	8.00E+00	9.93E-03	8.00E+01	9.93E-04
Manganese	1.90E+00	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								8.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.32E-04	8.80E+01	9.46E-06	2.84E+02	2.93E-06
Mercury	9.70E-05	mg/L	0.00E+00	mg/kg	7.97E-01	mg/kg	1.00E+00			1.26E+00	NA	4.08E-01	1.92E-01	1.92E-01	4.25E-08	0.00E+00	9.92E-06	0.00E+00	0.00E+00	7.97E-05	NA	1.81E-05	2.03E-06	0.00E+00	1.10E-04	1.00E+00	1.10E-04	5.00E+00	2.20E-05
Nickel	6.01E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								2.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.63E-05	4.00E+01	6.58E-07	8.00E+01	3.29E-07
Selenium	2.16E-03	mg/L	2.46E+00	mg/kg	0.00E+00	mg/kg	1.00E+00		5.39E+00		5.58E-01	NA			9.46E-07	3.06E-05	0.00E+00	0.00E+00	7.73E-04	0.00E+00	7.64E-05	NA	0.00E+00	0.00E+00	8.81E-04	2.00E-01	4.41E-03	3.30E-01	2.67E-03
Vanadium	3.20E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.40E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-05	2.10E-01	6.68E-05	2.10E+00	6.68E-06
Zinc	1.12E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.89E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.89E-05	1.60E+02	3.06E-07	3.20E+02	1.53E-07
PCBs																													
Aroclor 1254	0.00E+00	mg/L	0.00E+00	mg/kg	2.49E+00	mg/kg	1.00E+00			1.60E+01	8.84E-03	8.84E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	3.10E-05	0.00E+00	0.00E+00	3.17E-03	0.00E+00	1.23E-06	4.36E-08	0.00E+00	3.20E-03	1.40E-01	2.29E-02	6.90E-01	4.64E-03
Aroclor 1260	0.00E+00	mg/L	1.03E+00	mg/kg	9.27E+00	mg/kg	1.00E+00		3.20E+00	1.73E+01	4.55E-03	4.55E-03	1.32E-03	1.32E-03	0.00E+00	1.28E-05	1.15E-04	0.00E+00	1.92E-04	1.27E-02	2.60E-07	2.34E-06	1.62E-07	0.00E+00	1.31E-02	1.40E-01	9.33E-02	6.90E-01	1.89E-02
Aroclor 1268	0.00E+00	mg/L	5.17E+00	mg/kg	2.56E+01	mg/kg	1.00E+00		3.20E+00	1.42E+01	5.26E-01	5.26E-01	1.32E-03	1.32E-03	0.00E+00	6.44E-05	3.19E-04	0.00E+00	9.64E-04	2.89E-02	1.51E-04	7.49E-04	4.47E-07	0.00E+00	3.11E-02	1.40E-01	2.22E-01	6.90E-01	4.51E-02
Semivolatile Organics																													
Acenaphthylene	0.00E+00	mg/L	1.19E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.95E+00		4.97E-01	NA			0.00E+00	1.47E-06	0.00E+00	0.00E+00	1.35E-05	0.00E+00	3.28E-06	NA	0.00E+00	0.00E+00	1.82E-05	1.00E+02	1.82E-07	5.00E+02	3.64E-08
Anthracene	0.00E+00	mg/L	1.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.80E-01		5.85E-01	NA			0.00E+00	1.61E-06	0.00E+00	0.00E+00	1.36E-06	0.00E+00	4.21E-06	NA	0.00E+00	0.00E+00	7.19E-06	7.00E+01	1.03E-07	7.00E+02	1.03E-08
Benzo(a)anthracene	0.00E+00	mg/L	2.41E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.45E+00		1.19E-01	NA			0.00E+00	3.00E-06	0.00E+00	0.00E+00	2.04E-05	0.00E+00	1.59E-06	NA	0.00E+00	0.00E+00	2.50E-05	1.70E-01	1.47E-04	8.50E-01	2.94E-05
Benzo(a)pyrene	0.00E+00	mg/L	4.13E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.59E+00		1.30E-01	NA			0.00E+00	5.14E-06	0.00E+00	0.00E+00	3.83E-05	0.00E+00	2.99E-06	NA	0.00E+00	0.00E+00	4.64E-05	1.00E+00	4.64E-05	1.00E+01	4.64E-06
Benzo(b)fluoranthene	0.00E+00	mg/L	0.00E+00	mg/kg	5.63E-02	mg/kg	1.00E+00			2.10E-01	3.10E-01	3.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.01E-07	0.00E+00	0.00E+00	9.39E-07	0.00E+00	9.71E-07	0.00E+00	0.00E+00	2.61E-06	4.00E+00	6.53E-07	2.00E+01	1.31E-07
Benzo(ghi)perylene	0.00E+00	mg/L	2.31E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		2.10E-01		3.01E-01	NA			0.00E+00	2.88E-06	0.00E+00	0.00E+00	2.83E-06	0.00E+00	3.87E-06	NA	0.00E+00	0.00E+00	9.57E-06	7.20E+00	1.33E-06	7.20E+01	1.33E-07
Benzo(k)fluoranthene	0.00E+00	mg/L	3.15E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.36E-01	NA			0.00E+00	3.92E-06	0.00E+00	0.00E+00	2.95E-05	0.00E+00	2.38E-06	NA	0.00E+00	0.00E+00	3.59E-05	7.20E+00	4.98E-06	7.20E+01	4.98E-07
Bis(2-ethylhexyl)phthalate	2.15E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								9.40E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.40E-07	1.83E+01	5.13E-08	1.83E+02	5.14E-09
Carbazole	0.00E+00	mg/L	4.07E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		5.30E-01	5.30E-01			0.00E+00	5.06E-07	0.00E+00	0.00E+00	3.81E-06	0.00E+00	1.20E-06	0.00E+00	0.00E+00	0.00E+00	5.52E-06	2.28E+01	2.42E-07	2.28E+02	2.42E-08
Chrysene	0.00E+00	mg/L	4.91E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		8.27E+00		8.90E-02	NA			0.00E+00	6.11E-06	0.00E+00	0.00E+00	2.37E-04	0.00E+00	2.43E-06	NA	0.00E+00	0.00E+00	2.45E-04	1.70E-01	1.44E-03	8.50E-01	2.88E-04
Dibenz(a,h)anthracene	0.00E+00	mg/L	9.96E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.30E-01	1.30E-01			0.00E+00	1.24E-06	0.00E+00	0.00E+00	9.34E-06	0.00E+00	7.20E-07	0.00E+00	0.00E+00	0.00E+00	1.13E-05	1.33E+00	8.49E-06	1.33E+01	8.49E-07
Fluoranthene	0.00E+00	mg/L	4.81E-01	mg/kg	6.64E-02	mg/kg	1.00E+00		2.00E-01	2.10E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	5.99E-06	8.26E-07	0.00E+00	5.60E-06	1.11E-06	1.34E-05	1.85E-06	0.00E+00	0.00E+00	2.87E-05	1.25E+01	2.30E-06	6.25E+01	4.60E-07
Indeno(1,2,3-cd)pyrene	0.00E+00	mg/L	2.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.10E-01	1.10E-01			0.00E+00	2.86E-06	0.00E+00	0.00E+00	2.16E-05	0.00E+00	1.41E-06	0.00E+00	0.00E+00	0.00E+00	2.58E-05	7.20E+00	3.59E-06	3.60E+01	7.18E-07
Pyrene	0.00E+00	mg/L	4.83E-01	mg/kg	6.15E-02	mg/kg	1.00E+00		4.20E-01	4.50E-01	7.20E-01	7.20E-01	0.00E+00	0.00E+00	0.00E+00	6.01E-06	7.66E-07	0.00E+00	1.18E-05	2.20E-06	1.93E-05	2.46E-06	0.00E+00	0.00E+00	4.26E-05	7.50E+00	5.68E-06	3.75E+01	1.14E-06

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi\,xCij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EED = Estimated Exposure Dose
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box):
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or N See appropriate text tables for equations.
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors		
Terrestrial plant diet fraction =	0.21	unitless
Aquatic plant diet fraction =	0.21	unitless
Plant root diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0.22	unitless
Terr. Invert diet fraction =	0.3	unitless
Mammal diet fraction =	0.05	unitless
Bird diet fraction =	0	unitless
Soil ingestion rate =	0.01222	kg/d
Sediment ingestion rate =	0.01222	kg/d
Food ingestion rate =	0.26	kg/d
Body weight =	5.1	kg
Home range =	385	acres
Water intake rate =	0.43	L/d
Site Area =	2	acres
Area Use Factor (AUF) =	0.00519481	unitless
Exposure Frequency (EF) =	1	unitless

Table E-7
Chemicals of Potential Concern
Exposure Doses and Hazard Quotients for the Red-Tailed Hawk
Former Sellite Area
Plum Brook Ordnance Works, Sandusky, Ohio

Chemical	Surface Water Exposure Point Concentration	Units	Sediment Exposure Point Concentration	Units	Surface Soil Exposure Point Concentration	Units	Soil BAF	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Aq. Plant BAF	Terr. Plant BAF	Mammal BAF	Bird BAF	EED Surface Water	EED Sediment	EED Soil	EED Fish	EED Aq. Invert.	EED Terr. Invert.	EED Aq. Plants	EED Terr. Plants	EED Mammals	EED Birds	Total EED	TRV NOAEL	HQ NOAEL	TRV LOAEL	HQ LOAEL
							----------Unitless----------								mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d
Metals																													
Aluminum	2.73E+01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.56E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-03	1.10E+02	1.42E-05	1.10E+03	1.42E-06
Arsenic	8.34E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								4.78E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.78E-07	5.14E+00	9.29E-08	1.28E+01	3.72E-08
Barium	2.01E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.15E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-05	2.08E+01	5.53E-07	4.17E+01	2.76E-07
Beryllium	1.90E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-07	NA	NA	NA	NA
Cadmium	0.00E+00	mg/L	7.79E-01	mg/kg	1.55E+00	mg/kg	1.00E+00		6.00E-01	7.57E+00	6.97E-01	5.09E-01	2.25E-01	2.25E-01	0.00E+00	0.00E+00	1.78E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-05	4.82E-06	2.18E-05	1.45E+00	1.51E-05	2.00E+01	1.09E-06
Copper	6.00E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.44E-06	4.70E+01	7.31E-08	6.17E+01	5.57E-08
Lead	5.96E-02	mg/L	0.00E+00	mg/kg	2.97E+03	mg/kg	1.00E+00			1.72E-01	NA	7.92E-03	1.25E-02	1.25E-02	3.41E-06	0.00E+00	3.41E-03	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	1.61E-03	5.09E-04	5.53E-03	3.85E+00	1.44E-03	3.85E+01	1.44E-04
Manganese	1.90E+00	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.09E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-04	9.77E+02	1.11E-07	9.77E+03	1.11E-08
Mercury	9.70E-05	mg/L	0.00E+00	mg/kg	7.97E-01	mg/kg	1.00E+00			1.26E+00	NA	4.08E-01	1.92E-01	1.92E-01	5.56E-09	0.00E+00	9.13E-07	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	6.66E-06	2.10E-06	9.68E-06	4.50E-01	2.15E-05	9.00E-01	1.08E-05
Nickel	6.01E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								3.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.44E-06	7.74E+01	4.45E-08	1.07E+02	3.22E-08
Selenium	2.16E-03	mg/L	2.46E+00	mg/kg	0.00E+00	mg/kg	1.00E+00		5.39E+00		5.58E-01	NA			1.24E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	1.24E-07	4.40E-01	2.81E-07	1.50E+00	8.24E-08
Vanadium	3.20E-02	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.83E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-06	1.14E+01	1.61E-07	1.14E+02	1.61E-08
Zinc	1.12E-01	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								6.39E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E-06	1.45E+01	4.41E-07	1.31E+02	4.88E-08
PCBs																													
Aroclor 1254	0.00E+00	mg/L	0.00E+00	mg/kg	2.49E+00	mg/kg	1.00E+00			1.60E+01	8.84E-03	8.84E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	2.85E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-07	4.52E-08	3.04E-06	1.80E-01	1.69E-05	1.80E+00	1.69E-06
Aroclor 1260	0.00E+00	mg/L	1.03E+00	mg/kg	9.27E+00	mg/kg	1.00E+00		3.20E+00	1.73E+01	4.55E-03	4.55E-03	1.32E-03	1.32E-03	0.00E+00	0.00E+00	1.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E-07	1.68E-07	1.13E-05	1.80E-01	6.29E-05	1.80E+00	6.29E-06
Aroclor 1268	0.00E+00	mg/L	5.17E+00	mg/kg	2.56E+01	mg/kg	1.00E+00		3.20E+00	1.42E+01	5.26E-01	5.26E-01	1.32E-03	1.32E-03	0.00E+00	0.00E+00	2.93E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-06	4.64E-07	3.12E-05	1.80E-01	1.74E-04	1.80E+00	1.74E-05
Semivolatile Organics																													
Acenaphthylene	0.00E+00	mg/L	1.19E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.95E+00		4.97E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Anthracene	0.00E+00	mg/L	1.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.80E-01		5.85E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Benzo(a)anthracene	0.00E+00	mg/L	2.41E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.45E+00		1.19E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.00E-01	0.00E+00	3.50E+00	0.00E+00
Benzo(a)pyrene	0.00E+00	mg/L	4.13E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.59E+00		1.30E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Benzo(b)fluoranthene	0.00E+00	mg/L	0.00E+00	mg/kg	5.63E-02	mg/kg	1.00E+00			2.10E-01	3.10E-01	3.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.45E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.45E-08	1.40E-01	4.61E-07	7.00E-01	9.21E-08
Benzo(ghi)perylene	0.00E+00	mg/L	2.31E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		2.10E-01		3.01E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Benzo(k)fluoranthene	0.00E+00	mg/L	3.15E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.36E-01	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Bis(2-ethylhexyl)phthalate	2.15E-03	mg/L	0.00E+00	mg/kg	0.00E+00	mg/kg	1.00E+00								1.23E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-07	1.00E+00	1.23E-07	1.10E+01	1.12E-08
Carbazole	0.00E+00	mg/L	4.07E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		5.30E-01	5.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA
Chrysene	0.00E+00	mg/L	4.91E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		8.27E+00		8.90E-02	NA			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Dibenz(a,h)anthracene	0.00E+00	mg/L	9.96E-02	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.30E-01	1.30E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Fluoranthene	0.00E+00	mg/L	4.81E-01	mg/kg	6.64E-02	mg/kg	1.00E+00		2.00E-01	2.10E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.61E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.61E-08	3.95E+01	1.93E-09	3.95E+02	1.93E-10
Indeno(1,2,3-cd)pyrene	0.00E+00	mg/L	2.30E-01	mg/kg	0.00E+00	mg/kg	1.00E+00		1.61E+00		1.10E-01	1.10E-01			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	5.00E+00	0.00E+00
Pyrene	0.00E+00	mg/L	4.83E-01	mg/kg	6.15E-02	mg/kg	1.00E+00		4.20E-01	4.50E-01	7.20E-01	7.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.04E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.04E-08	3.95E+01	1.78E-09	3.95E+02	1.78E-10

Intake Equation:

$$Ej = \left(\frac{A}{HR} \left[\sum_{i=1}^{m} \left(\frac{IRi\, x Cij}{BW} \right) \right] \right)$$

Where:
Ej = Total Exposure to Chemical
A = Site Area
HR = Home Range
m = Total number of ingested media
i = counter
IRi = Consumption Rate for Medium
Cij = Chemical concentration (j) in medium (I) (mg/kg or mg/L)
BW = Body Weight

Notes:
BAF = Bioaccumulation Factor (may be BCF if this is the only value available)
EED = Estimated Exposure Dose
EEQ = Ecological Effects Quotient.
L = LOAEL based; N = NOAEL based
LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
NA = Not applicable/Not available
BAF (or BCF) values from appropriate text tables (BCF = bioconcentration factor)
Some BAF (or BCF) values based on media regression equations (value in box):
LOAEL and NOAEL values from appropriate toxicity summary tables in the text.
UF = Uncertainty Factor for toxicity factor extrapolation, and Adjusted LOAEL or N See appropriate text tables for equations.
A "0" entry in the exposure concentration column indicates this chemical not selected as a COPEC for this medium.
Receptor diet data and home range data from appropriate text table.
Exposure point concentrations (EPCs) from appropriate text tables.

Species-Specific Factors

Terrestrial plant diet fraction =	0	unitless
Aquatic plant diet fraction =	0	unitless
Plant root diet fraction =	0	unitless
Fish diet fraction =	0	unitless
Aq. Invert diet fraction =	0	unitless
Terr. Invert diet fraction =	0	unitless
Mammal diet fraction =	0.76	unitless
Bird diet fraction =	0.24	unitless
Soil ingestion rate =	0.00114	kg/d
Sediment ingestion rate =	0	kg/d
Food ingestion rate =	0.057	kg/d
Body weight =	0.957	kg
Home range =	2080	acres
Water intake rate =	0.057	L/d
Site Area =	2	acres
Area Use Factor (AUF) =	0.00096154	unitless
Exposure Frequency (EF) =	1	unitless

APPENDIX F

DATA USED IN THE SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB01					FSB-SB02					FSB-SB03					FSB-SB03					FSB-SB04					FSB-SB05				
SAMPLE NO		FSB0001					FSB0002					FSB0003					FSB0004					FSB0006					FSB0007				
SAMPLE DATE		19-May-11					17-May-11					20-May-11					20-May-11					16-May-11					20-May-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					FD					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																															
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Dinitrobenzene, 1,3-	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Dinitrotoluene, 2,4-	mg/kg	0.17	0.17	0.083	U	U	0.17	0.17	0.082	U	U	0.15	0.15	0.073	U	U	0.17	0.17	0.084	U	U	0.15	0.15	0.073	U	U	0.14	0.14	0.07	U	U
Dinitrotoluene, 2,6-	mg/kg	0.17	0.17	0.074	U	U	0.17	0.17	0.074	U	U	0.15	0.15	0.066	U	U	0.17	0.17	0.075	U	U	0.15	0.15	0.065	U	U	0.14	0.14	0.063	U	U
HMX	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Nitrobenzene	mg/kg	0.17	0.17	0.079	U	U	0.17	0.17	0.079	U	U	0.15	0.15	0.07	U	U	0.17	0.17	0.081	U	U	0.15	0.15	0.07	U	U	0.14	0.14	0.067	U	U
Nitrotoluene, 2-	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Nitrotoluene, 3-	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Nitrotoluene, 4-	mg/kg	0.17	0.17	0.086	U	U	0.17	0.17	0.086	U	U	0.15	0.15	0.076	U	U	0.17	0.17	0.087	U	U	0.15	0.15	0.076	U	U	0.14	0.14	0.073	U	U
RDX	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Tetryl	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.17	0.17	0.068	U	U	0.17	0.17	0.068	U	U	0.15	0.15	0.06	U	U	0.17	0.17	0.069	U	U	0.15	0.15	0.06	U	U	0.14	0.14	0.058	U	U
General Chemistry																															
pH	pH_units																														
% Solids	Percent	75.3	0				82	0				85.6	0				85.1	0				84.3	0				82.7	0			
pH	pH_units																														
Total organic carbon		0.81	0.19	0.19																											
Metals																															
Aluminum	mg/kg	6770	13	1.5			2000	11	1.3		J	3570	9.6	1.1			4330	10	1.2			2960	11	1.3			3630	12	1.4		J
Antimony	mg/kg	1.3	1.3	0.063	U	U	1.1	1.1	0.053	U	U	1.9	1.9	0.096	U	U	1	1	0.05	U	U	1.6	1.1	0.056			3.2	4.7	0.23	B	J
Arsenic	mg/kg	8.3	0.63	0.063			12.9	0.53	0.053		J	2.2	0.96	0.096		J	1.3	0.5	0.05		J	3	0.56	0.056			2.6	0.58	0.058		J
Barium	mg/kg	64.6	13	0.25			68.3	11	0.21			13.1	9.6	0.19			15.6	10	0.2			26.7	11	0.22			23.3	12	0.23		J
Beryllium	mg/kg	0.39	0.31	0.0063			0.08	0.27	0.0053	B	J	0.18	0.24	0.0048	B	J	0.2	0.25	0.005	B	J	0.17	0.28	0.0056	B	J	0.18	0.29	0.0058	B	J
Cadmium	mg/kg	1	0.25	0.0063			0.13	0.21	0.0053	B	J	0.38	0.38	0.0096	U	U	0.2	0.2	0.005	U	U	0.27	0.22	0.0056			6.6	0.23	0.0058		J
Calcium	mg/kg	2510	310	3.1			1530	270	2.7		J	1270	240	2.4			1330	250	2.5			20300	280	2.8		J	62700	1200	12		J
Chromium	mg/kg	12.9	0.63	0.063			3.7	0.53	0.053		J	4.9	0.48	0.048			6.2	0.5	0.05			5.8	0.56	0.056			11.3	2.3	0.23		J
Cobalt	mg/kg	8	3.1	0.063			0.69	2.7	0.053	B	J	2.2	4.8	0.096	B	J	1.5	2.5	0.05	B	J	2.6	2.8	0.056	B	J	2	2.9	0.058	B	J
Copper	mg/kg	14.8	1.6	0.063			5.7	1.3	0.053		J	2.3	1.2	0.048			2.1	1.2	0.05			6.3	1.4	0.056			10.8	5.8	0.23		J
Iron	mg/kg	14800	19	1.4			18600	16	1.2		J	5640	14	1.1			5870	15	1.1			6100	17	1.3			6690	17	1.3		J
Lead	mg/kg	57.7	1.3	0.063			12	1.1	0.053		J	4.1	0.96	0.048			4.7	1	0.05			66.4	1.1	0.056			170	4.7	0.23		J
Magnesium	mg/kg	1900	310	3.1			242	270	2.7	B	J	547	240	2.4			518	250	2.5			3850	280	2.8		J	7380	290	2.9		J
Manganese	mg/kg	788	4.7	0.31			14.7	0.8	0.053		J	96.5	0.72	0.048			73.5	0.75	0.05			172	0.84	0.056			207	3.5	0.23		J
Mercury	mg/kg	0.032	0.11	0.0079	B	J	0.05	0.1	0.0072	B	J	0.097	0.097	0.0069	U	U	0.014	0.095	0.0067	B	J	0.05	0.099	0.007	B	J	0.042	0.094	0.0067	B	J
Nickel	mg/kg	19.7	2.5	0.063			2	2.1	0.053	B	J	5.4	3.8	0.096			3.6	2	0.05			7.2	2.2	0.056			8.2	9.3	0.23	B	J
Potassium	mg/kg	734	630	3.1			2360	530	2.7			209	480	2.4	B	J	159	500	2.5	B	J	299	560	2.8	B	J	252	580	2.9	B	J
Selenium	mg/kg	0.31	1.3	0.13	B	J	0.89	1.1	0.11	B	J	1.9	1.9	0.19	U	U	1	1	0.1	U	U	1.1	1.1	0.11	U	U	4.7	4.7	0.47	U	U
Silver	mg/kg	0.63	0.63	0.063	U	U	0.53	0.53	0.053	U	U	0.48	0.48	0.048	U	U	0.5	0.5	0.05	U	U	0.56	0.56	0.056	U	U	0.58	0.58	0.058	U	UJ
Sodium	mg/kg	630	630	53	U	U	268	530	45	B	J	480	480	41	U	U	500	500	42	U	U	560	560	48	U	U	580	580	49	U	UJ
Thallium	mg/kg	0.63	0.63	0.094	U	U	0.53	0.53	0.08	U	U	0.48	0.48	0.072	U	U	0.5	0.5	0.075	U	U	0.56	0.56	0.084	U	U	2.3	2.3	0.35	U	U
Vanadium	mg/kg	17.3	3.1	0.063			25.6	2.7	0.053		J	10.4	2.4	0.048			13	2.5	0.05			7	2.8	0.056			10.6	2.9	0.058		J
Zinc	mg/kg	44.6	1.3	0.063			8.4	1.1	0.053		J	15.1	1.9	0.096			12.9	1	0.05			29.4	1.1	0.056			54	4.7	0.23		J
Pesticides/PCBs																															
Aroclor 1016	mg/kg	0.88	0.88	0.35	U	U	0.02	0.02	0.0081	U	U	0.019	0.019	0.0078	U	U	0.019	0.019	0.0077	U	U	0.49	0.49	0.19	U	U	1	1	0.4	U	U
Aroclor 1221	mg/kg	0.88	0.88	0.44	U	U	0.02	0.02	0.01	U	U	0.019	0.019	0.0097	U	U	0.019	0.019	0.0096	U	U	0.49	0.49	0.24	U	U	1	1	0.5	U	U
Aroclor 1232	mg/kg	0.88	0.88	0.44	U	U	0.02	0.02	0.01	U	U	0.019	0.019	0.0097	U	U	0.019	0.019	0.0096	U	U	0.49	0.49	0.24	U	U	1	1	0.5	U	U
Aroclor 1242	mg/kg	0.88	0.88	0.35	U	U	0.02	0.02	0.0081	U	U	0.019	0.019	0.0078	U	U	0.019	0.019	0.0077	U	U	0.49	0.49	0.19	U	U	1	1	0.4	U	U
Aroclor 1248	mg/kg	0.88	0.88	0.35	U	U	0.02	0.02	0.0081	U	U	0.019	0.019	0.0078	U	U	0.019	0.019	0.0077	U	U	0.49	0.49	0.19	U	U	1	1	0.4	U	U
Aroclor 1254	mg/kg	4.82	0.88	0.35	J	J	0.02	0.02	0.0081	U	U	0.0898	0.019	0.0078	J	J	0.019	0.019	0.0077	U	U	4.58	0.49	0.19	J	J	6.84	1	0.4	J	J
Aroclor 1260	mg/kg	6.68	0.88	0.35	J	J	0.02	0.02	0.0081	U	U	0.12	0.019	0.0078	J	J	0.019	0.019	0.0077	U	U	3.53	0.49	0.19	J	J	5.44	1	0.4	J	J
Aroclor 1268	mg/kg	2.3	0.88	0.35	J	J						0.0309	0.019	0.0078	J	J	0.019	0.019	0.0077	U	U						1.55	1	0.4	J	J
Semivolatile Organics																															
3-Methylphenol and 4-Methylphenol	mg/kg	0.22	0.22	0.032	U	U	0.2	0.2	0.029	U	U	0.19	0.19	0.028	U	U	0.19	0.19	0.028	U	U	0.2	0.2	0.028	U	U	0.2	0.2	0.029	U	U
Acenaphthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Acenaphthylene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Acetophenone	mg/kg																														
Anthracene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Atrazine	mg/kg																														
Benzaldehyde	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB01					FSB-SB02					FSB-SB03					FSB-SB03					FSB-SB04					FSB-SB05				
SAMPLE NO		FSB0001					FSB0002					FSB0003					FSB0004					FSB0006					FSB0007				
SAMPLE DATE		19-May-11					17-May-11					20-May-11					20-May-11					16-May-11					20-May-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					FD					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Benzo(a)anthracene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzo(a)pyrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzo(b)fluoranthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.0214	0.19	0.019	J	J	0.2	0.2	0.02	U	U	0.0234	0.2	0.02	J	J
Benzo(ghi)perylene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzo(k)fluoranthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzoic acid	mg/kg	1.1	1.1	0.39	U	U	1	1	0.36	U	U	0.97	0.97	0.34	U	U	0.97	0.97	0.34	U	U	0.98	0.98	0.34	U	U	1	1	0.35	U	UJ
Benzyl alcohol	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Bibenzene	mg/kg																														
Bis(2-chloroethoxy)methane	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroethyl)ether	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.44	0.44	0.088	U	U	0.41	0.41	0.082	U	U	0.39	0.39	0.078	U	U	0.39	0.39	0.077	U	U	0.39	0.39	0.078	U	U	0.4	0.4	0.081	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Butyl benzyl phthalate	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Caprolactam	mg/kg																														
Carbazole	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chloroaniline, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chloronaphthalene, 2-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Chlorophenol, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chrysene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.0206	0.2	0.02	J	J
Dibenz(a,h)anthracene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Dibenzofuran	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Dichlorobenzene, 1,2-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Dichlorobenzene, 1,3-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Dichlorobenzene, 1,4-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.44	0.44	0.044	U	U	0.41	0.41	0.041	U	U	0.39	0.39	0.039	U	U	0.39	0.39	0.039	U	U	0.39	0.39	0.039	U	U	0.4	0.4	0.04	U	U
Dichlorophenol, 2,4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Diethyl phthalate	mg/kg	0.44	0.44	0.088	U	U	0.41	0.41	0.082	U	U	0.39	0.39	0.078	U	U	0.39	0.39	0.077	U	U	0.39	0.39	0.078	U	U	0.4	0.4	0.081	U	U
Dimethyl phthalate	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Dimethylphenol, 2,4-	mg/kg	0.22	0.22	0.028	U	U	0.2	0.2	0.026	U	U	0.19	0.19	0.024	U	U	0.19	0.19	0.024	U	U	0.2	0.2	0.025	U	U	0.2	0.2	0.025	U	U
Di-n-butyl phthalate	mg/kg	0.44	0.44	0.088	U	U	0.41	0.41	0.082	U	U	0.39	0.39	0.078	U	U	0.39	0.39	0.077	U	U	0.39	0.39	0.078	U	U	0.4	0.4	0.081	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.44	0.44	0.088	U	U	0.41	0.41	0.082	U	UJ	0.39	0.39	0.078	U	U	0.39	0.39	0.077	U	U	0.39	0.39	0.078	U	U	0.4	0.4	0.081	U	U
Dinitrophenol, 2,4-	mg/kg	1.1	1.1	0.44	U	U	1	1	0.41	U	U	0.97	0.97	0.39	U	U	0.97	0.97	0.39	U	U	0.98	0.98	0.39	U	U	1	1	0.4	U	U
Dinitrotoluene, 2,4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Dinitrotoluene, 2,6-	mg/kg	0.22	0.22	0.026	U	U	0.2	0.2	0.024	U	U	0.19	0.19	0.023	U	U	0.19	0.19	0.023	U	U	0.2	0.2	0.023	U	U	0.2	0.2	0.024	U	U
Di-n-octyl phthalate	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Fluoranthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.0285	0.19	0.019	J	J	0.0261	0.2	0.02	J	J	0.0433	0.2	0.02	J	J
Fluorene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Hexachlorobenzene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Hexachlorobutadiene	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Hexachlorocyclopentadiene	mg/kg	0.22	0.22	0.097	U	U	0.2	0.2	0.09	U	UJ	0.19	0.19	0.085	U	U	0.19	0.19	0.085	U	U	0.2	0.2	0.086	U	U	0.2	0.2	0.089	U	U
Hexachloroethane	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Isophorone	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	UJ	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	UJ
Methylnaphthalene, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Methylphenol, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Naphthalene	mg/kg	0.22	0.22	0.035	U	U	0.2	0.2	0.033	U	U	0.19	0.19	0.031	U	U	0.19	0.19	0.031	U	U	0.2	0.2	0.031	U	U	0.2	0.2	0.032	U	U
Nitroaniline, 2-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Nitroaniline, 3-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Nitroaniline, 4-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.041	U	U	0.19	0.19	0.039	U	U	0.19	0.19	0.039	U	U	0.2	0.2	0.039	U	U	0.2	0.2	0.04	U	U
Nitrobenzene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 4-	mg/kg	1.1	1.1	0.18	U	U	1	1	0.16	U	U	0.97	0.97	0.16	U	U	0.97	0.97	0.15	U	U	0.98	0.98	0.16	U	U	1	1	0.16	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
n-Nitrosodiphenylamine	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Pentachlorophenol	mg/kg	1.1	1.1	0.26	U	U	1	1	0.24	U	U	0.97	0.97	0.23	U	U	0.97	0.97	0.23	U	U	0.98	0.98	0.23	U	U	1	1	0.24	U	U
Phenanthrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Phenol	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Pyrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.0221	0.19	0.019	J	J	0.0263	0.2	0.02	J	J	0.035	0.2	0.02	J	J

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB01					FSB-SB02					FSB-SB03					FSB-SB03					FSB-SB04					FSB-SB05				
SAMPLE NO		FSB0001					FSB0002					FSB0003					FSB0004					FSB0006					FSB0007				
SAMPLE DATE		19-May-11					17-May-11					20-May-11					20-May-11					16-May-11					20-May-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					FD					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Trichlorobenzene, 1,2,4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Volatile Organics																															
Acetone	mg/kg	0.0985	0.045	0.018		J	0.043	0.043	0.017	U	U	0.0366	0.032	0.013	J	J	0.04	0.04	0.016	U	U	0.0848	0.036	0.014			0.0607	0.036	0.014		J
Benzene	mg/kg	0.0045	0.0045	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0032	0.0032	0.00096	U	U	0.004	0.004	0.0012	U	U	0.0036	0.0036	0.0011	U	U	0.0036	0.0036	0.0011	U	U
Bromodichloromethane	mg/kg	0.0045	0.0045	0.00098	U	U	0.0043	0.0043	0.00094	U	U	0.0032	0.0032	0.0007	U	U	0.004	0.004	0.00087	U	U	0.0036	0.0036	0.00079	U	U	0.0036	0.0036	0.00079	U	U
Bromoform	mg/kg	0.0045	0.0045	0.0013	U	U	0.0043	0.0043	0.0013	U	UJ	0.0032	0.0032	0.00096	U	U	0.004	0.004	0.0012	U	U	0.0036	0.0036	0.0011	U	U	0.0036	0.0036	0.0011	U	U
Bromomethane	mg/kg	0.0045	0.0045	0.0018	U	U	0.0043	0.0043	0.0017	U	U	0.0032	0.0032	0.0013	U	U	0.004	0.004	0.0016	U	U	0.0036	0.0036	0.0014	U	U	0.0036	0.0036	0.0014	U	U
Butanone, 2-	mg/kg	0.022	0.022	0.0055	U	U	0.021	0.021	0.0052	U	U	0.0059	0.016	0.0039	J	J	0.02	0.02	0.0048	U	U	0.018	0.018	0.0044	U	U	0.018	0.018	0.0044	U	R
Carbon disulfide	mg/kg	0.0045	0.0045	0.0018	U	U	0.0043	0.0043	0.0017	U	UJ	0.0032	0.0032	0.0013	U	U	0.004	0.004	0.0016	U	U	0.0036	0.0036	0.0014	U	UJ	0.0036	0.0036	0.0014	U	U
Carbon tetrachloride	mg/kg	0.0045	0.0045	0.0016	U	U	0.0043	0.0043	0.0015	U	UJ	0.0032	0.0032	0.0012	U	U	0.004	0.004	0.0014	U	U	0.0036	0.0036	0.0013	U	UJ	0.0036	0.0036	0.0013	U	U
Chlorobenzene	mg/kg	0.0045	0.0045	0.00089	U	U	0.0043	0.0043	0.00085	U	U	0.0032	0.0032	0.00064	U	U	0.004	0.004	0.0008	U	U	0.0036	0.0036	0.00072	U	U	0.0036	0.0036	0.00072	U	U
Chloroethane	mg/kg	0.0045	0.0045	0.0018	U	R	0.0043	0.0043	0.0017	U	UJ	0.0032	0.0032	0.0013	U	U	0.004	0.004	0.0016	U	U	0.0036	0.0036	0.0014	U	UJ	0.0036	0.0036	0.0014	U	U
Chloroform	mg/kg	0.0045	0.0045	0.0011	U	U	0.0043	0.0043	0.001	U	U	0.0032	0.0032	0.00077	U	U	0.004	0.004	0.00095	U	U	0.0036	0.0036	0.00086	U	U	0.0036	0.0036	0.00086	U	U
Chloromethane	mg/kg	0.0045	0.0045	0.0018	U	U	0.0043	0.0043	0.0017	U	U	0.0032	0.0032	0.0013	U	U	0.004	0.004	0.0016	U	U	0.0036	0.0036	0.0014	U	U	0.0036	0.0036	0.0014	U	U
Cyclohexane	mg/kg																														
Dibromo-3-chloropropane, 1,2-	mg/kg																														
Dibromochloromethane	mg/kg	0.0045	0.0045	0.00089	U	U	0.0043	0.0043	0.00085	U	UJ	0.0032	0.0032	0.00064	U	U	0.004	0.004	0.0008	U	U	0.0036	0.0036	0.00072	U	U	0.0036	0.0036	0.00072	U	U
Dibromoethane, 1,2-	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorodifluoromethane	mg/kg																														
Dichloroethane, 1,1-	mg/kg	0.0045	0.0045	0.00098	U	U	0.0043	0.0043	0.00094	U	U	0.0032	0.0032	0.0007	U	U	0.004	0.004	0.00087	U	U	0.0036	0.0036	0.00079	U	U	0.0036	0.0036	0.00079	U	U
Dichloroethane, 1,2-	mg/kg	0.0045	0.0045	0.00089	U	U	0.0043	0.0043	0.00085	U	U	0.0032	0.0032	0.00064	U	U	0.004	0.004	0.0008	U	U	0.0036	0.0036	0.00072	U	U	0.0036	0.0036	0.00072	U	U
Dichloroethene, 1,1-	mg/kg	0.0045	0.0045	0.0013	U	U	0.0043	0.0043	0.0012	U	U	0.0032	0.0032	0.0009	U	U	0.004	0.004	0.0011	U	U	0.0036	0.0036	0.001	U	U	0.0036	0.0036	0.001	U	U
Dichloroethene, cis-1,2-	mg/kg	0.0045	0.0045	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0032	0.0032	0.00096	U	U	0.004	0.004	0.0012	U	U	0.0036	0.0036	0.0011	U	U	0.0036	0.0036	0.0011	U	U
Dichloroethene, trans-1,2-	mg/kg	0.0045	0.0045	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0032	0.0032	0.00096	U	U	0.004	0.004	0.0012	U	U	0.0036	0.0036	0.0011	U	U	0.0036	0.0036	0.0011	U	U
Dichloropropane, 1,2-	mg/kg	0.0045	0.0045	0.0011	U	U	0.0043	0.0043	0.001	U	U	0.0032	0.0032	0.00077	U	U	0.004	0.004	0.00095	U	U	0.0036	0.0036	0.00086	U	U	0.0036	0.0036	0.00086	U	U
Dichloropropene, cis-1,3-	mg/kg	0.0045	0.0045	0.00089	U	U	0.0043	0.0043	0.00085	U	U	0.0032	0.0032	0.00064	U	U	0.004	0.004	0.0008	U	U	0.0036	0.0036	0.00072	U	U	0.0036	0.0036	0.00072	U	U
Dichloropropene, trans-1,3-	mg/kg	0.0045	0.0045	0.00098	U	U	0.0043	0.0043	0.00094	U	UJ	0.0032	0.0032	0.0007	U	U	0.004	0.004	0.00087	U	U	0.0036	0.0036	0.00079	U	U	0.0036	0.0036	0.00079	U	U
Ethylbenzene	mg/kg	0.0045	0.0045	0.00089	U	U	0.0043	0.0043	0.00085	U	U	0.0032	0.0032	0.00064	U	U	0.004	0.004	0.0008	U	U	0.0036	0.0036	0.00072	U	U	0.0036	0.0036	0.00072	U	U
Hexanone, 2-	mg/kg	0.022	0.022	0.0048	U	U	0.021	0.021	0.0046	U	UJ	0.016	0.016	0.0035	U	U	0.02	0.02	0.0043	U	U	0.0284	0.018	0.0039			0.018	0.018	0.0039	U	U
Isopropylbenzene	mg/kg																														
METHYL ACETATE	mg/kg																														
Methyl Tertiary Butyl Ether	mg/kg																														
Methyl-2-pentanone, 4-	mg/kg	0.022	0.022	0.0049	U	U	0.021	0.021	0.0047	U	U	0.016	0.016	0.0035	U	U	0.02	0.02	0.0044	U	U	0.018	0.018	0.0039	U	U	0.018	0.018	0.0039	U	U
Methylcyclohexane	mg/kg																														
Methylene chloride	mg/kg	0.0067	0.0089	0.0041	J	J	0.0094	0.0085	0.0039	B	B	0.0052	0.0064	0.0029	J	J	0.0104	0.008	0.0037		J	0.0098	0.0072	0.0033	B	B	0.005	0.0072	0.0033	J	J
Styrene	mg/kg	0.0045	0.0045	0.0023	U	U	0.0043	0.0043	0.0022	U	U	0.0032	0.0032	0.0017	U	U	0.004	0.004	0.0021	U	U	0.0036	0.0036	0.0019	U	U	0.0036	0.0036	0.0019	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	0.0045	0.0045	0.0011	U	U	0.0043	0.0043	0.001	U	U	0.0032	0.0032	0.00077	U	U	0.004	0.004	0.00095	U	U	0.0036	0.0036	0.00086	U	U	0.0036	0.0036	0.00086	U	U
Tetrachloroethene	mg/kg	0.0045	0.0045	0.00089	U	U	0.0043	0.0043	0.00085	U	U	0.0032	0.0032	0.00064	U	U	0.004	0.004	0.0008	U	U	0.0036	0.0036	0.00072	U	U	0.0036	0.0036	0.00072	U	U
Toluene	mg/kg	0.0045	0.0045	0.0011	U	U	0.0043	0.0043	0.001	U	U	0.0013	0.0032	0.00077	J	J	0.0016	0.004	0.00095	J	J	0.0036	0.0036	0.00086	U	U	0.00094	0.0036	0.00086	J	J
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichloroethane, 1,1,1-	mg/kg	0.0045	0.0045	0.00098	U	U	0.0043	0.0043	0.00094	U	U	0.0032	0.0032	0.0007	U	U	0.004	0.004	0.00087	U	U	0.0036	0.0036	0.00079	U	U	0.0036	0.0036	0.00079	U	U
Trichloroethane, 1,1,2-	mg/kg	0.0045	0.0045	0.00098	U	U	0.0043	0.0043	0.00094	U	U	0.0032	0.0032	0.0007	U	U	0.004	0.004	0.00087	U	U	0.0036	0.0036	0.00079	U	U	0.0036	0.0036	0.00079	U	U
Trichloroethene	mg/kg	0.0045	0.0045	0.0011	U	U	0.0043	0.0043	0.001	U	U	0.0032	0.0032	0.00077	U	U	0.004	0.004	0.00095	U	U	0.0036	0.0036	0.00086	U	U	0.0036	0.0036	0.00086	U	U
Trichlorofluoromethane	mg/kg																														
Trichlorotrifluoroethane	mg/kg																														
Vinyl chloride	mg/kg	0.0045	0.0045	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0032	0.0032	0.00096	U	U	0.004	0.004	0.0012	U	U	0.0036	0.0036	0.0011	U	U	0.0036	0.0036	0.0011	U	U
Xylenes, total	mg/kg	0.013	0.013	0.0029	U	U	0.013	0.013	0.0027	U	U	0.0096	0.0096	0.002	U	U	0.012	0.012	0.0025	U	U	0.011	0.011	0.0023	U	U	0.011	0.011	0.0023	U	U

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB06					FSB-SB07					FSB-SB08					FSB-SB09					FSB-SB10					FSB-SB11				
SAMPLE NO		FSB0008					FSB0009					FSB0010					FSB0011					FSB0012					FSB0013				
SAMPLE DATE		16-May-11					16-May-11					17-May-11					20-May-11					20-May-11					17-May-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																															
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Dinitrobenzene, 1,3-	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Dinitrotoluene, 2,4-	mg/kg	0.19	0.19	0.092	U	U	0.15	0.15	0.074	U	U	0.16	0.16	0.079	U	U	0.14	0.14	0.069	U	U	0.14	0.14	0.07	U	U	0.15	0.15	0.073	U	U
Dinitrotoluene, 2,6-	mg/kg	0.19	0.19	0.083	U	U	0.15	0.15	0.066	U	U	0.16	0.16	0.071	U	U	0.14	0.14	0.062	U	U	0.14	0.14	0.063	U	U	0.15	0.15	0.065	U	U
HMX	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Nitrobenzene	mg/kg	0.19	0.19	0.089	U	U	0.15	0.15	0.071	U	U	0.16	0.16	0.076	U	U	0.14	0.14	0.066	U	U	0.14	0.14	0.067	U	U	0.15	0.15	0.07	U	U
Nitrotoluene, 2-	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Nitrotoluene, 3-	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Nitrotoluene, 4-	mg/kg	0.19	0.19	0.096	U	U	0.15	0.15	0.077	U	U	0.16	0.16	0.082	U	U	0.14	0.14	0.072	U	U	0.14	0.14	0.073	U	U	0.15	0.15	0.076	U	U
RDX	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Tetryl	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.16	0.16	0.065	U	U	0.14	0.14	0.057	U	U	0.14	0.14	0.058	U	U	0.15	0.15	0.06	U	U
General Chemistry																															
pH	pH_units																														
% Solids	Percent	86.2	0				81.8	0				74.8	0				80.1	0				82.2	0				82.8	0			
pH	pH_units																														
Total organic carbon																															
Metals																															
Aluminum	mg/kg	2670	43	5.1			4610	9.7	1.2			6110	200	24			3890	11	1.3			4420	9.4	0.94			4140	11	1.3		
Antimony	mg/kg	0.52	4.3	0.21	B	J	0.97	0.97	0.049	U	U	20	20	1	U	U	11.7	1.1	0.054			1.9	1.9	0.094	U	U	1.1	1.1	0.056	U	U
Arsenic	mg/kg	2.9	2.1	0.21			2.4	0.49	0.049			11.5	10	1			8.1	0.54	0.054			4.3	0.47	0.047			3.5	0.56	0.056		
Barium	mg/kg	17.7	43	0.85	B	J	31.9	9.7	0.19			48.9	200	4.1	B	J	107	11	0.22			30.4	9.4	0.047			29.4	11	0.22		
Beryllium	mg/kg	1.1	1.1	0.021	U	U	0.23	0.24	0.0049	B	J	5.1	5.1	0.1	U	U	0.21	0.27	0.0054	B	J	0.22	0.24	0.0047	B	J	0.18	0.28	0.0056	B	J
Cadmium	mg/kg	0.85	0.85	0.021	U	U	0.19	0.19	0.0049	U	U	4.1	4.1	0.1	U	U	1.7	0.22	0.0054			0.33	0.19	0.0047			0.22	0.22	0.0056	U	U
Calcium	mg/kg	99400	1100	11			2780	240	2.4		J	55600	5100	51			12500	270	2.7			32900	470	4.7			492	280	2.8		
Chromium	mg/kg	5.4	2.1	0.21			5.9	0.49	0.049			17.1	10	1			39.9	0.54	0.054			8.4	0.94	0.094			5.8	0.56	0.056		
Cobalt	mg/kg	1.9	11	0.21	B	J	1.9	2.4	0.049	B	J	31	51	1	B	J	5	2.7	0.054			6.1	2.4	0.047			1.6	2.8	0.056	B	J
Copper	mg/kg	4.3	5.3	0.21	B	J	4.8	1.2	0.049			17.8	26	1	B	J	37.5	1.4	0.054			11	2.4	0.094			6	1.4	0.056		
Iron	mg/kg	7300	64	4.9			7180	15	1.1			28100	310	23			20600	16	1.2			12300	14	1.6			7080	17	1.3		
Lead	mg/kg	19.3	0.85	0.043			11.9	0.97	0.049			9.5	1	0.051			4060	43	2.2			7.9	1.9	0.094			12.3	1.1	0.056		
Magnesium	mg/kg	14400	1100	11			1140	240	2.4		J	8940	5100	51			2360	270	2.7			7770	240	2.4			621	280	2.8		
Manganese	mg/kg	273	3.2	0.21			54.4	0.73	0.049			1380	15	1			707	8.1	0.54			908	3.5	0.24			34.5	0.84	0.056		
Mercury	mg/kg	0.033	0.089	0.0063	B	J	0.33	0.1	0.0072			0.035	0.11	0.0077	B	J	2.1	1	0.073			0.027	0.089	0.0064	B	J	0.035	0.089	0.0063	B	J
Nickel	mg/kg	5.8	8.5	0.21	B	J	5.4	1.9	0.049			44.8	41	1			20.1	2.2	0.054			13.3	1.9	0.047			5.1	2.2	0.056		
Potassium	mg/kg	249	2100	11	B	J	191	490	2.4	B	J	870	10000	51	B	J	463	540	2.7	B	J	569	470	2.4			327	560	2.8	B	J
Selenium	mg/kg	4.3	4.3	0.43	U	U	0.97	0.97	0.097	U	U	20	20	2	U	U	0.74	1.1	0.11	B	J	0.69	1.9	0.19	B	J	0.31	1.1	0.11	B	J
Silver	mg/kg	2.1	2.1	0.21	U	U	0.49	0.49	0.049	U	U	10	10	1	U	U	0.16	0.54	0.054	B	J	0.1	0.47	0.047	B	J	0.56	0.56	0.056	U	U
Sodium	mg/kg	2100	2100	180	U	U	70.8	490	41	B	J	10000	10000	870	U	U	84.8	540	46	B	J	68.9	470	35	B	J	560	560	48	U	U
Thallium	mg/kg	0.43	0.43	0.064	U	U	0.49	0.49	0.073	U	U	0.51	0.51	0.077	U	U	0.54	0.54	0.081	U	U	0.94	0.94	0.14	U	U	0.56	0.56	0.084	U	U
Vanadium	mg/kg	7.5	11	0.21	B	J	10.5	2.4	0.049			67.1	51	1			13.5	2.7	0.054			11.1	2.4	0.047			11.8	2.8	0.056		
Zinc	mg/kg	20.8	4.3	0.21			17.8	0.97	0.049			105	20	1			171	1.1	0.054			32.1	1.9	0.094			16.7	1.1	0.056		
Pesticides/PCBs																															
Aroclor 1016	mg/kg	0.019	0.019	0.0076	U	U	0.021	0.021	0.0082	U	U	0.022	0.022	0.0089	U	U	4.1	4.1	1.6	U	U	0.021	0.021	0.0082	U	U	0.02	0.02	0.008	U	U
Aroclor 1221	mg/kg	0.019	0.019	0.0095	U	U	0.021	0.021	0.01	U	U	0.022	0.022	0.011	U	U	4.1	4.1	2.1	U	U	0.021	0.021	0.01	U	U	0.02	0.02	0.01	U	U
Aroclor 1232	mg/kg	0.019	0.019	0.0095	U	U	0.021	0.021	0.01	U	U	0.022	0.022	0.011	U	U	4.1	4.1	2.1	U	U	0.021	0.021	0.01	U	U	0.02	0.02	0.01	U	U
Aroclor 1242	mg/kg	0.019	0.019	0.0076	U	U	0.021	0.021	0.0082	U	U	0.022	0.022	0.0089	U	U	4.1	4.1	1.6	U	U	0.021	0.021	0.0082	U	U	0.02	0.02	0.008	U	U
Aroclor 1248	mg/kg	0.019	0.019	0.0076	U	U	0.021	0.021	0.0082	U	U	0.022	0.022	0.0089	U	U	4.1	4.1	1.6	U	U	0.021	0.021	0.0082	U	U	0.02	0.02	0.008	U	U
Aroclor 1254	mg/kg	0.133	0.019	0.0076	J	J	0.113	0.021	0.0082	J	J	0.022	0.022	0.0089	U	U	6.37	4.1	1.6	J	J	0.0142	0.021	0.0082	J	J	0.02	0.02	0.008	U	U
Aroclor 1260	mg/kg	0.142	0.019	0.0076	J	J	0.216	0.021	0.0082	J	J	0.022	0.022	0.0089	U	U	18.2	4.1	1.6	J	J	0.0268	0.021	0.0082	J	J	0.02	0.02	0.008	U	U
Aroclor 1268	mg/kg																33.6	4.1	1.6	J	J	0.0267	0.021	0.0082	J	J					
Semivolatile Organics																															
3-Methylphenol and 4-Methylphenol	mg/kg	0.19	0.19	0.027	U	U	0.2	0.2	0.029	U	U	0.22	0.22	0.032	U	U	0.21	0.21	0.03	U	U	0.2	0.2	0.029	U	U	0.2	0.2	0.029	U	U
Acenaphthene	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Acenaphthylene	mg/kg	0.0252	0.19	0.019	J	J	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Acetophenone	mg/kg																														
Anthracene	mg/kg	0.0225	0.19	0.019	J	J	0.0754	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Atrazine	mg/kg																														
Benzaldehyde	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB06					FSB-SB07					FSB-SB08					FSB-SB09					FSB-SB10					FSB-SB11				
SAMPLE NO		FSB0008					FSB0009					FSB0010					FSB0011					FSB0012					FSB0013				
SAMPLE DATE		16-May-11					16-May-11					17-May-11					20-May-11					20-May-11					17-May-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Benzo(a)anthracene	mg/kg	0.0892	0.19	0.019	J	J	0.0404	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.0318	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzo(a)pyrene	mg/kg	0.0944	0.19	0.019	J	J	0.0318	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.0446	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzo(b)fluoranthene	mg/kg	0.132	0.19	0.019	J	J	0.0454	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.0692	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzo(ghi)perylene	mg/kg	0.0527	0.19	0.019	J	J	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.046	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzo(k)fluoranthene	mg/kg	0.0454	0.19	0.019	J	J	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.0261	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Benzoic acid	mg/kg	0.95	0.95	0.34	U	U	1	1	0.36	U	U	1.1	1.1	0.39	U	U	1	1	0.36	U	U	1	1	0.35	U	U	1	1	0.35	U	UJ
Benzyl alcohol	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Bibenzene	mg/kg																														
Bis(2-chloroethoxy)methane	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroethyl)ether	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.38	0.38	0.076	U	U	0.41	0.41	0.082	U	U	0.44	0.44	0.088	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Butyl benzyl phthalate	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Caprolactam	mg/kg																														
Carbazole	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chloroaniline, 4-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chloronaphthalene, 2-	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Chlorophenol, 2-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Chrysene	mg/kg	0.0911	0.19	0.019	J	J	0.037	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.0475	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Dibenz(a,h)anthracene	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Dibenzofuran	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Dichlorobenzene, 1,2-	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Dichlorobenzene, 1,3-	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Dichlorobenzene, 1,4-	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.38	0.38	0.038	U	U	0.41	0.41	0.041	U	U	0.44	0.44	0.044	U	U	0.41	0.41	0.041	U	U	0.4	0.4	0.04	U	U	0.4	0.4	0.04	U	U
Dichlorophenol, 2,4-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Diethyl phthalate	mg/kg	0.38	0.38	0.076	U	U	0.41	0.41	0.082	U	U	0.44	0.44	0.088	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U
Dimethyl phthalate	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Dimethylphenol, 2,4-	mg/kg	0.19	0.19	0.024	U	U	0.2	0.2	0.026	U	U	0.22	0.22	0.028	U	U	0.21	0.21	0.026	U	U	0.2	0.2	0.025	U	U	0.2	0.2	0.025	U	U
Di-n-butyl phthalate	mg/kg	0.38	0.38	0.076	U	U	0.41	0.41	0.082	U	U	0.44	0.44	0.088	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.38	0.38	0.076	U	U	0.41	0.41	0.082	U	U	0.44	0.44	0.088	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U
Dinitrophenol, 2,4-	mg/kg	0.95	0.95	0.38	U	U	1	1	0.41	U	U	1.1	1.1	0.44	U	U	1	1	0.41	U	U	1	1	0.4	U	U	1	1	0.4	U	U
Dinitrotoluene, 2,4-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Dinitrotoluene, 2,6-	mg/kg	0.19	0.19	0.023	U	U	0.2	0.2	0.024	U	U	0.22	0.22	0.026	U	U	0.21	0.21	0.024	U	U	0.2	0.2	0.024	U	U	0.2	0.2	0.024	U	U
Di-n-octyl phthalate	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Fluoranthene	mg/kg	0.179	0.19	0.019	J	J	0.0808	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.0831	0.21	0.021	J	J	0.0218	0.2	0.02	J	J	0.2	0.2	0.02	U	U
Fluorene	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Hexachlorobenzene	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Hexachlorobutadiene	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Hexachlorocyclopentadiene	mg/kg	0.19	0.19	0.084	U	U	0.2	0.2	0.09	U	U	0.22	0.22	0.096	U	U	0.21	0.21	0.091	U	U	0.2	0.2	0.088	U	U	0.2	0.2	0.088	U	U
Hexachloroethane	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.0637	0.19	0.019	J	J	0.0227	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.045	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Isophorone	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Methylnaphthalene, 2-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Methylphenol, 2-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Naphthalene	mg/kg	0.19	0.19	0.031	U	U	0.2	0.2	0.033	U	U	0.22	0.22	0.035	U	U	0.21	0.21	0.033	U	U	0.2	0.2	0.032	U	U	0.2	0.2	0.032	U	U
Nitroaniline, 2-	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Nitroaniline, 3-	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Nitroaniline, 4-	mg/kg	0.19	0.19	0.038	U	U	0.2	0.2	0.041	U	U	0.22	0.22	0.044	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U
Nitrobenzene	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 2-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 4-	mg/kg	0.95	0.95	0.15	U	U	1	1	0.16	U	U	1.1	1.1	0.18	U	U	1	1	0.17	U	U	1	1	0.16	U	U	1	1	0.16	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
n-Nitrosodiphenylamine	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Pentachlorophenol	mg/kg	0.95	0.95	0.23	U	U	1	1	0.25	U	U	1.1	1.1	0.26	U	U	1	1	0.25	U	U	1	1	0.24	U	U	1	1	0.24	U	U
Phenanthrene	mg/kg	0.0934	0.19	0.019	J	J	0.0305	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.0266	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Phenol	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Pyrene	mg/kg	0.178	0.19	0.019	J	J	0.0744	0.2	0.02	J	J	0.22	0.22	0.022	U	U	0.067	0.21	0.021	J	J	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB06					FSB-SB07					FSB-SB08					FSB-SB09					FSB-SB10					FSB-SB11				
SAMPLE NO		FSB0008					FSB0009					FSB0010					FSB0011					FSB0012					FSB0013				
SAMPLE DATE		16-May-11					16-May-11					17-May-11					20-May-11					20-May-11					17-May-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Trichlorobenzene, 1,2,4-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.22	0.22	0.022	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U
Volatile Organics																															
Acetone	mg/kg	0.0652	0.039	0.016			0.0734	0.043	0.017		J	0.043	0.043	0.017	U	R	0.035	0.041	0.016	J	J	0.058	0.058	0.023	U	R	0.034	0.034	0.014	U	R
Benzene	mg/kg	0.0017	0.0039	0.0012	J	J	0.0043	0.0043	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0041	0.0041	0.0012	U	U	0.0058	0.0058	0.0017	U	UJ	0.0034	0.0034	0.001	U	U
Bromodichloromethane	mg/kg	0.0039	0.0039	0.00086	U	U	0.0043	0.0043	0.00094	U	U	0.0043	0.0043	0.00094	U	U	0.0041	0.0041	0.00091	U	U	0.0058	0.0058	0.0013	U	UJ	0.0034	0.0034	0.00074	U	U
Bromoform	mg/kg	0.0039	0.0039	0.0012	U	U	0.0043	0.0043	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0041	0.0041	0.0012	U	U	0.0058	0.0058	0.0017	U	UJ	0.0034	0.0034	0.001	U	U
Bromomethane	mg/kg	0.0039	0.0039	0.0016	U	U	0.0043	0.0043	0.0017	U	U	0.0043	0.0043	0.0017	U	U	0.0041	0.0041	0.0016	U	U	0.0058	0.0058	0.0023	U	UJ	0.0034	0.0034	0.0014	U	U
Butanone, 2-	mg/kg	0.019	0.019	0.0048	U	U	0.021	0.021	0.0052	U	U	0.021	0.021	0.0052	U	U	0.021	0.021	0.005	U	R	0.029	0.029	0.007	U	UJ	0.017	0.017	0.0041	U	UJ
Carbon disulfide	mg/kg	0.0039	0.0039	0.0016	U	UJ	0.0043	0.0043	0.0017	U	U	0.0043	0.0043	0.0017	U	U	0.0041	0.0041	0.0016	U	U	0.0058	0.0058	0.0023	U	UJ	0.0034	0.0034	0.0014	U	U
Carbon tetrachloride	mg/kg	0.0039	0.0039	0.0014	U	UJ	0.0043	0.0043	0.0015	U	U	0.0043	0.0043	0.0015	U	U	0.0041	0.0041	0.0015	U	U	0.0058	0.0058	0.0021	U	UJ	0.0034	0.0034	0.0012	U	U
Chlorobenzene	mg/kg	0.0039	0.0039	0.00078	U	U	0.0043	0.0043	0.00085	U	U	0.0043	0.0043	0.00085	U	U	0.0041	0.0041	0.00082	U	U	0.0058	0.0058	0.0012	U	UJ	0.0034	0.0034	0.00068	U	U
Chloroethane	mg/kg	0.0039	0.0039	0.0016	U	UJ	0.0043	0.0043	0.0017	U	UJ	0.0043	0.0043	0.0017	U	UJ	0.0041	0.0041	0.0016	U	U	0.0058	0.0058	0.0023	U	UJ	0.0034	0.0034	0.0014	U	U
Chloroform	mg/kg	0.0039	0.0039	0.00094	U	U	0.0043	0.0043	0.001	U	U	0.0043	0.0043	0.001	U	U	0.0041	0.0041	0.00099	U	U	0.0058	0.0058	0.0014	U	UJ	0.0034	0.0034	0.00081	U	U
Chloromethane	mg/kg	0.0039	0.0039	0.0016	U	U	0.0043	0.0043	0.0017	U	U	0.0043	0.0043	0.0017	U	U	0.0041	0.0041	0.0016	U	U	0.0058	0.0058	0.0023	U	UJ	0.0034	0.0034	0.0014	U	U
Cyclohexane	mg/kg																														
Dibromo-3-chloropropane, 1,2-	mg/kg																														
Dibromochloromethane	mg/kg	0.0039	0.0039	0.00078	U	U	0.0043	0.0043	0.00085	U	U	0.0043	0.0043	0.00085	U	U	0.0041	0.0041	0.00082	U	U	0.0058	0.0058	0.0012	U	UJ	0.0034	0.0034	0.00068	U	U
Dibromoethane, 1,2-	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorodifluoromethane	mg/kg																														
Dichloroethane, 1,1-	mg/kg	0.0039	0.0039	0.00086	U	U	0.0043	0.0043	0.00094	U	U	0.0043	0.0043	0.00094	U	U	0.0041	0.0041	0.00091	U	U	0.0058	0.0058	0.0013	U	UJ	0.0034	0.0034	0.00074	U	U
Dichloroethane, 1,2-	mg/kg	0.0039	0.0039	0.00078	U	U	0.0043	0.0043	0.00085	U	U	0.0043	0.0043	0.00085	U	U	0.0041	0.0041	0.00082	U	U	0.0058	0.0058	0.0012	U	UJ	0.0034	0.0034	0.00068	U	U
Dichloroethene, 1,1-	mg/kg	0.0039	0.0039	0.0011	U	U	0.0043	0.0043	0.0012	U	U	0.0043	0.0043	0.0012	U	U	0.0041	0.0041	0.0012	U	U	0.0058	0.0058	0.0016	U	UJ	0.0034	0.0034	0.00095	U	U
Dichloroethene, cis-1,2-	mg/kg	0.0039	0.0039	0.0012	U	U	0.0043	0.0043	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0041	0.0041	0.0012	U	U	0.0058	0.0058	0.0017	U	UJ	0.0034	0.0034	0.001	U	U
Dichloroethene, trans-1,2-	mg/kg	0.0039	0.0039	0.0012	U	U	0.0043	0.0043	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0041	0.0041	0.0012	U	U	0.0058	0.0058	0.0017	U	UJ	0.0034	0.0034	0.001	U	U
Dichloropropane, 1,2-	mg/kg	0.0039	0.0039	0.00094	U	U	0.0043	0.0043	0.001	U	U	0.0043	0.0043	0.001	U	U	0.0041	0.0041	0.00099	U	U	0.0058	0.0058	0.0014	U	UJ	0.0034	0.0034	0.00081	U	U
Dichloropropene, cis-1,3-	mg/kg	0.0039	0.0039	0.00078	U	U	0.0043	0.0043	0.00085	U	U	0.0043	0.0043	0.00085	U	U	0.0041	0.0041	0.00082	U	U	0.0058	0.0058	0.0012	U	UJ	0.0034	0.0034	0.00068	U	U
Dichloropropene, trans-1,3-	mg/kg	0.0039	0.0039	0.00086	U	U	0.0043	0.0043	0.00094	U	U	0.0043	0.0043	0.00094	U	U	0.0041	0.0041	0.00091	U	U	0.0058	0.0058	0.0013	U	UJ	0.0034	0.0034	0.00074	U	U
Ethylbenzene	mg/kg	0.0013	0.0039	0.00078	J	J	0.0043	0.0043	0.00085	U	U	0.0043	0.0043	0.00085	U	U	0.0041	0.0041	0.00082	U	U	0.0058	0.0058	0.0012	U	UJ	0.0034	0.0034	0.00068	U	U
Hexanone, 2-	mg/kg	0.0203	0.019	0.0042			0.0556	0.021	0.0046			0.021	0.021	0.0046	U	U	0.0311	0.021	0.0045			0.029	0.029	0.0062	U	UJ	0.017	0.017	0.0037	U	U
Isopropylbenzene	mg/kg																														
METHYL ACETATE	mg/kg																														
Methyl Tertiary Butyl Ether	mg/kg																														
Methyl-2-pentanone, 4-	mg/kg	0.019	0.019	0.0043	U	U	0.021	0.021	0.0047	U	U	0.021	0.021	0.0047	U	U	0.021	0.021	0.0045	U	U	0.029	0.029	0.0063	U	UJ	0.017	0.017	0.0037	U	U
Methylcyclohexane	mg/kg																														
Methylene chloride	mg/kg	0.0125	0.0078	0.0036	B	B	0.009	0.0085	0.0039			0.0085	0.0085	0.0039	U	U	0.0047	0.0082	0.0038	JJ	J	0.0186	0.012	0.0053	B	B	0.0043	0.0068	0.0031	J	J
Styrene	mg/kg	0.0039	0.0039	0.002	U	U	0.0043	0.0043	0.0022	U	U	0.0043	0.0043	0.0022	U	U	0.0041	0.0041	0.0021	U	U	0.0058	0.0058	0.003	U	UJ	0.0034	0.0034	0.0018	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	0.0039	0.0039	0.00094	U	U	0.0043	0.0043	0.001	U	U	0.0043	0.0043	0.001	U	U	0.0041	0.0041	0.00099	U	U	0.0058	0.0058	0.0014	U	UJ	0.0034	0.0034	0.00081	U	U
Tetrachloroethene	mg/kg	0.0039	0.0039	0.00078	U	U	0.0043	0.0043	0.00085	U	U	0.0043	0.0043	0.00085	U	U	0.0041	0.0041	0.00082	U	U	0.0058	0.0058	0.0012	U	UJ	0.0034	0.0034	0.00068	U	U
Toluene	mg/kg	0.0043	0.0039	0.00094			0.0024	0.0043	0.001	J	J	0.0043	0.0043	0.001	U	U	0.0041	0.0041	0.00099	U	U	0.0058	0.0058	0.0014	U	UJ	0.0011	0.0034	0.00081	J	J
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichloroethane, 1,1,1-	mg/kg	0.0039	0.0039	0.00086	U	U	0.0043	0.0043	0.00094	U	U	0.0043	0.0043	0.00094	U	U	0.0041	0.0041	0.00091	U	U	0.0058	0.0058	0.0013	U	UJ	0.0034	0.0034	0.00074	U	U
Trichloroethane, 1,1,2-	mg/kg	0.0039	0.0039	0.00086	U	U	0.0043	0.0043	0.00094	U	U	0.0043	0.0043	0.00094	U	U	0.0041	0.0041	0.00091	U	U	0.0058	0.0058	0.0013	U	UJ	0.0034	0.0034	0.00074	U	U
Trichloroethene	mg/kg	0.0039	0.0039	0.00094	U	U	0.0043	0.0043	0.001	U	U	0.0043	0.0043	0.001	U	U	0.0041	0.0041	0.00099	U	U	0.0058	0.0058	0.0014	U	UJ	0.0034	0.0034	0.00081	U	U
Trichlorofluoromethane	mg/kg																														
Trichlorotrifluoroethane	mg/kg																														
Vinyl chloride	mg/kg	0.0039	0.0039	0.0012	U	U	0.0043	0.0043	0.0013	U	U	0.0043	0.0043	0.0013	U	U	0.0041	0.0041	0.0012	U	U	0.0058	0.0058	0.0017	U	UJ	0.0034	0.0034	0.001	U	U
Xylenes, total	mg/kg	0.0034	0.012	0.0025	J	J	0.013	0.013	0.0027	U	U	0.013	0.013	0.0027	U	U	0.012	0.012	0.0026	U	U	0.017	0.017	0.0037	U	UJ	0.01	0.01	0.0022	U	U

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB12					FSB-SB13					FSB-SB14					FSB-SB15					FSB-SS01					FSB-SS02				
SAMPLE NO		FSB0014					FSB0015					FSB0016					FSB0051					FSB0055					FSB0056				
SAMPLE DATE		17-May-11					17-May-11					17-May-11					30-Jun-11					25-Aug-11					25-Aug-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																															
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Dinitrobenzene, 1,3-	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Dinitrotoluene, 2,4-	mg/kg	0.16	0.16	0.078	U	U	0.19	0.19	0.09	U	U	0.19	0.19	0.092	U	U	0.17	0.17	0.083	U	U										
Dinitrotoluene, 2,6-	mg/kg	0.16	0.16	0.07	U	U	0.19	0.19	0.081	U	U	0.19	0.19	0.083	U	U	0.17	0.17	0.074	U	U										
HMX	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Nitrobenzene	mg/kg	0.16	0.16	0.075	U	U	0.19	0.19	0.086	U	U	0.19	0.19	0.089	U	U	0.17	0.17	0.079	U	U										
Nitrotoluene, 2-	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Nitrotoluene, 3-	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Nitrotoluene, 4-	mg/kg	0.16	0.16	0.081	U	U	0.19	0.19	0.094	U	U	0.19	0.19	0.096	U	U	0.17	0.17	0.086	U	U										
RDX	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Tetryl	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Trinitrobenzene, 1,3,5-	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
Trinitrotoluene, 2,4,6-	mg/kg	0.16	0.16	0.064	U	U	0.19	0.19	0.074	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.068	U	U										
General Chemistry																															
pH	pH_units																														
% Solids	Percent	80.5	0				78.6	0				77.2	0				84.7	0				88.1	0				83.6	0			
pH	pH_units																														
Total organic carbon																															
Metals																															
Aluminum	mg/kg	8770	12	1.4			424	10	1.3			4250	12	1.4			1290	8.7	1												
Antimony	mg/kg	1.2	1.2	0.058	U	U	1	1	0.052	U	U	1.2	1.2	0.058	U	U	0.87	0.87	0.043	U	U										
Arsenic	mg/kg	8.9	0.58	0.058			0.4	0.52	0.052	B	J	5.4	0.58	0.058			3.2	0.43	0.043												
Barium	mg/kg	57.7	12	0.23			59.5	10	0.21			90.5	12	0.23			56.1	8.7	0.17												
Beryllium	mg/kg	0.3	0.29	0.0058			0.26	0.26	0.0052	U	U	0.13	0.29	0.0058	B	J	0.091	0.22	0.0043	B	J										
Cadmium	mg/kg	0.46	0.46	0.012	U	U	0.21	0.21	0.0052	U	U	0.23	0.23	0.0058	U	U	0.17	0.17	0.0043	U	U										
Calcium	mg/kg	996	290	2.9			4360	260	2.6			4530	290	2.9			10400	220	2.2		J										
Chromium	mg/kg	15.6	0.58	0.058			0.79	0.52	0.052			11	0.58	0.058			2.6	0.43	0.043												
Cobalt	mg/kg	4.8	2.9	0.058			2.6	2.6	0.052	U	U	2	2.9	0.058	B	J	0.57	2.2	0.043	B	J										
Copper	mg/kg	14.3	1.5	0.058			0.76	1.3	0.052	B	J	10	1.4	0.058			4.3	1.1	0.043		J										
Iron	mg/kg	23500	17	1.3			431	16	1.2			15800	17	1.3			5850	13	1												
Lead	mg/kg	13.2	1.2	0.058			6.6	1	0.052			12.3	1.2	0.058			12.3	0.87	0.043												
Magnesium	mg/kg	1680	290	2.9			58.6	260	2.6	B	J	910	290	2.9			270	220	2.2												
Manganese	mg/kg	118	0.87	0.058			4.1	0.78	0.052			60.8	0.87	0.058			20.1	0.65	0.043												
Mercury	mg/kg	0.066	0.1	0.0073	B	J	0.051	0.1	0.0072	B	J	0.067	0.1	0.0071	B	J	0.047	0.094	0.0067	B	J										
Nickel	mg/kg	13.7	2.3	0.058			0.26	2.1	0.052	B	J	6.7	2.3	0.058			1.6	1.7	0.043	B	J										
Potassium	mg/kg	598	580	2.9			148	520	2.6	B	J	549	580	2.9	B	J	640	430	2.2												
Selenium	mg/kg	0.68	1.2	0.12	B	J	0.21	1	0.1	B	J	0.62	1.2	0.12	B	J	0.21	0.87	0.087	B	J										
Silver	mg/kg	0.58	0.58	0.058	U	U	0.063	0.52	0.052	B	J	0.58	0.58	0.058	U	U	0.43	0.43	0.043	U	U										
Sodium	mg/kg	120	580	49	B	J	63.2	520	44	B	J	67.9	580	49	B	J	166	430	37	B	J										
Thallium	mg/kg	0.58	0.58	0.087	U	U	0.52	0.52	0.078	U	U	0.58	0.58	0.087	U	U	0.43	0.43	0.065	U	U										
Vanadium	mg/kg	24.4	2.9	0.058			1.2	2.6	0.052	B	J	20.9	2.9	0.058			10.7	2.2	0.043												
Zinc	mg/kg	38.1	1.2	0.058			0.81	1	0.052	B	J	19.5	1.2	0.058			5.1	0.87	0.043		J										
Pesticides/PCBs																															
Aroclor 1016	mg/kg	0.02	0.02	0.0082	U	U	0.042	0.042	0.017	U	U	0.021	0.021	0.0086	U	U	0.2	0.2	0.078	U	U	1.9	1.9	0.74	U	U	0.99	0.99	0.4	U	U
Aroclor 1221	mg/kg	0.02	0.02	0.01	U	U	0.042	0.042	0.021	U	U	0.021	0.021	0.011	U	U	0.2	0.2	0.098	U	U	1.9	1.9	0.93	U	U	0.99	0.99	0.5	U	U
Aroclor 1232	mg/kg	0.02	0.02	0.01	U	U	0.042	0.042	0.021	U	U	0.021	0.021	0.011	U	U	0.2	0.2	0.098	U	U	1.9	1.9	0.93	U	U	0.99	0.99	0.5	U	U
Aroclor 1242	mg/kg	0.02	0.02	0.0082	U	U	0.042	0.042	0.017	U	U	0.021	0.021	0.0086	U	U	0.2	0.2	0.078	U	U	1.9	1.9	0.74	U	U	0.99	0.99	0.4	U	U
Aroclor 1248	mg/kg	0.02	0.02	0.0082	U	U	0.042	0.042	0.017	U	U	0.021	0.021	0.0086	U	U	0.2	0.2	0.078	U	U	1.9	1.9	0.74	U	U	0.99	0.99	0.4	U	U
Aroclor 1254	mg/kg	0.138	0.02	0.0082			0.287	0.042	0.017			0.021	0.021	0.0086	U	U	0.2	0.2	0.078	U	U	1.9	1.9	0.74	U	U	2.53	0.99	0.4	J	J
Aroclor 1260	mg/kg	0.02	0.02	0.0082	U	U	0.168	0.042	0.017			0.014	0.021	0.0086	J	J	0.2	0.2	0.078	U	U	4.46	1.9	0.74	J	J	5.68	0.99	0.4	J	J
Aroclor 1268	mg/kg																0.678	0.2	0.078			11.8	1.9	0.74	J	J	4.97	0.99	0.4	J	J
Semivolatile Organics																															
3-Methylphenol and 4-Methylphenol	mg/kg	0.2	0.2	0.029	U	U	0.21	0.21	0.031	U	U	0.21	0.21	0.031	U	U	0.19	0.19	0.028	U	U										
Acenaphthene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Acenaphthylene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Acetophenone	mg/kg																														
Anthracene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Atrazine	mg/kg																														
Benzaldehyde	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB12					FSB-SB13					FSB-SB14					FSB-SB15					FSB-SS01					FSB-SS02				
SAMPLE NO		FSB0014					FSB0015					FSB0016					FSB0051					FSB0055					FSB0056				
SAMPLE DATE		17-May-11					17-May-11					17-May-11					30-Jun-11					25-Aug-11					25-Aug-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Benzo(a)anthracene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.0317	0.19	0.019	J	J										
Benzo(a)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.0273	0.19	0.019	J	J										
Benzo(b)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.043	0.19	0.019	J	J										
Benzo(ghi)perylene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Benzo(k)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.0197	0.19	0.019	J	J										
Benzoic acid	mg/kg	1	1	0.36	U	UJ	1.1	1.1	0.37	U	UJ	1.1	1.1	0.37	U	UJ	0.97	0.97	0.34	U	U										
Benzyl alcohol	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Bibenzene	mg/kg																														
Bis(2-chloroethoxy)methane	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Bis(2-chloroethyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Bis(2-chloroisopropyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Bis(2-ethylhexyl)phthalate	mg/kg	0.41	0.41	0.081	U	U	0.42	0.42	0.085	U	U	0.42	0.42	0.085	U	U	0.39	0.39	0.078	U	U										
Bromophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Butyl benzyl phthalate	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Caprolactam	mg/kg																														
Carbazole	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Chloro-3-methylphenol, 4-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Chloroaniline, 4-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Chloronaphthalene, 2-	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Chlorophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Chlorophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Chrysene	mg/kg	0.2	0.2	0.02	U	U	0.0237	0.21	0.021	J	J	0.21	0.21	0.021	U	U	0.0394	0.19	0.019	J	J										
Dibenz(a,h)anthracene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Dibenzofuran	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Dichlorobenzene, 1,2-	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Dichlorobenzene, 1,3-	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Dichlorobenzene, 1,4-	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Dichlorobenzidine, 3,3'-	mg/kg	0.41	0.41	0.041	U	U	0.42	0.42	0.042	U	U	0.42	0.42	0.042	U	U	0.39	0.39	0.039	U	U										
Dichlorophenol, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Diethyl phthalate	mg/kg	0.41	0.41	0.081	U	U	0.42	0.42	0.085	U	U	0.42	0.42	0.085	U	U	0.39	0.39	0.078	U	U										
Dimethyl phthalate	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Dimethylphenol, 2,4-	mg/kg	0.2	0.2	0.026	U	U	0.21	0.21	0.027	U	U	0.21	0.21	0.027	U	U	0.19	0.19	0.024	U	U										
Di-n-butyl phthalate	mg/kg	0.41	0.41	0.081	U	U	0.42	0.42	0.085	U	U	0.42	0.42	0.085	U	U	0.39	0.39	0.078	U	U										
Dinitro-2-methylphenol, 4,6-	mg/kg	0.41	0.41	0.081	U	U	0.42	0.42	0.085	U	U	0.42	0.42	0.085	U	U	0.39	0.39	0.078	U	U										
Dinitrophenol, 2,4-	mg/kg	1	1	0.41	U	U	1.1	1.1	0.42	U	U	1.1	1.1	0.42	U	U	0.97	0.97	0.39	U	U										
Dinitrotoluene, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Dinitrotoluene, 2,6-	mg/kg	0.2	0.2	0.024	U	U	0.21	0.21	0.025	U	U	0.21	0.21	0.025	U	U	0.19	0.19	0.023	U	U										
Di-n-octyl phthalate	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.0771	0.19	0.019	J	J										
Fluorene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Hexachlorobenzene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Hexachlorobutadiene	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Hexachlorocyclopentadiene	mg/kg	0.2	0.2	0.09	U	U	0.21	0.21	0.093	U	U	0.21	0.21	0.093	U	U	0.19	0.19	0.085	U	U										
Hexachloroethane	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.0216	0.19	0.019	J	J										
Isophorone	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Methylnaphthalene, 2-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Methylphenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Naphthalene	mg/kg	0.2	0.2	0.033	U	U	0.21	0.21	0.034	U	U	0.21	0.21	0.034	U	U	0.19	0.19	0.031	U	U										
Nitroaniline, 2-	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Nitroaniline, 3-	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Nitroaniline, 4-	mg/kg	0.2	0.2	0.041	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.19	0.19	0.039	U	U										
Nitrobenzene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Nitrophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Nitrophenol, 4-	mg/kg	1	1	0.16	U	U	1.1	1.1	0.17	U	U	1.1	1.1	0.17	U	U	0.97	0.97	0.16	U	U										
n-Nitroso-di-n-propylamine	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
n-Nitrosodiphenylamine	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Pentachlorophenol	mg/kg	1	1	0.24	U	U	1.1	1.1	0.25	U	U	1.1	1.1	0.25	U	U	0.97	0.97	0.23	U	U										
Phenanthrene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.032	0.19	0.019	J	J										
Phenol	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Pyrene	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.0571	0.19	0.019	J	J										

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB12					FSB-SB13					FSB-SB14					FSB-SB15					FSB-SS01					FSB-SS02				
SAMPLE NO		FSB0014					FSB0015					FSB0016					FSB0051					FSB0055					FSB0056				
SAMPLE DATE		17-May-11					17-May-11					17-May-11					30-Jun-11					25-Aug-11					25-Aug-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Trichlorobenzene, 1,2,4-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Trichlorophenol, 2,4,5-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Trichlorophenol, 2,4,6-	mg/kg	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U										
Volatile Organics																															
Acetone	mg/kg	0.039	0.039	0.016	U	R	0.044	0.044	0.018	U	R	0.045	0.045	0.018	U	R	0.047	0.047	0.019	U	U										
Benzene	mg/kg	0.0039	0.0039	0.0012	U	U	0.0044	0.0044	0.0013	U	U	0.0045	0.0045	0.0014	U	U	0.0047	0.0047	0.0014	U	U										
Bromodichloromethane	mg/kg	0.0039	0.0039	0.00086	U	U	0.0044	0.0044	0.00097	U	U	0.0045	0.0045	0.001	U	U	0.0047	0.0047	0.001	U	U										
Bromoform	mg/kg	0.0039	0.0039	0.0012	U	UJ	0.0044	0.0044	0.0013	U	U	0.0045	0.0045	0.0014	U	U	0.0047	0.0047	0.0014	U	U										
Bromomethane	mg/kg	0.0039	0.0039	0.0016	U	U	0.0044	0.0044	0.0018	U	U	0.0045	0.0045	0.0018	U	U	0.0047	0.0047	0.0019	U	U										
Butanone, 2-	mg/kg	0.02	0.02	0.0048	U	UJ	0.022	0.022	0.0054	U	U	0.023	0.023	0.0055	U	UJ	0.023	0.023	0.0057	U	U										
Carbon disulfide	mg/kg	0.0039	0.0039	0.0016	U	U	0.0044	0.0044	0.0018	U	U	0.0045	0.0045	0.0018	U	U	0.0047	0.0047	0.0019	U	U										
Carbon tetrachloride	mg/kg	0.0039	0.0039	0.0014	U	U	0.0044	0.0044	0.0016	U	U	0.0045	0.0045	0.0016	U	U	0.0047	0.0047	0.0017	U	U										
Chlorobenzene	mg/kg	0.0039	0.0039	0.00078	U	U	0.0044	0.0044	0.00088	U	U	0.0045	0.0045	0.00091	U	U	0.0047	0.0047	0.00093	U	U										
Chloroethane	mg/kg	0.0039	0.0039	0.0016	U	U	0.0044	0.0044	0.0018	U	UJ	0.0045	0.0045	0.0018	U	U	0.0047	0.0047	0.0019	U	U										
Chloroform	mg/kg	0.0039	0.0039	0.00094	U	U	0.0044	0.0044	0.0011	U	U	0.0045	0.0045	0.0011	U	U	0.0047	0.0047	0.0011	U	U										
Chloromethane	mg/kg	0.0039	0.0039	0.0016	U	U	0.0044	0.0044	0.0018	U	U	0.0045	0.0045	0.0018	U	U	0.0047	0.0047	0.0019	U	U										
Cyclohexane	mg/kg																														
Dibromo-3-chloropropane, 1,2-	mg/kg																														
Dibromochloromethane	mg/kg	0.0039	0.0039	0.00078	U	UJ	0.0044	0.0044	0.00088	U	U	0.0045	0.0045	0.00091	U	U	0.0047	0.0047	0.00093	U	U										
Dibromoethane, 1,2-	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorodifluoromethane	mg/kg																														
Dichloroethane, 1,1-	mg/kg	0.0039	0.0039	0.00086	U	U	0.0044	0.0044	0.00097	U	U	0.0045	0.0045	0.001	U	U	0.0047	0.0047	0.001	U	U										
Dichloroethane, 1,2-	mg/kg	0.0039	0.0039	0.00078	U	U	0.0044	0.0044	0.00088	U	U	0.0045	0.0045	0.00091	U	U	0.0047	0.0047	0.00093	U	U										
Dichloroethene, 1,1-	mg/kg	0.0039	0.0039	0.0011	U	U	0.0044	0.0044	0.0012	U	U	0.0045	0.0045	0.0013	U	U	0.0047	0.0047	0.0013	U	U										
Dichloroethene, cis-1,2-	mg/kg	0.0039	0.0039	0.0012	U	U	0.0044	0.0044	0.0013	U	U	0.0045	0.0045	0.0014	U	U	0.0047	0.0047	0.0014	U	U										
Dichloroethene, trans-1,2-	mg/kg	0.0039	0.0039	0.0012	U	U	0.0044	0.0044	0.0013	U	U	0.0045	0.0045	0.0014	U	U	0.0047	0.0047	0.0014	U	U										
Dichloropropane, 1,2-	mg/kg	0.0039	0.0039	0.00094	U	U	0.0044	0.0044	0.0011	U	U	0.0045	0.0045	0.0011	U	U	0.0047	0.0047	0.0011	U	U										
Dichloropropene, cis-1,3-	mg/kg	0.0039	0.0039	0.00078	U	U	0.0044	0.0044	0.00088	U	U	0.0045	0.0045	0.00091	U	U	0.0047	0.0047	0.00093	U	U										
Dichloropropene, trans-1,3-	mg/kg	0.0039	0.0039	0.00086	U	UJ	0.0044	0.0044	0.00097	U	U	0.0045	0.0045	0.001	U	U	0.0047	0.0047	0.001	U	U										
Ethylbenzene	mg/kg	0.0039	0.0039	0.00078	U	U	0.0044	0.0044	0.00088	U	U	0.0045	0.0045	0.00091	U	U	0.0047	0.0047	0.00093	U	U										
Hexanone, 2-	mg/kg	0.02	0.02	0.0042	U	UJ	0.022	0.022	0.0048	U	U	0.023	0.023	0.0049	U	U	0.023	0.023	0.005	U	U										
Isopropylbenzene	mg/kg																														
METHYL ACETATE	mg/kg																														
Methyl Tertiary Butyl Ether	mg/kg																														
Methyl-2-pentanone, 4-	mg/kg	0.02	0.02	0.0043	U	UJ	0.022	0.022	0.0049	U	U	0.023	0.023	0.005	U	U	0.023	0.023	0.0051	U	U										
Methylcyclohexane	mg/kg																														
Methylene chloride	mg/kg	0.0056	0.0078	0.0036	J	J	0.0048	0.0088	0.0041	J	J	0.0042	0.0091	0.0042	J	J	0.0064	0.0093	0.0043	J	J										
Styrene	mg/kg	0.0039	0.0039	0.002	U	U	0.0044	0.0044	0.0023	U	U	0.0045	0.0045	0.0024	U	U	0.0047	0.0047	0.0024	U	UJ										
Tetrachloroethane, 1,1,2,2-	mg/kg	0.0039	0.0039	0.00094	U	U	0.0044	0.0044	0.0011	U	U	0.0045	0.0045	0.0011	U	U	0.0047	0.0047	0.0011	U	U										
Tetrachloroethene	mg/kg	0.0039	0.0039	0.00078	U	U	0.0044	0.0044	0.00088	U	U	0.0045	0.0045	0.00091	U	U	0.0047	0.0047	0.00093	U	U										
Toluene	mg/kg	0.0039	0.0039	0.00094	U	U	0.0012	0.0044	0.0011	J	J	0.0045	0.0045	0.0011	U	U	0.0047	0.0047	0.0011	U	U										
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichloroethane, 1,1,1-	mg/kg	0.0039	0.0039	0.00086	U	U	0.0044	0.0044	0.00097	U	U	0.0045	0.0045	0.001	U	U	0.0047	0.0047	0.001	U	U										
Trichloroethane, 1,1,2-	mg/kg	0.0039	0.0039	0.00086	U	UJ	0.0044	0.0044	0.00097	U	U	0.0045	0.0045	0.001	U	U	0.0047	0.0047	0.001	U	U										
Trichloroethene	mg/kg	0.0039	0.0039	0.00094	U	U	0.0044	0.0044	0.0011	U	U	0.0045	0.0045	0.0011	U	U	0.0047	0.0047	0.0011	U	U										
Trichlorofluoromethane	mg/kg																														
Trichlorotrifluoroethane	mg/kg																														
Vinyl chloride	mg/kg	0.0039	0.0039	0.0012	U	U	0.0044	0.0044	0.0013	U	U	0.0045	0.0045	0.0014	U	U	0.0047	0.0047	0.0014	U	U										
Xylenes, total	mg/kg	0.012	0.012	0.0025	U	U	0.013	0.013	0.0028	U	U	0.014	0.014	0.0029	U	U	0.014	0.014	0.003	U	U										

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS03					FSB-SS04					FSB-SS05					FSB-SS05					FSB-SS06					FSB-SS07				
SAMPLE NO		FSB0057					FSB0058					FSB0059					FSB0060					FSB0061					FSB0062				
SAMPLE DATE		25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					FD					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																															
Amino-2,6-dinitrotoluene, 4-	mg/kg																														
Amino-4,6-dinitrotoluene, 2-	mg/kg																														
Dinitrobenzene, 1,3-	mg/kg																														
Dinitrotoluene, 2,4-	mg/kg																														
Dinitrotoluene, 2,6-	mg/kg																														
HMX	mg/kg																														
Nitrobenzene	mg/kg																														
Nitrotoluene, 2-	mg/kg																														
Nitrotoluene, 3-	mg/kg																														
Nitrotoluene, 4-	mg/kg																														
RDX	mg/kg																														
Tetryl	mg/kg																														
Trinitrobenzene, 1,3,5-	mg/kg																														
Trinitrotoluene, 2,4,6-	mg/kg																														
General Chemistry																															
pH	pH_units																														
% Solids	Percent	96.4	0				89.6	0				87.6	0				87.4	0				88.9	0				92	0			
pH	pH_units																														
Total organic carbon																															
Metals																															
Aluminum	mg/kg																														
Antimony	mg/kg																														
Arsenic	mg/kg																														
Barium	mg/kg																														
Beryllium	mg/kg																														
Cadmium	mg/kg																														
Calcium	mg/kg																														
Chromium	mg/kg																														
Cobalt	mg/kg																														
Copper	mg/kg																														
Iron	mg/kg																														
Lead	mg/kg																														
Magnesium	mg/kg																														
Manganese	mg/kg																														
Mercury	mg/kg																														
Nickel	mg/kg																														
Potassium	mg/kg																														
Selenium	mg/kg																														
Silver	mg/kg																														
Sodium	mg/kg																														
Thallium	mg/kg																														
Vanadium	mg/kg																														
Zinc	mg/kg																														
Pesticides/PCBs																															
Aroclor 1016	mg/kg	1.7	1.7	0.68	U	U	0.37	0.37	0.15	U	U	1.9	1.9	0.76	U	U	1.9	1.9	0.76	U	U	0.19	0.19	0.074	U	U	3.6	3.6	1.4	U	U
Aroclor 1221	mg/kg	1.7	1.7	0.86	U	U	0.37	0.37	0.19	U	U	1.9	1.9	0.94	U	U	1.9	1.9	0.95	U	U	0.19	0.19	0.093	U	U	3.6	3.6	1.8	U	U
Aroclor 1232	mg/kg	1.7	1.7	0.86	U	U	0.37	0.37	0.19	U	U	1.9	1.9	0.94	U	U	1.9	1.9	0.95	U	U	0.19	0.19	0.093	U	U	3.6	3.6	1.8	U	U
Aroclor 1242	mg/kg	1.7	1.7	0.68	U	U	0.37	0.37	0.15	U	U	1.9	1.9	0.76	U	U	1.9	1.9	0.76	U	U	0.19	0.19	0.074	U	U	3.6	3.6	1.4	U	U
Aroclor 1248	mg/kg	1.7	1.7	0.68	U	U	0.37	0.37	0.15	U	U	1.9	1.9	0.76	U	U	1.9	1.9	0.76	U	U	0.19	0.19	0.074	U	U	3.6	3.6	1.4	U	U
Aroclor 1254	mg/kg	1.7	1.7	0.68	U	U	0.7	0.37	0.15	J	J	4.96	1.9	0.76	J	J	4.4	1.9	0.76	J	J	0.868	0.19	0.074	J	J	12.1	3.6	1.4	J	J
Aroclor 1260	mg/kg	2.64	1.7	0.68	J	J	2.51	0.37	0.15	J	J	10.2	1.9	0.76	J	J	18.8	1.9	0.76	J	J	1.41	0.19	0.074	J	J	41.1	3.6	1.4	J	J
Aroclor 1268	mg/kg	8.76	1.7	0.68	J	J	0.824	0.37	0.15	J	J	10	1.9	0.76	J	J	9.51	1.9	0.76	J	J	0.371	0.19	0.074	J	J	35.5	3.6	1.4	J	J
Semivolatile Organics																															
3-Methylphenol and 4-Methylphenol	mg/kg																														
Acenaphthene	mg/kg																														
Acenaphthylene	mg/kg																														
Acetophenone	mg/kg																														
Anthracene	mg/kg																														
Atrazine	mg/kg																														
Benzaldehyde	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS03					FSB-SS04					FSB-SS05					FSB-SS05					FSB-SS06					FSB-SS07				
SAMPLE NO		FSB0057					FSB0058					FSB0059					FSB0060					FSB0061					FSB0062				
SAMPLE DATE		25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					FD					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Benzo(a)anthracene	mg/kg																														
Benzo(a)pyrene	mg/kg																														
Benzo(b)fluoranthene	mg/kg																														
Benzo(ghi)perylene	mg/kg																														
Benzo(k)fluoranthene	mg/kg																														
Benzoic acid	mg/kg																														
Benzyl alcohol	mg/kg																														
Bibenzene	mg/kg																														
Bis(2-chloroethoxy)methane	mg/kg																														
Bis(2-chloroethyl)ether	mg/kg																														
Bis(2-chloroisopropyl)ether	mg/kg																														
Bis(2-ethylhexyl)phthalate	mg/kg																														
Bromophenyl phenyl ether, 4-	mg/kg																														
Butyl benzyl phthalate	mg/kg																														
Caprolactam	mg/kg																														
Carbazole	mg/kg																														
Chloro-3-methylphenol, 4-	mg/kg																														
Chloroaniline, 4-	mg/kg																														
Chloronaphthalene, 2-	mg/kg																														
Chlorophenol, 2-	mg/kg																														
Chlorophenyl phenyl ether, 4-	mg/kg																														
Chrysene	mg/kg																														
Dibenz(a,h)anthracene	mg/kg																														
Dibenzofuran	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorobenzidine, 3,3'-	mg/kg																														
Dichlorophenol, 2,4-	mg/kg																														
Diethyl phthalate	mg/kg																														
Dimethyl phthalate	mg/kg																														
Dimethylphenol, 2,4-	mg/kg																														
Di-n-butyl phthalate	mg/kg																														
Dinitro-2-methylphenol, 4,6-	mg/kg																														
Dinitrophenol, 2,4-	mg/kg																														
Dinitrotoluene, 2,4-	mg/kg																														
Dinitrotoluene, 2,6-	mg/kg																														
Di-n-octyl phthalate	mg/kg																														
Fluoranthene	mg/kg																														
Fluorene	mg/kg																														
Hexachlorobenzene	mg/kg																														
Hexachlorobutadiene	mg/kg																														
Hexachlorocyclopentadiene	mg/kg																														
Hexachloroethane	mg/kg																														
Indeno(1,2,3-cd)pyrene	mg/kg																														
Isophorone	mg/kg																														
Methylnaphthalene, 2-	mg/kg																														
Methylphenol, 2-	mg/kg																														
Naphthalene	mg/kg																														
Nitroaniline, 2-	mg/kg																														
Nitroaniline, 3-	mg/kg																														
Nitroaniline, 4-	mg/kg																														
Nitrobenzene	mg/kg																														
Nitrophenol, 2-	mg/kg																														
Nitrophenol, 4-	mg/kg																														
n-Nitroso-di-n-propylamine	mg/kg																														
n-Nitrosodiphenylamine	mg/kg																														
Pentachlorophenol	mg/kg																														
Phenanthrene	mg/kg																														
Phenol	mg/kg																														
Pyrene	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS03					FSB-SS04					FSB-SS05					FSB-SS05					FSB-SS06					FSB-SS07				
SAMPLE NO		FSB0057					FSB0058					FSB0059					FSB0060					FSB0061					FSB0062				
SAMPLE DATE		25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11					25-Aug-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					FD					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichlorophenol, 2,4,5-	mg/kg																														
Trichlorophenol, 2,4,6-	mg/kg																														
Volatile Organics																															
Acetone	mg/kg																														
Benzene	mg/kg																														
Bromodichloromethane	mg/kg																														
Bromoform	mg/kg																														
Bromomethane	mg/kg																														
Butanone, 2-	mg/kg																														
Carbon disulfide	mg/kg																														
Carbon tetrachloride	mg/kg																														
Chlorobenzene	mg/kg																														
Chloroethane	mg/kg																														
Chloroform	mg/kg																														
Chloromethane	mg/kg																														
Cyclohexane	mg/kg																														
Dibromo-3-chloropropane, 1,2-	mg/kg																														
Dibromochloromethane	mg/kg																														
Dibromoethane, 1,2-	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorodifluoromethane	mg/kg																														
Dichloroethane, 1,1-	mg/kg																														
Dichloroethane, 1,2-	mg/kg																														
Dichloroethene, 1,1-	mg/kg																														
Dichloroethene, cis-1,2-	mg/kg																														
Dichloroethene, trans-1,2-	mg/kg																														
Dichloropropane, 1,2-	mg/kg																														
Dichloropropene, cis-1,3-	mg/kg																														
Dichloropropene, trans-1,3-	mg/kg																														
Ethylbenzene	mg/kg																														
Hexanone, 2-	mg/kg																														
Isopropylbenzene	mg/kg																														
METHYL ACETATE	mg/kg																														
Methyl Tertiary Butyl Ether	mg/kg																														
Methyl-2-pentanone, 4-	mg/kg																														
Methylcyclohexane	mg/kg																														
Methylene chloride	mg/kg																														
Styrene	mg/kg																														
Tetrachloroethane, 1,1,2,2-	mg/kg																														
Tetrachloroethene	mg/kg																														
Toluene	mg/kg																														
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichloroethane, 1,1,1-	mg/kg																														
Trichloroethane, 1,1,2-	mg/kg																														
Trichloroethene	mg/kg																														
Trichlorofluoromethane	mg/kg																														
Trichlorotrifluoroethane	mg/kg																														
Vinyl chloride	mg/kg																														
Xylenes, total	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS08					FSB-SS09					FSB-SS10					FSB-SS14					FSB-SS15					FSB-SS16				
SAMPLE NO		FSB0063					FSB0064					FSB0065					FSB0070					FSB0071					FSB0072				
SAMPLE DATE		25-Aug-11					25-Aug-11					25-Aug-11					8-Nov-11					8-Nov-11					8-Nov-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																															
Amino-2,6-dinitrotoluene, 4-	mg/kg																														
Amino-4,6-dinitrotoluene, 2-	mg/kg																														
Dinitrobenzene, 1,3-	mg/kg																														
Dinitrotoluene, 2,4-	mg/kg																														
Dinitrotoluene, 2,6-	mg/kg																														
HMX	mg/kg																														
Nitrobenzene	mg/kg																														
Nitrotoluene, 2-	mg/kg																														
Nitrotoluene, 3-	mg/kg																														
Nitrotoluene, 4-	mg/kg																														
RDX	mg/kg																														
Tetryl	mg/kg																														
Trinitrobenzene, 1,3,5-	mg/kg																														
Trinitrotoluene, 2,4,6-	mg/kg																														
General Chemistry																															
pH	pH_units																														
% Solids	Percent	85.4	0				88.6	0				89.2	0																		
pH	pH_units																74.5	0				81.6	0				78.4	0			
Total organic carbon																															
Metals																															
Aluminum	mg/kg																														
Antimony	mg/kg																														
Arsenic	mg/kg																														
Barium	mg/kg																														
Beryllium	mg/kg																														
Cadmium	mg/kg																														
Calcium	mg/kg																														
Chromium	mg/kg																														
Cobalt	mg/kg																														
Copper	mg/kg																														
Iron	mg/kg																														
Lead	mg/kg																														
Magnesium	mg/kg																														
Manganese	mg/kg																														
Mercury	mg/kg																														
Nickel	mg/kg																														
Potassium	mg/kg																														
Selenium	mg/kg																														
Silver	mg/kg																														
Sodium	mg/kg																														
Thallium	mg/kg																														
Vanadium	mg/kg																														
Zinc	mg/kg																														
Pesticides/PCBs																															
Aroclor 1016	mg/kg	0.19	0.19	0.077	U	U	0.37	0.37	0.15	U	U	1.9	1.9	0.75	U	U	2.2	2.2	0.89	U	U	4.1	4.1	1.6	U	U	2.1	2.1	0.84	U	U
Aroclor 1221	mg/kg	0.19	0.19	0.096	U	U	0.37	0.37	0.19	U	U	1.9	1.9	0.93	U	U	2.2	2.2	1.1	U	U	4.1	4.1	2	U	U	2.1	2.1	1.1	U	U
Aroclor 1232	mg/kg	0.19	0.19	0.096	U	U	0.37	0.37	0.19	U	U	1.9	1.9	0.93	U	U	2.2	2.2	1.1	U	U	4.1	4.1	2	U	U	2.1	2.1	1.1	U	U
Aroclor 1242	mg/kg	0.19	0.19	0.077	U	U	0.37	0.37	0.15	U	U	1.9	1.9	0.75	U	U	2.2	2.2	0.89	U	U	4.1	4.1	1.6	U	U	2.1	2.1	0.84	U	U
Aroclor 1248	mg/kg	0.19	0.19	0.077	U	U	0.37	0.37	0.15	U	U	1.9	1.9	0.75	U	U	2.2	2.2	0.89	U	U	4.1	4.1	1.6	U	U	2.1	2.1	0.84	U	U
Aroclor 1254	mg/kg	0.65	0.19	0.077	J	J	1.72	0.37	0.15	J	J	7.63	1.9	0.75	J	J	1.62	2.2	0.89	J	J	4.1	4.1	1.6	U	U	2.1	2.1	0.84	U	U
Aroclor 1260	mg/kg	0.757	0.19	0.077	J	J	1.37	0.37	0.15	J	J	12.3	1.9	0.75	J	J	5.34	2.2	0.89	J	J	3.04	4.1	1.6	J	J	2.1	2.1	0.84	U	U
Aroclor 1268	mg/kg	0.171	0.19	0.077	J	J	0.37	0.37	0.15	U	U	4.71	1.9	0.75	J	J	7.25	2.2	0.89	J	J	22.6	4.1	1.6	J	J	5.67	2.1	0.84		
Semivolatile Organics																															
3-Methylphenol and 4-Methylphenol	mg/kg																														
Acenaphthene	mg/kg																														
Acenaphthylene	mg/kg																														
Acetophenone	mg/kg																														
Anthracene	mg/kg																														
Atrazine	mg/kg																														
Benzaldehyde	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS08					FSB-SS09					FSB-SS10					FSB-SS14					FSB-SS15					FSB-SS16				
SAMPLE NO		FSB0063					FSB0064					FSB0065					FSB0070					FSB0071					FSB0072				
SAMPLE DATE		25-Aug-11					25-Aug-11					25-Aug-11					8-Nov-11					8-Nov-11					8-Nov-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Benzo(a)anthracene	mg/kg																														
Benzo(a)pyrene	mg/kg																														
Benzo(b)fluoranthene	mg/kg																														
Benzo(ghi)perylene	mg/kg																														
Benzo(k)fluoranthene	mg/kg																														
Benzoic acid	mg/kg																														
Benzyl alcohol	mg/kg																														
Bibenzene	mg/kg																														
Bis(2-chloroethoxy)methane	mg/kg																														
Bis(2-chloroethyl)ether	mg/kg																														
Bis(2-chloroisopropyl)ether	mg/kg																														
Bis(2-ethylhexyl)phthalate	mg/kg																														
Bromophenyl phenyl ether, 4-	mg/kg																														
Butyl benzyl phthalate	mg/kg																														
Caprolactam	mg/kg																														
Carbazole	mg/kg																														
Chloro-3-methylphenol, 4-	mg/kg																														
Chloroaniline, 4-	mg/kg																														
Chloronaphthalene, 2-	mg/kg																														
Chlorophenol, 2-	mg/kg																														
Chlorophenyl phenyl ether, 4-	mg/kg																														
Chrysene	mg/kg																														
Dibenz(a,h)anthracene	mg/kg																														
Dibenzofuran	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorobenzidine, 3,3'-	mg/kg																														
Dichlorophenol, 2,4-	mg/kg																														
Diethyl phthalate	mg/kg																														
Dimethyl phthalate	mg/kg																														
Dimethylphenol, 2,4-	mg/kg																														
Di-n-butyl phthalate	mg/kg																														
Dinitro-2-methylphenol, 4,6-	mg/kg																														
Dinitrophenol, 2,4-	mg/kg																														
Dinitrotoluene, 2,4-	mg/kg																														
Dinitrotoluene, 2,6-	mg/kg																														
Di-n-octyl phthalate	mg/kg																														
Fluoranthene	mg/kg																														
Fluorene	mg/kg																														
Hexachlorobenzene	mg/kg																														
Hexachlorobutadiene	mg/kg																														
Hexachlorocyclopentadiene	mg/kg																														
Hexachloroethane	mg/kg																														
Indeno(1,2,3-cd)pyrene	mg/kg																														
Isophorone	mg/kg																														
Methylnaphthalene, 2-	mg/kg																														
Methylphenol, 2-	mg/kg																														
Naphthalene	mg/kg																														
Nitroaniline, 2-	mg/kg																														
Nitroaniline, 3-	mg/kg																														
Nitroaniline, 4-	mg/kg																														
Nitrobenzene	mg/kg																														
Nitrophenol, 2-	mg/kg																														
Nitrophenol, 4-	mg/kg																														
n-Nitroso-di-n-propylamine	mg/kg																														
n-Nitrosodiphenylamine	mg/kg																														
Pentachlorophenol	mg/kg																														
Phenanthrene	mg/kg																														
Phenol	mg/kg																														
Pyrene	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS08					FSB-SS09					FSB-SS10					FSB-SS14					FSB-SS15					FSB-SS16				
SAMPLE NO		FSB0063					FSB0064					FSB0065					FSB0070					FSB0071					FSB0072				
SAMPLE DATE		25-Aug-11					25-Aug-11					25-Aug-11					8-Nov-11					8-Nov-11					8-Nov-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichlorophenol, 2,4,5-	mg/kg																														
Trichlorophenol, 2,4,6-	mg/kg																														
Volatile Organics																															
Acetone	mg/kg																														
Benzene	mg/kg																														
Bromodichloromethane	mg/kg																														
Bromoform	mg/kg																														
Bromomethane	mg/kg																														
Butanone, 2-	mg/kg																														
Carbon disulfide	mg/kg																														
Carbon tetrachloride	mg/kg																														
Chlorobenzene	mg/kg																														
Chloroethane	mg/kg																														
Chloroform	mg/kg																														
Chloromethane	mg/kg																														
Cyclohexane	mg/kg																														
Dibromo-3-chloropropane, 1,2-	mg/kg																														
Dibromochloromethane	mg/kg																														
Dibromoethane, 1,2-	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorodifluoromethane	mg/kg																														
Dichloroethane, 1,1-	mg/kg																														
Dichloroethane, 1,2-	mg/kg																														
Dichloroethene, 1,1-	mg/kg																														
Dichloroethene, cis-1,2-	mg/kg																														
Dichloroethene, trans-1,2-	mg/kg																														
Dichloropropane, 1,2-	mg/kg																														
Dichloropropene, cis-1,3-	mg/kg																														
Dichloropropene, trans-1,3-	mg/kg																														
Ethylbenzene	mg/kg																														
Hexanone, 2-	mg/kg																														
Isopropylbenzene	mg/kg																														
METHYL ACETATE	mg/kg																														
Methyl Tertiary Butyl Ether	mg/kg																														
Methyl-2-pentanone, 4-	mg/kg																														
Methylcyclohexane	mg/kg																														
Methylene chloride	mg/kg																														
Styrene	mg/kg																														
Tetrachloroethane, 1,1,2,2-	mg/kg																														
Tetrachloroethene	mg/kg																														
Toluene	mg/kg																														
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichloroethane, 1,1,1-	mg/kg																														
Trichloroethane, 1,1,2-	mg/kg																														
Trichloroethene	mg/kg																														
Trichlorofluoromethane	mg/kg																														
Trichlorotrifluoroethane	mg/kg																														
Vinyl chloride	mg/kg																														
Xylenes, total	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS17					FSB-SS18					FSB-SS19					FSB-SS20					FSB-SS21					FSB-SS22				
SAMPLE NO		FSB0073					FSB0074					FSB0075					FSB0076					FSB0077					FSB0078				
SAMPLE DATE		8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																																
Amino-2,6-dinitrotoluene, 4-	mg/kg																															
Amino-4,6-dinitrotoluene, 2-	mg/kg																															
Dinitrobenzene, 1,3-	mg/kg																															
Dinitrotoluene, 2,4-	mg/kg																															
Dinitrotoluene, 2,6-	mg/kg																															
HMX	mg/kg																															
Nitrobenzene	mg/kg																															
Nitrotoluene, 2-	mg/kg																															
Nitrotoluene, 3-	mg/kg																															
Nitrotoluene, 4-	mg/kg																															
RDX	mg/kg																															
Tetryl	mg/kg																															
Trinitrobenzene, 1,3,5-	mg/kg																															
Trinitrotoluene, 2,4,6-	mg/kg																															
General Chemistry																																
pH	pH_units																															
% Solids	Percent																					79.2	0				81.3	0			
pH	pH_units	87.9	0				86.4	0				87.1	0				83.9	0													
Total organic carbon																																
Metals																																
Aluminum	mg/kg																															
Antimony	mg/kg																															
Arsenic	mg/kg																															
Barium	mg/kg																															
Beryllium	mg/kg																															
Cadmium	mg/kg																															
Calcium	mg/kg																															
Chromium	mg/kg																															
Cobalt	mg/kg																															
Copper	mg/kg																															
Iron	mg/kg																															
Lead	mg/kg																															
Magnesium	mg/kg																															
Manganese	mg/kg																															
Mercury	mg/kg																															
Nickel	mg/kg																															
Potassium	mg/kg																															
Selenium	mg/kg																															
Silver	mg/kg																															
Sodium	mg/kg																															
Thallium	mg/kg																															
Vanadium	mg/kg																															
Zinc	mg/kg																															
Pesticides/PCBs																																
Aroclor 1016	mg/kg	0.019	0.019	0.0076	U	U	1.9	1.9	0.77	U	U	0.019	0.019	0.0076	U	U	0.98	0.98	0.39	U	U	0.021	0.021	0.0084	U	U	0.02	0.02	0.0081	U	U
Aroclor 1221	mg/kg	0.019	0.019	0.0094	U	U	1.9	1.9	0.96	U	U	0.019	0.019	0.0095	U	U	0.98	0.98	0.49	U	U	0.021	0.021	0.01	U	U	0.02	0.02	0.01	U	U
Aroclor 1232	mg/kg	0.019	0.019	0.0094	U	U	1.9	1.9	0.96	U	U	0.019	0.019	0.0095	U	U	0.98	0.98	0.49	U	U	0.021	0.021	0.01	U	U	0.02	0.02	0.01	U	U
Aroclor 1242	mg/kg	0.019	0.019	0.0076	U	U	1.9	1.9	0.77	U	U	0.019	0.019	0.0076	U	U	0.98	0.98	0.39	U	U	0.021	0.021	0.0084	U	U	0.02	0.02	0.0081	U	U
Aroclor 1248	mg/kg	0.019	0.019	0.0076	U	U	1.9	1.9	0.77	U	U	0.019	0.019	0.0076	U	U	0.98	0.98	0.39	U	U	0.021	0.021	0.0084	U	U	0.02	0.02	0.0081	U	U
Aroclor 1254	mg/kg	0.019	0.019	0.0076	U	U	1.89	1.9	0.77	J	J	0.0318	0.019	0.0076	J	J	3.94	0.98	0.39	J	J	0.021	0.021	0.0084	U	U	0.0568	0.02	0.0081	J	J
Aroclor 1260	mg/kg	0.0227	0.019	0.0076	J	J	3.71	1.9	0.77	J	J	0.069	0.019	0.0076	J	J	3.88	0.98	0.39	J	J	0.0137	0.021	0.0084	J	J	0.108	0.02	0.0081	J	J
Aroclor 1268	mg/kg	0.0821	0.019	0.0076	J	J	16.5	1.9	0.77	J	J	0.0408	0.019	0.0076	J	J	0.98	0.98	0.39	U	U	0.021	0.021	0.0084	U	U	0.02	0.02	0.0081	U	U
Semivolatile Organics																																
3-Methylphenol and 4-Methylphenol	mg/kg																															
Acenaphthene	mg/kg																															
Acenaphthylene	mg/kg																															
Acetophenone	mg/kg																															
Anthracene	mg/kg																															
Atrazine	mg/kg																															
Benzaldehyde	mg/kg																															

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS17					FSB-SS18					FSB-SS19					FSB-SS20					FSB-SS21					FSB-SS22				
SAMPLE NO		FSB0073					FSB0074					FSB0075					FSB0076					FSB0077					FSB0078				
SAMPLE DATE		8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	Units	Result	RL	MDL	LQ	VQ	Result	RL	MDL	LQ	VQ	Result	RL	MDL	LQ	VQ	Result	RL	MDL	LQ	VQ	Result	RL	MDL	LQ	VQ	Result	RL	MDL	LQ	VQ
Benzo(a)anthracene	mg/kg																														
Benzo(a)pyrene	mg/kg																														
Benzo(b)fluoranthene	mg/kg																														
Benzo(ghi)perylene	mg/kg																														
Benzo(k)fluoranthene	mg/kg																														
Benzoic acid	mg/kg																														
Benzyl alcohol	mg/kg																														
Bibenzene	mg/kg																														
Bis(2-chloroethoxy)methane	mg/kg																														
Bis(2-chloroethyl)ether	mg/kg																														
Bis(2-chloroisopropyl)ether	mg/kg																														
Bis(2-ethylhexyl)phthalate	mg/kg																														
Bromophenyl phenyl ether, 4-	mg/kg																														
Butyl benzyl phthalate	mg/kg																														
Caprolactam	mg/kg																														
Carbazole	mg/kg																														
Chloro-3-methylphenol, 4-	mg/kg																														
Chloroaniline, 4-	mg/kg																														
Chloronaphthalene, 2-	mg/kg																														
Chlorophenol, 2-	mg/kg																														
Chlorophenyl phenyl ether, 4-	mg/kg																														
Chrysene	mg/kg																														
Dibenz(a,h)anthracene	mg/kg																														
Dibenzofuran	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorobenzidine, 3,3'-	mg/kg																														
Dichlorophenol, 2,4-	mg/kg																														
Diethyl phthalate	mg/kg																														
Dimethyl phthalate	mg/kg																														
Dimethylphenol, 2,4-	mg/kg																														
Di-n-butyl phthalate	mg/kg																														
Dinitro-2-methylphenol, 4,6-	mg/kg																														
Dinitrophenol, 2,4-	mg/kg																														
Dinitrotoluene, 2,4-	mg/kg																														
Dinitrotoluene, 2,6-	mg/kg																														
Di-n-octyl phthalate	mg/kg																														
Fluoranthene	mg/kg																														
Fluorene	mg/kg																														
Hexachlorobenzene	mg/kg																														
Hexachlorobutadiene	mg/kg																														
Hexachlorocyclopentadiene	mg/kg																														
Hexachloroethane	mg/kg																														
Indeno(1,2,3-cd)pyrene	mg/kg																														
Isophorone	mg/kg																														
Methylnaphthalene, 2-	mg/kg																														
Methylphenol, 2-	mg/kg																														
Naphthalene	mg/kg																														
Nitroaniline, 2-	mg/kg																														
Nitroaniline, 3-	mg/kg																														
Nitroaniline, 4-	mg/kg																														
Nitrobenzene	mg/kg																														
Nitrophenol, 2-	mg/kg																														
Nitrophenol, 4-	mg/kg																														
n-Nitroso-di-n-propylamine	mg/kg																														
n-Nitrosodiphenylamine	mg/kg																														
Pentachlorophenol	mg/kg																														
Phenanthrene	mg/kg																														
Phenol	mg/kg																														
Pyrene	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS17					FSB-SS18					FSB-SS19					FSB-SS20					FSB-SS21					FSB-SS22				
SAMPLE NO		FSB0073					FSB0074					FSB0075					FSB0076					FSB0077					FSB0078				
SAMPLE DATE		8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11					8-Nov-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichlorophenol, 2,4,5-	mg/kg																														
Trichlorophenol, 2,4,6-	mg/kg																														
Volatile Organics																															
Acetone	mg/kg																														
Benzene	mg/kg																														
Bromodichloromethane	mg/kg																														
Bromoform	mg/kg																														
Bromomethane	mg/kg																														
Butanone, 2-	mg/kg																														
Carbon disulfide	mg/kg																														
Carbon tetrachloride	mg/kg																														
Chlorobenzene	mg/kg																														
Chloroethane	mg/kg																														
Chloroform	mg/kg																														
Chloromethane	mg/kg																														
Cyclohexane	mg/kg																														
Dibromo-3-chloropropane, 1,2-	mg/kg																														
Dibromochloromethane	mg/kg																														
Dibromoethane, 1,2-	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorodifluoromethane	mg/kg																														
Dichloroethane, 1,1-	mg/kg																														
Dichloroethane, 1,2-	mg/kg																														
Dichloroethene, 1,1-	mg/kg																														
Dichloroethene, cis-1,2-	mg/kg																														
Dichloroethene, trans-1,2-	mg/kg																														
Dichloropropane, 1,2-	mg/kg																														
Dichloropropene, cis-1,3-	mg/kg																														
Dichloropropene, trans-1,3-	mg/kg																														
Ethylbenzene	mg/kg																														
Hexanone, 2-	mg/kg																														
Isopropylbenzene	mg/kg																														
METHYL ACETATE	mg/kg																														
Methyl Tertiary Butyl Ether	mg/kg																														
Methyl-2-pentanone, 4-	mg/kg																														
Methylcyclohexane	mg/kg																														
Methylene chloride	mg/kg																														
Styrene	mg/kg																														
Tetrachloroethane, 1,1,2,2-	mg/kg																														
Tetrachloroethene	mg/kg																														
Toluene	mg/kg																														
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichloroethane, 1,1,1-	mg/kg																														
Trichloroethane, 1,1,2-	mg/kg																														
Trichloroethene	mg/kg																														
Trichlorofluoromethane	mg/kg																														
Trichlorotrifluoroethane	mg/kg																														
Vinyl chloride	mg/kg																														
Xylenes, total	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS23					FSB-SS23					FSB-SS24					FSB-SS25					FSB-SS26					FSB-SS27				
SAMPLE NO		FSB0079					FSB0080					FSB0082					FSB0083					FSB0084					FSB0085				
SAMPLE DATE		8-Nov-11					8-Nov-11					8-Nov-11					20-Dec-11					20-Dec-11					20-Dec-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																															
Amino-2,6-dinitrotoluene, 4-	mg/kg																														
Amino-4,6-dinitrotoluene, 2-	mg/kg																														
Dinitrobenzene, 1,3-	mg/kg																														
Dinitrotoluene, 2,4-	mg/kg																														
Dinitrotoluene, 2,6-	mg/kg																														
HMX	mg/kg																														
Nitrobenzene	mg/kg																														
Nitrotoluene, 2-	mg/kg																														
Nitrotoluene, 3-	mg/kg																														
Nitrotoluene, 4-	mg/kg																														
RDX	mg/kg																														
Tetryl	mg/kg																														
Trinitrobenzene, 1,3,5-	mg/kg																														
Trinitrotoluene, 2,4,6-	mg/kg																														
General Chemistry																															
pH	pH_units																														
% Solids	Percent	87.8	0				84.7	0				88	0				80.2	0				78.4	0				78.1	0			
pH	pH_units																														
Total organic carbon																															
Metals																															
Aluminum	mg/kg																														
Antimony	mg/kg																														
Arsenic	mg/kg																														
Barium	mg/kg																														
Beryllium	mg/kg																														
Cadmium	mg/kg																														
Calcium	mg/kg																														
Chromium	mg/kg																														
Cobalt	mg/kg																														
Copper	mg/kg																														
Iron	mg/kg																														
Lead	mg/kg																														
Magnesium	mg/kg																														
Manganese	mg/kg																														
Mercury	mg/kg																														
Nickel	mg/kg																														
Potassium	mg/kg																														
Selenium	mg/kg																														
Silver	mg/kg																														
Sodium	mg/kg																														
Thallium	mg/kg																														
Vanadium	mg/kg																														
Zinc	mg/kg																														
Pesticides/PCBs																															
Aroclor 1016	mg/kg	9.4	9.4	3.8	U	U	19	19	7.8	U	U	0.37	0.37	0.15	U	U	0.21	0.21	0.083	U	U	0.042	0.042	0.017	U	U	0.21	0.21	0.085	U	U
Aroclor 1221	mg/kg	9.4	9.4	4.7	U	U	19	19	9.7	U	U	0.37	0.37	0.19	U	U	0.21	0.21	0.1	U	U	0.042	0.042	0.021	U	U	0.21	0.21	0.11	U	U
Aroclor 1232	mg/kg	9.4	9.4	4.7	U	U	19	19	9.7	U	U	0.37	0.37	0.19	U	U	0.21	0.21	0.1	U	U	0.042	0.042	0.021	U	U	0.21	0.21	0.11	U	U
Aroclor 1242	mg/kg	9.4	9.4	3.8	U	U	19	19	7.8	U	U	0.37	0.37	0.15	U	U	0.21	0.21	0.083	U	U	0.042	0.042	0.017	U	U	0.21	0.21	0.085	U	U
Aroclor 1248	mg/kg	9.4	9.4	3.8	U	U	19	19	7.8	U	U	0.37	0.37	0.15	U	U	0.21	0.21	0.083	U	U	0.042	0.042	0.017	U	U	0.21	0.21	0.085	U	U
Aroclor 1254	mg/kg	9.4	9.4	3.8	U	U	19	19	7.8	U	U	0.664	0.37	0.15	J	J	1.33	0.21	0.083	J	J	0.222	0.042	0.017	J	J	0.379	0.21	0.085	J	J
Aroclor 1260	mg/kg	19	9.4	3.8	J	J	19	19	7.8	U	U	0.986	0.37	0.15	J	J	2.2	0.21	0.083	J	J	0.291	0.042	0.017	J	J	0.772	0.21	0.085	J	J
Aroclor 1268	mg/kg	120	9.4	3.8	J	J	71.7	19	7.8		J	1.07	0.37	0.15	J	J						0.0661	0.042	0.017	J	J					
Semivolatile Organics																															
3-Methylphenol and 4-Methylphenol	mg/kg																														
Acenaphthene	mg/kg																														
Acenaphthylene	mg/kg																														
Acetophenone	mg/kg																														
Anthracene	mg/kg																														
Atrazine	mg/kg																														
Benzaldehyde	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS23					FSB-SS23					FSB-SS24					FSB-SS25					FSB-SS26					FSB-SS27				
SAMPLE NO		FSB0079					FSB0080					FSB0082					FSB0083					FSB0084					FSB0085				
SAMPLE DATE		8-Nov-11					8-Nov-11					8-Nov-11					20-Dec-11					20-Dec-11					20-Dec-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Benzo(a)anthracene	mg/kg																														
Benzo(a)pyrene	mg/kg																														
Benzo(b)fluoranthene	mg/kg																														
Benzo(ghi)perylene	mg/kg																														
Benzo(k)fluoranthene	mg/kg																														
Benzoic acid	mg/kg																														
Benzyl alcohol	mg/kg																														
Bibenzene	mg/kg																														
Bis(2-chloroethoxy)methane	mg/kg																														
Bis(2-chloroethyl)ether	mg/kg																														
Bis(2-chloroisopropyl)ether	mg/kg																														
Bis(2-ethylhexyl)phthalate	mg/kg																														
Bromophenyl phenyl ether, 4-	mg/kg																														
Butyl benzyl phthalate	mg/kg																														
Caprolactam	mg/kg																														
Carbazole	mg/kg																														
Chloro-3-methylphenol, 4-	mg/kg																														
Chloroaniline, 4-	mg/kg																														
Chloronaphthalene, 2-	mg/kg																														
Chlorophenol, 2-	mg/kg																														
Chlorophenyl phenyl ether, 4-	mg/kg																														
Chrysene	mg/kg																														
Dibenz(a,h)anthracene	mg/kg																														
Dibenzofuran	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorobenzidine, 3,3'-	mg/kg																														
Dichlorophenol, 2,4-	mg/kg																														
Diethyl phthalate	mg/kg																														
Dimethyl phthalate	mg/kg																														
Dimethylphenol, 2,4-	mg/kg																														
Di-n-butyl phthalate	mg/kg																														
Dinitro-2-methylphenol, 4,6-	mg/kg																														
Dinitrophenol, 2,4-	mg/kg																														
Dinitrotoluene, 2,4-	mg/kg																														
Dinitrotoluene, 2,6-	mg/kg																														
Di-n-octyl phthalate	mg/kg																														
Fluoranthene	mg/kg																														
Fluorene	mg/kg																														
Hexachlorobenzene	mg/kg																														
Hexachlorobutadiene	mg/kg																														
Hexachlorocyclopentadiene	mg/kg																														
Hexachloroethane	mg/kg																														
Indeno(1,2,3-cd)pyrene	mg/kg																														
Isophorone	mg/kg																														
Methylnaphthalene, 2-	mg/kg																														
Methylphenol, 2-	mg/kg																														
Naphthalene	mg/kg																														
Nitroaniline, 2-	mg/kg																														
Nitroaniline, 3-	mg/kg																														
Nitroaniline, 4-	mg/kg																														
Nitrobenzene	mg/kg																														
Nitrophenol, 2-	mg/kg																														
Nitrophenol, 4-	mg/kg																														
n-Nitroso-di-n-propylamine	mg/kg																														
n-Nitrosodiphenylamine	mg/kg																														
Pentachlorophenol	mg/kg																														
Phenanthrene	mg/kg																														
Phenol	mg/kg																														
Pyrene	mg/kg																														

Table F-1

Surface Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SS23					FSB-SS23					FSB-SS24					FSB-SS25					FSB-SS26					FSB-SS27				
SAMPLE NO		FSB0079					FSB0080					FSB0082					FSB0083					FSB0084					FSB0085				
SAMPLE DATE		8-Nov-11					8-Nov-11					8-Nov-11					20-Dec-11					20-Dec-11					20-Dec-11				
DEPTH		0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft					0 - 1 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichlorophenol, 2,4,5-	mg/kg																														
Trichlorophenol, 2,4,6-	mg/kg																														
Volatile Organics																															
Acetone	mg/kg																														
Benzene	mg/kg																														
Bromodichloromethane	mg/kg																														
Bromoform	mg/kg																														
Bromomethane	mg/kg																														
Butanone, 2-	mg/kg																														
Carbon disulfide	mg/kg																														
Carbon tetrachloride	mg/kg																														
Chlorobenzene	mg/kg																														
Chloroethane	mg/kg																														
Chloroform	mg/kg																														
Chloromethane	mg/kg																														
Cyclohexane	mg/kg																														
Dibromo-3-chloropropane, 1,2-	mg/kg																														
Dibromochloromethane	mg/kg																														
Dibromoethane, 1,2-	mg/kg																														
Dichlorobenzene, 1,2-	mg/kg																														
Dichlorobenzene, 1,3-	mg/kg																														
Dichlorobenzene, 1,4-	mg/kg																														
Dichlorodifluoromethane	mg/kg																														
Dichloroethane, 1,1-	mg/kg																														
Dichloroethane, 1,2-	mg/kg																														
Dichloroethene, 1,1-	mg/kg																														
Dichloroethene, cis-1,2-	mg/kg																														
Dichloroethene, trans-1,2-	mg/kg																														
Dichloropropane, 1,2-	mg/kg																														
Dichloropropene, cis-1,3-	mg/kg																														
Dichloropropene, trans-1,3-	mg/kg																														
Ethylbenzene	mg/kg																														
Hexanone, 2-	mg/kg																														
Isopropylbenzene	mg/kg																														
METHYL ACETATE	mg/kg																														
Methyl Tertiary Butyl Ether	mg/kg																														
Methyl-2-pentanone, 4-	mg/kg																														
Methylcyclohexane	mg/kg																														
Methylene chloride	mg/kg																														
Styrene	mg/kg																														
Tetrachloroethane, 1,1,2,2-	mg/kg																														
Tetrachloroethene	mg/kg																														
Toluene	mg/kg																														
Trichlorobenzene, 1,2,4-	mg/kg																														
Trichloroethane, 1,1,1-	mg/kg																														
Trichloroethane, 1,1,2-	mg/kg																														
Trichloroethene	mg/kg																														
Trichlorofluoromethane	mg/kg																														
Trichlorotrifluoroethane	mg/kg																														
Vinyl chloride	mg/kg																														
Xylenes, total	mg/kg																														

FD - Field duplicate.
LQ - Laboratory qualifier.
MDL - Method detection limit.
mg/kg - Milligrams per kilogram.
REG - Regular Sample.
RL - Reporting limit.
VQ - Validation qualifier.

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB01					FSB-SB01					FSB-SB02					FSB-SB03					FSB-SB04				
SAMPLE NO		FSB0017					FSB0018					FSB0020					FSB0021					FSB0022				
SAMPLE DATE		19-May-11					19-May-11					17-May-11					20-May-11					16-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																										
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Dinitrobenzene, 1,3-	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Dinitrotoluene, 2,4-	mg/kg	0.15	0.15	0.074	U	U	0.17	0.17	0.083	U	U	0.19	0.19	0.092	U	U	0.17	0.17	0.081	U	U	0.16	0.16	0.076	U	U
Dinitrotoluene, 2,6-	mg/kg	0.15	0.15	0.066	U	U	0.17	0.17	0.074	U	U	0.19	0.19	0.082	U	U	0.17	0.17	0.072	U	U	0.16	0.16	0.068	U	U
HMX	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Nitrobenzene	mg/kg	0.15	0.15	0.071	U	U	0.17	0.17	0.079	U	U	0.19	0.19	0.088	U	U	0.17	0.17	0.077	U	U	0.16	0.16	0.073	U	U
Nitrotoluene, 2-	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Nitrotoluene, 3-	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Nitrotoluene, 4-	mg/kg	0.15	0.15	0.077	U	U	0.17	0.17	0.086	U	U	0.19	0.19	0.095	U	U	0.17	0.17	0.084	U	U	0.16	0.16	0.079	U	U
RDX	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Tetryl	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.15	0.15	0.061	U	U	0.17	0.17	0.068	U	U	0.19	0.19	0.075	U	U	0.17	0.17	0.067	U	U	0.16	0.16	0.063	U	U
General Chemistry																										
% Solids	Percent	83.9	0				87.1	0				81.6	0				83.1	0				79.6	0			
Metals																										
Aluminum	mg/kg	2390	9.4	1.1		J	4710	11	1.3		J	7080	42	5			10600	58	6.9			12000	46	5.5		
Antimony	mg/kg	3.8	3.8	0.19	U	U	2.2	2.2	0.11	U	U	4.2	4.2	0.21	U	U	5.8	5.8	0.29	U	U	4.6	4.6	0.23	U	U
Arsenic	mg/kg	5.5	0.47	0.047			3.6	1.1	0.11			13.9	2.1	0.21			11.5	2.9	0.29			9.3	2.3	0.23		
Barium	mg/kg	18	9.4	0.19			24.6	11	0.22			65.2	42	0.83			71.9	58	1.2			69.7	46	0.92		
Beryllium	mg/kg	0.16	0.23	0.0047	B	J	0.24	0.27	0.0054	B	J	0.42	1	0.021	B	J	0.56	1.4	0.029	B	J	0.62	1.1	0.023	B	J
Cadmium	mg/kg	0.14	0.19	0.0047	B	J	0.43	0.43	0.011	U	U	0.34	0.83	0.021	B	J	1.2	1.2	0.029	U	U	0.28	0.92	0.023	B	J
Calcium	mg/kg	44800	940	9.4		J	11600	270	2.7		J	47400	1000	10			3030	1400	14			10100	1100	11		
Chromium	mg/kg	6.2	1.9	0.19			8.8	1.1	0.11			12.1	2.1	0.21			16.9	2.9	0.29			17.8	2.3	0.23		
Cobalt	mg/kg	3.1	2.3	0.047			3.6	5.4	0.11	B	J	12.8	10	0.21			7.7	14	0.29	B	J	10.5	11	0.23	B	J
Copper	mg/kg	8.7	4.7	0.19			6.2	2.7	0.11			20.2	5.2	0.21			19.1	7.2	0.29			20.5	5.7	0.23		
Iron	mg/kg	7350	14	1.1			8180	16	1.2			22200	63	4.8			22400	87	6.7			24600	69	5.3		
Lead	mg/kg	5	3.8	0.19			5.5	1.1	0.054			11.9	4.2	0.21			12.4	1.2	0.058			11	0.92	0.046		
Magnesium	mg/kg	10000	230	2.3		J	3690	270	2.7		J	17500	1000	10			3110	1400	14			4430	1100	11		
Manganese	mg/kg	449	2.8	0.19			332	1.6	0.11			702	3.1	0.21			304	4.3	0.29			434	3.4	0.23		
Mercury	mg/kg	0.015	0.096	0.0068	B	J	0.015	0.096	0.0068	B	J	0.027	0.099	0.007	B	J	0.029	0.099	0.007	B	J	0.03	0.098	0.007	B	J
Nickel	mg/kg	7.8	1.9	0.047			9.4	4.3	0.11			28.6	8.3	0.21			22.7	12	0.29			25.7	9.2	0.23		
Potassium	mg/kg	350	470	2.3	B	J	381	540	2.7	B	J	862	2100	10	B	J	853	2900	14	B	J	619	2300	11	B	J
Selenium	mg/kg	3.8	3.8	0.38	U	U	2.2	2.2	0.22	U	U	4.2	4.2	0.42	U	U	5.8	5.8	0.58	U	U	4.6	4.6	0.46	U	U
Silver	mg/kg	0.47	0.47	0.047	U	U	1.1	1.1	0.11	U	U	2.1	2.1	0.21	U	U	2.9	2.9	0.29	U	U	2.3	2.3	0.23	U	U
Sodium	mg/kg	140	470	40	B	J	174	540	46	B	J	2100	2100	180	U	U	381	2900	250	B	J	2300	2300	190	U	U
Thallium	mg/kg	1.9	1.9	0.28	U	U	0.54	0.54	0.081	U	U	2.1	2.1	0.31	U	U	0.58	0.58	0.087	U	U	0.46	0.46	0.069	U	U
Vanadium	mg/kg	7.8	2.3	0.047		J	16.2	5.4	0.11		J	19.8	10	0.21			26.5	14	0.29			26.9	11	0.23		
Zinc	mg/kg	22.4	3.8	0.19			19.9	2.2	0.11			49	4.2	0.21			50.1	5.8	0.29			47.1	4.6	0.23		
Pesticides/PCBs																										
Aroclor 1016	mg/kg	0.02	0.02	0.0078	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0081	U	U	0.02	0.02	0.008	U	U	0.021	0.021	0.0084	U	U
Aroclor 1221	mg/kg	0.02	0.02	0.0098	U	U	0.019	0.019	0.0095	U	U	0.02	0.02	0.01	U	U	0.02	0.02	0.01	U	U	0.021	0.021	0.011	U	U
Aroclor 1232	mg/kg	0.02	0.02	0.0098	U	U	0.019	0.019	0.0095	U	U	0.02	0.02	0.01	U	U	0.02	0.02	0.01	U	U	0.021	0.021	0.011	U	U
Aroclor 1242	mg/kg	0.02	0.02	0.0078	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0081	U	U	0.02	0.02	0.008	U	U	0.021	0.021	0.0084	U	U
Aroclor 1248	mg/kg	0.02	0.02	0.0078	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0081	U	U	0.02	0.02	0.008	U	U	0.021	0.021	0.0084	U	U
Aroclor 1254	mg/kg	0.02	0.02	0.0078	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0081	U	U	0.02	0.02	0.008	U	U	0.0116	0.021	0.0084	J	J
Aroclor 1260	mg/kg	0.02	0.02	0.0078	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0081	U	U	0.02	0.02	0.008	U	U	0.021	0.021	0.0084	U	U
Aroclor 1268	mg/kg	0.02	0.02	0.0078	U	U	0.019	0.019	0.0076	U	U						0.02	0.02	0.008	U	U					
Semivolatile Organics																										
3-Methylphenol and 4-Methylphenol	mg/kg	0.2	0.2	0.028	U	U	0.19	0.19	0.027	U	U	0.2	0.2	0.029	U	U	0.2	0.2	0.029	U	U	0.21	0.21	0.03	U	U
Acenaphthene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB01					FSB-SB01					FSB-SB02					FSB-SB03					FSB-SB04				
SAMPLE NO		FSB0017					FSB0018					FSB0020					FSB0021					FSB0022				
SAMPLE DATE		19-May-11					19-May-11					17-May-11					20-May-11					16-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Acenaphthylene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Acetophenone	mg/kg																									
Anthracene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Atrazine	mg/kg																									
Benzaldehyde	mg/kg																									
Benzo(a)anthracene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Benzo(a)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Benzo(b)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Benzo(ghi)perylene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Benzo(k)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Benzoic acid	mg/kg	0.98	0.98	0.35	U	U	0.95	0.95	0.33	U	U	1	1	0.35	U	U	1	1	0.35	U	U	1.1	1.1	0.37	U	U
Benzyl alcohol	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Bibenzene	mg/kg																									
Bis(2-chloroethoxy)methane	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Bis(2-chloroethyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.39	0.39	0.079	U	U	0.38	0.38	0.076	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U	0.42	0.42	0.084	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Butyl benzyl phthalate	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Caprolactam	mg/kg																									
Carbazole	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Chloroaniline, 4-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Chloronaphthalene, 2-	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Chlorophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Chrysene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Dibenz(a,h)anthracene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Dibenzofuran	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Dichlorobenzene, 1,2-	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Dichlorobenzene, 1,3-	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Dichlorobenzene, 1,4-	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.39	0.39	0.039	U	U	0.38	0.38	0.038	U	U	0.4	0.4	0.04	U	U	0.4	0.4	0.04	U	U	0.42	0.42	0.042	U	U
Dichlorophenol, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Diethyl phthalate	mg/kg	0.39	0.39	0.079	U	U	0.38	0.38	0.076	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U	0.42	0.42	0.084	U	U
Dimethyl phthalate	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Dimethylphenol, 2,4-	mg/kg	0.2	0.2	0.025	U	U	0.19	0.19	0.024	U	U	0.2	0.2	0.025	U	U	0.2	0.2	0.025	U	U	0.21	0.21	0.027	U	U
Di-n-butyl phthalate	mg/kg	0.39	0.39	0.079	U	U	0.38	0.38	0.076	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U	0.42	0.42	0.084	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.39	0.39	0.079	U	U	0.38	0.38	0.076	U	U	0.4	0.4	0.08	U	U	0.4	0.4	0.08	U	U	0.42	0.42	0.084	U	U
Dinitrophenol, 2,4-	mg/kg	0.98	0.98	0.39	U	U	0.95	0.95	0.38	U	U	1	1	0.4	U	U	1	1	0.4	U	U	1.1	1.1	0.42	U	U
Dinitrotoluene, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Dinitrotoluene, 2,6-	mg/kg	0.2	0.2	0.023	U	U	0.19	0.19	0.022	U	U	0.2	0.2	0.024	U	U	0.2	0.2	0.024	U	U	0.21	0.21	0.025	U	U
Di-n-octyl phthalate	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Fluorene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Hexachlorobenzene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Hexachlorobutadiene	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Hexachlorocyclopentadiene	mg/kg	0.2	0.2	0.087	U	U	0.19	0.19	0.084	U	U	0.2	0.2	0.088	U	U	0.2	0.2	0.088	U	U	0.21	0.21	0.093	U	U
Hexachloroethane	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Isophorone	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Methylnaphthalene, 2-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Methylphenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB01					FSB-SB01					FSB-SB02					FSB-SB03					FSB-SB04				
SAMPLE NO		FSB0017					FSB0018					FSB0020					FSB0021					FSB0022				
SAMPLE DATE		19-May-11					19-May-11					17-May-11					20-May-11					16-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Naphthalene	mg/kg	0.2	0.2	0.031	U	U	0.19	0.19	0.03	U	U	0.2	0.2	0.032	U	U	0.2	0.2	0.032	U	U	0.21	0.21	0.034	U	U
Nitroaniline, 2-	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Nitroaniline, 3-	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Nitroaniline, 4-	mg/kg	0.2	0.2	0.039	U	U	0.19	0.19	0.038	U	U	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U
Nitrobenzene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Nitrophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Nitrophenol, 4-	mg/kg	0.98	0.98	0.16	U	U	0.95	0.95	0.15	U	U	1	1	0.16	U	U	1	1	0.16	U	U	1.1	1.1	0.17	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
n-Nitrosodiphenylamine	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Pentachlorophenol	mg/kg	0.98	0.98	0.24	U	U	0.95	0.95	0.23	U	U	1	1	0.24	U	U	1	1	0.24	U	U	1.1	1.1	0.25	U	U
Phenanthrene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Phenol	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Pyrene	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Trichlorobenzene, 1,2,4-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.2	0.2	0.02	U	U	0.19	0.19	0.019	U	U	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U
Volatile Organics																										
Acetone	mg/kg	0.0729	0.035	0.014		J	0.0281	0.035	0.014	J	J	0.039	0.039	0.016	U	U	0.0183	0.037	0.015	J	J	0.0201	0.045	0.018	J	J
Benzene	mg/kg	0.0035	0.0035	0.0011	U	UJ	0.0035	0.0035	0.0011	U	U	0.0014	0.0039	0.0012	J	J	0.0037	0.0037	0.0011	U	U	0.0015	0.0045	0.0014	J	J
Bromodichloromethane	mg/kg	0.0035	0.0035	0.00077	U	UJ	0.0035	0.0035	0.00077	U	U	0.0039	0.0039	0.00086	U	U	0.0037	0.0037	0.00081	U	U	0.0045	0.0045	0.001	U	U
Bromoform	mg/kg	0.0035	0.0035	0.0011	U	UJ	0.0035	0.0035	0.0011	U	U	0.0039	0.0039	0.0012	U	U	0.0037	0.0037	0.0011	U	U	0.0045	0.0045	0.0014	U	U
Bromomethane	mg/kg	0.0035	0.0035	0.0014	U	UJ	0.0035	0.0035	0.0014	U	U	0.0039	0.0039	0.0016	U	U	0.0037	0.0037	0.0015	U	U	0.0045	0.0045	0.0018	U	U
Butanone, 2-	mg/kg	0.018	0.018	0.0043	U	UJ	0.018	0.018	0.0043	U	U	0.019	0.019	0.0047	U	U	0.018	0.018	0.0045	U	U	0.023	0.023	0.0055	U	U
Carbon disulfide	mg/kg	0.0035	0.0035	0.0014	U	UJ	0.0035	0.0035	0.0014	U	U	0.0039	0.0039	0.0016	U	UJ	0.0037	0.0037	0.0015	U	U	0.0045	0.0045	0.0018	U	UJ
Carbon tetrachloride	mg/kg	0.0035	0.0035	0.0013	U	UJ	0.0035	0.0035	0.0013	U	U	0.0039	0.0039	0.0014	U	UJ	0.0037	0.0037	0.0013	U	U	0.0045	0.0045	0.0016	U	U
Chlorobenzene	mg/kg	0.0035	0.0035	0.0007	U	UJ	0.0035	0.0035	0.0007	U	U	0.0039	0.0039	0.00078	U	U	0.0037	0.0037	0.00074	U	U	0.0045	0.0045	0.00091	U	U
Chloroethane	mg/kg	0.0035	0.0035	0.0014	U	R	0.0035	0.0035	0.0014	U	R	0.0039	0.0039	0.0016	U	UJ	0.0037	0.0037	0.0015	U	U	0.0045	0.0045	0.0018	U	UJ
Chloroform	mg/kg	0.0035	0.0035	0.00084	U	UJ	0.0035	0.0035	0.00085	U	U	0.0039	0.0039	0.00093	U	U	0.0037	0.0037	0.00088	U	U	0.0045	0.0045	0.0011	U	U
Chloromethane	mg/kg	0.0035	0.0035	0.0014	U	UJ	0.0035	0.0035	0.0014	U	U	0.0039	0.0039	0.0016	U	U	0.0037	0.0037	0.0015	U	U	0.0045	0.0045	0.0018	U	U
Cyclohexane	mg/kg																									
Dibromo-3-chloropropane, 1,2-	mg/kg																									
Dibromochloromethane	mg/kg	0.0035	0.0035	0.0007	U	UJ	0.0035	0.0035	0.0007	U	U	0.0039	0.0039	0.00078	U	U	0.0037	0.0037	0.00074	U	U	0.0045	0.0045	0.00091	U	U
Dibromoethane, 1,2-	mg/kg																									
Dichlorobenzene, 1,2-	mg/kg																									
Dichlorobenzene, 1,3-	mg/kg																									
Dichlorobenzene, 1,4-	mg/kg																									
Dichlorodifluoromethane	mg/kg																									
Dichloroethane, 1,1-	mg/kg	0.0035	0.0035	0.00077	U	UJ	0.0035	0.0035	0.00077	U	U	0.0039	0.0039	0.00086	U	U	0.0037	0.0037	0.00081	U	U	0.0045	0.0045	0.001	U	U
Dichloroethane, 1,2-	mg/kg	0.0035	0.0035	0.0007	U	UJ	0.0035	0.0035	0.0007	U	U	0.0039	0.0039	0.00078	U	U	0.0037	0.0037	0.00074	U	U	0.0045	0.0045	0.00091	U	U
Dichloroethene, 1,1-	mg/kg	0.0035	0.0035	0.00098	U	UJ	0.0035	0.0035	0.00099	U	U	0.0039	0.0039	0.0011	U	U	0.0037	0.0037	0.001	U	U	0.0045	0.0045	0.0013	U	U
Dichloroethene, cis-1,2-	mg/kg	0.0035	0.0035	0.0011	U	UJ	0.0035	0.0035	0.0011	U	U	0.0039	0.0039	0.0012	U	U	0.0037	0.0037	0.0011	U	U	0.0045	0.0045	0.0014	U	U
Dichloroethene, trans-1,2-	mg/kg	0.0035	0.0035	0.0011	U	UJ	0.0035	0.0035	0.0011	U	U	0.0039	0.0039	0.0012	U	U	0.0037	0.0037	0.0011	U	U	0.0045	0.0045	0.0014	U	U
Dichloropropane, 1,2-	mg/kg	0.0035	0.0035	0.00084	U	UJ	0.0035	0.0035	0.00085	U	U	0.0039	0.0039	0.00093	U	U	0.0037	0.0037	0.00088	U	U	0.0045	0.0045	0.0011	U	U
Dichloropropene, cis-1,3-	mg/kg	0.0035	0.0035	0.0007	U	UJ	0.0035	0.0035	0.0007	U	U	0.0039	0.0039	0.00078	U	U	0.0037	0.0037	0.00074	U	U	0.0045	0.0045	0.00091	U	U
Dichloropropene, trans-1,3-	mg/kg	0.0035	0.0035	0.00077	U	UJ	0.0035	0.0035	0.00077	U	U	0.0039	0.0039	0.00086	U	U	0.0037	0.0037	0.00081	U	U	0.0045	0.0045	0.001	U	U
Ethylbenzene	mg/kg	0.0035	0.0035	0.0007	U	UJ	0.0035	0.0035	0.0007	U	U	0.0039	0.0039	0.00078	U	U	0.0037	0.0037	0.00074	U	U	0.0045	0.0045	0.00091	U	U
Hexanone, 2-	mg/kg	0.018	0.018	0.0038	U	UJ	0.018	0.018	0.0038	U	U	0.019	0.019	0.0042	U	U	0.018	0.018	0.004	U	U	0.023	0.023	0.0049	U	U
Isopropylbenzene	mg/kg																									
METHYL ACETATE	mg/kg																									
Methyl Tertiary Butyl Ether	mg/kg																									
Methyl-2-pentanone, 4-	mg/kg	0.018	0.018	0.0039	U	UJ	0.018	0.018	0.0039	U	U	0.019	0.019	0.0043	U	U	0.018	0.018	0.0041	U	U	0.023	0.023	0.005	U	U
Methylcyclohexane	mg/kg																									
Methylene chloride	mg/kg	0.0078	0.007	0.0032		J	0.0064	0.007	0.0032	J	J	0.0099	0.0078	0.0036	B	B	0.0074	0.0074	0.0034	U	U	0.0107	0.0091	0.0042	B	B

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB01					FSB-SB01					FSB-SB02					FSB-SB03					FSB-SB04				
SAMPLE NO		FSB0017					FSB0018					FSB0020					FSB0021					FSB0022				
SAMPLE DATE		19-May-11					19-May-11					17-May-11					20-May-11					16-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Styrene	mg/kg	0.0035	0.0035	0.0018	U	UJ	0.0035	0.0035	0.0018	U	U	0.0039	0.0039	0.002	U	U	0.0037	0.0037	0.0019	U	U	0.0045	0.0045	0.0024	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	0.0035	0.0035	0.00084	U	UJ	0.0035	0.0035	0.00085	U	U	0.0039	0.0039	0.00093	U	U	0.0037	0.0037	0.00088	U	U	0.0045	0.0045	0.0011	U	U
Tetrachloroethene	mg/kg	0.0035	0.0035	0.0007	U	UJ	0.0035	0.0035	0.0007	U	U	0.0039	0.0039	0.00078	U	U	0.0037	0.0037	0.00074	U	U	0.0045	0.0045	0.00091	U	U
Toluene	mg/kg	0.0035	0.0035	0.00084	U	UJ	0.00093	0.0035	0.00085	J	J	0.0019	0.0039	0.00093	J	J	0.0037	0.0037	0.00088	U	U	0.0017	0.0045	0.0011	J	J
Trichlorobenzene, 1,2,4-	mg/kg																									
Trichloroethane, 1,1,1-	mg/kg	0.0035	0.0035	0.00077	U	UJ	0.0035	0.0035	0.00077	U	U	0.0039	0.0039	0.00086	U	U	0.0037	0.0037	0.00081	U	U	0.0045	0.0045	0.001	U	U
Trichloroethane, 1,1,2-	mg/kg	0.0035	0.0035	0.00077	U	UJ	0.0035	0.0035	0.00077	U	U	0.0039	0.0039	0.00086	U	U	0.0037	0.0037	0.00081	U	U	0.0045	0.0045	0.001	U	U
Trichloroethene	mg/kg	0.0035	0.0035	0.00084	U	UJ	0.0035	0.0035	0.00085	U	U	0.0039	0.0039	0.00093	U	U	0.0037	0.0037	0.00088	U	U	0.0045	0.0045	0.0011	U	U
Trichlorofluoromethane	mg/kg																									
Trichlorotrifluoroethane	mg/kg																									
Vinyl chloride	mg/kg	0.0035	0.0035	0.0011	U	UJ	0.0035	0.0035	0.0011	U	U	0.0039	0.0039	0.0012	U	U	0.0037	0.0037	0.0011	U	U	0.0045	0.0045	0.0014	U	U
Xylenes, total	mg/kg	0.011	0.011	0.0022	U	UJ	0.011	0.011	0.0023	U	U	0.012	0.012	0.0025	U	U	0.011	0.011	0.0024	U	U	0.014	0.014	0.0029	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB05					FSB-SB06					FSB-SB07					FSB-SB08					FSB-SB09				
SAMPLE NO		FSB0023					FSB0024					FSB0025					FSB0026					FSB0027				
SAMPLE DATE		20-May-11					16-May-11					16-May-11					17-May-11					20-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																										
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Dinitrobenzene, 1,3-	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Dinitrotoluene, 2,4-	mg/kg	0.17	0.17	0.08	U	U	0.17	0.17	0.082	U	U	0.16	0.16	0.079	U	U	0.16	0.16	0.076	U	U	0.19	0.19	0.09	U	U
Dinitrotoluene, 2,6-	mg/kg	0.17	0.17	0.072	U	U	0.17	0.17	0.074	U	U	0.16	0.16	0.07	U	U	0.16	0.16	0.068	U	U	0.19	0.19	0.081	U	U
HMX	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Nitrobenzene	mg/kg	0.17	0.17	0.077	U	U	0.17	0.17	0.079	U	U	0.16	0.16	0.075	U	U	0.16	0.16	0.073	U	U	0.19	0.19	0.087	U	U
Nitrotoluene, 2-	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Nitrotoluene, 3-	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Nitrotoluene, 4-	mg/kg	0.17	0.17	0.083	U	U	0.17	0.17	0.086	U	U	0.16	0.16	0.082	U	U	0.16	0.16	0.079	U	U	0.19	0.19	0.094	U	U
RDX	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Tetryl	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.17	0.17	0.066	U	U	0.17	0.17	0.068	U	U	0.16	0.16	0.065	U	U	0.16	0.16	0.063	U	U	0.19	0.19	0.074	U	U
General Chemistry																										
% Solids	Percent	81.2	0				89	0				79.9	0				79.6	0				82.8	0			
Metals																										
Aluminum	mg/kg	7080	11	1.3			7040	46	5.5			10800	48	5.8			5430	12	1.4			10700	8.8	1.1		
Antimony	mg/kg	4.4	4.4	0.22	U	U	4.6	4.6	0.23	U	U	4.8	4.8	0.24	U	U	4.7	4.7	0.24	U	U	0.88	0.88	0.044	U	U
Arsenic	mg/kg	5.3	0.55	0.055			5.2	2.3	0.23			10.9	2.4	0.24			5.9	0.59	0.059			6.2	0.44	0.044		
Barium	mg/kg	48.5	11	0.22			46.8	46	0.91			84.9	48	0.96			40.1	12	0.24			47.7	8.8	0.18		
Beryllium	mg/kg	0.38	0.28	0.0055			0.36	1.1	0.023	B	J	0.61	1.2	0.024	B	J	0.31	0.3	0.0059			0.3	0.22	0.0044		
Cadmium	mg/kg	0.32	0.22	0.0055			0.91	0.91	0.023	U	U	0.27	0.96	0.024	B	J	0.27	0.24	0.0059			0.19	0.18	0.0044		
Calcium	mg/kg	61400	1100	11			12600	1100	11			20600	1200	12			55100	1200	12			1760	220	2.2		
Chromium	mg/kg	15	2.2	0.22			10.2	2.3	0.23			16.1	2.4	0.24			12.6	2.4	0.24			19.1	0.44	0.044		
Cobalt	mg/kg	8	2.8	0.055			7	11	0.23	B	J	10.4	12	0.24	B	J	5.8	3	0.059			4.1	2.2	0.044		
Copper	mg/kg	16.1	5.5	0.22			11.9	5.7	0.23			21.6	6	0.24			18.1	5.9	0.24			25	1.1	0.044		
Iron	mg/kg	12100	17	1.3			13400	69	5.3			23800	72	5.5			12600	18	1.4			19700	13	1		
Lead	mg/kg	11.1	4.4	0.22			63.4	0.91	0.046			12.8	0.96	0.048			10.2	4.7	0.24			14.5	0.88	0.044		
Magnesium	mg/kg	9610	280	2.8			3930	1100	11			9030	1200	12			12600	300	3		J	2540	220	2.2		
Manganese	mg/kg	405	3.3	0.22			419	3.4	0.23			1220	7.2	0.48			338	3.6	0.24			88.9	0.66	0.044		
Mercury	mg/kg	0.01	0.098	0.0069	B	J	0.048	0.089	0.0063	B	J	0.02	0.1	0.0073	B	J	0.034	0.1	0.0074	B	J	0.014	0.097	0.0069	B	J
Nickel	mg/kg	17.5	2.2	0.055			15.6	9.1	0.23			27.8	9.6	0.24			15.4	2.4	0.059			17.3	1.8	0.044		
Potassium	mg/kg	956	550	2.8			377	2300	11	B	J	631	2400	12	B	J	988	590	3			734	440	2.2		
Selenium	mg/kg	4.4	4.4	0.44	U	U	4.6	4.6	0.46	U	U	4.8	4.8	0.48	U	U	4.7	4.7	0.47	U	U	0.19	0.88	0.088	B	J
Silver	mg/kg	0.55	0.55	0.055	U	U	2.3	2.3	0.23	U	U	2.4	2.4	0.24	U	U	0.59	0.59	0.059	U	U	0.44	0.44	0.044	U	U
Sodium	mg/kg	81.9	550	47	B	J	2300	2300	190	U	U	2400	2400	200	U	U	103	590	50	B	J	93.8	440	37	B	J
Thallium	mg/kg	2.2	2.2	0.33	U	U	0.46	0.46	0.069	U	U	0.48	0.48	0.072	U	U	2.4	2.4	0.36	U	U	0.44	0.44	0.066	U	U
Vanadium	mg/kg	15.5	2.8	0.055			16.5	11	0.23			27	12	0.24			17.2	12	0.24			23.7	2.2	0.044		
Zinc	mg/kg	73.9	4.4	0.22			34	4.6	0.23			44.7	4.8	0.24			47.2	4.7	0.24			45	0.88	0.044		
Pesticides/PCBs																										
Aroclor 1016	mg/kg	0.02	0.02	0.0081	U	U	0.092	0.092	0.037	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0083	U	U	0.02	0.02	0.008	U	U
Aroclor 1221	mg/kg	0.02	0.02	0.01	U	U	0.092	0.092	0.046	U	U	0.021	0.021	0.01	U	U	0.021	0.021	0.01	U	U	0.02	0.02	0.01	U	U
Aroclor 1232	mg/kg	0.02	0.02	0.01	U	U	0.092	0.092	0.046	U	U	0.021	0.021	0.01	U	U	0.021	0.021	0.01	U	U	0.02	0.02	0.01	U	U
Aroclor 1242	mg/kg	0.02	0.02	0.0081	U	U	0.092	0.092	0.037	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0083	U	U	0.02	0.02	0.008	U	U
Aroclor 1248	mg/kg	0.02	0.02	0.0081	U	U	0.092	0.092	0.037	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0083	U	U	0.02	0.02	0.008	U	U
Aroclor 1254	mg/kg	0.0346	0.02	0.0081	J	J	0.462	0.092	0.037			0.021	0.021	0.0084	U	U	0.021	0.021	0.0083	U	U	0.0127	0.02	0.008	J	J
Aroclor 1260	mg/kg	0.0281	0.02	0.0081	J	J	0.092	0.092	0.092	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0083	U	U	0.0273	0.02	0.008	J	J
Aroclor 1268	mg/kg	0.0105	0.02	0.0081	J	J																0.0298	0.02	0.008	J	J
Semivolatile Organics																										
3-Methylphenol and 4-Methylphenol	mg/kg	0.2	0.2	0.029	U	U	0.18	0.18	0.027	U	U	0.21	0.21	0.03	U	U	0.21	0.21	0.03	U	U	0.2	0.2	0.029	U	U
Acenaphthene	mg/kg	0.2	0.2	0.02	U	U	0.0364	0.18	0.018	J	J	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB05					FSB-SB06					FSB-SB07					FSB-SB08					FSB-SB09				
SAMPLE NO		FSB0023					FSB0024					FSB0025					FSB0026					FSB0027				
SAMPLE DATE		20-May-11					16-May-11					16-May-11					17-May-11					20-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Acenaphthylene	mg/kg	0.2	0.2	0.02	U	U	0.196	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Acetophenone	mg/kg																									
Anthracene	mg/kg	0.2	0.2	0.02	U	U	0.59	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Atrazine	mg/kg																									
Benzaldehyde	mg/kg																									
Benzo(a)anthracene	mg/kg	0.2	0.2	0.02	U	U	1.06	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Benzo(a)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.885	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Benzo(b)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	1.15	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Benzo(ghi)perylene	mg/kg	0.2	0.2	0.02	U	U	0.411	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Benzo(k)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.439	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Benzoic acid	mg/kg	1	1	0.36	U	U	0.92	0.92	0.32	U	U	1.1	1.1	0.37	U	U	1	1	0.36	U	U	0.99	0.99	0.35	U	U
Benzyl alcohol	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Bibenzene	mg/kg																									
Bis(2-chloroethoxy)methane	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroethyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.23	0.41	0.082	J	J	0.37	0.37	0.074	U	U	0.42	0.42	0.084	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.079	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Butyl benzyl phthalate	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Caprolactam	mg/kg																									
Carbazole	mg/kg	0.2	0.2	0.02	U	U	0.0942	0.18	0.018	J	J	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Chloroaniline, 4-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Chloronaphthalene, 2-	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Chlorophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Chrysene	mg/kg	0.2	0.2	0.02	U	U	0.885	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Dibenz(a,h)anthracene	mg/kg	0.2	0.2	0.02	U	U	0.116	0.18	0.018	J	J	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Dibenzofuran	mg/kg	0.2	0.2	0.02	U	U	0.0565	0.18	0.018	J	J	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Dichlorobenzene, 1,2-	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Dichlorobenzene, 1,3-	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Dichlorobenzene, 1,4-	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.41	0.41	0.041	U	U	0.37	0.37	0.037	U	U	0.42	0.42	0.042	U	U	0.41	0.41	0.041	U	U	0.4	0.4	0.04	U	U
Dichlorophenol, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Diethyl phthalate	mg/kg	0.41	0.41	0.082	U	U	0.37	0.37	0.074	U	U	0.42	0.42	0.084	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.079	U	U
Dimethyl phthalate	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Dimethylphenol, 2,4-	mg/kg	0.2	0.2	0.026	U	U	0.18	0.18	0.023	U	U	0.21	0.21	0.027	U	U	0.21	0.21	0.026	U	U	0.2	0.2	0.025	U	U
Di-n-butyl phthalate	mg/kg	0.41	0.41	0.082	U	U	0.37	0.37	0.074	U	U	0.42	0.42	0.084	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.079	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.41	0.41	0.082	U	U	0.37	0.37	0.074	U	U	0.42	0.42	0.084	U	U	0.41	0.41	0.083	U	U	0.4	0.4	0.079	U	U
Dinitrophenol, 2,4-	mg/kg	1	1	0.41	U	U	0.92	0.92	0.37	U	U	1.1	1.1	0.42	U	U	1	1	0.41	U	U	0.99	0.99	0.4	U	U
Dinitrotoluene, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Dinitrotoluene, 2,6-	mg/kg	0.2	0.2	0.024	U	U	0.18	0.18	0.022	U	U	0.21	0.21	0.025	U	U	0.21	0.21	0.024	U	U	0.2	0.2	0.023	U	U
Di-n-octyl phthalate	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Fluoranthene	mg/kg	0.2	0.2	0.02	U	U	1.99	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Fluorene	mg/kg	0.2	0.2	0.02	U	U	0.191	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Hexachlorobenzene	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Hexachlorobutadiene	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Hexachlorocyclopentadiene	mg/kg	0.2	0.2	0.09	U	U	0.18	0.18	0.081	U	U	0.21	0.21	0.093	U	U	0.21	0.21	0.091	U	U	0.2	0.2	0.087	U	U
Hexachloroethane	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.513	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Isophorone	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Methylnaphthalene, 2-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Methylphenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB05					FSB-SB06					FSB-SB07					FSB-SB08					FSB-SB09				
SAMPLE NO		FSB0023					FSB0024					FSB0025					FSB0026					FSB0027				
SAMPLE DATE		20-May-11					16-May-11					16-May-11					17-May-11					20-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Naphthalene	mg/kg	0.2	0.2	0.033	U	U	0.18	0.18	0.029	U	U	0.21	0.21	0.034	U	U	0.21	0.21	0.033	U	U	0.2	0.2	0.032	U	U
Nitroaniline, 2-	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Nitroaniline, 3-	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Nitroaniline, 4-	mg/kg	0.2	0.2	0.041	U	U	0.18	0.18	0.037	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U	0.2	0.2	0.04	U	U
Nitrobenzene	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 4-	mg/kg	1	1	0.16	U	U	0.92	0.92	0.15	U	U	1.1	1.1	0.17	U	U	1	1	0.17	U	U	0.99	0.99	0.16	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
n-Nitrosodiphenylamine	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Pentachlorophenol	mg/kg	1	1	0.25	U	U	0.92	0.92	0.22	U	U	1.1	1.1	0.25	U	U	1	1	0.25	U	U	0.99	0.99	0.24	U	U
Phenanthrene	mg/kg	0.2	0.2	0.02	U	U	1.52	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Phenol	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Pyrene	mg/kg	0.2	0.2	0.02	U	U	1.85	0.18	0.018			0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Trichlorobenzene, 1,2,4-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.2	0.2	0.02	U	U	0.18	0.18	0.018	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.2	0.2	0.02	U	U
Volatile Organics																										
Acetone	mg/kg	0.037	0.037	0.015	U	U	0.036	0.036	0.014	U	R	0.037	0.037	0.015	U	R	0.0237	0.032	0.013	J	J	0.026	0.026	0.01	U	R
Benzene	mg/kg	0.0022	0.0037	0.0011	J	J	0.0011	0.0036	0.0011	J	J	0.0037	0.0037	0.0011	U	U	0.0032	0.0032	0.00095	U	U	0.0026	0.0026	0.00077	U	U
Bromodichloromethane	mg/kg	0.0037	0.0037	0.00082	U	U	0.0036	0.0036	0.00079	U	U	0.0037	0.0037	0.00081	U	U	0.0032	0.0032	0.0007	U	U	0.0026	0.0026	0.00056	U	U
Bromoform	mg/kg	0.0037	0.0037	0.0011	U	U	0.0036	0.0036	0.0011	U	U	0.0037	0.0037	0.0011	U	U	0.0032	0.0032	0.00095	U	U	0.0026	0.0026	0.00077	U	U
Bromomethane	mg/kg	0.0037	0.0037	0.0015	U	U	0.0036	0.0036	0.0014	U	U	0.0037	0.0037	0.0015	U	U	0.0032	0.0032	0.0013	U	U	0.0026	0.0026	0.001	U	U
Butanone, 2-	mg/kg	0.019	0.019	0.0045	U	U	0.018	0.018	0.0044	U	UJ	0.018	0.018	0.0045	U	U	0.016	0.016	0.0039	U	U	0.013	0.013	0.0031	U	R
Carbon disulfide	mg/kg	0.0037	0.0037	0.0015	U	U	0.0036	0.0036	0.0014	U	U	0.0037	0.0037	0.0015	U	U	0.0032	0.0032	0.0013	U	U	0.0026	0.0026	0.001	U	U
Carbon tetrachloride	mg/kg	0.0037	0.0037	0.0013	U	U	0.0036	0.0036	0.0013	U	U	0.0037	0.0037	0.0013	U	U	0.0032	0.0032	0.0011	U	U	0.0026	0.0026	0.00092	U	U
Chlorobenzene	mg/kg	0.0037	0.0037	0.00074	U	U	0.0036	0.0036	0.00072	U	U	0.0037	0.0037	0.00073	U	U	0.0032	0.0032	0.00064	U	U	0.0026	0.0026	0.00051	U	U
Chloroethane	mg/kg	0.0037	0.0037	0.0015	U	U	0.0036	0.0036	0.0014	U	U	0.0037	0.0037	0.0015	U	UJ	0.0032	0.0032	0.0013	U	UJ	0.0026	0.0026	0.001	U	U
Chloroform	mg/kg	0.0037	0.0037	0.00089	U	U	0.0036	0.0036	0.00086	U	U	0.0037	0.0037	0.00088	U	U	0.0032	0.0032	0.00076	U	U	0.0026	0.0026	0.00061	U	U
Chloromethane	mg/kg	0.0037	0.0037	0.0015	U	U	0.0036	0.0036	0.0014	U	U	0.0037	0.0037	0.0015	U	U	0.0032	0.0032	0.0013	U	U	0.0026	0.0026	0.001	U	U
Cyclohexane	mg/kg																									
Dibromo-3-chloropropane, 1,2-	mg/kg																									
Dibromochloromethane	mg/kg	0.0037	0.0037	0.00074	U	U	0.0036	0.0036	0.00072	U	U	0.0037	0.0037	0.00073	U	U	0.0032	0.0032	0.00064	U	U	0.0026	0.0026	0.00051	U	U
Dibromoethane, 1,2-	mg/kg																									
Dichlorobenzene, 1,2-	mg/kg																									
Dichlorobenzene, 1,3-	mg/kg																									
Dichlorobenzene, 1,4-	mg/kg																									
Dichlorodifluoromethane	mg/kg																									
Dichloroethane, 1,1-	mg/kg	0.0037	0.0037	0.00082	U	U	0.0036	0.0036	0.00079	U	U	0.0037	0.0037	0.00081	U	U	0.0032	0.0032	0.0007	U	U	0.0026	0.0026	0.00056	U	U
Dichloroethane, 1,2-	mg/kg	0.0037	0.0037	0.00074	U	U	0.0036	0.0036	0.00072	U	U	0.0037	0.0037	0.00073	U	U	0.0032	0.0032	0.00064	U	U	0.0026	0.0026	0.00051	U	U
Dichloroethene, 1,1-	mg/kg	0.0037	0.0037	0.001	U	U	0.0036	0.0036	0.001	U	U	0.0037	0.0037	0.001	U	U	0.0032	0.0032	0.00089	U	U	0.0026	0.0026	0.00071	U	U
Dichloroethene, cis-1,2-	mg/kg	0.0037	0.0037	0.0011	U	U	0.0036	0.0036	0.0011	U	U	0.0037	0.0037	0.0011	U	U	0.0032	0.0032	0.00095	U	U	0.0026	0.0026	0.00077	U	U
Dichloroethene, trans-1,2-	mg/kg	0.0037	0.0037	0.0011	U	U	0.0036	0.0036	0.0011	U	U	0.0037	0.0037	0.0011	U	U	0.0032	0.0032	0.00095	U	U	0.0026	0.0026	0.00077	U	U
Dichloropropane, 1,2-	mg/kg	0.0037	0.0037	0.00089	U	U	0.0036	0.0036	0.00086	U	U	0.0037	0.0037	0.00088	U	U	0.0032	0.0032	0.00076	U	U	0.0026	0.0026	0.00061	U	U
Dichloropropene, cis-1,3-	mg/kg	0.0037	0.0037	0.00074	U	U	0.0036	0.0036	0.00072	U	U	0.0037	0.0037	0.00073	U	U	0.0032	0.0032	0.00064	U	U	0.0026	0.0026	0.00051	U	U
Dichloropropene, trans-1,3-	mg/kg	0.0037	0.0037	0.00082	U	U	0.0036	0.0036	0.00079	U	U	0.0037	0.0037	0.00081	U	U	0.0032	0.0032	0.0007	U	U	0.0026	0.0026	0.00056	U	U
Ethylbenzene	mg/kg	0.0037	0.0037	0.00074	U	U	0.0036	0.0036	0.00072	U	U	0.0037	0.0037	0.00073	U	U	0.0032	0.0032	0.00064	U	U	0.0026	0.0026	0.00051	U	U
Hexanone, 2-	mg/kg	0.019	0.019	0.004	U	U	0.018	0.018	0.0039	U	U	0.018	0.018	0.004	U	U	0.016	0.016	0.0034	U	U	0.013	0.013	0.0028	U	U
Isopropylbenzene	mg/kg																									
METHYL ACETATE	mg/kg																									
Methyl Tertiary Butyl Ether	mg/kg																									
Methyl-2-pentanone, 4-	mg/kg	0.019	0.019	0.0041	U	U	0.018	0.018	0.004	U	U	0.018	0.018	0.004	U	U	0.016	0.016	0.0035	U	U	0.013	0.013	0.0028	U	U
Methylcyclohexane	mg/kg																									
Methylene chloride	mg/kg	0.0059	0.0074	0.0034	J	J	0.0051	0.0072	0.0033	J	J	0.0042	0.0073	0.0034	J	J	0.0064	0.0064	0.0029	U	U	0.0051	0.0051	0.0023	U	R

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB05					FSB-SB06					FSB-SB07					FSB-SB08					FSB-SB09				
SAMPLE NO		FSB0023					FSB0024					FSB0025					FSB0026					FSB0027				
SAMPLE DATE		20-May-11					16-May-11					16-May-11					17-May-11					20-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Styrene	mg/kg	0.0037	0.0037	0.0019	U	U	0.0036	0.0036	0.0019	U	U	0.0037	0.0037	0.0019	U	U	0.0032	0.0032	0.0017	U	U	0.0026	0.0026	0.0013	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	0.0037	0.0037	0.00089	U	U	0.0036	0.0036	0.00086	U	U	0.0037	0.0037	0.00088	U	U	0.0032	0.0032	0.00076	U	UJ	0.0026	0.0026	0.00061	U	U
Tetrachloroethene	mg/kg	0.0037	0.0037	0.00074	U	U	0.0036	0.0036	0.00072	U	U	0.0037	0.0037	0.00073	U	U	0.0032	0.0032	0.00064	U	U	0.0026	0.0026	0.00051	U	U
Toluene	mg/kg	0.0029	0.0037	0.00089	J	J	0.0016	0.0036	0.00086	J	J	0.0037	0.0037	0.00088	U	U	0.0032	0.0032	0.00076	U	U	0.0026	0.0026	0.00061	U	U
Trichlorobenzene, 1,2,4-	mg/kg																									
Trichloroethane, 1,1,1-	mg/kg	0.0037	0.0037	0.00082	U	U	0.0036	0.0036	0.00079	U	U	0.0037	0.0037	0.00081	U	U	0.0032	0.0032	0.0007	U	U	0.0026	0.0026	0.00056	U	U
Trichloroethane, 1,1,2-	mg/kg	0.0037	0.0037	0.00082	U	U	0.0036	0.0036	0.00079	U	U	0.0037	0.0037	0.00081	U	U	0.0032	0.0032	0.0007	U	U	0.0026	0.0026	0.00056	U	U
Trichloroethene	mg/kg	0.0037	0.0037	0.00089	U	U	0.0036	0.0036	0.00086	U	U	0.0037	0.0037	0.00088	U	U	0.0032	0.0032	0.00076	U	U	0.0026	0.0026	0.00061	U	U
Trichlorofluoromethane	mg/kg																									
Trichlorotrifluoroethane	mg/kg																									
Vinyl chloride	mg/kg	0.0037	0.0037	0.0011	U	U	0.0036	0.0036	0.0011	U	U	0.0037	0.0037	0.0011	U	U	0.0032	0.0032	0.00095	U	U	0.0026	0.0026	0.00077	U	U
Xylenes, total	mg/kg	0.011	0.011	0.0024	U	U	0.011	0.011	0.0023	U	U	0.011	0.011	0.0024	U	U	0.0095	0.0095	0.002	U	U	0.0077	0.0077	0.0016	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB10					FSB-SB10					FSB-SB11					FSB-SB12					FSB-SB13				
SAMPLE NO		FSB0028					FSB0029					FSB0031					FSB0032					FSB0033				
SAMPLE DATE		20-May-11					20-May-11					17-May-11					17-May-11					17-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																										
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Dinitrobenzene, 1,3-	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Dinitrotoluene, 2,4-	mg/kg	0.17	0.17	0.085	U	U	0.19	0.19	0.092	U	U	0.15	0.15	0.074	U	U	0.19	0.19	0.092	U	U	0.17	0.17	0.085	U	U
Dinitrotoluene, 2,6-	mg/kg	0.17	0.17	0.076	U	U	0.19	0.19	0.082	U	U	0.15	0.15	0.066	U	U	0.19	0.19	0.082	U	U	0.17	0.17	0.076	U	U
HMX	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Nitrobenzene	mg/kg	0.17	0.17	0.081	U	U	0.19	0.19	0.088	U	U	0.15	0.15	0.071	U	U	0.19	0.19	0.088	U	U	0.17	0.17	0.081	U	U
Nitrotoluene, 2-	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Nitrotoluene, 3-	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Nitrotoluene, 4-	mg/kg	0.17	0.17	0.088	U	U	0.19	0.19	0.096	U	U	0.15	0.15	0.077	U	U	0.19	0.19	0.096	U	U	0.17	0.17	0.088	U	U
RDX	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Tetryl	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.17	0.17	0.07	U	U	0.19	0.19	0.076	U	U	0.15	0.15	0.061	U	U	0.19	0.19	0.076	U	U	0.17	0.17	0.07	U	U
General Chemistry																										
% Solids	Percent	83.1	0				82.8	0				79	0				77.4	0				79.1	0			
Metals																										
Aluminum	mg/kg	14200	40	4.9			8980	43	5.2			13500	60	7.2			9210	63	7.5			3840	11	1.3		
Antimony	mg/kg	4	4	0.2	U	U	4.3	4.3	0.22	U	U	6	6	0.3	U	U	6.3	6.3	0.31	U	U	1.1	1.1	0.053	U	U
Arsenic	mg/kg	10	2	0.2		J	4.5	2.2	0.22		J	17.1	3	0.3			6.7	3.1	0.31			21.5	0.53	0.053		
Barium	mg/kg	87.1	40	0.81		J	47.2	43	0.86		J	85.3	60	1.2			71.9	63	1.3			87.5	11	0.21		
Beryllium	mg/kg	0.84	1	0.02	B	J	0.56	1.1	0.022	B	J	0.74	1.5	0.03	B	J	0.53	1.6	0.031	B	J	0.13	0.27	0.0053	B	J
Cadmium	mg/kg	0.26	0.81	0.02	B	J	0.31	0.86	0.022	B	J	1.2	1.2	0.03	U	U	1.3	1.3	0.031	U	U	0.21	0.21	0.0053	U	U
Calcium	mg/kg	6710	1000	10		J	2150	1100	11		J	6370	1500	15			17700	1600	16			2470	270	2.7		
Chromium	mg/kg	18.6	2	0.2		J	10.4	2.2	0.22		J	20.1	3	0.3			15.9	3.1	0.31			5.6	0.53	0.053		
Cobalt	mg/kg	7.3	10	0.2	B	J	5.3	11	0.22	B	J	8.3	15	0.3	B	J	8.7	16	0.31	B	J	0.99	2.7	0.053	B	J
Copper	mg/kg	19	5.1	0.2		J	9.1	5.4	0.22		J	27.9	7.5	0.3			17.2	7.8	0.31			6.4	1.3	0.053		
Iron	mg/kg	24300	61	4.7		J	11200	65	5		J	33600	90	6.9			18400	94	7.2			7840	16	1.2		
Lead	mg/kg	14.2	1	0.051		J	7.8	1.1	0.054		J	14.7	1.2	0.06			8.3	1.3	0.063			9.5	1.1	0.053		
Magnesium	mg/kg	4050	1000	10		J	1520	1100	11		J	3680	1500	15			10800	1600	16			461	270	2.7		
Manganese	mg/kg	199	3	0.2		J	67.6	3.2	0.22		J	234	4.5	0.3			813	4.7	0.31			24.2	0.8	0.053		
Mercury	mg/kg	0.032	0.087	0.0062	B	J	0.043	0.097	0.0069	B	J	0.049	0.097	0.0069	B	J	0.035	0.1	0.0072	B	J	0.05	0.11	0.0075	B	J
Nickel	mg/kg	27.4	8.1	0.2		J	15.2	8.6	0.22		J	27.7	12	0.3			25.7	13	0.31			3.8	2.1	0.053		
Potassium	mg/kg	831	2000	10	B	J	440	2200	11	B	J	878	3000	15	B	J	1000	3100	16	B	J	803	530	2.7		
Selenium	mg/kg	4	4	0.4	U	U	4.3	4.3	0.43	U	U	6	6	0.6	U	U	6.3	6.3	0.63	U	U	0.23	1.1	0.11	B	J
Silver	mg/kg	2	2	0.2	U	U	2.2	2.2	0.22	U	U	3	3	0.3	U	U	3.1	3.1	0.31	U	U	0.53	0.53	0.053	U	U
Sodium	mg/kg	2000	2000	170	U	U	2200	2200	180	U	U	3000	3000	260	U	U	3100	3100	270	U	U	62.7	530	45	B	J
Thallium	mg/kg	0.51	0.51	0.051	U	U	0.54	0.54	0.054	U	U	0.6	0.6	0.09	U	U	0.63	0.63	0.094	U	U	0.53	0.53	0.08	U	U
Vanadium	mg/kg	29.6	10	0.2		J	17.3	11	0.22		J	34.1	15	0.3			19.3	16	0.31			13.1	2.7	0.053		
Zinc	mg/kg	55	4	0.2			48.6	4.3	0.22			98.6	6	0.3			56.2	6.3	0.31			8.7	1.1	0.053		
Pesticides/PCBs																										
Aroclor 1016	mg/kg	0.02	0.02	0.008	U	U	0.02	0.02	0.0081	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0085	U	U	0.021	0.021	0.0083	U	U
Aroclor 1221	mg/kg	0.02	0.02	0.01	U	U	0.02	0.02	0.01	U	U	0.021	0.021	0.011	U	U	0.021	0.021	0.011	U	U	0.021	0.021	0.01	U	U
Aroclor 1232	mg/kg	0.02	0.02	0.01	U	U	0.02	0.02	0.01	U	U	0.021	0.021	0.011	U	U	0.021	0.021	0.011	U	U	0.021	0.021	0.01	U	U
Aroclor 1242	mg/kg	0.02	0.02	0.008	U	U	0.02	0.02	0.0081	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0085	U	U	0.021	0.021	0.0083	U	U
Aroclor 1248	mg/kg	0.02	0.02	0.008	U	U	0.02	0.02	0.0081	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0085	U	U	0.021	0.021	0.0083	U	U
Aroclor 1254	mg/kg	0.02	0.02	0.008	U	U	0.02	0.02	0.0081	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0085	U	U	0.021	0.021	0.0083	U	U
Aroclor 1260	mg/kg	0.02	0.02	0.008	U	U	0.02	0.02	0.0081	U	U	0.021	0.021	0.0084	U	U	0.021	0.021	0.0085	U	U	0.021	0.021	0.0083	U	U
Aroclor 1268	mg/kg	0.02	0.02	0.008	U	U	0.02	0.02	0.0081	U	U															
Semivolatile Organics																										
3-Methylphenol and 4-Methylphenol	mg/kg	0.2	0.2	0.029	U	U	0.2	0.2	0.029	U	U	0.21	0.21	0.03	U	U	0.21	0.21	0.031	U	U	0.21	0.21	0.03	U	U
Acenaphthene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB10					FSB-SB10					FSB-SB11					FSB-SB12					FSB-SB13				
SAMPLE NO		FSB0028					FSB0029					FSB0031					FSB0032					FSB0033				
SAMPLE DATE		20-May-11					20-May-11					17-May-11					17-May-11					17-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Acenaphthylene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Acetophenone	mg/kg																									
Anthracene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Atrazine	mg/kg																									
Benzaldehyde	mg/kg																									
Benzo(a)anthracene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Benzo(a)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Benzo(b)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Benzo(ghi)perylene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Benzo(k)fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Benzoic acid	mg/kg	1	1	0.35	U	U	0.99	0.99	0.35	U	U	1.1	1.1	0.37	U	UJ	1.1	1.1	0.37	U	UJ	1	1	0.36	U	UJ
Benzyl alcohol	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Bibenzene	mg/kg																									
Bis(2-chloroethoxy)methane	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Bis(2-chloroethyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.4	0.4	0.08	U	U	0.4	0.4	0.079	U	U	0.42	0.42	0.084	U	U	0.42	0.42	0.085	U	U	0.41	0.41	0.083	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Butyl benzyl phthalate	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Caprolactam	mg/kg																									
Carbazole	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Chloroaniline, 4-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Chloronaphthalene, 2-	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Chlorophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Chrysene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Dibenz(a,h)anthracene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Dibenzofuran	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Dichlorobenzene, 1,2-	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Dichlorobenzene, 1,3-	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Dichlorobenzene, 1,4-	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.4	0.4	0.04	U	U	0.4	0.4	0.04	U	U	0.42	0.42	0.042	U	U	0.42	0.42	0.042	U	U	0.41	0.41	0.041	U	U
Dichlorophenol, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Diethyl phthalate	mg/kg	0.4	0.4	0.08	U	U	0.4	0.4	0.079	U	U	0.42	0.42	0.084	U	U	0.42	0.42	0.085	U	U	0.41	0.41	0.083	U	U
Dimethyl phthalate	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Dimethylphenol, 2,4-	mg/kg	0.2	0.2	0.025	U	U	0.2	0.2	0.025	U	U	0.21	0.21	0.027	U	U	0.21	0.21	0.027	U	U	0.21	0.21	0.026	U	U
Di-n-butyl phthalate	mg/kg	0.4	0.4	0.08	U	U	0.4	0.4	0.079	U	U	0.42	0.42	0.084	U	U	0.42	0.42	0.085	U	U	0.41	0.41	0.083	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.4	0.4	0.08	U	U	0.4	0.4	0.079	U	U	0.42	0.42	0.084	U	U	0.42	0.42	0.085	U	U	0.41	0.41	0.083	U	U
Dinitrophenol, 2,4-	mg/kg	1	1	0.4	U	U	0.99	0.99	0.4	U	U	1.1	1.1	0.42	U	U	1.1	1.1	0.42	U	U	1	1	0.41	U	U
Dinitrotoluene, 2,4-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Dinitrotoluene, 2,6-	mg/kg	0.2	0.2	0.024	U	U	0.2	0.2	0.023	U	U	0.21	0.21	0.025	U	U	0.21	0.21	0.025	U	U	0.21	0.21	0.024	U	U
Di-n-octyl phthalate	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Fluoranthene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Fluorene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Hexachlorobenzene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Hexachlorobutadiene	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Hexachlorocyclopentadiene	mg/kg	0.2	0.2	0.088	U	U	0.2	0.2	0.087	U	U	0.21	0.21	0.093	U	U	0.21	0.21	0.093	U	U	0.21	0.21	0.091	U	U
Hexachloroethane	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Isophorone	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Methylnaphthalene, 2-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Methylphenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB10					FSB-SB10					FSB-SB11					FSB-SB12					FSB-SB13				
SAMPLE NO		FSB0028					FSB0029					FSB0031					FSB0032					FSB0033				
SAMPLE DATE		20-May-11					20-May-11					17-May-11					17-May-11					17-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Naphthalene	mg/kg	0.2	0.2	0.032	U	U	0.2	0.2	0.032	U	U	0.21	0.21	0.034	U	U	0.21	0.21	0.034	U	U	0.21	0.21	0.033	U	U
Nitroaniline, 2-	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Nitroaniline, 3-	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Nitroaniline, 4-	mg/kg	0.2	0.2	0.04	U	U	0.2	0.2	0.04	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.042	U	U	0.21	0.21	0.041	U	U
Nitrobenzene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Nitrophenol, 2-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Nitrophenol, 4-	mg/kg	1	1	0.16	U	U	0.99	0.99	0.16	U	U	1.1	1.1	0.17	U	U	1.1	1.1	0.17	U	U	1	1	0.17	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
n-Nitrosodiphenylamine	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Pentachlorophenol	mg/kg	1	1	0.24	U	U	0.99	0.99	0.24	U	U	1.1	1.1	0.25	U	U	1.1	1.1	0.25	U	U	1	1	0.25	U	U
Phenanthrene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Phenol	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Pyrene	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Trichlorobenzene, 1,2,4-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.2	0.2	0.02	U	U	0.2	0.2	0.02	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U	0.21	0.21	0.021	U	U
Volatile Organics																										
Acetone	mg/kg	0.038	0.038	0.015	U	U	0.035	0.035	0.014	U	U	0.042	0.042	0.017	U	R	0.046	0.046	0.018	U	R	0.038	0.038	0.015	U	R
Benzene	mg/kg	0.0038	0.0038	0.0011	U	U	0.0035	0.0035	0.0011	U	U	0.0042	0.0042	0.0013			0.0046	0.0046	0.0014	U	UJ	0.0038	0.0038	0.0011	U	U
Bromodichloromethane	mg/kg	0.0038	0.0038	0.00083	U	U	0.0035	0.0035	0.00078	U	U	0.0042	0.0042	0.00092	U	U	0.0046	0.0046	0.001	U	UJ	0.0038	0.0038	0.00084	U	U
Bromoform	mg/kg	0.0038	0.0038	0.0011	U	U	0.0035	0.0035	0.0011	U	U	0.0042	0.0042	0.0013	U	U	0.0046	0.0046	0.0014	U	UJ	0.0038	0.0038	0.0011	U	U
Bromomethane	mg/kg	0.0038	0.0038	0.0015	U	U	0.0035	0.0035	0.0014	U	U	0.0042	0.0042	0.0017	U	U	0.0046	0.0046	0.0018	U	UJ	0.0038	0.0038	0.0015	U	U
Butanone, 2-	mg/kg	0.019	0.019	0.0046	U	U	0.018	0.018	0.0043	U	U	0.021	0.021	0.0051	U	UJ	0.023	0.023	0.0056	U	UJ	0.019	0.019	0.0047	U	UJ
Carbon disulfide	mg/kg	0.0038	0.0038	0.0015	U	U	0.0035	0.0035	0.0014	U	U	0.0042	0.0042	0.0017	U	U	0.0046	0.0046	0.0018	U	UJ	0.0038	0.0038	0.0015	U	U
Carbon tetrachloride	mg/kg	0.0038	0.0038	0.0014	U	U	0.0035	0.0035	0.0013	U	U	0.0042	0.0042	0.0015	U	U	0.0046	0.0046	0.0017	U	UJ	0.0038	0.0038	0.0014	U	U
Chlorobenzene	mg/kg	0.0038	0.0038	0.00076	U	U	0.0035	0.0035	0.0007	U	U	0.0042	0.0042	0.00083	U	U	0.0046	0.0046	0.00092	U	UJ	0.0038	0.0038	0.00077	U	U
Chloroethane	mg/kg	0.0038	0.0038	0.0015	U	U	0.0035	0.0035	0.0014	U	U	0.0042	0.0042	0.0017	U	U	0.0046	0.0046	0.0018	U	UJ	0.0038	0.0038	0.0015	U	U
Chloroform	mg/kg	0.0038	0.0038	0.00091	U	U	0.0035	0.0035	0.00085	U	U	0.0042	0.0042	0.001	U	U	0.0046	0.0046	0.0011	U	UJ	0.0038	0.0038	0.00092	U	U
Chloromethane	mg/kg	0.0038	0.0038	0.0015	U	U	0.0035	0.0035	0.0014	U	U	0.0042	0.0042	0.0017	U	U	0.0046	0.0046	0.0018	U	UJ	0.0038	0.0038	0.0015	U	U
Cyclohexane	mg/kg																									
Dibromo-3-chloropropane, 1,2-	mg/kg																									
Dibromochloromethane	mg/kg	0.0038	0.0038	0.00076	U	U	0.0035	0.0035	0.0007	U	U	0.0042	0.0042	0.00083	U	U	0.0046	0.0046	0.00092	U	UJ	0.0038	0.0038	0.00077	U	U
Dibromoethane, 1,2-	mg/kg																									
Dichlorobenzene, 1,2-	mg/kg																									
Dichlorobenzene, 1,3-	mg/kg																									
Dichlorobenzene, 1,4-	mg/kg																									
Dichlorodifluoromethane	mg/kg																									
Dichloroethane, 1,1-	mg/kg	0.0038	0.0038	0.00083	U	U	0.0035	0.0035	0.00078	U	U	0.0042	0.0042	0.00092	U	U	0.0046	0.0046	0.001	U	UJ	0.0038	0.0038	0.00084	U	U
Dichloroethane, 1,2-	mg/kg	0.0038	0.0038	0.00076	U	U	0.0035	0.0035	0.0007	U	U	0.0042	0.0042	0.00083	U	U	0.0046	0.0046	0.00092	U	UJ	0.0038	0.0038	0.00077	U	U
Dichloroethene, 1,1-	mg/kg	0.0038	0.0038	0.0011	U	U	0.0035	0.0035	0.00099	U	U	0.0042	0.0042	0.0012	U	U	0.0046	0.0046	0.0013	U	UJ	0.0038	0.0038	0.0011	U	U
Dichloroethene, cis-1,2-	mg/kg	0.0038	0.0038	0.0011	U	U	0.0035	0.0035	0.0011	U	U	0.0042	0.0042	0.0013	U	U	0.0046	0.0046	0.0014	U	UJ	0.0038	0.0038	0.0011	U	U
Dichloroethene, trans-1,2-	mg/kg	0.0038	0.0038	0.0011	U	U	0.0035	0.0035	0.0011	U	U	0.0042	0.0042	0.0013	U	U	0.0046	0.0046	0.0014	U	UJ	0.0038	0.0038	0.0011	U	U
Dichloropropane, 1,2-	mg/kg	0.0038	0.0038	0.00091	U	U	0.0035	0.0035	0.00085	U	U	0.0042	0.0042	0.001	U	U	0.0046	0.0046	0.0011	U	UJ	0.0038	0.0038	0.00092	U	U
Dichloropropene, cis-1,3-	mg/kg	0.0038	0.0038	0.00076	U	U	0.0035	0.0035	0.0007	U	U	0.0042	0.0042	0.00083	U	U	0.0046	0.0046	0.00092	U	UJ	0.0038	0.0038	0.00077	U	U
Dichloropropene, trans-1,3-	mg/kg	0.0038	0.0038	0.00083	U	U	0.0035	0.0035	0.00078	U	U	0.0042	0.0042	0.00092	U	U	0.0046	0.0046	0.001	U	UJ	0.0038	0.0038	0.00084	U	U
Ethylbenzene	mg/kg	0.0038	0.0038	0.00076	U	U	0.0035	0.0035	0.0007	U	U	0.0026	0.0042	0.00083	J	J	0.0046	0.0046	0.00092	U	UJ	0.0038	0.0038	0.00077	U	U
Hexanone, 2-	mg/kg	0.019	0.019	0.0041	U	U	0.018	0.018	0.0038	U	U	0.021	0.021	0.0045	U	U	0.023	0.023	0.005	U	UJ	0.019	0.019	0.0041	U	U
Isopropylbenzene	mg/kg																									
METHYL ACETATE	mg/kg																									
Methyl Tertiary Butyl Ether	mg/kg																									
Methyl-2-pentanone, 4-	mg/kg	0.019	0.019	0.0042	U	U	0.018	0.018	0.0039	U	U	0.021	0.021	0.0046	U	U	0.023	0.023	0.0051	U	UJ	0.019	0.019	0.0042	U	U
Methylcyclohexane	mg/kg																									
Methylene chloride	mg/kg	0.0055	0.0076	0.0035	J	J	0.0065	0.007	0.0032	J	J	0.0046	0.0083	0.0038	J	J	0.0046	0.0092	0.0042	J	J	0.0077	0.0077	0.0035	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB10					FSB-SB10					FSB-SB11					FSB-SB12					FSB-SB13				
SAMPLE NO		FSB0028					FSB0029					FSB0031					FSB0032					FSB0033				
SAMPLE DATE		20-May-11					20-May-11					17-May-11					17-May-11					17-May-11				
DEPTH		3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					FD					REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Styrene	mg/kg	0.0038	0.0038	0.002	U	U	0.0035	0.0035	0.0018	U	U	0.0042	0.0042	0.0022	U	U	0.0046	0.0046	0.0024	U	UJ	0.0038	0.0038	0.002	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	0.0038	0.0038	0.00091	U	U	0.0035	0.0035	0.00085	U	U	0.0042	0.0042	0.001	U	UJ	0.0046	0.0046	0.0011	U	UJ	0.0038	0.0038	0.00092	U	U
Tetrachloroethene	mg/kg	0.0038	0.0038	0.00076	U	U	0.0035	0.0035	0.0007	U	U	0.0042	0.0042	0.00083	U	U	0.0046	0.0046	0.00092	U	UJ	0.0038	0.0038	0.00077	U	U
Toluene	mg/kg	0.0038	0.0038	0.00091	U	U	0.0035	0.0035	0.00085	U	U	0.0101	0.0042	0.001			0.0015	0.0046	0.0011	J	J	0.0038	0.0038	0.00092	U	U
Trichlorobenzene, 1,2,4-	mg/kg																									
Trichloroethane, 1,1,1-	mg/kg	0.0038	0.0038	0.00083	U	U	0.0035	0.0035	0.00078	U	U	0.0042	0.0042	0.00092	U	U	0.0046	0.0046	0.001	U	UJ	0.0038	0.0038	0.00084	U	U
Trichloroethane, 1,1,2-	mg/kg	0.0038	0.0038	0.00083	U	U	0.0035	0.0035	0.00078	U	U	0.0042	0.0042	0.00092	U	U	0.0046	0.0046	0.001	U	UJ	0.0038	0.0038	0.00084	U	U
Trichloroethene	mg/kg	0.0038	0.0038	0.00091	U	U	0.0035	0.0035	0.00085	U	U	0.0042	0.0042	0.001	U	U	0.0046	0.0046	0.0011	U	UJ	0.0038	0.0038	0.00092	U	U
Trichlorofluoromethane	mg/kg																									
Trichlorotrifluoroethane	mg/kg																									
Vinyl chloride	mg/kg	0.0038	0.0038	0.0011	U	U	0.0035	0.0035	0.0011	U	U	0.0042	0.0042	0.0013	U	U	0.0046	0.0046	0.0014	U	UJ	0.0038	0.0038	0.0011	U	U
Xylenes, total	mg/kg	0.011	0.011	0.0024	U	U	0.011	0.011	0.0023	U	U	0.0049	0.013	0.0027	J	J	0.014	0.014	0.0029	U	UJ	0.011	0.011	0.0024	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB14					FSB-SB15				
SAMPLE NO		FSB0034					FSB0052				
SAMPLE DATE		17-May-11					30-Jun-11				
DEPTH		3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives											
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Dinitrobenzene, 1,3-	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Dinitrotoluene, 2,4-	mg/kg	0.16	0.16	0.079	U	U	0.16	0.16	0.079	U	U
Dinitrotoluene, 2,6-	mg/kg	0.16	0.16	0.071	U	U	0.16	0.16	0.071	U	U
HMX	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Nitrobenzene	mg/kg	0.16	0.16	0.076	U	U	0.16	0.16	0.076	U	U
Nitrotoluene, 2-	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Nitrotoluene, 3-	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Nitrotoluene, 4-	mg/kg	0.16	0.16	0.082	U	U	0.16	0.16	0.082	U	U
RDX	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Tetryl	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.16	0.16	0.065	U	U	0.16	0.16	0.065	U	U
General Chemistry											
% Solids	Percent	75.6	0				84.6	0			
Metals											
Aluminum	mg/kg	11700	24	2.9			9950	20	2		
Antimony	mg/kg	2.4	2.4	0.12	U	U	2	2	0.1	U	U
Arsenic	mg/kg	12.3	1.2	0.12			11	1	0.1		
Barium	mg/kg	113	24	0.48			65.2	20	0.1		
Beryllium	mg/kg	0.64	0.6	0.012			0.62	0.51	0.01		
Cadmium	mg/kg	0.48	0.48	0.012	U	U	0.4	0.4	0.01	U	U
Calcium	mg/kg	7730	600	6			1460	510	5.1		J
Chromium	mg/kg	16.2	1.2	0.12			15.6	1	0.1		
Cobalt	mg/kg	7.3	6	0.12			11	5.1	0.1		
Copper	mg/kg	28.6	3	0.12			17.5	2.5	0.1		J
Iron	mg/kg	25200	36	2.7			20000	30	3.4		
Lead	mg/kg	12.7	1.2	0.06			12.8	1	0.051		
Magnesium	mg/kg	2950	600	6			2310	510	5.1		
Manganese	mg/kg	154	1.8	0.12			408	1.5	0.1		
Mercury	mg/kg	0.037	0.097	0.0069	B	J	0.051	0.092	0.0066	B	J
Nickel	mg/kg	25.9	4.8	0.12			22.5	4	0.1		
Potassium	mg/kg	1100	1200	6	B	J	622	1000	5.1	B	J
Selenium	mg/kg	0.69	2.4	0.24	B	J	2.4	2	0.2		
Silver	mg/kg	1.2	1.2	0.12	U	U	1	1	0.1	U	U
Sodium	mg/kg	1200	1200	100	U	U	1000	1000	76	U	U
Thallium	mg/kg	0.6	0.6	0.089	U	U	0.51	0.51	0.076	U	U
Vanadium	mg/kg	22.5	6	0.12			25	5.1	0.1		
Zinc	mg/kg	63.8	2.4	0.12			50.7	2	0.1		J
Pesticides/PCBs											
Aroclor 1016	mg/kg	0.022	0.022	0.0087	U	U	0.02	0.02	0.0078	U	U
Aroclor 1221	mg/kg	0.022	0.022	0.011	U	U	0.02	0.02	0.0098	U	U
Aroclor 1232	mg/kg	0.022	0.022	0.011	U	U	0.02	0.02	0.0098	U	U
Aroclor 1242	mg/kg	0.022	0.022	0.0087	U	U	0.02	0.02	0.0078	U	U
Aroclor 1248	mg/kg	0.022	0.022	0.0087	U	U	0.02	0.02	0.0078	U	U
Aroclor 1254	mg/kg	0.022	0.022	0.0087	U	U	0.02	0.02	0.0078	U	U
Aroclor 1260	mg/kg	0.022	0.022	0.0087	U	U	0.02	0.02	0.0078	U	U
Aroclor 1268	mg/kg										
Semivolatile Organics											
3-Methylphenol and 4-Methylphenol	mg/kg	0.22	0.22	0.032	U	U	0.2	0.2	0.028	U	U
Acenaphthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB14					FSB-SB15				
SAMPLE NO		FSB0034					FSB0052				
SAMPLE DATE		17-May-11					30-Jun-11				
DEPTH		3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Acenaphthylene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Acetophenone	mg/kg										
Anthracene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Atrazine	mg/kg										
Benzaldehyde	mg/kg										
Benzo(a)anthracene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Benzo(a)pyrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Benzo(b)fluoranthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Benzo(ghi)perylene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Benzo(k)fluoranthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Benzoic acid	mg/kg	1.1	1.1	0.39	U	UJ	0.98	0.98	0.35	U	U
Benzyl alcohol	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Bibenzene	mg/kg										
Bis(2-chloroethoxy)methane	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroethyl)ether	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.44	0.44	0.088	U	U	0.39	0.39	0.079	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Butyl benzyl phthalate	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Caprolactam	mg/kg										
Carbazole	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Chloroaniline, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Chloronaphthalene, 2-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Chlorophenol, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Chrysene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Dibenz(a,h)anthracene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Dibenzofuran	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Dichlorobenzene, 1,2-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Dichlorobenzene, 1,3-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Dichlorobenzene, 1,4-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.44	0.44	0.044	U	U	0.39	0.39	0.039	U	U
Dichlorophenol, 2,4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Diethyl phthalate	mg/kg	0.44	0.44	0.088	U	U	0.39	0.39	0.079	U	U
Dimethyl phthalate	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Dimethylphenol, 2,4-	mg/kg	0.22	0.22	0.028	U	U	0.2	0.2	0.025	U	U
Di-n-butyl phthalate	mg/kg	0.44	0.44	0.088	U	U	0.39	0.39	0.079	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.44	0.44	0.088	U	U	0.39	0.39	0.079	U	U
Dinitrophenol, 2,4-	mg/kg	1.1	1.1	0.44	U	U	0.98	0.98	0.39	U	U
Dinitrotoluene, 2,4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Dinitrotoluene, 2,6-	mg/kg	0.22	0.22	0.026	U	U	0.2	0.2	0.023	U	U
Di-n-octyl phthalate	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Fluoranthene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Fluorene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Hexachlorobenzene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Hexachlorobutadiene	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Hexachlorocyclopentadiene	mg/kg	0.22	0.22	0.096	U	U	0.2	0.2	0.086	U	U
Hexachloroethane	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Isophorone	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Methylnaphthalene, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Methylphenol, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB14					FSB-SB15				
SAMPLE NO		FSB0034					FSB0052				
SAMPLE DATE		17-May-11					30-Jun-11				
DEPTH		3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Naphthalene	mg/kg	0.22	0.22	0.035	U	U	0.2	0.2	0.031	U	U
Nitroaniline, 2-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Nitroaniline, 3-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Nitroaniline, 4-	mg/kg	0.22	0.22	0.044	U	U	0.2	0.2	0.039	U	U
Nitrobenzene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 2-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Nitrophenol, 4-	mg/kg	1.1	1.1	0.18	U	U	0.98	0.98	0.16	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
n-Nitrosodiphenylamine	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Pentachlorophenol	mg/kg	1.1	1.1	0.26	U	U	0.98	0.98	0.24	U	U
Phenanthrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Phenol	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Pyrene	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Trichlorobenzene, 1,2,4-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.22	0.22	0.022	U	U	0.2	0.2	0.02	U	U
Volatile Organics											
Acetone	mg/kg	0.046	0.046	0.019	U	R	0.0345	0.037	0.015	J	J
Benzene	mg/kg	0.0046	0.0046	0.0014	U	U	0.0037	0.0037	0.0011	U	U
Bromodichloromethane	mg/kg	0.0046	0.0046	0.001	U	U	0.0037	0.0037	0.00082	U	U
Bromoform	mg/kg	0.0046	0.0046	0.0014	U	U	0.0037	0.0037	0.0011	U	U
Bromomethane	mg/kg	0.0046	0.0046	0.0019	U	U	0.0037	0.0037	0.0015	U	U
Butanone, 2-	mg/kg	0.023	0.023	0.0057	U	UJ	0.019	0.019	0.0045	U	U
Carbon disulfide	mg/kg	0.0046	0.0046	0.0019	U	U	0.0037	0.0037	0.0015	U	U
Carbon tetrachloride	mg/kg	0.0046	0.0046	0.0017	U	U	0.0037	0.0037	0.0013	U	U
Chlorobenzene	mg/kg	0.0046	0.0046	0.00093	U	U	0.0037	0.0037	0.00075	U	U
Chloroethane	mg/kg	0.0046	0.0046	0.0019	U	U	0.0037	0.0037	0.0015	U	U
Chloroform	mg/kg	0.0046	0.0046	0.0011	U	U	0.0037	0.0037	0.00089	U	U
Chloromethane	mg/kg	0.0046	0.0046	0.0019	U	U	0.0037	0.0037	0.0015	U	U
Cyclohexane	mg/kg										
Dibromo-3-chloropropane, 1,2-	mg/kg										
Dibromochloromethane	mg/kg	0.0046	0.0046	0.00093	U	U	0.0037	0.0037	0.00075	U	U
Dibromoethane, 1,2-	mg/kg										
Dichlorobenzene, 1,2-	mg/kg										
Dichlorobenzene, 1,3-	mg/kg										
Dichlorobenzene, 1,4-	mg/kg										
Dichlorodifluoromethane	mg/kg										
Dichloroethane, 1,1-	mg/kg	0.0046	0.0046	0.001	U	U	0.0037	0.0037	0.00082	U	U
Dichloroethane, 1,2-	mg/kg	0.0046	0.0046	0.00093	U	U	0.0037	0.0037	0.00075	U	U
Dichloroethene, 1,1-	mg/kg	0.0046	0.0046	0.0013	U	U	0.0037	0.0037	0.001	U	U
Dichloroethene, cis-1,2-	mg/kg	0.0046	0.0046	0.0014	U	U	0.0037	0.0037	0.0011	U	U
Dichloroethene, trans-1,2-	mg/kg	0.0046	0.0046	0.0014	U	U	0.0037	0.0037	0.0011	U	U
Dichloropropane, 1,2-	mg/kg	0.0046	0.0046	0.0011	U	U	0.0037	0.0037	0.00089	U	U
Dichloropropene, cis-1,3-	mg/kg	0.0046	0.0046	0.00093	U	U	0.0037	0.0037	0.00075	U	U
Dichloropropene, trans-1,3-	mg/kg	0.0046	0.0046	0.001	U	U	0.0037	0.0037	0.00082	U	U
Ethylbenzene	mg/kg	0.0046	0.0046	0.00093	U	U	0.0037	0.0037	0.00075	U	U
Hexanone, 2-	mg/kg	0.023	0.023	0.005	U	U	0.019	0.019	0.004	U	U
Isopropylbenzene	mg/kg										
METHYL ACETATE	mg/kg										
Methyl Tertiary Butyl Ether	mg/kg										
Methyl-2-pentanone, 4-	mg/kg	0.023	0.023	0.0051	U	U	0.019	0.019	0.0041	U	U
Methylcyclohexane	mg/kg										
Methylene chloride	mg/kg	0.005	0.0093	0.0043	J	J	0.0069	0.0075	0.0034	J	J

Table F-2

Additional Soil Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SB14					FSB-SB15				
SAMPLE NO		FSB0034					FSB0052				
SAMPLE DATE		17-May-11					30-Jun-11				
DEPTH		3 - 5 Ft					3 - 5 Ft				
SAMPLE PURPOSE		REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Styrene	mg/kg	0.0046	0.0046	0.0024	U	U	0.0037	0.0037	0.0019	U	U
Tetrachloroethane, 1,1,2,2-	mg/kg	0.0046	0.0046	0.0011	U	U	0.0037	0.0037	0.00089	U	U
Tetrachloroethene	mg/kg	0.0046	0.0046	0.00093	U	U	0.0037	0.0037	0.00075	U	U
Toluene	mg/kg	0.0046	0.0046	0.0011	U	U	0.0037	0.0037	0.00089	U	U
Trichlorobenzene, 1,2,4-	mg/kg										
Trichloroethane, 1,1,1-	mg/kg	0.0046	0.0046	0.001	U	U	0.0037	0.0037	0.00082	U	U
Trichloroethane, 1,1,2-	mg/kg	0.0046	0.0046	0.001	U	U	0.0037	0.0037	0.00082	U	U
Trichloroethene	mg/kg	0.0046	0.0046	0.0011	U	U	0.0037	0.0037	0.00089	U	U
Trichlorofluoromethane	mg/kg										
Trichlorotrifluoroethane	mg/kg										
Vinyl chloride	mg/kg	0.0046	0.0046	0.0014	U	U	0.0037	0.0037	0.0011	U	U
Xylenes, total	mg/kg	0.014	0.014	0.003	U	U	0.011	0.011	0.0024	U	U

FD - Field duplicate.
LQ - Laboratory qualifier.
MDL - Method detection limit.
mg/kg - Milligrams per kilogram.
REG - Regular Sample.
RL - Reporting limit.
VQ - Validation qualifier.

Table F-3

Surface Water Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

	LOCATION CODE		FSB-SW01					FSB-SW02					FSB-SW02					FSB-SW03				
	SAMPLE NO		FSB2000					FSB2001					FSB2002					FSB2004				
	SAMPLE DATE		9-Jan-12					9-Jan-12					9-Jan-12					9-Jan-12				
	DEPTH		0 - 0 Ft					0 - 0 Ft					0 - 0 Ft					0 - 0 Ft				
	SAMPLE PURPOSE		REG					REG					FD					REG				
Parameter	**Filtered**	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																						
Amino-2,6-dinitrotoluene, 4-	N	µg/L	0.2	0.2	0.082	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.08	U	U	0.2	0.2	0.08	U	U
Amino-4,6-dinitrotoluene, 2-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Dinitrobenzene, 1,3-	N	µg/L	0.2	0.2	0.097	U	U	0.2	0.2	0.095	U	U	0.19	0.19	0.094	U	U	0.2	0.2	0.095	U	U
Dinitrotoluene, 2,4-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Dinitrotoluene, 2,6-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
HMX	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Nitrobenzene	N	µg/L	0.2	0.2	0.084	U	U	0.2	0.2	0.082	U	U	0.19	0.19	0.082	U	U	0.2	0.2	0.082	U	U
Nitrotoluene, 2-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Nitrotoluene, 3-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Nitrotoluene, 4-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
RDX	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Tetryl	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Trinitrobenzene, 1,3,5-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
Trinitrotoluene, 2,4,6-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.19	0.19	0.078	U	U	0.2	0.2	0.078	U	U
General Chemistry																						
Hardness (as CaCO3)	N	mg/L	409	23	0.66			368	23	0.66			381	23	0.66			378	23	0.66		
Metals																						
Aluminum	N	µg/L	27300	200	20			39.4	200	20	B	J	44.6	200	20	B	J	48.4	200	20	B	J
Antimony	N	µg/L	6	6	1	U	U	6	6	1	U	U	6	6	1	U	U	6	6	1	U	U
Arsenic	N	µg/L	9.9	10	1	B	J	10	10	1	U	U	10	10	1	U	U	10	10	1	U	U
Barium	N	µg/L	273	200	1			35.7	200	1	B	J	37.3	200	1	B	J	35.3	200	1	B	J
Beryllium	N	µg/L	1.9	4	0.1	B	J	4	4	0.1	U	U	4	4	0.1	U	U	4	4	0.1	U	U
Cadmium	N	µg/L	5	5	0.1	U	U	5	5	0.1	U	U	5	5	0.1	U	U	5	5	0.1	U	U
Calcium	N	µg/L	110000	1000	50			106000	1000	50			110000	1000	50			109000	1000	50		
Chromium	N	µg/L	40.3	10	1			10	10	1	U	U	10	10	1	U	U	10	10	1	U	U
Cobalt	N	µg/L	21.6	50	1	B	J	50	50	1	U	U	50	50	1	U	U	50	50	1	U	U
Copper	N	µg/L	61.2	25	1			25	25	1	U	U	25	25	1	U	U	25	25	1	U	U
Iron	N	µg/L	41100	300	34			55.3	300	34	B	J	55.6	300	34	B	J	300	300	34		
Lead	N	µg/L	60.8	5	1			5	5	1	U	U	5	5	1	U	U	5	5	1	U	U
Magnesium	N	µg/L	32500	5000	50			25100	5000	50			25800	5000	50			25800	5000	50		
Manganese	N	µg/L	1220	15	1			14	15	1	B	J	24.4	15	1		J	99.3	15	1		
Mercury	N	µg/L	0.12	1	0.071	B	J	1	1	0.071	U	U	1	1	0.071	U	U	1	1	0.071	U	U
Nickel	N	µg/L	60.1	40	1			40	40	1	U	U	40	40	1	U	U	40	40	1	U	U
Potassium	N	µg/L	3150	10000	50	B	J	631	10000	50	B	J	647	10000	50	B	J	1030	10000	50	B	J
Selenium	N	µg/L	2.3	10	2	B	J	10	10	2	U	U	10	10	2	U	U	10	10	2	U	U
Silver	N	µg/L	10	10	1	U	U	10	10	1	U	U	10	10	1	U	U	10	10	1	U	U
Sodium	N	µg/L	4950	10000	750	B	J	6020	10000	750	B	J	6340	10000	750	B	J	7370	10000	750	B	J
Thallium	N	µg/L	10	10	1	U	U	10	10	1	U	U	10	10	1	U	U	10	10	1	U	U
Vanadium	N	µg/L	54.8	50	1			50	50	1	U	U	50	50	1	U	U	50	50	1	U	U
Zinc	N	µg/L	190	20	1			20	20	1	U	U	20	20	1	U	U	20	20	1	U	U
Semivolatiles																						
3-Methylphenol and 4-Methylphenol	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.8	4.8	1.1	U	U	4.9	4.9	1.1	U	U
Acenaphthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Acenaphthylene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Acetophenone	N	µg/L																				
Anthracene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Atrazine	N	µg/L																				
Benzaldehyde	N	µg/L																				
Benzo(a)anthracene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(a)pyrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(b)fluoranthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(ghi)perylene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(k)fluoranthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzoic acid	N	µg/L	48	48	9.6	U	U	48	48	9.5	U	U	48	48	9.6	U	U	49	49	9.7	U	U
Benzyl alcohol	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.8	4.8	0.96	U	U	4.9	4.9	0.97	U	U
Bibenzene	N	µg/L																				
Bis(2-chloroethoxy)methane	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Bis(2-chloroethyl)ether	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.8	4.8	0.52	U	U	4.9	4.9	0.52	U	U
Bis(2-chloroisopropyl)ether	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.8	4.8	0.52	U	U	4.9	4.9	0.52	U	U
Bis(2-ethylhexyl)phthalate	N	µg/L	3.1	4.8	1.1	J	J	4.8	4.8	1	U	U	4.8	4.8	1.1	U	U	4.9	4.9	1.1	U	U
Bromophenyl phenyl ether, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Butyl benzyl phthalate	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.8	4.8	1.1	U	U	4.9	4.9	1.1	U	U
Caprolactam	N	µg/L																				
Carbazole	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U

Table F-3

Surface Water Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION CODE	FSB-SW01					FSB-SW02					FSB-SW02					FSB-SW03				
		SAMPLE NO	FSB2000					FSB2001					FSB2002					FSB2004				
		SAMPLE DATE	9-Jan-12					9-Jan-12					9-Jan-12					9-Jan-12				
		DEPTH	0 - 0 Ft					0 - 0 Ft					0 - 0 Ft					0 - 0 Ft				
		SAMPLE PURPOSE	REG					REG					FD					REG				
Parameter	**Filtered**	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Chloro-3-methylphenol, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chloroaniline, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chloronaphthalene, 2-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chlorophenol, 2-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chlorophenyl phenyl ether, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chrysene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Dibenz(a,h)anthracene	N	µg/L	4.8	4.8	0.5	U	U	4.8	4.8	0.5	U	U	4.8	4.8	0.5	U	U	4.9	4.9	0.5	U	U
Dibenzofuran	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Dichlorobenzene, 1,2-	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.8	4.8	0.96	U	U	4.9	4.9	0.97	U	U
Dichlorobenzene, 1,3-	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.8	4.8	0.96	U	U	4.9	4.9	0.97	U	U
Dichlorobenzene, 1,4-	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.8	4.8	0.96	U	U	4.9	4.9	0.97	U	U
Dichlorobenzidine, 3,3'-	N	µg/L	9.6	9.6	0.96	U	U	9.5	9.5	0.95	U	U	9.6	9.6	0.96	U	U	9.7	9.7	0.97	U	U
Dichlorophenol, 2,4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Diethyl phthalate	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.8	4.8	1.1	U	U	4.9	4.9	1.1	U	U
Dimethyl phthalate	N	µg/L	4.8	4.8	0.95	U	U	4.8	4.8	0.94	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.96	U	U
Dimethylphenol, 2,4-	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.8	4.8	1.1	U	U	4.9	4.9	1.1	U	U
Di-n-butyl phthalate	N	µg/L	4.8	4.8	0.84	U	U	4.8	4.8	0.83	U	U	4.8	4.8	0.84	U	U	4.9	4.9	0.84	U	U
Dinitro-2-methylphenol, 4,6-	N	µg/L	9.6	9.6	1.9	U	U	9.5	9.5	1.9	U	U	9.6	9.6	1.9	U	U	9.7	9.7	1.9	U	U
Dinitrophenol, 2,4-	N	µg/L	24	24	9.6	U	U	24	24	9.5	U	U	24	24	9.6	U	U	24	24	9.7	U	U
Dinitrotoluene, 2,4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Dinitrotoluene, 2,6-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Di-n-octyl phthalate	N	µg/L	4.8	4.8	1.1	U	UJ	4.8	4.8	1	U	UJ	4.8	4.8	1.1	U	UJ	4.9	4.9	1.1	U	UJ
Fluoranthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Fluorene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Hexachlorobenzene	N	µg/L	4.8	4.8	0.54	U	U	4.8	4.8	0.53	U	U	4.8	4.8	0.54	U	U	4.9	4.9	0.54	U	U
Hexachlorobutadiene	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.8	4.8	0.96	U	U	4.9	4.9	0.97	U	U
Hexachlorocyclopentadiene	N	µg/L	9.6	9.6	1.8	U	U	9.5	9.5	1.8	U	U	9.6	9.6	1.8	U	U	9.7	9.7	1.8	U	U
Hexachloroethane	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.8	4.8	0.96	U	U	4.9	4.9	0.97	U	U
Indeno(1,2,3-cd)pyrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Isophorone	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Methylnaphthalene, 2-	N	µg/L	4.8	4.8	0.55	U	U	4.8	4.8	0.54	U	U	4.8	4.8	0.55	U	U	4.9	4.9	0.55	U	U
Methylphenol, 2-	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.8	4.8	0.52	U	U	4.9	4.9	0.52	U	U
Naphthalene	N	µg/L	4.8	4.8	0.77	U	U	4.8	4.8	0.76	U	U	4.8	4.8	0.77	U	U	4.9	4.9	0.78	U	U
Nitroaniline, 2-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Nitroaniline, 3-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Nitroaniline, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Nitrobenzene	N	µg/L	4.8	4.8	0.57	U	U	4.8	4.8	0.56	U	U	4.8	4.8	0.57	U	U	4.9	4.9	0.57	U	U
Nitrophenol, 2-	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.8	4.8	0.52	U	U	4.9	4.9	0.52	U	U
Nitrophenol, 4-	N	µg/L	24	24	4.8	U	U	24	24	4.8	U	U	24	24	4.8	U	U	24	24	4.9	U	U
n-Nitroso-di-n-propylamine	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
n-Nitrosodiphenylamine	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.8	4.8	0.96	U	U	4.9	4.9	0.97	U	U
Pentachlorophenol	N	µg/L	24	24	5.2	U	U	24	24	5.1	U	U	24	24	5.2	U	U	24	24	5.2	U	U
Phenanthrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Phenol	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Pyrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Trichlorobenzene, 1,2,4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Trichlorophenol, 2,4,5-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Trichlorophenol, 2,4,6-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U

FD - Field duplicate.
LQ - Laboratory qualifier.
MDL - Method detection limit.
µg/L - Micrograms per liter.
REG - Regular Sample.
RL - Reporting limit.
VQ - Validation qualifier.

Table F-3

Surface Water Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION CODE	FSB-SW04					FSB-SW05					FSB-SW06				
		SAMPLE NO	FSB2005					FSB2006					FSB2007				
		SAMPLE DATE	9-Jan-12					9-Jan-12					9-Jan-12				
		DEPTH	0 - 0 Ft					0 - 0 Ft					0 - 0 Ft				
		SAMPLE PURPOSE	REG					REG					REG				
Parameter	**Filtered**	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																	
Amino-2,6-dinitrotoluene, 4-	N	µg/L	0.2	0.2	0.082	U	U	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U
Amino-4,6-dinitrotoluene, 2-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Dinitrobenzene, 1,3-	N	µg/L	0.2	0.2	0.097	U	U	0.2	0.2	0.095	U	U	0.2	0.2	0.095	U	U
Dinitrotoluene, 2,4-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Dinitrotoluene, 2,6-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
HMX	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Nitrobenzene	N	µg/L	0.2	0.2	0.084	U	U	0.2	0.2	0.082	U	U	0.2	0.2	0.082	U	U
Nitrotoluene, 2-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Nitrotoluene, 3-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Nitrotoluene, 4-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
RDX	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Tetryl	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Trinitrobenzene, 1,3,5-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
Trinitrotoluene, 2,4,6-	N	µg/L	0.2	0.2	0.08	U	U	0.2	0.2	0.078	U	U	0.2	0.2	0.078	U	U
General Chemistry																	
Hardness (as CaCO3)	N	mg/L	418	23	0.66			422	23	0.66			456	23	0.66		
Metals																	
Aluminum	N	µg/L	75.2	200	20	B	J	2930	200	20			2060	200	20		
Antimony	N	µg/L	6	6	1	U	U	6	6	1	U	U	6	6	1	U	U
Arsenic	N	µg/L	10	10	1	U	U	6	10	1	B	J	10	10	1	U	U
Barium	N	µg/L	40	200	1	B	J	75.4	200	1	B	J	49.5	200	1	B	J
Beryllium	N	µg/L	4	4	0.1	U	U	4	4	0.1	U	U	4	4	0.1	U	U
Cadmium	N	µg/L	5	5	0.1	U	U	5	5	0.1	U	U	5	5	0.1	U	U
Calcium	N	µg/L	120000	1000	50			122000	1000	50			129000	1000	50		
Chromium	N	µg/L	10	10	1	U	U	3.7	10	1	B	J	2.7	10	1	B	J
Cobalt	N	µg/L	50	50	1	U	U	8.8	50	1	B	J	1.8	50	1	B	J
Copper	N	µg/L	25	25	1	U	U	4.6	25	1	B	J	3.7	25	1	B	J
Iron	N	µg/L	561	300	34			20800	300	34			3250	300	34		
Lead	N	µg/L	5	5	1	U	U	3.5	5	1	B	J	4.6	5	1	B	J
Magnesium	N	µg/L	28700	5000	50			28400	5000	50			32500	5000	50		
Manganese	N	µg/L	131	15	1			1900	15	1			229	15	1		
Mercury	N	µg/L	1	1	0.071	U	U	1	1	0.071	U	U	1	1	0.071	U	U
Nickel	N	µg/L	40	40	1	U	U	5.6	40	1	B	J	4.4	40	1	B	J
Potassium	N	µg/L	1420	10000	50	B	J	1660	10000	50	B	J	1580	10000	50	B	J
Selenium	N	µg/L	10	10	2	U	U	10	10	2	U	U	10	10	2	U	U
Silver	N	µg/L	10	10	1	U	U	10	10	1	U	U	10	10	1	U	U
Sodium	N	µg/L	8320	10000	750	B	J	8080	10000	750	B	J	8000	10000	750	B	J
Thallium	N	µg/L	10	10	1	U	U	10	10	1	U	U	10	10	1	U	U
Vanadium	N	µg/L	50	50	1	U	U	6	50	1	B	J	4.8	50	1	B	J
Zinc	N	µg/L	20	20	1	U	U	37.7	20	1			12.3	20	1	B	J
Semivolatiles																	
3-Methylphenol and 4-Methylphenol	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.9	4.9	1.1	U	U
Acenaphthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Acenaphthylene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Acetophenone	N	µg/L															
Anthracene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Atrazine	N	µg/L															
Benzaldehyde	N	µg/L															
Benzo(a)anthracene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(a)pyrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(b)fluoranthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(ghi)perylene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzo(k)fluoranthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Benzoic acid	N	µg/L	48	48	9.6	U	U	48	48	9.5	U	U	49	49	9.7	U	U
Benzyl alcohol	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.97	U	U
Bibenzene	N	µg/L															
Bis(2-chloroethoxy)methane	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Bis(2-chloroethyl)ether	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.9	4.9	0.52	U	U
Bis(2-chloroisopropyl)ether	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.9	4.9	0.52	U	U
Bis(2-ethylhexyl)phthalate	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.9	4.9	1.1	U	U
Bromophenyl phenyl ether, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Butyl benzyl phthalate	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.9	4.9	1.1	U	U
Caprolactam	N	µg/L															
Carbazole	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U

Table F-3

Surface Water Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

		LOCATION CODE	FSB-SW04					FSB-SW05					FSB-SW06				
		SAMPLE NO	FSB2005					FSB2006					FSB2007				
		SAMPLE DATE	9-Jan-12					9-Jan-12					9-Jan-12				
		DEPTH	0 - 0 Ft					0 - 0 Ft					0 - 0 Ft				
		SAMPLE PURPOSE	REG					REG					REG				
Parameter	**Filtered**	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Chloro-3-methylphenol, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chloroaniline, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chloronaphthalene, 2-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chlorophenol, 2-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chlorophenyl phenyl ether, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Chrysene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Dibenz(a,h)anthracene	N	µg/L	4.8	4.8	0.5	U	U	4.8	4.8	0.5	U	U	4.9	4.9	0.5	U	U
Dibenzofuran	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Dichlorobenzene, 1,2-	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.97	U	U
Dichlorobenzene, 1,3-	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.97	U	U
Dichlorobenzene, 1,4-	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.97	U	U
Dichlorobenzidine, 3,3'-	N	µg/L	9.6	9.6	0.96	U	U	9.5	9.5	0.95	U	U	9.7	9.7	0.97	U	U
Dichlorophenol, 2,4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Diethyl phthalate	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.9	4.9	1.1	U	U
Dimethyl phthalate	N	µg/L	4.8	4.8	0.95	U	U	4.8	4.8	0.94	U	U	4.9	4.9	0.96	U	U
Dimethylphenol, 2,4-	N	µg/L	4.8	4.8	1.1	U	U	4.8	4.8	1	U	U	4.9	4.9	1.1	U	U
Di-n-butyl phthalate	N	µg/L	4.8	4.8	0.84	U	U	4.8	4.8	0.83	U	U	4.9	4.9	0.84	U	U
Dinitro-2-methylphenol, 4,6-	N	µg/L	9.6	9.6	1.9	U	U	9.5	9.5	1.9	U	U	9.7	9.7	1.9	U	U
Dinitrophenol, 2,4-	N	µg/L	24	24	9.6	U	U	24	24	9.5	U	U	24	24	9.7	U	U
Dinitrotoluene, 2,4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Dinitrotoluene, 2,6-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Di-n-octyl phthalate	N	µg/L	4.8	4.8	1.1	U	UJ	4.8	4.8	1	U	UJ	4.9	4.9	1.1	U	UJ
Fluoranthene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Fluorene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Hexachlorobenzene	N	µg/L	4.8	4.8	0.54	U	U	4.8	4.8	0.53	U	U	4.9	4.9	0.54	U	U
Hexachlorobutadiene	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.97	U	U
Hexachlorocyclopentadiene	N	µg/L	9.6	9.6	1.8	U	U	9.5	9.5	1.8	U	U	9.7	9.7	1.8	U	U
Hexachloroethane	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.97	U	U
Indeno(1,2,3-cd)pyrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Isophorone	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	UJ
Methylnaphthalene, 2-	N	µg/L	4.8	4.8	0.55	U	U	4.8	4.8	0.54	U	U	4.9	4.9	0.55	U	U
Methylphenol, 2-	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.9	4.9	0.52	U	U
Naphthalene	N	µg/L	4.8	4.8	0.77	U	U	4.8	4.8	0.76	U	U	4.9	4.9	0.78	U	U
Nitroaniline, 2-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Nitroaniline, 3-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Nitroaniline, 4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Nitrobenzene	N	µg/L	4.8	4.8	0.57	U	U	4.8	4.8	0.56	U	U	4.9	4.9	0.57	U	U
Nitrophenol, 2-	N	µg/L	4.8	4.8	0.52	U	U	4.8	4.8	0.51	U	U	4.9	4.9	0.52	U	U
Nitrophenol, 4-	N	µg/L	24	24	4.8	U	U	24	24	4.8	U	U	24	24	4.9	U	U
n-Nitroso-di-n-propylamine	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
n-Nitrosodiphenylamine	N	µg/L	4.8	4.8	0.96	U	U	4.8	4.8	0.95	U	U	4.9	4.9	0.97	U	U
Pentachlorophenol	N	µg/L	24	24	5.2	U	U	24	24	5.1	U	U	24	24	5.2	U	U
Phenanthrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Phenol	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Pyrene	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Trichlorobenzene, 1,2,4-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Trichlorophenol, 2,4,5-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U
Trichlorophenol, 2,4,6-	N	µg/L	4.8	4.8	0.48	U	U	4.8	4.8	0.48	U	U	4.9	4.9	0.49	U	U

FD - Field duplicate.
LQ - Laboratory qualifier.
MDL - Method detection limit.
µg/L - Micrograms per liter.
REG - Regular Sample.
RL - Reporting limit.
VQ - Validation qualifier.

Table F-4

Sediment Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SD01					FSB-SD02					FSB-SD02					FSB-SD03				
SAMPLE NO		FSB1001					FSB1002					FSB1003					FSB1005				
SAMPLE DATE		31-Aug-11					31-Aug-11					31-Aug-11					31-Aug-11				
DEPTH		0 - 0.3 Ft					0 - 0.1 Ft					0 - 0.1 Ft					0 - 0.1 Ft				
SAMPLE PURPOSE		REG					REG					FD					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																					
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Dinitrobenzene, 1,3-	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Dinitrotoluene, 2,4-	mg/kg	0.2	0.2	0.097	U	U	0.2	0.2	0.097	U	U	0.19	0.19	0.092	U	U	0.2	0.2	0.097	U	U
Dinitrotoluene, 2,6-	mg/kg	0.2	0.2	0.087	U	U	0.2	0.2	0.087	U	U	0.19	0.19	0.082	U	U	0.2	0.2	0.087	U	U
HMX	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Nitrobenzene	mg/kg	0.2	0.2	0.093	U	U	0.2	0.2	0.093	U	U	0.19	0.19	0.088	U	U	0.2	0.2	0.093	U	U
Nitrotoluene, 2-	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Nitrotoluene, 3-	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Nitrotoluene, 4-	mg/kg	0.2	0.2	0.1	U	U	0.2	0.2	0.1	U	U	0.19	0.19	0.096	U	U	0.2	0.2	0.1	U	U
RDX	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Tetryl	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Trinitrobenzene, 1,3,5-	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.2	0.2	0.08	U	U	0.2	0.2	0.08	U	U	0.19	0.19	0.076	U	U	0.2	0.2	0.08	U	U
General Chemistry																					
% Solids	Percent	71.4	0				81.6	0				87.7	0				84.6	0			
Total organic carbon	Percent	3.5	2	2																	
Metals																					
Aluminum	mg/kg	7420	64	7.7			8530	45	5.4			7080	42	5			11900	59	7.1		
Antimony	mg/kg	6.4	6.4	0.32	U	U	4.5	4.5	0.23	U	U	4.2	4.2	0.21	U	U	5.9	5.9	0.3	U	U
Arsenic	mg/kg	4.6	3.2	0.32			8.2	2.3	0.23			7.7	2.1	0.21			8.5	3	0.3		
Barium	mg/kg	52.5	64	1.3	B	J	49.2	45	0.9			44.3	42	0.84			81.1	59	1.2		
Beryllium	mg/kg	0.43	1.6	0.032	B	J	0.42	1.1	0.023	B	J	0.35	1	0.021	B	J	0.82	1.5	0.03	B	J
Cadmium	mg/kg	1.3	1.3	0.032	U	U	0.9	0.9	0.023	U	U	0.21	0.84	0.021	B	J	1.2	1.2	0.03		
Calcium	mg/kg	3940	1600	16			10800	1100	11			11700	1000	10			7590	1500	15		
Chromium	mg/kg	11.7	3.2	0.32			13	2.3	0.23			10.9	2.1	0.21			14.8	3	0.3		
Cobalt	mg/kg	5.1	16	0.32	B	J	6.5	11	0.23	B	J	5.7	10	0.21	B	J	7.5	15	0.3	B	J
Copper	mg/kg	15.2	8	0.32			14.3	5.6	0.23			12.8	5.2	0.21			25.8	7.4	0.3		
Iron	mg/kg	12900	96	7.4			16000	68	5.2			13800	63	4.8			19900	89	6.8		
Lead	mg/kg	17.8	1.3	0.064			14	0.9	0.045			13.2	0.84	0.042			21.9	1.2	0.059		
Magnesium	mg/kg	1840	1600	16			3040	1100	11			2930	1000	10			2090	1500	15		
Manganese	mg/kg	243	4.8	0.32			216	3.4	0.23			194	3.1	0.21			226	4.4	0.3		
Mercury	mg/kg	0.083	0.11	0.0076	B	J	0.062	0.1	0.0073	B	J	0.045	0.09	0.0064	B	J	0.098	0.092	0.0066		
Nickel	mg/kg	13.7	13	0.32			16.3	9	0.23			14.4	8.4	0.21			24.5	12	0.3		
Potassium	mg/kg	772	3200	16	B	J	760	2300	11	B	J	580	2100	10	B	J	1360	3000	15	B	J
Selenium	mg/kg	6.4	6.4	0.64	U	U	4.5	4.5	0.45	U	U	0.9	4.2	0.42	B	J	2	5.9	0.59	B	J
Silver	mg/kg	3.2	3.2	0.32	U	U	2.3	2.3	0.23	U	U	2.1	2.1	0.21	U	U	3	3	0.3	U	U
Sodium	mg/kg	3200	3200	270	U	U	2300	2300	190	U	U	2100	2100	180	U	U	3000	3000	250	U	U
Thallium	mg/kg	0.64	0.64	0.096	U	U	0.45	0.45	0.068	U	U	0.42	0.42	0.063	U	U	3	3	0.89	U	U
Vanadium	mg/kg	18.5	16	0.32			21	11	0.23			17.5	10	0.21			23.1	15	0.3		
Zinc	mg/kg	46.6	6.4	0.32			42.8	4.5	0.23			38.7	4.2	0.21			92.1	5.9	0.3		
Pesticides/PCBs																					
Aroclor 1016	mg/kg	0.023	0.023	0.0094	U	U	0.021	0.021	0.0083	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0079	U	U
Aroclor 1221	mg/kg	0.023	0.023	0.012	U	U	0.021	0.021	0.01	U	U	0.019	0.019	0.0095	U	U	0.02	0.02	0.0099	U	U
Aroclor 1232	mg/kg	0.023	0.023	0.012	U	U	0.021	0.021	0.01	U	U	0.019	0.019	0.0095	U	U	0.02	0.02	0.0099	U	U
Aroclor 1242	mg/kg	0.023	0.023	0.0094	U	U	0.021	0.021	0.0083	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0079	U	U
Aroclor 1248	mg/kg	0.023	0.023	0.0094	U	U	0.021	0.021	0.0083	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0079	U	U
Aroclor 1254	mg/kg	0.023	0.023	0.0094	U	U	0.021	0.021	0.0083	U	U	0.019	0.019	0.0076	U	U	0.02	0.02	0.0079	U	U
Aroclor 1260	mg/kg	0.0179	0.023	0.0094	J	J	0.0139	0.021	0.0083	J	J	0.0143	0.019	0.0076	J	J	0.0283	0.02	0.0079	J	J
Aroclor 1268	mg/kg																0.0332	0.02	0.0079	J	J
-																					
3-Methylphenol and 4-Methylphenol	mg/kg	0.23	0.23	0.034	U	U	0.21	0.21	0.03	U	U	0.19	0.19	0.027	U	U	0.79	0.79	0.11	U	U
Acenaphthene	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Acenaphthylene	mg/kg	0.23	0.23	0.023	U	U	0.128	0.21	0.021	J	J	0.109	0.19	0.019	J	J	0.79	0.79	0.079	U	U
Acetophenone	mg/kg																				
Anthracene	mg/kg	0.23	0.23	0.023	U	U	0.146	0.21	0.021	J	J	0.113	0.19	0.019	J	J	0.79	0.79	0.079	U	U

Table F-4

Sediment Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SD01					FSB-SD02					FSB-SD02					FSB-SD03				
SAMPLE NO		FSB1001					FSB1002					FSB1003					FSB1005				
SAMPLE DATE		31-Aug-11					31-Aug-11					31-Aug-11					31-Aug-11				
DEPTH		0 - 0.3 Ft					0 - 0.1 Ft					0 - 0.1 Ft					0 - 0.1 Ft				
SAMPLE PURPOSE		REG					REG					FD					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Atrazine	mg/kg																				
Benzaldehyde	mg/kg																				
Benzo(a)anthracene	mg/kg	0.23	0.23	0.023	U	U	0.448	0.21	0.021			0.344	0.19	0.019			0.79	0.79	0.079	U	U
Benzo(a)pyrene	mg/kg	0.0241	0.23	0.023	J	J	0.498	0.21	0.021			0.393	0.19	0.019			0.79	0.79	0.079	U	U
Benzo(b)fluoranthene	mg/kg	0.0318	0.23	0.023	J	J	0.895	0.21	0.021			0.703	0.19	0.019			0.11	0.79	0.079	J	J
Benzo(ghi)perylene	mg/kg	0.23	0.23	0.023	U	U	0.432	0.21	0.021			0.363	0.19	0.019			0.79	0.79	0.079	U	U
Benzo(k)fluoranthene	mg/kg	0.23	0.23	0.023	U	U	0.35	0.21	0.021			0.28	0.19	0.019			0.79	0.79	0.079	U	U
Benzoic acid	mg/kg	1.2	1.2	0.41	U	U	1	1	0.36	U	U	0.95	0.95	0.33	U	U	4	4	1.4	U	U
Benzyl alcohol	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Bibenzene	mg/kg																				
Bis(2-chloroethoxy)methane	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Bis(2-chloroethyl)ether	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.47	0.47	0.094	U	U	0.41	0.41	0.083	U	U	0.38	0.38	0.076	U	U	1.6	1.6	0.32	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Butyl benzyl phthalate	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Caprolactam	mg/kg																				
Carbazole	mg/kg	0.23	0.23	0.023	U	U	0.0438	0.21	0.021	J	J	0.0375	0.19	0.019	J	J	0.79	0.79	0.079	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Chloroaniline, 4-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Chloronaphthalene, 2-	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Chlorophenol, 2-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Chrysene	mg/kg	0.0269	0.23	0.023	J	J	0.668	0.21	0.021			0.516	0.19	0.019			0.0811	0.79	0.079	J	J
Dibenz(a,h)anthracene	mg/kg	0.23	0.23	0.023	U	U	0.105	0.21	0.021	J	J	0.0941	0.19	0.019	J	J	0.79	0.79	0.079	U	U
Dibenzofuran	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Dichlorobenzene, 1,2-	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Dichlorobenzene, 1,3-	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Dichlorobenzene, 1,4-	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.47	0.47	0.047	U	U	0.41	0.41	0.041	U	U	0.38	0.38	0.038	U	U	1.6	1.6	0.16	U	U
Dichlorophenol, 2,4-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Diethyl phthalate	mg/kg	0.47	0.47	0.094	U	U	0.41	0.41	0.083	U	U	0.38	0.38	0.076	U	U	1.6	1.6	0.32	U	U
Dimethyl phthalate	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Dimethylphenol, 2,4-	mg/kg	0.23	0.23	0.03	U	U	0.21	0.21	0.026	U	U	0.19	0.19	0.024	U	U	0.79	0.79	0.1	U	U
Di-n-butyl phthalate	mg/kg	0.47	0.47	0.094	U	U	0.41	0.41	0.083	U	U	0.38	0.38	0.076	U	U	1.6	1.6	0.32	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.47	0.47	0.094	U	U	0.41	0.41	0.083	U	U	0.38	0.38	0.076	U	U	1.6	1.6	0.32	U	U
Dinitrophenol, 2,4-	mg/kg	1.2	1.2	0.47	U	U	1	1	0.41	U	U	0.95	0.95	0.38	U	U	4	4	1.6	U	U
Dinitrotoluene, 2,4-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Dinitrotoluene, 2,6-	mg/kg	0.23	0.23	0.028	U	U	0.21	0.21	0.024	U	U	0.19	0.19	0.022	U	U	0.79	0.79	0.094	U	U
Di-n-octyl phthalate	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Fluoranthene	mg/kg	0.0454	0.23	0.023	J	J	0.633	0.21	0.021			0.543	0.19	0.019			0.112	0.79	0.079	J	J
Fluorene	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Hexachlorobenzene	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Hexachlorobutadiene	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Hexachlorocyclopentadiene	mg/kg	0.23	0.23	0.1	U	U	0.21	0.21	0.091	U	U	0.19	0.19	0.084	U	U	0.79	0.79	0.35	U	U
Hexachloroethane	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.23	0.23	0.023	U	U	0.425	0.21	0.021			0.357	0.19	0.019			0.79	0.79	0.079	U	U
Isophorone	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Methylnaphthalene, 2-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Methylphenol, 2-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Naphthalene	mg/kg	0.23	0.23	0.038	U	U	0.21	0.21	0.033	U	U	0.19	0.19	0.03	U	U	0.79	0.79	0.13	U	U
Nitroaniline, 2-	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Nitroaniline, 3-	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Nitroaniline, 4-	mg/kg	0.23	0.23	0.047	U	U	0.21	0.21	0.041	U	U	0.19	0.19	0.038	U	U	0.79	0.79	0.16	U	U
Nitrobenzene	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Nitrophenol, 2-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Nitrophenol, 4-	mg/kg	1.2	1.2	0.19	U	U	1	1	0.17	U	U	0.95	0.95	0.15	U	U	4	4	0.63	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
n-Nitrosodiphenylamine	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Pentachlorophenol	mg/kg	1.2	1.2	0.28	U	U	1	1	0.25	U	U	0.95	0.95	0.23	U	U	4	4	0.95	U	U

Table F-4

Sediment Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SD01					FSB-SD02					FSB-SD02					FSB-SD03				
SAMPLE NO		FSB1001					FSB1002					FSB1003					FSB1005				
SAMPLE DATE		31-Aug-11					31-Aug-11					31-Aug-11					31-Aug-11				
DEPTH		0 - 0.3 Ft					0 - 0.1 Ft					0 - 0.1 Ft					0 - 0.1 Ft				
SAMPLE PURPOSE		REG					REG					FD					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Phenanthrene	mg/kg	0.23	0.23	0.023	U	U	0.132	0.21	0.021	J	J	0.0993	0.19	0.019	J	J	0.79	0.79	0.079	U	U
Phenol	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Pyrene	mg/kg	0.0362	0.23	0.023	J	J	0.659	0.21	0.021			0.525	0.19	0.019			0.0907	0.79	0.079	J	J
Trichlorobenzene, 1,2,4-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.23	0.23	0.023	U	U	0.21	0.21	0.021	U	U	0.19	0.19	0.019	U	U	0.79	0.79	0.079	U	U

FD - Field duplicate.
LQ - Laboratory qualifier.
MDL - Method detection limit.
mg/kg - Milligrams per kilogram.
REG - Regular Sample.
RL - Reporting limit.
VQ - Validation qualifier.

Table F-4

Sediment Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SD04					FSB-SD05					FSB-SD06				
SAMPLE NO		FSB1006					FSB1007					FSB1008				
SAMPLE DATE		31-Aug-11					31-Aug-11					31-Aug-11				
DEPTH		0 - 0.2 Ft					0 - 0.2 Ft					0 - 0.2 Ft				
SAMPLE PURPOSE		REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Explosives																
Amino-2,6-dinitrotoluene, 4-	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Amino-4,6-dinitrotoluene, 2-	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Dinitrobenzene, 1,3-	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Dinitrotoluene, 2,4-	mg/kg	0.19	0.19	0.092	U	U	0.19	0.19	0.093	U	U	0.2	0.2	0.096	U	U
Dinitrotoluene, 2,6-	mg/kg	0.19	0.19	0.083	U	U	0.19	0.19	0.083	U	U	0.2	0.2	0.086	U	U
HMX	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Nitrobenzene	mg/kg	0.19	0.19	0.089	U	U	0.19	0.19	0.089	U	U	0.2	0.2	0.092	U	U
Nitrotoluene, 2-	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Nitrotoluene, 3-	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Nitrotoluene, 4-	mg/kg	0.19	0.19	0.096	U	U	0.19	0.19	0.097	U	U	0.2	0.2	0.1	U	U
RDX	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Tetryl	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	UJ
Trinitrobenzene, 1,3,5-	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
Trinitrotoluene, 2,4,6-	mg/kg	0.19	0.19	0.076	U	U	0.19	0.19	0.077	U	U	0.2	0.2	0.079	U	U
General Chemistry																
% Solids	Percent	72.4	0				69.2	0				65.6	0			
Total organic carbon	Percent															
Metals																
Aluminum	mg/kg	10000	66	7.9			9330	62	7.4			14400	67	8.1		J
Antimony	mg/kg	6.6	6.6	0.33	U	U	6.2	6.2	0.31	U	U	6.7	6.7	0.34	U	UJ
Arsenic	mg/kg	5.5	3.3	0.33			18.5	3.1	0.31			12	3.4	0.34		J
Barium	mg/kg	86.9	66	1.3			122	62	1.2			77.5	67	1.3		J
Beryllium	mg/kg	1.6	1.6	0.033	U	UJ	0.48	1.5	0.031	B	J	0.82	1.7	0.034	B	J
Cadmium	mg/kg	1.3	1.3	0.033	U	U	0.46	1.2	0.031	B	J	0.47	1.3	0.034	B	J
Calcium	mg/kg	5060	1600	16			4710	1500	15			12700	1700	17		J
Chromium	mg/kg	14.2	3.3	0.33			11.2	3.1	0.31			18.1	3.4	0.34		J
Cobalt	mg/kg	5.6	16	0.33	B	J	4.7	15	0.31	B	J	15.1	17	0.34	B	J
Copper	mg/kg	20.7	8.2	0.33			16.5	7.7	0.31			25.1	8.4	0.34		J
Iron	mg/kg	12900	99	7.6			38000	93	7.1			25500	100	7.8		J
Lead	mg/kg	16.7	1.3	0.066			34.5	1.2	0.062			33.1	1.3	0.067		
Magnesium	mg/kg	2580	1600	16			1140	1500	15	B	J	5290	1700	17		J
Manganese	mg/kg	111	4.9	0.33			142	4.6	0.31			819	5.1	0.34		J
Mercury	mg/kg	0.089	0.1	0.0074	B	J	0.069	0.11	0.0081	B	J	0.11	0.12	0.0083	B	J
Nickel	mg/kg	16.2	13	0.33			10	12	0.31	B	J	29.3	13	0.34		J
Potassium	mg/kg	1110	3300	16	B	J	963	3100	15	B	J	941	3400	17	B	J
Selenium	mg/kg	6.6	6.6	0.66	U	U	3.3	6.2	0.62	B	J	1.9	6.7	0.67	B	J
Silver	mg/kg	3.3	3.3	0.33	U	U	3.1	3.1	0.31	U	U	3.4	3.4	0.34	U	U
Sodium	mg/kg	3300	3300	280	U	U	3100	3100	260	U	U	3400	3400	290	U	U
Thallium	mg/kg	0.66	0.66	0.099	U	U	0.62	0.62	0.093	U	U	0.67	0.67	0.1	U	U
Vanadium	mg/kg	21.4	16	0.33			28.5	15	0.31			28.2	17	0.34		J
Zinc	mg/kg	46.5	6.6	0.33			42	6.2	0.31			93.2	6.7	0.34		J
Pesticides/PCBs																
Aroclor 1016	mg/kg	0.023	0.023	0.0091	U	U	0.024	0.024	0.0097	U	U	0.51	0.51	0.2	U	U
Aroclor 1221	mg/kg	0.023	0.023	0.011	U	U	0.024	0.024	0.012	U	U	0.51	0.51	0.26	U	U
Aroclor 1232	mg/kg	0.023	0.023	0.011	U	U	0.024	0.024	0.012	U	U	0.51	0.51	0.26	U	U
Aroclor 1242	mg/kg	0.023	0.023	0.0091	U	U	0.024	0.024	0.0097	U	U	0.51	0.51	0.2	U	U
Aroclor 1248	mg/kg	0.023	0.023	0.0091	U	U	0.024	0.024	0.0097	U	U	0.51	0.51	0.2	U	U
Aroclor 1254	mg/kg	0.023	0.023	0.0091	U	U	0.024	0.024	0.0097	U	U	0.51	0.51	0.2	U	U
Aroclor 1260	mg/kg	0.015	0.023	0.0091	J	J	0.0413	0.024	0.0097	J	J	1.03	0.51	0.2	J	J
Aroclor 1268	mg/kg	0.0132	0.023	0.0091	J	J	0.164	0.024	0.0097	J	J	5.17	0.51	0.2	J	J
`-																
3-Methylphenol and 4-Methylphenol	mg/kg	0.23	0.23	0.033	U	U	0.24	0.24	0.035	U	U	0.25	0.25	0.036	U	U
Acenaphthene	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Acenaphthylene	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Acetophenone	mg/kg															
Anthracene	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U

Table F-4

Sediment Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SD04					FSB-SD05					FSB-SD06				
SAMPLE NO		FSB1006					FSB1007					FSB1008				
SAMPLE DATE		31-Aug-11					31-Aug-11					31-Aug-11				
DEPTH		0 - 0.2 Ft					0 - 0.2 Ft					0 - 0.2 Ft				
SAMPLE PURPOSE		REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Atrazine	mg/kg															
Benzaldehyde	mg/kg															
Benzo(a)anthracene	mg/kg	0.23	0.23	0.023	U	U	0.0512	0.24	0.024	J	J	0.0745	0.25	0.025	J	J
Benzo(a)pyrene	mg/kg	0.0269	0.23	0.023	J	J	0.0675	0.24	0.024	J	J	0.0845	0.25	0.025	J	J
Benzo(b)fluoranthene	mg/kg	0.0385	0.23	0.023	J	J	0.132	0.24	0.024	J	J	0.119	0.25	0.025	J	J
Benzo(ghi)perylene	mg/kg	0.0231	0.23	0.023	J	J	0.0638	0.24	0.024	J	J	0.0563	0.25	0.025	J	J
Benzo(k)fluoranthene	mg/kg	0.23	0.23	0.023	U	U	0.048	0.24	0.024	J	J	0.0476	0.25	0.025	J	J
Benzoic acid	mg/kg	1.1	1.1	0.4	U	U	1.2	1.2	0.42	U	U	1.3	1.3	0.44	U	R
Benzyl alcohol	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Bibenzene	mg/kg															
Bis(2-chloroethoxy)methane	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Bis(2-chloroethyl)ether	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Bis(2-chloroisopropyl)ether	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Bis(2-ethylhexyl)phthalate	mg/kg	0.45	0.45	0.091	U	U	0.48	0.48	0.096	U	U	0.5	0.5	0.1	U	U
Bromophenyl phenyl ether, 4-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Butyl benzyl phthalate	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Caprolactam	mg/kg															
Carbazole	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Chloro-3-methylphenol, 4-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Chloroaniline, 4-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Chloronaphthalene, 2-	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Chlorophenol, 2-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Chlorophenyl phenyl ether, 4-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Chrysene	mg/kg	0.0312	0.23	0.023	J	J	0.0924	0.24	0.024	J	J	0.11	0.25	0.025	J	J
Dibenz(a,h)anthracene	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Dibenzofuran	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Dichlorobenzene, 1,2-	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Dichlorobenzene, 1,3-	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Dichlorobenzene, 1,4-	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Dichlorobenzidine, 3,3'-	mg/kg	0.45	0.45	0.045	U	U	0.48	0.48	0.048	U	U	0.5	0.5	0.05	U	U
Dichlorophenol, 2,4-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Diethyl phthalate	mg/kg	0.45	0.45	0.091	U	U	0.48	0.48	0.096	U	U	0.5	0.5	0.1	U	U
Dimethyl phthalate	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Dimethylphenol, 2,4-	mg/kg	0.23	0.23	0.029	U	U	0.24	0.24	0.03	U	U	0.25	0.25	0.032	U	U
Di-n-butyl phthalate	mg/kg	0.45	0.45	0.091	U	U	0.48	0.48	0.096	U	U	0.5	0.5	0.1	U	U
Dinitro-2-methylphenol, 4,6-	mg/kg	0.45	0.45	0.091	U	U	0.48	0.48	0.096	U	U	0.5	0.5	0.1	U	U
Dinitrophenol, 2,4-	mg/kg	1.1	1.1	0.45	U	U	1.2	1.2	0.48	U	U	1.3	1.3	0.5	U	UJ
Dinitrotoluene, 2,4-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Dinitrotoluene, 2,6-	mg/kg	0.23	0.23	0.027	U	U	0.24	0.24	0.028	U	U	0.25	0.25	0.03	U	U
Di-n-octyl phthalate	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Fluoranthene	mg/kg	0.0419	0.23	0.023	J	J	0.126	0.24	0.024	J	J	0.17	0.25	0.025	J	J
Fluorene	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Hexachlorobenzene	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Hexachlorobutadiene	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Hexachlorocyclopentadiene	mg/kg	0.23	0.23	0.1	U	U	0.24	0.24	0.11	U	U	0.25	0.25	0.11	U	R
Hexachloroethane	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	UJ
Indeno(1,2,3-cd)pyrene	mg/kg	0.0247	0.23	0.023	J	J	0.0697	0.24	0.024	J	J	0.0669	0.25	0.025	J	J
Isophorone	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	UJ
Methylnaphthalene, 2-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Methylphenol, 2-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	UJ
Naphthalene	mg/kg	0.23	0.23	0.036	U	U	0.24	0.24	0.039	U	U	0.25	0.25	0.04	U	U
Nitroaniline, 2-	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Nitroaniline, 3-	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Nitroaniline, 4-	mg/kg	0.23	0.23	0.045	U	U	0.24	0.24	0.048	U	U	0.25	0.25	0.05	U	U
Nitrobenzene	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Nitrophenol, 2-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Nitrophenol, 4-	mg/kg	1.1	1.1	0.18	U	U	1.2	1.2	0.19	U	U	1.3	1.3	0.2	U	U
n-Nitroso-di-n-propylamine	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
n-Nitrosodiphenylamine	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Pentachlorophenol	mg/kg	1.1	1.1	0.27	U	U	1.2	1.2	0.29	U	U	1.3	1.3	0.3	U	U

Table F-4

Sediment Data Used in the Screening-Level Ecological Risk Assessment
Former Sellite Area
Former Plum Brook Ordnance Works, Sandusky, Ohio

LOCATION CODE		FSB-SD04					FSB-SD05					FSB-SD06				
SAMPLE NO		FSB1006					FSB1007					FSB1008				
SAMPLE DATE		31-Aug-11					31-Aug-11					31-Aug-11				
DEPTH		0 - 0.2 Ft					0 - 0.2 Ft					0 - 0.2 Ft				
SAMPLE PURPOSE		REG					REG					REG				
Parameter	**Units**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**	**Result**	**RL**	**MDL**	**LQ**	**VQ**
Phenanthrene	mg/kg	0.23	0.23	0.023	U	U	0.0399	0.24	0.024	J	J	0.0857	0.25	0.025	J	J
Phenol	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Pyrene	mg/kg	0.0339	0.23	0.023	J	J	0.101	0.24	0.024	J	J	0.133	0.25	0.025	J	J
Trichlorobenzene, 1,2,4-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Trichlorophenol, 2,4,5-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U
Trichlorophenol, 2,4,6-	mg/kg	0.23	0.23	0.023	U	U	0.24	0.24	0.024	U	U	0.25	0.25	0.025	U	U

FD - Field duplicate.
LQ - Laboratory qualifier.
MDL - Method detection limit.
mg/kg - Milligrams per kilogram.
REG - Regular Sample.
RL - Reporting limit.
VQ - Validation qualifier.

RESPONSE TO COMMENTS

Responses to Ohio Environmental Protection Agency Comments on the Draft Baseline Human Health Risk Assessment and Screening-Level Ecological Risk Assessment for the Garage Maintenance Area (Former Sellite Area) Former Plum Brook Ordnance Works, Sandusky, Ohio, Dated August 19, 2013

Comments by Brian Tucker, Risk Assessor, Ohio Environmental Protection Agency, received September 9, 2013.

BHHRA Comments

Comment 1: **Section 3.2.1. Ground water should be evaluated based on data from individual wells. 95% UCL estimates from the same well may be used. Revise ground water risk estimates from ground water exposure to be based on individual wells.**

Response 1: The evaluation of groundwater was performed as described in the final Sellite Area work plan (Shaw, 2013a) and is consistent with the BHHRA groundwater evaluation protocol for all other baseline human health risk assessments conducted at PBOW to date. 95 percent upper confidence limits on the mean concentrations (UCL) cannot be calculated on a well-by-well basis at the Former Sellite Area because only two samples were collected per well. Please note that of the 11 COPCs identified for overburden groundwater, 4 use the maximum detected concentration (MDC) of the data set as the exposure point concentration (EPC). Of the 7 remaining COPCs, the MDCs of the data sets are each less than 1.5 times the UCL value used as the EPC; thus the UCLs appear to be appropriately conservative, especially given that no site-related contamination or chemical plumes are present in the overburden groundwater. Thus, even if well-specific MDCs were used, the conclusions of the BHHRA would not be affected: the elevated risk values associated with the groundwater pathway result from natural sources.

Comment 2: **Section 3.2.2.4. Ohio EPA has specific life history information on various wildlife, including white-tailed deer (see page 4-39 of: http://www.epa.ohio.gov/portals/30/rules/RR-031.pdf), as part of the ecological risk assessment guidance. Part of that information includes a soil fraction as part of the diet which was not included in the estimate of contaminant concentration in venison. Please include in future assessments.**

Response 2: The Ohio EPA life history data will be considered for future PBOW BHHRA work plans. The venison ingestion pathway was evaluated as described in the final Sellite Area work plan (Shaw, 2013a) and is consistent with the BHHRA evaluation protocol for all other baseline human health risk assessments conducted at PBOW to date.

SLERA Comments

Comment 3: **Section 2.2.3.1. Provide clarification that the State of Ohio Surface Water Quality Standards (OAC 3745-1) are not screening values (although may be used in the screening process) but specific standards to be met in waters of the state. In addition, it is not clear from the text whether the appropriate standards were evaluated (e.g., outside mixing zone averages and maximum (OMZA and OMZM) during the screening step. Appendix B lists the OMZA values which are to be compared to 30 day averages, but no listing of OMZM values (no single measurement is to exceed the OMZM). In addition, pH was not listed in the Ohio water quality standards or screening values used in the ecological assessment. The State has criteria for pH (6.5-9.0) and those need to be evaluated (see table 7-1 of OAC 3745-1-7) given the low pH associated with the sulfur residuals onsite.**

Response 3: The following sentence will be added to the "Surface Water" bullet in Section 2.2.3.1, Comparison to Ecological Screening Values:

"*Although the Ohio Surface Water Quality Criteria are standards to be met in waters of the state, and are not screening values, they are used in the COPEC screening step as benchmark values protective of wildlife biota.*"

The outside mixing zone average (OMZA) values have been adopted as screening values for all PBOW SLERAs to date. They were selected over the maximum (OMZM) values because, even though samples are only collected once from a water body (as opposed to multiple samples over a number of days or weeks), they are assumed to be representative of the typical, or average, concentrations that ecological receptors would be exposed to over time. Also, because the OMZA values are protective of chronic effects, they are lower (i.e., more conservative) than the OMZM criteria, and are therefore more appropriate for use in a screening-level exercise.

Although collection of surface water pH data was not specified in the Sampling and Analysis Plan (Shaw, 2011), surface water pH data were collected in the field and documented on the sample collection logs, which are included in Appendix A of the Former Sellite Area Site Characterization Report (SCR) (Shaw, 2013b). As indicated in these SCR forms, surface water pH at the Former Sellite Area ranged from 7.27 to 7.63, which is within the State pH criteria range of 6.5 to 9.0. A discussion of surface water pH based on these field measurements will be added to the SLERA.

Comment 4: **Section 2.4.1. Terrestrial and other ecological receptors are found in Ohio EPA Ecological Risk Assessment Guidance which includes generic species to be used in an ecological risk assessment and supporting life history and exposure parameters. Future ecological risk assessments should follow**

the Ohio EPA guidance. See: http://www.epa.ohio.gov/portals/30/rules/RR-031.pdf for details.

Response 4: The terrestrial and aquatic assessment receptors used to represent foraging guilds likely to be present at the site were largely based on suggested receptors listed in the Ohio EPA Ecological Risk Assessment Guidance, and their life history and exposure parameters are also consistent with the State guidance. The use of these receptors and parameters, as discussed in the final Sellite Area work plan (Shaw, 2013a), is based partly on previous PBOW Project Delivery Team comments. However, because the investigation at PBOW pre-dates the current Ohio EPA guidance, some of the receptors and exposure parameters that have been used consistently in current and previous PBOW SLERAs are based on the Federal EPA Wildlife Exposure Factors Handbook (EPA, 1993). These receptors and exposure factors have been retained because they are technically defensible, appropriate for use in the SLERAs, and because their inclusion maintains consistency with earlier SLERAs.

Comment 5: **Section 2.4.2. The drainage ditch onsite needs to be classified as either terrestrial habitat that conveys surface water at times or aquatic habitat, in which case, specific ecological risk assessment is needed based on Ohio water quality standards (and detailed in the Ohio ecological risk assessment). Using remote sensing data the reviewer suggests the habitat be considered terrestrial habitat that occasionally conveys surface water and the evaluation of aquatic habitats be removed from the ecological risk assessment. Additional evaluation of the surface water is required.**

Response 5: As discussed during a teleconference with Mr. Archie Lunsey and Mr. Brian Tucker of Ohio EPA on October 24, 2013, additional descriptive language will be added to the SLERA to clarify that the ditch only conveys surface water intermittently during the year (e.g., after heavy rain events), does not contain habitat features typical of an aquatic system (e.g., benthic substrate, inundation of water for significant periods of time, etc.), and likely does not support populations of aquatic receptors. The raccoon will be retained as an assessment receptor evaluated in the SLERA because the Army considers its potential exposure pathways to both terrestrial as well as semi-aquatic media (which could include the "sediment" within the ditch) to be consistent with the site's conceptual model. However, the muskrat will be eliminated from the SLERA as an assessment receptor, and any references to potential impacts to benthic invertebrates and/or plants will also be removed. The text in Section 2.4.2 will be replaced with text consistent with the following (changes will also be made to other portions of the SLERA, as appropriate):

"The only aquatic habitat at the site is the drainage ditch that partially surrounds the Former Sellite Area to the east, north, and west. Based on observations made during the site reconnaissance visits and using remote sensing technology, this ditch appears to only be filled with water

periodically, such as following significant rain events. Therefore, exposure pathways are typically not complete for aquatic receptors, and no aquatic receptors are selected for further evaluation. One semiaquatic species is evaluated (raccoon) because the raccoon would likely forage in the ditch surrounding the Former Sellite Area. Although benthic organisms are unlikely to inhabit the soil/sediment within the ditch, this exposure route is assumed to be complete for the raccoon, and its ingestion of invertebrates inhabiting the soil/sediment is the primary reason for the inclusion of this receptor. A separate aquatic conceptual site model is not developed for this SLERA because true aquatic habitat does not exist at the site. The raccoon is also evaluated as a terrestrial receptor. The raccoon has been documented at the installation (Section 2.1) and has a potential high abundance and wide distribution at the site, and sufficient toxicological information is available in the literature for comparative and interpretive purposes."

Comment 6: **<u>Section 3.0</u>. Additional information is needed on the barren areas related to the AOC. Surface area (e.g., 0.5 acre) and soil pH and sulfur (S, and related compounds) profile estimates are provided in section 6 but not evaluated quantitatively in the assessment. In addition, contribution to a possible failure (if identified) of surface water pH standards should be ascertained.**

Response 6: Although pH is typically evaluated as part of soil sampling to determine soil's general chemistry properties, sulfur is not included in the standard target analyte list for characterizing hazardous waste sites, and analytical data for sulfur in soil are not available for the Former Sellite Area. Furthermore, ecological screening and toxicity values are not available for pH and sulfur; therefore, their potential effects on ecological receptors cannot be quantified in the SLERA. A detailed discussion of the potential effects of the low soil pH observed at the site is presented on page 6-2 of the SLERA, and a similar discussion will be presented for sulfur.

As noted in the Response to Comment No. 3, the surface water pH at the site was not depressed, as it was in the soil. All surface water pH levels recorded on the sample collection logs met the Statewide water quality criteria for the protection of aquatic life (OMZA range for pH = 6.5 to 9.0). This will be noted in the SLERA.

Comment 7: **<u>Section 6.0</u>. The conclusions that the site is safe for ecological receptors cannot be made at this time. Additional information on the barren areas and surface water is needed. Either additional assessment can be completed to reduce uncertainty, or remedial goals can be developed and used in a feasibility study to redress possible ecological adverse effects and potential human risks and hazards.**

Response 7: SLERAs performed at PBOW deliberately avoid providing recommendations (e.g., remediation, additional study, no further action, etc.) based on the SLERA findings. Rather, the SLERA provides a summary of the potential for adverse ecological effects, which is used as the basis for ecological recommendations that are provided in the (separate) Remedial Investigation report.

The Former Sellite Area SLERA concludes that the potential for adverse impacts to small-range receptors could be present at the site, but it also emphasizes that the small size of the site precludes regular exposure to most receptors, and therefore that it is unlikely that impacts to populations of receptors are occurring or have occurred in the past, particularly for large-range receptors. The last sentence of the first full paragraph on page 6-4 will be edited as follows:

"*Because of the small size of the site, it would be reasonable to conclude that the site is protective for ecological receptors even without performing an investigation~~, the conclusion could be reached that the site is safe for ecological receptors because of~~ due to spatial considerations alone (e.g., number of animals present; time spent contacting the site, etc.). This is particularly true for large-range receptors. However, the potential for adverse impacts to small-range receptors cannot be entirely discounted, as discussed in the following paragraphs.*

~~However, t~~The presence of lead and PCBs in soil (particularly in the vicinity of soil sample location SB09) at elevated concentrations…"

The Remedial Investigation report will present the final recommendations as to whether additional study or action is necessary for addressing potential ecological impacts at the Former Sellite Area.

Additional information will be provided in Chapter 6.0 on the surface water, as described in the Response to Comment 5. Additional information regarding the size of the sulfur mounds and the areas of low pH in relation to the overall size of the site, and their associated ecological impacts (including fate and transport, toxicity, and other considerations) will also be summarized and included in this Chapter as well. As stated in the previous paragraph, the recommendation for whether additional evaluation is required for ecological impacts will be presented in the Remedial Investigation report. If remediation is determined to be necessary, remedial goals may be developed and presented in a feasibility study, as suggested by the reviewer.

REFERENCES

Shaw Environmental, Inc. (Shaw), 2013a, ***Work Plans, Baseline Human Health Risk Assessment and Screening Level Ecological Risk Assessment for Garage Maintenance Area***

(Sellite Area and Unloading Area), Final, Plum Brook Ordnance Works, Sandusky, Ohio, May.

Shaw Environmental, Inc. (Shaw), 2013b, ***Site Characterization Report, Garage Maintenance Area (Former Sellite Area), Final, Plum Brook Ordnance Works, Sandusky, Ohio,*** April.

Shaw Environmental, Inc. (Shaw), 2011, ***Site-Specific Sampling and Analysis Plan, Remedial Investigation, Data Gap Investigation for the Garae Maintenance Area, Former Sellite Area and Unloading Area, Final, Plum Brook Ordnance Works, Sandusky, Ohio,*** June.

U.S. Environmental Protection Agency (EPA), 1993, ***Wildlife Exposure Factors Handbook***, Vols. I and II, Office of Research and Development, Washington, DC, EPA/600/R-93/187a.