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REMEDIAL INVESTIGATION REPORT FOR SITE 3 NINTH STREET LANDFILL VOLUME I OF II TEXT AND APPENDICES A THROUGH B NAS WILLOW GROVE PA
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TETRA TECH

Remedial Investigation Report
for
Site 3 - Ninth Street Landfill

Naval Air Station
Joint Reserve Base (NAS JRB)
Willow Grove, Pennsylvania

Naval Facilities Engineering Command
Mid-Atlantic

Contract Number N62470-08-D-1001
Contract Task Order WE05

VOLUME I - TEXT

October 2011

TETRA TECH

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REMEDIAL INVESTIGATION REPORT
for
SITE 3 - NINTH STREET LANDFILL

NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB)
WILLOW GROVE, PENNSYLVANIA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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Contract No. N62470-08-D-1001
Contract Task Order WE05

OCTOBER 2011

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ACRONYMS

µg	Micrograms
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
$\mu g/m^3$	Micrograms per meter cubed
%R	Percent recovery
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
ACM	Asbestos containing material
ACT 2	Pennsylvania Land Recycling and Environmental Standards
ADAF	Age dependent adjustment factor
AETs	Apparent effects thresholds
ARCS	Assessment and Remediation of Contaminated Sediments Program
ARDL	Applied Research and Development Laboratory
ARS	Air Reserve Station
ASTM	ASTM International
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
BAF	Biota accumulation factor
BCA	Bias-corrected accelerated
BSAF	Biota sediment accumulation factor
BERA	Baseline ecological risk assessment
bgs	Below ground surface
BHC	Benzenehexachloride
BTAG	Biological Technical Assistance Group
BRAC	Base Realignment and Closure
CCME	Canadian Council of Ministers of the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract laboratory program
cm^2	Centimeters squared
cm^2/day	Centimeters squared per day
cm/hr	Centimeters per hour
CNS	Central nervous system
COCs	Contaminants of concern

ACRONYMS (Continued)

COPC	Chemical of potential concern
CRDL	Contract required detection limit
CRQL	Contract-required quantitation limit
CT	Central tendency
CTE	Central tendency exposure
DAF	Dilution attenuation factor
DCA	Dichloroethane
DCE	Dichloroethene
DDD	Dichlorodiphenyleichloroethane
DDE	Dichlorodiphenyldrichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DoD	Department of Defense
DON	Department of the Navy
DOT	Department of Transportation
DQOs	Data quality objectives
DWHAs	Drinking water health advisories
ECAO	Environmental criteria and assessment office
Eco-SSL	Ecological soil screening level
EFANE	Engineering Field Activity Northeast
EM	Electromagnetic
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EPC	Exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ERA	Ecological Risk Assessment
ER-L	Effects range-low
ER-M	Effects range-median
ESV	Ecological screening value
FFA	Federal Facilities Agreement
FCVs	Final chronic values
FOL	Field operations leader
FS	Feasibility Study
g/m^2	Gram per meter squared
gpm	Gallons per minute
g/sec	Gram per second

ACRONYMS (Continued)

GEFco	George E. Failing Company, Inc.
GI tract	Gastrointestinal tract
HCH	Hexachlorocyclohexane
HEAST	Health Effects Summary Tables
HHRA	Human health risk assessment
HI	Hazard Index
HQ	Hazard quotient
HpCDD	Heptachlorodibenzo-p-dioxin
HpCDF	Heptachlorodibenzofuran
HxCDD	Hexachlorodibenzo-p-dioxin
HxCDF	Hexachlorodibenzofuran
IAS	Initial Assessment Study
ICP	Inductively coupled plasma
ICS	Interference check standard
ICR	Incremental cancer risk
ID	Inner diameter
IDW	Investigation-derived waste
IEUBK	Integrated Exposure and Uptake Biokinetic
IGWM	Interim Groundwater Monitoring
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
IURs	Inhalation unit risks
Kg	Kilogram
Koc	Organic carbon partition coefficient
L/day	Liters per day
L/min	Liters per minute
LEL	Lowest effect level
LOAEL	Lowest-observed-adverse-effect-level
m	Meter
m^2	Meter squared
m^3	Meter cubed
MCL	Maximum contaminant level
MCLGs	Maximum contaminant level goals
mg	Milligrams
mg/cm^2	Milligram per centimeter squared

ACRONYMS (Continued)

mg/kg	Milligram per kilogram
mg/m^3	Milligram per meter cubed
m^3/hr	Meter cubed per hour
MHSP&E	Dutch Ministry of Housing, Spatial Planning, and the Environment
min	Minutes
mm	Millimeter
MQA	Material Quality Assurance
MRLs	Minimum Risk Levels
MSC	Medium-specific concentration
m/sec	Meter per second
msl	Mean sea level
MTBE	Methyl tert-butyl ether
MVUE	Minimum variance unbiased estimators
N/A	Not applicable
NAS JRB	Naval Air Station Joint Reserve Base
NCEA	National Center for Environmental Assessment
NFEC	Naval Facilities Engineering Command
NFESC	Naval Facilities Engineering Service Center
ng/kg	Nanogram per kilogram
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No-observed-adverse-effect-level
OCDD	Octachlorodibenzo-p-dioxin
OCDF	Octachlorodibenzofuran
OME	Ontario Ministry of the Environment
ORNL	Oak Ridge National Laboratory
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary assessment
PADEP	Pennsylvania Department of Environmental Protection
PAH	Polycyclic aromatic hydrocarbon
PARCC	Precision, accuracy, representatives, comparability, and completeness
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
PCDD	Polychlorinated dibenzo-p-dioxin
PCDF	Polychlorinated dibenzofuran
PEC	Probable effects concentration

ACRONYMS (Continued)

PEF	Particulate emission factor
PeCDD	Pentachlorodibenzo-p-dioxin
PeCDF	Pentachlorodibenzofuran
PELs	Probable effects level
PID	Photoionization detector
PPE	Personal protective equipment
PPRTVs	Provisional Peer Reviewed Toxicity Values
PVC	Polyvinyl chloride
QA	Quality assurance
QAPP	Quality assurance program plan
QC	Quality control
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-Based Concentrations
RCRA	Resource Conservation and Recovery Act
RfCs	Reference concentrations
RfDs	Reference doses
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable maximum exposure
ROS	Regression on Order Statistics
RPDs	Relative percent differences
RPF	Relative potency factor
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SELs	Severe effects levels
SFs	Slope factors
SI	Site inspection
SMDPs	Specific/Management Decision Points
SOP	Standard operating procedure
SQG	Soil Quality Guideline
SSL	Soil screening level
SVCA	Soil Vapor Contaminant Assessment
SVOC	Semivolatile organic compound

ACRONYMS (Continued)

TAL	Target Analyte List
TBCs	Criteria to be considered
TCDD	Tetrachlorodibenzo-p-dioxin
TCDF	Tetrachlorodibenzofuran
TCE	Trichloroethene
TCL	Target Compound List
TE	Toxicity equivalent
TEC	Threshold effects concentration
TEFs	Toxicity equivalency factors
TPH	Total petroleum hydrocarbons
TOC	Total organic carbon
TRV	Toxicity reference value
USFWS	U.S. Fish and Wildlife Service
USCS	Unified Soil Classification System
USGS	United States Geological Survey
UCL	Upper confidence limit
UTL	Upper tolerance limit
VF	Volatilization factor
VOC	Volatile organic compound
WQC	Water quality criteria

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (Tetra Tech) has prepared this Remedial Investigation (RI) Summary Report for the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove in response to Contract Task Order No. WE05 under Contract N62470-08-D-1001, Comprehensive Long-Term Environmental Action Navy (CLEAN). This work is part of the Navy's Installation Restoration Program (IRP), which is designed to identify and characterize contamination of Navy and Marine Corps facilities resulting from past operations and to institute corrective measures as appropriate.

The following summary provides conclusions and recommendations resulting from the Navy's investigation of conditions at the NAS JRB Willow Grove Site 3 (the Ninth Street Landfill) environmental study site.

SITE LOCATION AND DESCRIPTION

NAS JRB Willow Grove, Pennsylvania is located in Horsham Township, Montgomery County in southeastern Pennsylvania, approximately 20 miles north of the city of Philadelphia. NAS JRB Willow Grove occupies approximately 900 acres of the 1,100 acres that the Department of Defense (DoD) maintains at the Air Station, hereafter referred to as the Base. The Willow Grove Air Reserve Station (ARS) occupies approximately 200 acres of land in the northeastern section of the Base and shares common facilities with NAS JRB Willow Grove. Figure ES-1 shows the location of NAS JRB Willow Grove and ARS.

The primary mission of NAS JRB Willow Grove is to provide support for operations involving aviation training activities and to train Navy reservists. NAS JRB Willow Grove supports DoD tenants such as the Marine Reserve, Pennsylvania National Guard and the Army Reserve and shares facilities/services with the Air Force Reserve. NAS JRB Willow Grove provides facilities, services, materials, and training in direct support of all assigned units. In 2005, NAS JRB Willow Grove, Pennsylvania was designated for closure under the authority of the Department of Defense Base Realignment and Closure Act (BRAC) of 1990, Public Law 101-510 as amended.

SITE 3 - THE NINTH STREET LANDFILL

The Ninth Street Landfill is located immediately north of Ninth Street along the western boundary of NAS JRB Willow Grove (Figure ES-2). The landfill was used as an alternate disposal area following the phase-out of the Antenna Field Landfill/South Landfill in 1960. The Ninth Street landfill was operational from 1960 until its official closure in 1967. Wastes reportedly disposed in the landfill include trichloroethene (TCE),

paint wastes, asbestos, polychlorinated biphenyl (PCB) fluids, general refuse, metal scrap, sewage sludge, and industrial pretreatment plant sludge. The landfill method consisted of burning the refuse and burying the residue in trenches. Subsequent to the landfill's closure, a salvage yard was established over a large portion of the landfill for the handling of empty drums, discarded equipment, and transformers containing PCBs.

The Ninth Street Landfill is located in an undeveloped area between Ninth Street and Dawes Road. The ground surface is well vegetated with a mixture of grass and woody vegetation. The ground surface slopes northwest toward the Base perimeter road a wetland area, and intermittent stream. There is a storm water retention basin located north (side gradient) of Site 3. Recreational facilities including a pavilion, playground, and baseball diamond are located within or immediately adjacent to the site.

SITE HISTORY

IRP Site 3 was investigated as part of a multi-step process from approximately 1986 through 2010. Steps in the process and investigations performed included the Preliminary Assessment (PA), Site Inspection (SI), and several phases of RI processes.

The PA, also identified as the Initial Assessment Study (IAS), was completed in 1986 and consisted of a records search and a site reconnaissance. Site 3 was recommended for an SI based on the potentially hazardous nature of the wastes disposed at the site, the lack of specific documentation regarding waste quantities, and the potential for contaminants to migrate from the site via surface water.

The SI, which was completed in 1990, consisted of an electromagnetic survey, a soil vapor contaminant assessment (SVCA), installation and sampling of seven monitoring wells, collection of six surface/shallow subsurface soil samples, and the collection of six surface water/sediment samples.

During Phase I of the RI for Site 3, 32 surface and shallow subsurface soil samples were collected from the baseball field, four test pits were excavated and seven subsurface soil samples were collected, four surface water samples and six sediment samples were collected from the storm water retention basin and the unnamed tributary north of the landfill, and four additional monitoring wells were installed and sampled.

Initial Phase II RI field activities were conducted from March through July 1997. Field activities included installation of seven monitoring wells, collection of groundwater samples from the new and existing wells, collection of surface soil samples from twelve locations, collection of sixteen subsurface soil samples, and sampling of surface water and sediment at two locations. The draft Phase II RI Report was submitted for review in April 1998.

Additional investigations performed in 2005 and 2006 included drilling and installation of two monitoring wells, collection of groundwater samples from nineteen monitoring wells, measurement of static water levels, collection of surface soil and subsurface soil samples from ten locations, and a review and evaluation of the low-flow groundwater sampling procedure used.

The Test Pit Investigation performed in October 2007 included excavation of 18 test pits and collection of 25 subsurface soil samples.

The Landfill Delineation Investigation performed from December 2008 to January 2009 included completion of a geophysical survey to identify areas of buried waste, excavation of 12 test pits, collection of 25 subsurface soil samples, collection of six surface water/sediment samples, and collection of 24 surface soil samples.

Interim Groundwater Monitoring Investigations included completion of three groundwater/surface water sampling events in March 2008, October 2008, and April 2009. In March 2008 and October 2008, samples were collected from 20 on-site monitoring wells, one off-Base irrigation well, and two off-Base surface water locations. In April 2009, samples were collected from seven on-site monitoring wells, one off-Base irrigation well, and two off-Base surface water locations.

In January/February 2010, two monitoring wells, 03MW09O and 03MW09S, were installed and sampled.

This report provides details and results from the draft Phase II RI and all subsequent activities.

DISCUSSION OF RESULTS AT SITE 3 - NINTH STREET LANDFILL

Sample results indicate that the principal classes of contaminants in landfill soils are SVOCs, pesticides, PCBs, dioxins/furans, and metals. VOCs, including PCE, were detected at three test pit locations. Ethyl benzene was the only VOC that exceeded screening levels (for soil to groundwater only). Surface water and sediment show PAH and lead contamination. Groundwater in the vicinity of the landfill shows PCE contamination, which has migrated off-site to the adjacent golf course property.

The present hydrogeologic interpretation and the existing analytical data suggest that there was more than one source of the PCE contamination in the groundwater at Site 3. One source of the contamination in the unconfined groundwater zone was likely in the vicinity of well cluster 03MW06, up gradient from the landfill. The landfill was a likely secondary source of PCE to groundwater in the unconfined zone. The data suggest that the source of contamination in the confined groundwater zone is also located up gradient of the 03MW06 well cluster. PCE has been detected in the soils of the landfill but not in the soils

of the other two potential source areas. The historical analytical results indicate a significant decrease in the groundwater PCE concentrations since the Phase I investigation, which suggests that the sources are depleted.

HUMAN HEALTH RISK ASSESSMENT (HHRA)

The HHRA for Site 3 was performed to evaluate risks posed to current or future human receptors from exposure to groundwater, surface soil, total (surface and subsurface) soil, surface water, and sediment. The following receptors were evaluated: current/future child recreational person, current/future adult recreational person, current/future lifetime recreational person, future residential child, future residential adult, future lifetime resident, future construction worker, and current/future industrial worker. Potential exposure routes include ingestion, dermal contact, and inhalation.

The estimated reasonable maximum exposure (RME) incremental cancer risk (ICR) for the most restrictive land use scenario, future lifetime resident, exceeded the upper limit of EPA's target risk range of 10^{-4} to 10^{-6} for landfill area surface soil (4.5×10^{-4}), landfill area total soil (4.6×10^{-4}) and Hangar area total soil (3.3×10^{-4}), and was at the upper limit for groundwater (1.3×10^{-4}). For the lifetime recreational scenario, the estimated cancer risk was at the upper limit of the target risk range for landfill area surface soil (1.3×10^{-4}) and landfill area total soil (1.3×10^{-4}). The primary contributors to cancer risk for landfill area surface soil were arsenic, chromium, PAHs, and dioxin; for landfill area total soil were arsenic, chromium, ethylbenzene, PAHs, pesticides, PCBs, and dioxin; and for hangar area total soil were PAHs. The primary contributor to cancer risk for groundwater was arsenic.

Target-organ specific non-cancer hazard indices (HIs) developed for the most restrictive future land use scenario (future lifetime child resident) exceeded 1 for groundwater and landfill area total soil. The maximum target organ HI for groundwater was 1.2 and for landfill area total soil was 5.0.

<u>Conclusion</u>

Based on the human health risk assessment performed for Site 3, action appears warranted to protect potential future human receptors. A Feasibility Study (FS) would identify the actions appropriate to achieve protection of human health.

ECOLOGICAL RISK ASSESSMENT

The ecological endpoints evaluated in the Ecological Risk Assessment (ERA) were terrestrial invertebrates, terrestrial plants, aquatic and benthic organisms, birds and mammals that consume

terrestrial invertebrates/plants, and birds and mammals that consume aquatic/benthic organisms. Several chemicals that were detected in surface soil, surface water, and sediment at Site 3 were retained as chemicals of potential concern (COPCs) because their chemical concentrations exceeded screening values, screening values were not available, or the chemicals were bioaccumulative. These chemicals were then evaluated in Step 3A of the ERA (Refinement of Preliminary COPCs) to determine which chemicals have the greatest potential for causing risks to ecological receptors.

Background concentrations were discussed in Step 3A of the ERA, but background concentrations were not used to screen out COPCs. Other factors for risk managers to consider include the spatial extent of potential risk, comparisons of surface water and sediment concentrations to alternate toxicity guidelines, and the current and future expected use of the site.

Soil

Surface soil concentrations of metals tended to be low in most samples and pose negligible potential risks to soil invertebrates and plants. Subsurface soil concentrations of metals tended to be higher than in surface samples. Antimony, copper, vanadium, zinc, and other metals were considerably elevated in some subsurface soil samples. To the extent that receptors are exposed to subsurface soil, the elevated subsurface concentrations of these metals and other COPCs pose risks to receptors.

PAH compounds were elevated in some soil samples and pose risks to soil invertebrates, especially in surface samples 03SB06 and 03SB03, and subsurface samples from test pits 03TP04 and 03TP24. Potential PAH-related risks to plants are largely limited to the vicinity of sample 03SB06. Potential risks to soil invertebrates and plants from other SVOCs at the site are minor.

Soil concentrations of pesticides, dioxins, and VOCs indicate negligible or minor potential risks to plants and soil invertebrates, or risks that are similar to risks posed by background conditions.

PCBs were infrequently detected and at relatively low concentrations in soil, except the concentration of Aroclor-1254 was 4,000 µg/kg in a subsurface sample from test pit 03TP24. Potential PCB-related risk to invertebrates in this sample appears to be limited to a small area in the vicinity of this sample. PCBs in soil pose negligible risks to plants.

Food chain modeling indicates that mercury poses potential risk to herbivorous mammals with small home ranges (such as voles) in a few areas. PAHs in soil might pose risks to herbivorous mammals with small home ranges (such as voles) and to insectivorous mammals with small home ranges (such as shrews) in a few areas.

Surface Water and Sediment

Sediment concentrations of metals tended to be low and pose negligible potential risks to benthic organisms, or do not appear to be related to former activities at the landfill. Concentrations of several PAH compounds were elevated in sediment, and exceeded background sediment values. Sediment concentrations of total PAHs exceeded the MacDonald et al (2000) consensus-based probable effects concentration (PEC) of 22,800 µg/kg (the concentration above which toxic effects are expected to frequently occur) in samples 03SD12 (25,580 µg/kg) and 03SD14 (35,749 µg/kg). However, the PAHs found in samples 03SD12 and 03SD14 are believed to be from the retention basin or other upgradient sources, not related to Site 3. The surface water and sediment data indicate that potential risks from other COPCs are probably minor. Because concentrations of surface water and sediment COPCs tended to be elevated in a few discrete locations and do not pose potential risks at other sediment sample locations or in off-site sediments downstream, and since the intermittent stream in which these samples were collected is a small area that does not support a permanent aquatic and benthic community, remediation of sediments at Site 3 is considered to be unnecessary, and no further action is proposed for Site 3 surface water and sediment. It is likely that any remedy to address human health will also reduce potential ecological risk originating from Site 3 soil contamination.

Bioaccumulative COPCs in sediment and surface water pose minor risks via the food chain.

Conclusion

Based on the ecological risk screening performed for Site 3, no action appears warranted to protect potential ecological receptors.

1.0 INTRODUCTION

Tetra Tech NUS, Inc. (Tetra Tech) submits this remedial investigation (RI) report for Site 3 - The Ninth Street Landfill at the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove in response to Contract Task Order No. WE05 under Contract N62470-08-D-1001, Comprehensive Long-Term Environmental Action Navy (CLEAN). This work is part of the Navy's Installation Restoration Program (IRP), which is designed to identify and characterize contamination of Navy and Marine Corps facilities resulting from past operations and to institute corrective measures as appropriate.

IRP activities are typically performed in four distinct steps. The first step consists of a preliminary assessment (PA), and the second step consists of a site inspection (SI). The third step is a remedial investigation/feasibility study (RI/FS) to characterize the physical and chemical parameters and risks associated with the facility and to evaluate remedial approaches. The fourth step consists of remedial action to control and mitigate contamination. This report was prepared under Step 3 IRP activities (RI/FS).

IRP Site 3 has been investigated as part of the PA, SI, and RI processes. The first phase of Step 3 RI field investigation activities was performed in 1991, and the final Phase I RI report was issued in February 1993. Phase II RI field activities were conducted at four NAS JRB Willow Grove IR sites (Site 1 - Privet Road Compound, Site 2 - Antenna Field Landfill, Site 3 - Ninth Street Landfill and Site 5 - Fire Training Area) from March through July 1997 in accordance with the Phase II RI Work Plan for those four sites submitted by Tetra Tech in May 1997. The draft Phase II RI Report, discussing results and analysis for all four IR sites, was submitted for review in April 1998, but the report was never finalized. Informal comments from the United States Environmental Protection Agency (EPA) were addressed through a series of investigations or studies conducted from 1998 through 2006. This “stand alone” individual Site 3 RI report combines the results from the 1998 draft Phase II combined RI Report for all four sites that was never finalized with the results of the subsequent activities and studies performed for Site 3 from April 1998 through March 2010.

In addition to meeting the objectives of the Navy's IRP, the purpose of the RI is to meet the requirements of CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980), as amended by SARA (Superfund Amendments and Reauthorization Act of 1986). The RI probes the nature and extent of contamination associated with all hazardous substance releases at the facility that are not regulated and are not being investigated under the authority of the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act (RCRA), or other federal statutes. A Federal Facilities Agreement (FFA) for NAS JRB Willow Grove was finalized June 27, 2005, between the Navy, EPA, and the Pennsylvania Department of Environmental Protection (PADEP). The FFA ensures that environmental impacts associated with the site are fully investigated and proper response actions are taken.

In 2005, NAS JRB Willow Grove, Pennsylvania was designated for closure under the authority of the Department of Defense Base Realignment and Closure Act (BRAC) of 1990, Public Law 101-510 as amended. BRAC legislation requires that the base closure be in full compliance with CERCLA. Section 2 (Definitions) of the FFA identifies Navy Engineering Field Activity Northeast (EFANE) as the primary Navy local contact entity. Since the EFANE office was designated for closure under the 2005 round of BRAC, EFANE has been replaced by the BRAC Program Management Office Northeast, located at the former Philadelphia Navy Shipyard, as the primary local Navy contact office.

1.1 PURPOSE AND OBJECTIVES

The purpose of this report is to present the methods and results of the Phase II RI activities and subsequent investigations conducted at NAS JRB Willow Grove Site 3.

The RI objective was to characterize the nature and extent of contaminants at Site 3 and gain additional understanding of the physical parameters affecting contaminant fate and transport. The results presented in this final RI report summarize RI activities and provide the necessary data to evaluate human health risk and ecological risk, and move into the feasibility study and/or remedial action steps of the IRP.

1.2 SITE LOCATION AND DESCRIPTION

NAS JRB Willow Grove is located in Horsham Township, Montgomery County in southeastern Pennsylvania, approximately 20 miles north of the City of Philadelphia. NAS JRB Willow Grove occupies approximately 900 acres of 1,100 acres the Department of Defense (DoD) maintains at the Air Station, hereafter referred to as the Base. The Willow Grove Air Reserve Station (ARS) occupies approximately 200 acres of land in the northeastern section of the Base and shares common facilities with the NAS JRB. Figure 1-1 shows the location of NAS JRB Willow Grove and ARS. The Air Station is comprised of flat to slightly rolling terrain and is generally bounded by State Route 611 to the east, State Route 463 to the southwest, and Keith Valley Road to the north.

The primary mission of NAS JRB Willow Grove is to provide support for operations involving aviation training activities and to train Navy reservists. NAS JRB Willow Grove supports DoD tenants such as the Marine Reserve, Pennsylvania National Guard and the Army Reserve and shares facilities/services with the Air Force Reserve. The Base provides facilities, services, materials, and training in direct support of all assigned units.

Sites included within the scope of the IRP include three landfill areas [Antenna Field Landfill (Site 2), Ninth Street Landfill (Site 3), and South Landfill (Site 12)], a waste transfer station [Privet Road Compound Site

(Site 1)], and a former fire protection training area [Fire Training Area (Site 5)]. The relative locations of the sites are shown on Figure 1-2.

Site 3 occupies approximately 9 acres and is located immediately north of Ninth Street along the western boundary of NAS JRB Willow Grove. From 1960 to 1967, Site 3 was used as a landfill by the Public Works Department and as an open disposal ground by various operations at the Base. The landfill method consisted of burning the refuse and burying the residue in trenches. Reportedly, the landfill wastes consisted mainly of general refuse, but also included paint wastes; paint stripper; trichloroethene (TCE); sewage sludge; petroleum, oils and lubricants; and industrial pretreatment plant sludge. After closure of the landfill, a salvage yard operated in the eastern portion of Site 3. Between 1980 and 1983, clean fill and construction debris were deposited in the area southwest of the storm water retention basin.

Site 3 is located in an undeveloped area between Ninth Street and Dawes Road. The ground surface is well vegetated with a mixture of grass and woody vegetation. The ground surface slopes northwest toward a wetland area and intermittent stream. There is a storm water retention basin located approximately 200 feet from what historical information indicates was the northern limit of waste disposal. Surface recreational facilities including a pavilion, playground, and baseball field are located in the northeastern portion of Site 3.

1.3 PREVIOUS INVESTIGATIONS

Previous work at NAS JRB Willow Grove includes the PA, SI, and first-phase RI. The PA, also identified as the Initial Assessment Study, identified 16 sites, including seven sites at the ARS (including Navy and Air Force sites) in 1984 (Weston, 1984) and nine sites (Navy only) at the NAS in 1986 (NEESA, 1986). One additional Navy site, the Navy Fuel Farm, was added to the program in 1988.

The Site 3 PA consisted of a records search and a site reconnaissance. Site 3 was recommended for a site inspection based on the potentially hazardous nature of the wastes disposed at the site and the potential for contaminants to migrate from the site via surface water.

The Site 3 SI consisted of an electromagnetic (EM) survey, a soil vapor contaminant assessment (SVCA), the installation and sampling of seven monitoring wells, the collection of six collocated surface/shallow subsurface soil samples, and the collection of six collocated surface water/sediment samples. All samples were analyzed for full Target Compound List (TCL)/Target Analyte List (TAL) parameters, total organic carbon (TOC), and total petroleum hydrocarbons (TPH). Several EM anomalies and SVCA positive detections were observed. The SVCA positive detections were low (less than 1 ppm) and were attributable to tetrachloroethylene (PCE). Several of the EM anomalies corresponded with SVCA positive detections.

Dieldrin was detected in surface soil and sediment samples at levels exceeding screening criteria. Numerous polyaromatic hydrocarbon (PAH) compounds were detected in sediment samples and in surface soil samples from the baseball diamond area. PCE was detected in groundwater samples at concentrations above its Maximum Contaminant Level (MCL). Groundwater PCE concentrations ranged from 13 micrograms per liter (µg/L) to 75 µg/L. Site 3 was recommended for an RI/FS based primarily on the detection of PCE in the groundwater and PAHs in surface soils in the baseball field.

During Phase I of the RI for Site 3, 32 surface and shallow subsurface soil samples were collected from the baseball field, four test pits were excavated and seven subsurface soil samples were collected, four surface water samples and six sediment samples were collected from the storm water retention basin and the unnamed tributary north of the landfill, and four additional monitoring wells were installed and sampled. All samples were analyzed for full TCL/TAL parameters. The primary contaminants in the site soils were PAHs, and to a lesser extent bis(2-ethylhexyl) phthalate and dieldrin. The highest concentrations of PAHs were detected in the soil samples from the baseball field. Surface water samples revealed low levels of several metals and trace levels of bis(2-ethyl hexyl) phthalate. PAHs and metals were the most significant contaminants detected in sediment samples. The highest concentrations were detected in the sediment samples from the storm water retention basin up gradient of the landfill. Groundwater samples revealed PCE in eight of the eleven monitoring wells sampled at concentrations ranging from 7 µg/L to 61 µg/L. PCE was also detected in the monitoring wells up gradient of the landfill. The report recommended an additional groundwater investigation be conducted to define the up gradient extent of PCE contamination and to identify the source of the contamination.

Recommendations for further investigation included in the Phase I RI were incorporated into subsequent planning discussions for additional work and have led to the Phase II RI activities that are reported in this report. These activities are described in detail in Section 2.

1.4 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

A description of the regional or general physical characteristics of NAS JRB Willow Grove has been prepared on the basis of published information, reports of previous site studies, and information obtained and interpreted during the course of the Phase II RI. Site-specific physical characteristics for Site 3 are discussed in Section 3.

1.4.1 Meteorology

NAS JRB Willow Grove is located about 70 miles west of the Atlantic Ocean, which tends to have a moderating effect on temperatures. Normal minimum and maximum daily temperatures range from 24 degrees Fahrenheit in February to 86 degrees in July.

The average annual rainfall is 44.5 inches. The average annual snowfall is 21.5 inches. Precipitation is evenly distributed throughout the year, with an increase in rainfall during the summer months. Average annual and extreme frost penetrations are 20 inches and 30 inches, respectively.

Mean annual relative humidity ranges from 54 percent in the early afternoon to 78 percent before dawn. The mean annual Class A Pan Evaporation is about 42 inches per year.

The prevailing wind direction at the Air Station is southwesterly during the summer and northwesterly during the winter. The mean annual wind speed and direction are approximately 9 miles per hour from the west-northwest.

1.4.2 Topography and Surface Water Hydrology

NAS JRB Willow Grove lies within the Triassic Lowlands Section of the Piedmont Physiographic Province. This section is characterized by rolling topography. Broad northeast-southwest-trending ridges in the area reflect resistant conglomeratic sandstone beds or diabase dikes. The Base occupies a relative topographic high, which for the most part precludes surface water flow onto the facility from surrounding areas. Surface elevations range from a high of approximately 370 feet above mean sea level (MSL) in the vicinity of Taxiway Juliet to a low of approximately 240 feet above MSL in the northern portion of the Base. Slopes are generally less than three percent. In areas where the land has been regraded, however, some slopes are steeper.

NAS JRB Willow Grove is situated within an upland area that forms a local drainage divide between the Little Neshaminy Creek drainage basin to the north and the Pennypack Creek drainage basin to the south. Both of these local drainage basins lie within the regional drainage basin of the Delaware River. Most of the Base property drains toward the north through several unnamed ephemeral, intermittent, and perennial drainage ways into Park Creek, which is a tributary of Little Neshaminy Creek. The extreme southern portion of the Base, including the Antenna Field Landfill and a portion of the Fire Training Area, lies within the Pennypack Creek drainage basin. The Ninth Street Landfill lies within the Park Creek drainage basin.

Runoff from surface areas is primarily channeled through open drainage swales and enclosed storm sewers to one of five primary outfall areas. Three of these outfalls drain to Park Creek. The fourth outfall is an intermittent stream that flows into Pennypack Creek. The fifth outfall receives runoff from the airfield and the northern portion of the Base's storm sewer system.

The receiving waters for storm water runoff derived from the Base are fished. PADEP designates Pennypack Creek as a warm-water fishery. Little Neshaminy Creek is stocked with trout.

1.4.3 Soils

Soils observed at NAS JRB Willow Grove during current and previous RI fieldwork ranged from four feet to about twenty feet in thickness. Generally, the soils included brown, yellowish-brown, reddish-brown, and orange mixtures of silt, clay, and sand with finer-grained materials dominant.

The Soil Survey of Montgomery County (United States Department of Agriculture, 1967) indicates that five major soil series are encountered within the boundaries of the four RI sites. The soil series include the Lansdale, Lawrenceville, Chalfont, and Readington silt loams and the Lansdale loam. Minor areas of other soil series, composed chiefly of silt loam materials, are developed in small, low-lying areas. In general, these soils have a moderate to slow permeability that encourages rapid runoff during normal precipitation events.

Most of the soil within the boundaries of the Air Station has been disturbed. In addition, large areas have been filled with shale and sandstone mixed earth materials. These soils, known as made land, vary widely in depth and drainage potential.

1.4.4 Regional Geology

NAS JRB Willow Grove is located within the Triassic Basin of southeastern Pennsylvania. The bedrock underlying NAS JRB consists of the middle arkose member of the Late Triassic age Stockton Formation. The Stockton Formation locally is about 5,000 feet thick and is unconformably underlain by Ordovician to PreCambrian age basement rocks. Current and previous environmental investigations indicate that the top of bedrock at the Air Station is generally found in the range of four feet to 25 feet below ground surface (bgs).

The Stockton Formation is composed of fine- to coarse-grained arkosic sandstones and conglomerates that are interbedded with finer grained shales and siltstones. These sediments were deposited by a series of coalescing alluvial fans that deposited materials eroded from highlands to the south (Sloto and Davis, 1983).

Bedding is very irregular throughout the Stockton Formation, although coarse-grained units commonly overlie fine-grained units. Beds commonly pinch out or form gradational contacts with overlying or underlying beds over lateral distances greater than several hundred feet (Rima et al., 1962). Based principally on dominant grain size and lithology, the Stockton Formation is divided into lower, middle, and upper members.

The middle member of the Stockton Formation is approximately 4,200 feet thick and consists of fine- to medium-grained arkosic sandstone interbedded with shale. Beds of shale and siltstone are common in the upper portion of the member, and coarser-grained units are more common in the lower portion of the member. The rocks of the middle member are well sorted and weakly cemented, which creates a relatively high porosity compared to the lower and upper members of the formation (Rima et al., 1962). The middle member of the Stockton Formation typically weathers to a depth of 15 to 35 feet.

The lower member of the Stockton Formation is composed primarily of coarse-grained arkosic sandstone and conglomerate and, to a lesser extent, medium-grained arkosic sandstone. Locally, the lower member is less than 1,500 feet thick.

The upper member of the Stockton Formation is not present in the vicinity of NAS JRB Willow Grove. The upper member is composed primarily of shale, siltstone, and fine-grained arkosic sandstone. In general, the grain size within this unit decreases in a stratigraphically upward direction, with the fine-grained sandstone occurring most commonly in the lower portion of the unit.

Regionally, the sedimentary beds of the Stockton Formation strike to the northeast and dip at an average rate of 12 degrees to the northwest. Based on subsurface correlations made during this current investigation, the bedrock strike was calculated to be north 76 degrees east and the dip was calculated to be 7 degrees to the northwest. At another former government installation located approximately 3 miles northeast of the site, strikes ranging from north 64 degrees east to north 71 degrees east and dips ranging from 5 degrees to 9 degrees to the northwest were calculated from subsurface correlations of geophysical borehole logs for the middle member of the Stockton Formation (Halliburton NUS, 1995).

A northeast-southwest-trending, nearly vertical igneous diabase dike bisects the Stockton Formation and passes just south and east of the NAS JRB Willow Grove boundary. The thickness of this dike is approximately 90 feet (Rima et al., 1962). Figure 1-3 is a general geological map of the NAS JRB Willow Grove vicinity.

1.4.5 Regional Hydrogeology

The sandstones, shales, and conglomerates of the Triassic Basin are relatively good water-bearing formations. They generally yield abundant supplies to wells (Hall, 1933). The groundwater ranges from soft to hard, with the average hardness being greater than that of most other formations in southeastern Pennsylvania.

The major source of groundwater in the vicinity of NAS JRB Willow Grove is the fractured bedrock of the Stockton Formation (Earth Data, Incorporated, 1985). These rocks form a multi-aquifer system of relatively discrete water-bearing zones separated by less permeable zones. Transmissivity and groundwater movement within water-bearing zones are greater parallel to bedding than across bedding. Groundwater can generally be found between 5 and 25 feet bgs.

Groundwater within the Stockton Formation occurs locally under both unconfined and confined conditions. The unconfined conditions generally extend to a subsurface depth of about 75 to 100 feet, depending on the local lithologies. Confined conditions are generally encountered below a depth of about 150 feet. A semi-confined or transitional aquifer lies between the unconfined and confined aquifers. Vertical or nearly vertical fractures that cut across bedding and the weathering of various beds permit varying degrees of leakage between individual water-bearing zones, particularly at shallower depths.

Although significant amounts of groundwater may be held in storage within the primary porosity of the fine- to medium-grained sandstones, groundwater migration is chiefly through the secondary porosity created by fractures and joints and along bedding-plane partings. The finer grained shale and siltstone beds typically have very low permeabilities. In addition, fractures and joints are typically not as well developed in these finer grained beds. Consequently, the shale and siltstone units often act as confining layers to groundwater flow.

There are numerous private (residential) and municipal-type production wells that supply water for domestic and commercial uses in the vicinity of NAS JRB Willow Grove. Figure 1-4 shows the approximate locations of public and private wells in the vicinity of the southern end of NAS JRB Willow Grove.

1.4.6 Ecology

A detailed evaluation of NAS JRB Willow Grove biological features was conducted during the SI phase of the environmental activities for the Base (EA, May 1990). Most of the following discussion is excerpted from that report.

1.4.6.1 Ecosystems

The natural environment at NAS JRB Willow Grove has been altered by development ever since an airport was established there in 1919. Buildings and paved roadways are concentrated mainly in the eastern portion of the facility. Due to the development on the Base, the land has not retained a natural vegetation cover. The vegetative communities that remain are limited and generally include lawn areas maintained by activity personnel, old field, immature forest, and wetland.

Except for old field scrub/shrub, maintained grassy field is probably the most common vegetative cover at the Base. Most of this habitat is located west of the runways. The herbaceous species and woody shrubs there provide habitat for many wildlife species. Typical herbaceous plants include cinquefoils (*Potentilla spp*.), ragweed (*Ambrosia artemisiifolia*), field daisy (*Chrysanthemum leucanthemum*), wild strawberry (*Fragaria vesca*), and numerous grasses. Shrubs observed include multiflora rose (*Rosa multiflora*), poison ivy (*Rhus radicans*), chokecherry (*Prunus virginiana*), and blackberry (*Rubus spp*.).

Wooded areas occur mainly along the western boundary of the Base and serve as a buffer between it and residences along Route 463 and the neighboring golf course/commercial complex. Common forest species observed include red maple (*Acer rubrum*), sassafras (*Sassafras albidum*), sycamore (*Platanus occidentalis*), and oak (*Quercus spp*.). The mixed hardwoods provide nesting, protective, and feeding habitat for many wildlife species.

Wetland habitat is rare within the Base area, although to the National Wetlands Inventory map of this area (United States Department of Interior, undated) indicate some wetland areas. An excavated pond, classified as a palustrine, open water, intermittently exposed wetland formerly located near the property boundary in the extreme northern portion of the Base has been converted to a grassy surface, below-ground, dry, storm-water retention basin. There is a storm water retention basin near the picnic area adjacent to Site 3. A small palustrine, scrub/shrub emergent wetland is located downstream of the storm water retention basin. Two small ponds near the southeastern corner of the Base are classified as palustrine, open water, intermittently exposed, excavated wetlands.

A larger (several acres) area of marsh habitat consisting mainly of sedges and bulrush occupies topographically low areas just north of the runway end zone. Many of these wetland grasses were planted by Air Station tenant personnel and have not been formally mapped as wetlands.

Wildlife species occurring at NAS JRB Willow Grove are those that commonly occur near urbanized areas. Species observed, or reported to occur, include eastern cottontail (*Sylvilagus floridanus*), muskrat (*Ondatra zibethica*), raccoon (*Procyon lotor*), woodchuck (*Marmota monax*), eastern gray squirrel (*Sciurus*

carolinensis), and white-tailed deer (Odocoileus virginianus). Pheasants (*Phasianus colchicum*) have been observed in the old field habitat. Canada geese (*Branta canadensis*) apparently nest within the Base boundaries. Mallards (*Anas platyrhynchos*) have been observed in the wetlands area downstream from the pond at the picnic area. Other observed bird species include robin (*Turdus migratorius*), starling (*Sturnus vulgaris*), mourning dove (*Zenaidura macroura*), wood thrush (*Hylocichla mustelina*), cardinal (*Cardinalis cardinalis*), mockingbird (*Mimus polyglottos*), sparrows, and numerous others.

Aquatic communities on the Base occupy a man-made impoundment at the storm water retention basin (near the Ninth Street Landfill). The aquatic community includes catfish, largemouth bass (*Micropterus salmoides*), and sunfish. This basin is available to Base personnel for recreational fishing under a strict catch and release policy. The storm water retention basin receives runoff from the runway and taxiways. Fish kills have been reported in this retention basin. There are also two small wet areas at Site 5 that are inhabited by frogs and insects if the weather is rainy.

1.4.6.2 Endangered and Threatened Species

The Endangered Species Act of 1973, as amended, provides for the protection of endangered and threatened species. Government agencies are required to submit to the United States Fish and Wildlife Service any proposed actions that may jeopardize the continued existence of any species listed under the act as threatened or endangered. No federally listed plants or animals are known to occur on the Base. There are no known threatened or endangered plants or animals, as recognized by the Commonwealth of Pennsylvania under Chapter 147, Title 58, within the boundaries of the Base.

1.5 QUALITY ASSURANCE/QUALITY CONTROL RESULTS

The objective of this process is to evaluate data quality of field quality control blanks, field duplicate precision, laboratory quality control analyses and precision, accuracy, representatives, comparability, and completeness (PARCC). The usability of field sample results was determined by the process described below. As a result of this process, all field sample results have been rated as to data quality. The data usability qualifier (e.g., R - rejected or J - estimated) is included as a suffix to the numerical laboratory result in data summary tables and the qualifier is explained in a footnote on the tables.

1.5.1 Field Quality Control Blanks

Field quality control blanks are generally used to measure success of the program to avoid extraneous contamination during sample collection, storage, and transport. Field quality control blanks served to trace possible routes of contamination, including bottleware, sampling equipment, rinsate water, solvent

vapors, and items (e.g., gloves) that may contact samples or sample containers. Field quality control blanks were collected at the frequencies specified in the work plan, following EPA Region III guidance.

Field Blanks

Field blanks were obtained to estimate incidental or accidental contamination from field sampling techniques and to determine if cross-contamination of samples had occurred. Field blanks were taken separately from each source of equipment decontamination water (potable water and bottled deionized water) and analyzed for the same suite of parameters as the environmental samples, in accordance with Navy Facilities Engineering Service Center (NFESC) guidelines at the frequencies specified in the work plan, following EPA Region III guidance.

Trip Blanks

Trip blanks were used to determine if contamination was introduced during sample storage and transport. Trip blanks remained with the sample containers in the field at all times, were returned unopened at the conclusion of each day's field activities, and were included in each cooler shipment of volatile organic compound (VOC) samples sent to the laboratory. Trip blanks were analyzed for TCL VOCs only.

Rinsate Blanks

Equipment rinsate blanks were utilized to determine if contamination had been introduced through contact with the sampling equipment. Equipment rinsate blanks were prepared by running analyte-free water through sample collection equipment (bailer, split-spoon, hand auger bucket, etc.) after decontamination. Rinsate blanks were generated for each type of non-dedicated sampling equipment at the frequencies specified in the work plan. Equipment rinsate blanks were analyzed for the same suite of parameters as the associated environmental samples.

1.5.2 Field Duplicate Precision

Field duplicate pairs were analyzed to assess the overall precision of the sampling and analysis process. Field duplicate pairs consisted of two field samples of identical media sampled at the same field location using the same sampling process. Duplicate pairs were stored and transported together to the laboratory for analyses. The relative percent differences (RPDs) for the duplicate pairs were calculated and reported by the laboratory and evaluated by the data validator in order to quantitate any imprecision. In general, the majority of the field duplicate results exhibited acceptable precision and there were no consistent trends to indicate improper sampling technique.

1.5.3 Laboratory Quality Control Analyses

Laboratory quality control samples were analyzed as required by each specific analytical protocol and NFESC requirements. Quality control data from organic analyses included laboratory blank results, surrogate, matrix spike, and matrix spike duplicate recoveries, internal standard recoveries, initial calibration relative standard deviations and minimum response factors, continuing calibration percent differences and response factors, laboratory control spikes, mass spectral tuning ratios, clean-up column recoveries, pesticide performance evaluation recoveries, pesticide analyte degradation percentages, and compound identification criteria (mass ratios, retention time windows, and two-column percent differences). In general, the frequency of analytical problems in each of these areas was very low and indicated overall acceptable method performance for each type of analysis.

Organic analysis of laboratory blanks revealed limited contamination, with low concentrations [near or below the Contract Required Quantitation Limit (CRQL)] of common laboratory contaminants such as methylene chloride, acetone, 2-butanone, and selected phthalate esters. Sample-matrix-related interferences caused high percent differences for a few pesticide results, resulting in data qualified as estimated based upon validation protocols. A limited number of volatile and semivolatile results were qualified as estimated based upon calibration relative standard deviations or percent differences. Several semivolatile soil sample results were qualified as estimated due to slightly exceeded holding times [greater than the 7-day allowance per regional data validation guidelines but within Contract Laboratory Program (CLP) method-specified contractual holding times]. In a few cases, sample matrix effects may have caused low or high internal standard, matrix spike, or surrogate recoveries, which lead to the qualification of results as estimated or biased low. Where required, such samples were reanalyzed according the analytical protocol.

Quality control data from inorganic analyses included laboratory blank results, matrix spike recoveries, laboratory duplicate RPDs, serial dilution percent differences, initial calibration, continuing calibration, and CRDL standard percent accuracies, laboratory control sample recoveries, and interference check standard accuracies.

The frequency of analytical problems in each of these areas was low and indicated overall acceptable method performance for each type of analysis. Inorganic analysis laboratory blanks revealed low frequencies of contamination generally restricted to concentrations below the CRDL, which affect data qualification but do not require sample reanalysis based on EPA protocols. Several matrix spike or post-digestion spike recoveries were below or above quality control (QC) limits and resulted in the qualification of data as biased low or biased high, respectively. These problems are typically attributed to sample matrix interference effects caused by other substances in the sample. A few results were qualified as

estimated or biased because of laboratory duplicate imprecision or CRDL standard recoveries above or below control limits. Very few problems occurred in other areas.

1.5.4 Parameters

The quality of the data set is measured by certain characteristics of the data, namely the PARCC parameters. Precision and accuracy are expressed quantitatively, and the others are expressed qualitatively.

Precision

Precision characterizes the amount of variability and bias inherent in a data set. Precision describes the reproducibility of measurements of the same parameter for a sample under the same or similar conditions. Precision is expressed as a range (the difference between two measurements of the same parameter) or as an RPD (the range relative to the mean, expressed as a percent). Precision is measured quantitatively. Range and RPD values are calculated as follows:

Range = OR - DR

RPD = (OR - DR) / [(OR + DR) / 2] x 100%

where: OR = original sample result
DR = duplicate sample result

RPD values are calculated for matrix spike duplicates, laboratory duplicates, and field duplicates and are compared to the control limits as a quality assurance (QA) check. Data validation field duplicate results associated with this RI are discussed in Section 1.5.3.

Accuracy

Accuracy is the comparison between experimental and known or calculated values expressed as a percent recovery (%R). Percent recoveries are derived from analysis of standards spiked into deionized water (standard recovery) or into actual samples (matrix spike or surrogate spike. recovery). Recovery is calculated as follows:

For a surrogate spike or laboratory control spike or standard

$$\%R = E / T \times 100\%$$

where: E = experimental result
T = true value (theoretical result)

For a sample matrix spike

$$\%R = (SSR - SR) / SA \times 100\%$$

where: SSR = sample spike result
SR = sample result (unspiked)
SA = spike concentration added

and

SA = (spike aliquot) (spike concentration)/ (sample aliquot + spike aliquot)

Accuracy for aqueous and solid samples was evaluated by use of surrogate and matrix spikes at the CLP-required frequencies. CLP acceptance criteria and corrective actions were applied. Out-of-criteria results were reviewed during EPA data validation to determine the need for qualification or rejection.

Representativeness

All data obtained should be representative of actual conditions at the sampling location. The work plan was designed so that the samples taken present an accurate representation of actual site conditions. The rationale discussed in the work plan was designed to ensure this. All sampling activities conformed to the protocols specified in the work plan. The use of CLP analytical protocols and data deliverables ensured that analytical procedures were consistently performed to generate results that are considered representative.

The use of low-flow sampling pumps in conjunction with monitoring of turbidity and other parameters ensured that monitoring well data were as representative of the formation as possible. Despite efforts such as the use of low-flow bladder pumps and adherence to the low-flow sampling procedure, in a few instances, low turbidity samples could not be collected. Where use of the low-flow purge method did not result in stabilized turbidity readings, filtered samples were also obtained from the same location. Filtered and unfiltered metals results were then compared to achieve a more accurate perspective of contaminant fate and transport.

Comparability

Comparability is achieved by using standardized sampling and analysis methods and data reporting procedures. The use of standard analytical procedures and sample collection techniques throughout all sampling rounds maximized the comparability of all Willow Grove data. Additionally, consideration was given to field environmental conditions that could influence analytical results.

Completeness

Completeness is a measure of the amount of valid data obtained from the measurement program, compared to the total amount collected. For relatively clean, homogeneous matrices, 100 percent completeness is expected. However, as matrix complexity and heterogeneity increase, completeness may decrease. Where analysis is precluded or where data quality objectives (DQOs) are compromised, effects on the overall investigation must be considered. Whether any particular sample is critical to the investigation is evaluated in terms of the sample location, the parameter in question, the intended data use, and the risk associated with the error.

Critical data points were not evaluated until all the analytical results were evaluated. If in the evaluation of results it becomes apparent that the data for a specific medium are of insufficient quality (for example, completeness less than 95 percent), either with respect to the number of samples or an individual analysis, resampling of the deficient data point(s) may be necessary.

2.0 FIELD INVESTIGATION

The Phase II field investigation consisted of initial activities completed in 1997 and follow-on activities at Site 3 completed in 2005 to 2006. The initial field investigation activities at Site 3 were part of a Base-wide investigation performed between March 3 and July 15, 1997. (A second round of groundwater-level measurements was performed on August 7, 1997.) The follow-on investigation activities at Site 3 were performed between October 2005 and March 2006. The initial Phase II RI field activities were conducted in accordance with the final Phase II RI Work Plan submitted by Tetra Tech in May 1997. The 2005 and 2006 follow-on activities were conducted in accordance with the Remedial Investigation Work Plan Addendum for Groundwater Investigation at Site 3 submitted by Tetra Tech in December 2005.

Subsequent activities at the site have included the Test Pit Investigation in May 2007, the Landfill Delineation Investigation in December 2008 through January 2009, the Interim Groundwater Monitoring (IGWM) sampling events in March 2008, October 2008, and April 2009, and the installation and sampling of monitoring wells 03MW09O and 03MW09S in January/February 2010. The Test Pit Investigation was conducted in accordance with the Work Plan for Test Pit Investigation (Tetra Tech, April 2008). The Landfill Delineation Investigation was conducted in accordance with the Sampling and Analysis Plan for Site 3 Landfill Delineation (Tetra Tech, November 2008). The IGWM was conducted in accordance with the SAP for Interim Groundwater Monitoring, Site 3 - Ninth Street Landfill (Tetra Tech 2008).

Subcontractors provided several site investigation services, including drilling and monitoring well installation, test pit excavation, site surveying activities, and laboratory analysis. The United States Geological Survey (USGS) provided borehole geophysical logging services through its Interagency Agreement with the Navy. The 2005 and 2006 follow-on activities were conducted by a third-party Navy contractor.

2.1 SUMMARY OF ACTIVITIES

The initial field activities at Site 3 performed in 1997 to support the Phase II investigation included the following:

- Drilling and installation of seven monitoring wells (Section 2.1.6.1).
- Geophysical logging of all newly drilled boreholes.
- Measurement of static water levels in the new wells and existing wells.
- Collection of groundwater samples for laboratory analysis (Section 2.1.6.4). Samples were analyzed for TCL VOCs, TCL semivolatile organic compounds (SVOCs), polychlorinated biphenyl (PCB)/pesticides,

TAL inorganics, and cyanide. Samples were submitted to Applied Research and Development Laboratory (ARDL) in Mount Vernon, Illinois.

- Sampling and analysis of surface soils at 12 on-site locations and at 12 NAS JRB Willow Grove background locations away from the investigation sites (Section 2.1.2). Samples were submitted to ARDL for various TCL and TAL analyses depending on site data requirements and specific locations. Samples were submitted to Triangle Laboratories, Incorporated, of Durham, North Carolina for dioxin analysis.

- Sampling and analysis of subsurface soils at 16 locations (Section 2.1.3). Samples were submitted to Triangle Laboratories for dioxin and to ARDL for various TCL and TAL analysis.

- Sampling of surface water at two locations to obtain water quality data (Section 2.1.4). Nine surface water samples were collected at off-Base locations to provide baseline background water quality data. Samples were submitted to ARDL for TCL VOCs, SVOCs, PCB/pesticides, TAL inorganics, and cyanide analysis.

- Sampling of sediment was performed at the same locations as surface water (Section 2.1.5). An additional sediment sample was collected upgradient of a Phase I RI sediment location. These samples were submitted to ARDL for TCL VOCs, SVOCs, PCB/pesticides, TAL inorganics, cyanide, total organic carbon (TOC), and grain size analysis.

- Repair of three artesian wells to stop groundwater from continually flowing.

- Surveying of the horizontal locations and the vertical elevations of newly installed monitoring wells and horizontal locations of surface soil, subsurface soil, and sediment samples (Section 2.1.8).

- Sampling and disposal of investigation-derived waste (IDW) (Section 2.1.9).

The follow-on activities performed from October 2005 to March 2006 to support the Phase II investigation at Site 3 included the following:

- Drilling and installation of two permanent monitoring wells (03MW08S and 03MW08D) within a single borehole in October/November 2005 (Section 2.1.6.2).

- Geophysical logging of the newly drilled borehole.

- Collection of groundwater samples for laboratory analysis from nineteen wells in January/February 2006 (Section 2.1.6.5). The samples were analyzed for TCL VOCs. The samples from the two newly installed wells were also analyzed for TCL SVOCs.

- Collection of surface and subsurface soil samples from ten locations using a combination of hand auger and direct push technology (Sections 2.1.2 and 2.1.3). Samples were analyzed for TCL VOCs and SVOCs.
- Measurement of static water levels in all Site 3 monitoring wells (Section 2.1.6.8).

The Test Pit Investigation performed in October 2007 included the following:

- Excavation of 18 test pits and the collection of 25 subsurface soil samples (Section 2.1.3.3). Samples were analyzed for full TCL/TAL parameters. Two samples were analyzed for dioxin.

The Landfill Delineation Investigation performed from December 2008 to January 2009 included the following:

- Completion of a geophysical survey of the site to identify areas of buried waste (Section 2.1.1).
- Excavation of 12 test pits and the collection of 25 subsurface soil samples (Section 2.1.3.4). Samples were analyzed for full TCL/TAL parameters. One sample was analyzed for dioxin.
- Collection of six surface water/sediment samples (Section 2.1.4 and 2.1.5).
- Collection of 12 surface soil samples (Section 2.1.2). Samples were analyzed for full TCL/TAL parameters.

The Interim Groundwater Monitoring Investigation included the following:

- Completion of three rounds of groundwater/surface water sampling: in March 2008, October 2008, and April 2009 (Section 2.1.6.6). In March 2008 and October 2008, samples were collected from twenty site monitoring wells, one off-Base well, and two off-Base surface water locations. In April 2009, samples were collected from seven site monitoring wells, one off-Base well, and two off-Base surface water locations. During the first sampling round, the samples were analyzed for TCL VOCs, 1,4-dioxane, and total and dissolved TAL metals. Eight well samples were also analyzed for hexavalent chromium. During the second and third sampling rounds, all samples were analyzed for TCL VOCs.

In January/February 2010, two permanent monitoring wells, 03MW09O and 03MW09S, were drilled, installed, and sampled (Section 2.1.6.3).

2.1.1 Geophysical Survey

A geophysical survey of Site 3 was performed by Advanced Geological Services, a subcontractor to Tetra Tech, in April 2008. A Geonics EM-31 ground conductivity meter was used to measure the variability of electrical conductivity of subsurface materials. A Trimble PRO/XRS Global Positioning System was used concurrently with the EM-31 to provide a GPS coordinate for each EM data point. The EM data were collected approximately every 2.5 feet along traverses spaced 5 to 10 feet apart. Appendix E contains the geophysical survey report.

The geophysical survey results indicated three large areas of possible buried waste (Figure 2-1):

1) A 400 ft. x 50 ft. linear feature in the southwestern part of the site. This feature had strong EM responses, indicating the presence of buried metal, and corresponds with a linear topographic depression.
2) A 200 ft. x 160 ft. irregular area near the center of the site. This feature had moderately strong, discontinuous EM response, indicating that the waste is mainly non-metallic and thinly distributed over the area.
3) A 140 ft. x 50 ft. area adjacent to Ninth Street, southwest of the large grass playing field. This feature had a strong EM response, indicating the presence of buried metal. There are mounds of soil/construction debris at this location.

In addition, two discrete anomalies were discovered in the northern part of the Site 3 survey area:

1) An approximately 40 ft. x 40 ft. area between the volleyball court and playground. The strong EM response in this area indicates the presence of buried metal.
2) A 20 ft. x 20 ft. area in a lightly wooded area 100 feet southwest of the volleyball court. This area showed a moderately strong EM response, indicating that some buried metal is present.

2.1.2 Surface Soil Investigation

Surface soil samples were collected during the Phase I RI in 1991, the Phase II RI in 1997, the RI follow-on activities in 2006, and the Landfill Delineation Investigation in 2008/2009. The following sections describe the samples collected during each investigation. A summary of the surface soil samples collected during the Phase II RI and subsequent investigations is presented in Table 2-1. Figures 2-2 and 2-3 show the surface soil sample locations. Surface soil sample log sheets are included in Appendix C.

2.1.2.1 Phase I

During Phase I activities, surface soil samples were obtained from 16 locations, S-1 through S-16 (also referred to as 03SS01 through 03SS16), at a depth interval of 0 to 6 inches, and from 14 locations, S-1, S-3, and S-5 through S-16, at a depth interval of 1.5 to 2 feet. The samples were collected over a 90-foot-by-90-foot grid on the baseball field, in response to the detection of PAHs in this area during the SI. The samples were analyzed for full TAL metals and TCL organic parameters. These soil samples, originally designated S-1 through S-16 (including one duplicate of S-16), were obtained on September 5, 1991. Later, due to data base constraints, these soil samples were redesignated 03SS01 through 03SS16 with the sample date of 9/5/1991 to differentiate them from soil samples 03SS01 through 03SS12 obtained in 1997 from different locations.

2.1.2.2 Phase II

During the initial Phase II RI activities in 1997, surface soil samples were obtained from 12 locations, 03SS01 through 03SS12. The samples were analyzed for TCL SVOCs, TCL pesticides/PCBs, and TAL metals. Samples 03SS04 and 03SS08 were also analyzed for dibenzofurans and dibenzodioxins. One surface soil sample location was resampled for confirmation during the follow-on field activities in 2006. The surface soil samples were obtained by a Tetra Tech geologist by digging 0 to 6 inches below ground surface (bgs) with a stainless-steel trowel and placing the soil directly into a laboratory-provided sample jar.

During the Phase II RI follow-on activities, one surface soil sample, 03SB18-0002, was collected. The sample was collected from a soil boring in the hangar area from a depth of 0 to 2 feet bgs, and was analyzed for TCL VOCs and SVOCs. The sample was collected as part of an investigation of potential source areas up gradient of the site. The soil boring sampling procedures are described in Section 2.1.3.2 below.

Thirteen background surface soil samples were collected at 12 on-Base locations during the Phase II RI. A minimum of three samples were collected from each of the four major soil series mapped within the Base, as specified in the Phase II RI Work Plan. The background soil samples were collected away from known or suspected waste-handling or waste disposal sites. The approximate locations of the soil samples are presented in Section 2.2. Each background sample was analyzed for TCL SVOCs, PCB/pesticides, TAL inorganics, and cyanide.

2.1.2.3 Landfill Delineation Investigation

Surface soils samples were obtained from 12 locations at Site 3 during the Landfill Delineation Investigation in December 2008. These samples were collected from a depth of 0 to 6 inches bgs. The samples were obtained by a Tetra Tech geologist by digging with a disposable trowel and placing the soil directly into a laboratory-provided sample jar. The sample locations were chosen based on the results of the EM survey of Site 3 that was completed in April 2008. Six of the samples (03-SS-18, -20, -21, -23, -24, and -26) were collected from areas where EM anomalies were found, and the remaining six samples (03-SS-17, -19, -22, 25, -27, and -28) were collected from areas where there were no EM anomalies. The intent was to obtain representative coverage of the site that included areas with and without suspected buried waste. The samples were analyzed for full TCL/TAL parameters plus cyanide.

In August 2009, an additional twelve surface soil samples (03SS31 through 03SS42) were collected from a depth of 0 to 2 feet bgs to provide additional data for the ecological risk evaluation. The samples were collected using a stainless steel hand auger and disposable trowel. The soil was homogenized in a stainless steel bowl before being placed into the sample jars. The portion of the sample for VOC analysis was collected from the midpoint of the sample interval directly from the hand auger prior to sample homogenization using an Encore sampling device. These additional samples were collected near soil sample locations 03SS18 through 03SS28. The samples were analyzed for full TCL/TAL parameters plus cyanide.

2.1.3 Subsurface Soil Investigation

Subsurface soil samples were collected during the Phase I RI in 1991, the Phase II RI in 1996, the Phase II follow-on activities in 2006, the Test Pit Investigation in 2007, and the Landfill Delineation Investigation in 2008/2009. The following sections describe the samples collected for each investigation. A summary of the subsurface soil samples collected during the Phase II RI and subsequent investigations is presented in Table 2-2. Figures 2-4 and 2-5 show the subsurface soil sample locations. Subsurface soil sample log sheets are included in Appendix C. Boring logs are included in Appendix B.

2.1.3.1 Phase I

During Phase I activities, subsurface samples were obtained from two locations (03SB02 and 03SB04) in the baseball diamond at a depth interval of 1.5 to 2.5 feet bgs using a hand auger. Samples were analyzed for full TAL metals and TCL organic parameters. The samples were removed from the auger bucket with a stainless-steel trowel and transferred directly into the laboratory-supplied sample jars.

In addition, eight samples were obtained from four test pits (03TP01 through 03TP04) excavated at the site. The test pits were located in accordance with the Draft Plan of Action (EA, 1991), which was based on the results of the site inspection (EA, 1990).

2.1.3.2 Phase II

During the Phase II investigation, three subsurface samples were obtained from location 03SB01 at depths of 2 to 4 feet bgs (03SB01-0204), 6 to 8 feet bgs (03SB01-0608), and 14 to 16 feet bgs (03SB01-1416). These samples were analyzed for TCL VOCs. During the follow-on activities in March 2006, twenty-one subsurface soil samples were collected from 10 boring locations (03SB17 through 03SB26) and analyzed for VOCs and SVOCs.

The Phase II soil boring was drilled by Advanced Drilling, Incorporated, of Washington, New Jersey, using a Stratastar-25 drill rig with 2-1/4-inch ID augers. The boring was sampled continuously with a split-spoon sampler in accordance with ASTM International (ASTM) D 1586-84 from the ground surface to the top of bedrock or split-spoon refusal. The augers were advanced after each sample was taken, and a center plug was used during advancement of the augers. All drilling activities and soil sampling activities were supervised, logged, and recorded by a Tetra Tech field geologist.

The borings for the Phase II RI follow-on activities were completed by the subcontractor to a third party Navy contractor (ECOR Solutions of West Chester, PA) using direct push technology. The locations were cleared for utilities before beginning each boring. Soil was collected in a disposable acetate liner inside of a metal tube called a macro-core sampler. The macro-core sampler was advanced in four foot sample intervals to the top of bedrock (approximately 10 to 15 feet deep). The field geologist logged the soil samples continuously using the Unified Soil Classification System (USCS). Head space samples and analytical samples obtained using a hermetically sealed sample vial (EnCore®) were collected every two feet and at suspect intervals where contamination was evident using visual and olfactory senses. Discrete samples were collected using the EnCore® method (method EPA SW-846 5035) and placed on ice. One unpreserved laboratory jar was filled for SVOC analysis. Samples for laboratory analysis were chosen based upon the head space readings.

Borings were backfilled with the soils generated during sampling. Soils were tamped every two feet or more to ensure minimal voids in backfilling. If additional soils were needed, coarse bentonite chips were used to a subsurface depth of six inches and native soils or store-bought topsoil were used to grade. For borings drilled within a paved or concrete area, bituminous coldpatch or concrete (minimum six inch thickness) was placed flush with the pavement surface to match existing conditions.

2.1.3.3 Test Pit Investigation

The Test Pit Investigation was performed from April 30 to May 8, 2007. The test pit locations were chosen based upon historical information and observations made during a site reconnaissance, such as hummocky terrain and wastes exposed by burrowing animals. Twenty-six subsurface soil samples were collected from fourteen test pits (03TP05 to 03TP18). The samples were analyzed for full TCL/TAL parameters. Two of the samples were also analyzed for dioxin. The samples were chosen based on direct (visual or olfactory) evidence of contamination, or on the highest observed photoionization detector (PID) screening responses. The intent was to bias the samples toward areas with the highest degree of contamination observed. If no evidence of contamination was observed, then the samples were collected from mid-depth at locations approximately equally spaced along the length of the excavation. The dioxin samples were collected from areas that showed evidence of charred waste. Tetra Tech personnel performed all sample collection, sample handling, and sample management throughout the investigation. Berner Construction, Incorporated (Berner Construction), of Gap, Pennsylvania, performed as a subcontractor to Tetra Tech and provided the excavating equipment and the equipment operation. The test pits were excavated to bedrock, and ranged in depth from 6 feet to 10 feet bgs.

The samples were obtained using a disposable trowel, except for that portion of the sample that was to be analyzed for volatile organic compounds, which was collected using the Encore® sampling device. The samples were collected from excavated material either directly from the backhoe bucket or after it had been deposited on the ground. The soil was described by the site geologist and was screened for evidence of contamination with a PID. Any qualitative visual signs of potential contamination (such as soil staining) were noted on the test pit log. In addition, photographs were taken of each test pit.

All excavated materials were used as backfill at the conclusion of the excavation activities at each location. Each test pit was backfilled at the end of the day on which it was excavated, in order to prevent leaving an excavation open overnight. If a test pit could not be completed by the end of the day, it was backfilled and then completed the following day. Subsurface soil sample log sheets are included in Appendix C. Test pit log sheets are included in Appendix D.

2.1.3.4 Landfill Delineation Investigation

Landfill Delineation test pit excavations were completed in January 2009. Fourteen subsurface soil samples were collected from thirteen test pits (03TP19 to 03TP30). The samples were analyzed for full TCL/TAL parameters plus cyanide. One of the samples was also analyzed for dioxin. The test pit locations were chosen to coincide with areas of EM anomalies based upon the results of the April 2008 EM survey of Site 3 (see Section 2.1.1). Tetra Tech personnel performed all sample collection, sample handling, and sample management throughout the investigation. Berner Construction performed as a subcontractor to

Tetra Tech providing the excavating equipment and the equipment operation. All sampling data were recorded on sample log sheets and in the site logbook by the Tetra Tech geologist. Subsurface soil sample log sheets are included in Appendix C. Test pit log sheets are included in Appendix D.

Samples were chosen based on direct (visual or olfactory) evidence of contamination, or on the highest observed PID screening responses. The intent was to bias the samples toward areas with the highest degree of contamination observed. No samples were collected from test pits 03TP21 and 03TP22 since no waste or minimal waste was encountered in these two test pits. The dioxin sample was collected from TP30 from an area showing evidence of charred (burned) waste. All excavated materials were used as backfill at the conclusion of the excavation activities at each location. Each test pit was backfilled at the end of the day on which it was excavated in order to prevent leaving an excavation open overnight.

The samples were obtained using a disposable trowel, except for that portion of the sample that was to be analyzed for volatile organic compounds, which was collected using the Encore® sampling device. The samples were collected from excavated material either directly from the backhoe bucket or after it had been deposited on the ground. Soil description was recorded by the site geologist and all soil samples were screened for evidence of contamination with a PID. Any qualitative visual signs of potential contamination (such as soil staining) were noted on the test pit log. In addition, photographs were taken of each test pit.

2.1.4 Surface Water Investigation

Surface water samples have been collected throughout the different phases of the Site 3 investigation, as described in the following paragraphs. Field measurements were taken for the surface water samples prior to sample collection. The field measurements included pH, temperature, conductivity, and visual descriptions of the color and turbidity. All field data were recorded in the field logbook and on the appropriate sample log sheet. Sample log sheets for the surface water sampling program are included in Appendix C. Figure 2-6 shows the surface water sample locations. Table 2-3 summarizes the surface water samples collected.

During Phase I activities, four surface water samples were collected (03SW01 and 03SW03 through 03SW05). 03SW01 was collected from the upstream (eastern) end of the storm water retention basin, 03SW03 was collected from the basin's downstream (western) discharge point, 03SW04 was collected from a location downstream along the drainage pathway, and 03SW05 was collected from the wetlands area upgradient of the pond.

During Phase II, two surface water samples, 03SW08 and 03SW09, were collected. Sample 03SW08 was obtained near the concrete headwall/outfall north of Building 177. Paint chips were observed at this location. Sample 03SW09 was collected from a drainage ditch prior to the discharge point into the pond. Samples for both Phase I and Phase II were analyzed for TAL metals, and full TCL organic compounds. There were no surface water samples collected as part of the follow-on activities conducted in 2005 and 2006.

During each of the three rounds of the Interim Groundwater Monitoring in March 2008, October 2008, and April 2009, two surface water samples (03SW10 and 03SW11) were obtained from the unnamed tributary to Park Creek north of the site, upstream and downstream from the discharge point of the off-Base irrigation well. These samples were collected to determine if the irrigation well discharge was impacting the unnamed tributary. The samples were analyzed for TCL VOCs.

During the Site 3 Landfill Delineation Investigation in December 2008, six surface water samples were collected from the intermittent stream that drains the storm water retention basin immediately north of the site. The samples consisted of an upstream sample (03SW17) collected from the retention basin discharge, a downstream sample (03SW12) collected at the Base property boundary, and four intermediate samples (03SW13 through 03SW16) collected along the stream length between these two locations. The samples were analyzed for full TCL/TAL analyses plus cyanide.

Subsequent to the completion of the Phase II activities, the Navy and regulators agreed that the storm water retention basin would not be considered part of Site 3. Therefore, the samples collected from the retention basin and up gradient of the basin are not included in the current risk assessment. The samples collected from the intermittent stream during the Phase I investigation are also not included since the more recent sample results taken from these same locations during the Landfill Delineation Investigation are available and were utilized in the current risk assessment.

2.1.5 Sediment Investigation

During Phase I, six sediment samples were obtained (03SD01 and 03SD03 through 03SD07). The sediments were collected from the corresponding surface water locations, with the exception of 03SD06 and 03SD07. These two samples were obtained from the retention basin; no surface water samples were obtained at these two locations. During Phase II, three sediment samples were collected (03SD08 through 03SD10). These sediment samples were also collected from the corresponding surface water locations, with the exception of 03SD10, which was collected from the eastern side of the storm water retention basin between locations 03SD01 and 03SD06. Sediment samples from both phases were

analyzed for TAL metals and full TCL organic compounds. There were no sediment samples collected as part of the follow-on investigation in 2006.

During the Site 3 Landfill Delineation Investigation in December 2008, six sediment samples (SD-12 through SD-17) were collected from the intermittent stream that drains the storm water retention basin immediately north of the site. The sediment samples were collected from the corresponding surface water sample locations. The samples were analyzed for full TCL/TAL analyses plus cyanide.

As with the surface water samples, the sediment samples collected during the Phase I and II investigations are not included in the current risk assessment because they were located within or upstream from the retention basin, or because the results have been replaced by more recent samples.

Figure 2-6 shows the sediment sample locations. Table 2-4 summarizes the sediment samples collected.

2.1.6 Groundwater Investigation

Monitoring wells were installed during the initial Phase II RI field activities and during the Phase II follow-on activities. Groundwater samples were collected during the initial Phase II RI activities in 1996, the Phase II follow-on activities in 2006, and the Interim Groundwater Monitoring in 2008/2009. The following sections describe the monitoring wells installed and the samples collected for each investigation. Table 2-5 summarizes monitoring well construction details and Table 2-6 summarizes the Phase II RI groundwater sampling program. Figure 2-7 shows the monitoring well locations. Boring logs and well construction diagrams are included in Appendix B. Groundwater sample log sheets are included in Appendix C.

The results of the Phase I RI indicated that groundwater at Site 3 flows in a generally north to northwest direction. Volatile organic contamination (PCE) was detected at the immediately up gradient monitoring well location (03MW01) in the shallow (unconfined) and shallow-intermediate (transitional) groundwater zones, and in the most up gradient monitoring well (03MW05) in the shallow, unconfined zone (no deeper monitoring wells existed at this location). These data have been interpreted to indicate that the landfill may not be the sole source (or contributing source) of the PCE detected in the monitoring wells installed down gradient from the landfill.

2.1.6.1 Monitoring Well Installation - Initial Field Activities

Based on the results of the Phase I RI, seven additional monitoring wells were installed to further delineate the nature and horizontal and vertical extent of groundwater contamination and to provide the additional hydraulic head data needed to refine the hydrogeologic interpretation of the site.

Monitoring well cluster 03MW06 was installed southeast of the landfill and adjacent to the Army Reserve Hangar (Building No. 177) to further investigate the hypothesis that a PCE source existed up gradient of the Site 3 landfill. This three-well cluster was installed to obtain groundwater quality and hydraulic head data from all three groundwater zones up gradient of the landfill.

A shallow-intermediate monitoring well (03MW05I) was installed at location 03MW05 to pair with the existing shallow well (03MW05S) to further evaluate other potential sources of groundwater contamination up gradient from Site 3. Both the shallow well at 03MW05 and the shallow and the shallow-intermediate monitoring wells immediately down gradient from this location (03MW01) contained PCE during the Phase I RI.

Two new monitoring wells were installed at the location of the existing shallow well 03MW02S immediately downgradient from the landfill. Shallow-intermediate (03MW02SI) and intermediate (03MW02I) depth monitoring wells were installed to monitor the transitional and confined groundwater zones, respectively.

Monitoring well 03MW07S was installed at the northwest corner of the site to monitor the groundwater quality and to obtain hydraulic head data within this generally downgradient location that had no existing monitoring wells.

The target depth for each proposed monitoring well was determined by the data needs identified during the scoping process and was based on the local hydrogeology as determined from the previous investigation. For shallow monitoring wells, the target depth was from the top of bedrock to a subsurface depth of 75 feet. For the intermediate monitoring wells, the target depth was from a subsurface depth of 75 to 150 feet. These target drilling depths were used only as general guidelines. The actual depth of the boreholes varied and was selected by the field geologist based on the subsurface conditions encountered during the drilling process.

The proposed drilling locations were cleared for potential underground obstructions by the Navy and local utilities before beginning the borings. The boreholes were drilled with a Stratastar-25 air-rotary drilling rig operated by Advanced Drilling, Incorporated. For each bedrock borehole, a 10-inch-diameter borehole was drilled from the ground surface to a depth of at least 5 feet into competent bedrock. Six-inch-diameter steel surface casing was installed and grouted into the bedrock with cement-bentonite grout to hydrogeologically isolate the overburden from the bedrock. This casing also serves as the outer protective casing for the completed well above ground. The grout was allowed to set undisturbed for a minimum of 24 hours. Subsequently, a nominal 6-inch-diameter borehole was drilled in the bedrock until significant water-bearing zones were encountered within the target interval for the respective borehole. A Tetra Tech field geologist logged subsurface lithology as determined by the drill cuttings and recorded

pertinent drilling information, such as water entry zones, on the boring logs. The borehole and the cuttings were screened with a PID, and readings were recorded in the site logbook and documented in the boring logs.

Most of the new boreholes were geophysically logged by the USGS to identify subsurface lithology, fractured intervals, water entry or exit zones, and vertical flow direction and quantity. Caliper, gamma ray, single-point resistivity, fluid temperature, fluid resistivity, and thermal-pulse flowmeter logs were run in each borehole that was logged by USGS. A down-hole video camera/recording system was employed at select locations to obtain a visual record of the inner borehole and potential water entry zones. Copies of the geophysical log results are contained in Appendix G.

The vertical interval to be screened in each borehole was determined by evaluating the geophysical logs and the well boring logs. In general, the wells were constructed to monitor the most significant (highest yielding) water-bearing zone within the target interval for that particular borehole. Other factors considered included stratigraphic and vertical separation of the various water-bearing zones already screened in existing wells (if any) at that well cluster. The actual screen elevations were selected through discussions with the Navy, EPA, PADEP, USGS, and Tetra Tech.

At some locations, a nested pair of two monitoring wells was installed within one borehole. Typically, this was done in shallow bedrock boreholes in order to monitor both the minimally productive zones usually found at the water table and a higher yielding, deeper fracture within the target interval for the shallow wells.

Monitoring Well Construction

Monitoring wells were constructed with 2-inch-diameter, flush-joint and threaded polyvinyl chloride (PVC) well casing and 2-inch-diameter, Schedule 40, 0.020-inch slotted well screen fitted with a bottom cap. The space between the bottom of the borehole and the bottom of the screen (if any) was backfilled with bentonite and/or cement-bentonite grout to the bottom of the desired monitoring interval and with No. 2 quartz sand from that depth to the bottom of the screen. The annular space between the well screen and the borehole was packed with No. 2 quartz sand to at least 1 foot above the top of the desired monitoring interval. (Monitoring wells 03MW09O and 03MW09S were constructed with 0.010-inch slotted well screen and No. 1 quartz sand.) A minimum 2-foot-thick bentonite pellet seal was installed above the sand pack and allowed to hydrate prior to grout emplacement. The remaining annulus was then backfilled with a cement-bentonite grout mixture to within 1 foot of the ground surface or, when two wells were constructed in one borehole, to a depth 2 to 5 feet below the bottom of the shallow well. The depths of all backfill materials were constantly monitored by a Tetra Tech geologist during the well installation process to ensure that bridging did not occur and that the correct construction depths were achieved. Monitoring wells were

completed with a 2-foot-square concrete pad at ground level around the stickup pipe, keyed 1 foot into the annular space. Steel/concrete bollards were placed at selected monitoring well sites where the risk of damage from vehicular traffic or maintenance activities exists. A monitoring well construction log was completed for each well. Well construction logs are contained in Appendix B.

Well Development

Most monitoring wells were developed with a submersible pump. The groundwater temperature, pH, conductivity, and turbidity were monitored during development. The wells were developed until these parameters were measured within 10 percent of one another from three consecutive samples and the groundwater became clear. The amount of water removed during well development and the field parameters for each well were recorded in the project field notebooks.

One well, 03MW06S, was developed by hand bailing with a disposable Teflon bailer for 2½ hours because of low well yield. A total of 60 gallons were removed and the final water had a very light brown color.

2.1.6.2 Monitoring Well Installation - Follow-On Phase II RI Field Activities

Four additional monitoring wells, 03MW08S, 03MW08D 03MW09S and 03MW09O, were installed as part of the follow-on field activities in order to further investigate the source(s) of the VOC plume at Site 3. Wells 03MW08S and 03MW08D were installed in November 2005; wells 03MW09O and 03MW09S were installed in January/February 2010. The wells were installed in accordance with the general requirements included in the original Work Plan and the specific requirements indicated in the Addendum Remedial Investigation Work Plan for Groundwater Investigation at Site 3.

Wells 03MW08S and 03MW08D were installed in a single borehole located between the oil/water separator and the maintenance shed in order to evaluate the quality of the groundwater up gradient of the oil/water separator. The shallow well was screened from 38 feet to 68 feet bgs to monitor groundwater quality at the water table; the deep well was screened from 163 feet to 173 feet bgs to approximate the depth of the deepest impacted well at cluster 03MW06, at the separator. The two monitoring wells of the 03MW08 cluster were given the designations “shallow” and “deep” by the third party contractor that installed the wells, although based on their completion depths they more accurately fit the established designations of “shallow-intermediate” and “intermediate”.

Borehole advancement, monitoring well construction, and well development were performed using methods similar to those described for the initial field activities. Based on the results of the geophysical logs for the 03MW08 borehole, the USGS performed packer tests (VOC analyses) to determine the

vertical distribution of VOCs within the borehole. The screen intervals were then selected using the results of the geophysical logs and the packer tests, through discussions with the Navy, EPA, PADEP, USGS, and Tetra Tech.

2.1.6.3 Monitoring Well Installation - 03MW09 Well Cluster

Wells 03MW09O and 03MW09S were installed southeast of the perimeter fence road down gradient of the Site. Well 03MW09O was screened from 5 feet to 10 feet bgs to monitor groundwater quality in the overburden. Well 03MW09S was screened from 18 feet to 33 feet bgs to monitor groundwater quality in the shallow, unconfined aquifer.

2.1.6.4 Groundwater Sampling - Initial Phase II RI Activities

In June 1997, groundwater samples were obtained from all accessible permanent monitoring wells at the study sites including the newly installed wells (Phase II RI) and pre-existing wells. Monitoring wells were sampled a minimum of 14 days after development. One monitoring well, 03MW01SI, could not be sampled due to damaged casing approximately 3 feet bgs.

The groundwater sampling program was conducted in accordance with the low-flow sampling procedure (Appendix M) based on EPA Region III (amended) Groundwater Sampling Procedure Low-Flow Purge and Sampling guidance. Monitoring wells were purged prior to sampling using a low-flow submersible pump and disposable polyethylene tubing. Care was taken to place the pump at the prescribed depth within the well screen and to purge the wells at a rate less than the well yield. Purge rates generally did not exceed 1 liter per minute (L/min) and were typically set to the minimum capability of the pump (0.2 L/min to 0.5 L/min) shortly after flow was established. Groundwater was directed into a flow-through cell with a multi-probe water quality meter. Each well was purged until the monitored parameters (pH, temperature, conductivity, turbidity, and dissolved oxygen) of three consecutive readings were within the tolerance limits specified in the guidance.

The groundwater samples from the monitoring wells were obtained directly at the discharge point of dedicated, disposable polyethylene tubing. The tubing was detached from the flow-through monitoring cell prior to sample collection in order to obtain the groundwater directly from the pump and dedicated tubing.

Groundwater samples were analyzed for TCL VOC, TCL SVOCs, TCL pesticides/PCBs, TAL metals, and cyanide. Table 2-6 summarizes the groundwater sampling program. All pertinent field data were recorded in the field logbook and on the appropriate sample log sheet.

2.1.6.5 Groundwater Sampling - Follow-On Phase II RI Field Activities

In February 2006, groundwater samples were obtained from all existing and newly installed permanent monitoring wells at Site 3. There was no groundwater sample collected from 03MW03I due to an obstruction at a depth of about 10 feet. The newly installed monitoring wells were sampled a minimum of 14 days after development. The groundwater sampling was conducted in accordance with the low flow sample procedure described above for the initial Phase II RI activities.

A total of 22 groundwater samples (19 monitoring wells and 3 duplicates) were analyzed for TCL VOCs. The samples from the two new monitoring wells (03MW08s and 03MW08D) were also analyzed for TCL SVOCs. The samples were analyzed by Severn Trent Services. All pertinent field data were recorded in the field logbook and on the appropriate sample log sheet.

In February 2010, the two new monitoring wells 03MW09O and 03MW09S were sampled for TCL VOCs.

2.1.6.6 Groundwater Sampling – Interim Groundwater Monitoring

Three rounds of groundwater sampling were performed: two full rounds, in March 2008 and October 2008, and one partial round, in April 2009. During the full sampling rounds, groundwater samples were obtained from all existing permanent monitoring wells at Site 3 and from the off-Base downgradient flowing irrigation well on the adjacent golf course property. During the partial sampling round, groundwater samples were obtained from seven of the Site 3 monitoring wells (03MW03S, 03MW03SI, 03MW03I, 03MW04S, 03MW04SI, 03MW04I, and 03MW07S) and the off-Base downgradient well.

Each of the monitoring wells was purged prior to sampling. Monitoring wells with a screen length of 10 feet or less were purged and sampled following the low-flow sampling technique prescribed by the EPA Region 3 Recommended Procedure (Bulletin QAD023 - June 16, 1999). The monitoring wells were purged and sampled using a submersible pump with an adjustable flow rate. In each well, the pump was positioned within the well screen interval at the depth of the water-producing fracture, which was identified using the boring logs and geophysical logs. Sample pumping rate was set at between 0.1 to 0.4 L/min, and water levels were monitored to assure that the static water level was not drawn down into the well screen. Purged water was monitored every five minutes for pH, specific conductivity, temperature, turbidity, reduction potential, and dissolved oxygen. When the levels of these parameters stabilized, and a minimum of two saturated screen volumes had been removed from the well, the purging was considered complete and the groundwater samples were collected. Parameter stabilization was defined as three successive readings (taken at least 5 minutes apart) within 0.1 unit for pH, 3 percent for conductivity, 10 percent for turbidity and dissolved oxygen, and 10 mV for redox potential. The vertical

location of the pump, the required minimum purge volume, and the calculations for parameter stabilization were recorded on the groundwater sample log sheet.

In accordance with discussions with the EPA hydrogeologist, monitoring wells having a screen length greater than 10 feet were sampled by purging three to five well volumes with a submersible pump prior to sample collection. Water quality indicator parameters such as pH, specific conductivity, temperature, turbidity, redox potential, and dissolved oxygen were recorded for every half well volume. When three consecutive readings had reached stabilization, and at least three well volumes had been purged, the samples were collected. Well 03MW01SI has damage that prevents the use of a submersible pump in the well. This well was sampled using a small diameter bailer after purging three well volumes with a peristaltic pump.

The off-Base, Lot 1 irrigation well (03IW01), which is an open-bedrock borehole flowing artesian well, was sampled by directly filling the sample bottles from the flow of water from the well.

Round 1 samples were analyzed for TCL VOCs, 1,4-dioxane, and TAL metals (total and dissolved). In addition, samples from six wells (03MW01S, 03MW01I, 03MW03I, 03MW05S, 03MW05I, 03MW06SI, and 03MW06I) were analyzed for hexavalent chromium. Round 2 and Round 3 samples were analyzed for TCL VOCs. All pertinent field data were recorded in the field logbook and on the appropriate sample log sheet. Groundwater sample log sheets are included in Appendix C.

2.1.6.7 Static Water Level Measurements - Phase II RI Field Activities

Two rounds of groundwater-level measurements were collected at Site 3 (on July 2, 1997 and August 7, 1997) to provide hydraulic head data for piezometric elevations and groundwater contour maps. Static water levels were measured in all available wells using an electronic water-level indicator (m-scope) and were recorded to the nearest 0.01 foot. The static water levels in the flowing artesian wells were obtained by extending the casing stick-up of the wells and measuring the height of the water above the reference point elevation.

2.1.6.8 Static Water Level Measurements - 1998 through 2006 Field Activities

A Base-wide round of water level measurements was performed in October 1998 to assist the USGS in constructing a regional groundwater elevation contour map.

One round of groundwater-level measurements was recorded at Site 3 on September 28, 2006 to provide hydraulic head data for piezometric elevations and groundwater contour maps. Static water levels were

measured in all available wells using an electronic water-level indicator (Heron Water Level Indicator) and were recorded to the nearest 0.01 foot.

2.1.6.9 Static Water Level Measurements – Interim Groundwater Monitoring

Three rounds of groundwater-level measurements were collected at Site 3 (on March 18, 2008; October 14, 2008; and April 1, 2009) to provide hydraulic head data for piezometric elevations and groundwater contour maps. Static water levels were measured in all available wells using an electronic water-level indicator (m-scope) and were recorded to the nearest 0.01 foot. The static water levels in the flowing artesian wells were obtained by extending the casing stick-up of the wells and measuring the height of the water above the reference point elevation.

2.1.6.10 Review and Evaluation of Low-Flow Sampling Procedures

The regulatory community expressed concerns that the low-flow sampling methods used during the Phase II initial field activities may not have been executed in accordance with approved protocols. The Navy was requested to review all Phase II initial field activity groundwater sample acquisition records. The Navy was also requested to compare historical results with the Phase II RI sample results for those samples that were found to have been acquired outside of conformance with accepted low-flow protocol. The ultimate objective was to identify potential impacts on the site conceptual model (and the associated human health risk evaluation) at the site. The Navy and Tetra Tech completed the review and evaluation in June 1999. The results of this evaluation can be found in Appendix L - Summary of Action Items Evaluation.

2.1.7 Review of EPIC Historical Aerial Photographs

In April 1999, the EPA provided information to the Navy summarizing a review of Environmental Photographic Interpretation Center (EPIC) historical aerial photographs that indicated various unidentifiable anomalies at or near each of the IRP Sites. The EPA considered these anomalies potential environmental concerns, and requested the Navy to conduct further investigation to assess the potential concerns. The Navy obtained the EPIC aerial photos and completed further review.

The Navy conducted an independent review of the aerial photos and systematically attempted to ascertain the identity of each anomaly, and if an environmental concern existed. The location of each anomaly was determined in relation to current site conditions. Sample location mapping developed for the RI were reviewed to determine if and to what extent the anomalies were investigated. On-site personnel were interviewed, and a site visit at each location was performed on October 24, 2000. As a result of the EPIC study, Site Screening Area 12 was found northeast of the Antenna Field Landfill (Site 2).

2.1.8 Site Survey

The monitoring wells installed for the initial Phase II RI field activities were surveyed for horizontal location and elevation by the Pennsylvania-licensed surveyors GEO-Technical Services, Incorporated, of Harrisburg, Pennsylvania. Class B surveying was performed, allowing for a horizontal closure of 1:10,000 and a high vertical accuracy (at least 0.01 foot). Elevations measured for each well included the ground surface at the well and a designated reference point on the top of the inner well casing. Horizontal coordinates are reported to Pennsylvania South Zone-NAD 83 and elevations are reported with respect to NAVD 88. Select existing wells were surveyed to tie in previous survey data and as a check on the new survey data. Vertical elevation data from the previous investigation phases were reported to NGVD 29 and have been converted to NAVD 88 for this report.

Soil borings, surface soil sampling locations, surface water, and sediment sampling locations were surveyed for horizontal location and elevation. In addition, other significant site features such as building corners or site boundaries were surveyed for horizontal locations as needed to provide adequate site references for improving the quality and accuracy of the site-specific drawings.

The monitoring wells, soil borings, and test pits installed subsequent to the Phase II RI field activities were surveyed by the Pennsylvania-licensed surveyors James Stewart, Incorporated, of Philadelphia, Pennsylvania, and Dennis W. Sklar, Inc., following the same procedures followed for the initial field activities described above. Survey data are included as Appendix N.

2.1.9 Handling of Investigation-Derived Waste

2.1.9.1 Drill Cuttings

All drill cuttings generated during the soil boring and well installation program were field screened with a PID. The soil boring boreholes were backfilled with drill cuttings generated by the drilling due to the absence of organic vapors. Drill cuttings from the Site 3 boring locations also did not produce any significant PID readings, so the cuttings were spread around the immediate area of the borehole.

2.1.9.2 Development Water

Development water from the installed monitoring wells was directed away from the wellhead and discharged to the ground surface and allowed to infiltrate the soil since no elevated (above background) PID readings were noted during the drilling.

2.1.9.3 Purge Water

Purge water was directed away from the wellhead and discharged to the ground surface and allowed to infiltrate the soil. Very small quantities of purge water were generated during groundwater sampling due to the low-flow sampling procedure. The quantities of purge water removed from each well are listed on the groundwater sample log sheets which are located in Appendix C.

2.1.9.4 Decontamination Fluids and Drilling Fluids

Steam wash and rinse liquids from the drill rig, tools, and the backhoe bucket were collected at site-specific collection pads. In most cases, the water in the decontamination pads evaporated or was discharged in a manner consistent with the handling of the solids produced during that activity (e.g., drilling auger rinses were allowed to infiltrate the site soil where the corresponding cuttings had been returned to the hole or were spread on the site surface).

Water produced during the air-rotary drilling was temporarily contained at the head of the borehole in a plastic-lined, bermed holding pad. This water was discharged away from the wellhead and to the local ground surface and allowed to reinfiltrate since PID readings from the borehole were not elevated and there was no possibility of the drilling water flowing to a natural surface water body.

2.1.9.5 Personal Protective Equipment

Personal protective equipment (PPE) was double bagged and disposed off site.

2.1.10 General Sampling Operations

2.1.10.1 Sample Designation

Each sample collected was assigned a unique sample tracking number. The sample tracking number consisted of a three-segment or four-segment alpha (A)-numeric (N) code that identifies the site designation, sample medium and location, sample depth (for subsurface soils), and QA designation if required. Any other pertinent information regarding sample identification was recorded in the field logbooks. Additionally, monitoring wells installed during the previous SI and RI were renamed to fit the Phase II RI designations with a code that expresses the site number, monitoring well (initials), location number, and assigned depth designation; for example, 03MW03SI represents Site 3, monitoring well location 3, shallow intermediate depth.

The alpha-numeric coding used in the sample system is explained in the diagram and the subsequent definitions:

NN	AA	NN	NNNN
Site Designation	Sample Medium	Sample Location	Sample Depth

Character Type:

A = Alphabetical
N = Numerical

Site Designation:

03 = Site 3 - Ninth Street Landfill
BG = background Sampling Location

Sample Medium:

MW = Groundwater sample from a monitoring well
SB = Soil boring sample
TP = Test pit sample
SS = Surface soil sample
SW = Surface water sample
SD = Sediment sample
SP = Seep sample (additional designation L-liquid, S-sediment at end of tracking number)

Sample Location:

Subsurface soil	=	soil boring or test pit number
Surface soil	=	sample location number from map
Groundwater sample	=	well number
Surface water/sediment	=	sample location number from map
Seeps	=	sample location number from map
Background Sample	=	background sample location number

Sample Depth:

For soil samples, the two-digit start depth followed by the two-digit final depth (i.e., 0204 denotes beginning at 2 feet and ending at 4 feet).

Not used for groundwater, surface water, or sediment samples.

Field Duplicate Labels

Field duplicates were designated as DUP-01, DUP-02, etc. so they were submitted to the laboratory "blind." The chain-of-custody form and other documentation submitted to the laboratory were filled out in such a way that the laboratory could not match the duplicates to the original sample. The time on the duplicate samples was noted as 00:00. The correct sample location, time, etc. were documented in the field logbook. Alternately, duplicate samples were assigned a fictitious sample location, depth, and time to appear as another environmental sample. The correct sample association for the duplicate was documented in the field notebook.

Quality Control Sample Labels

Quality control samples were taken periodically. These samples were used to document the effectiveness of decontamination, to determine the quality of water used for decontamination, and to identify possible cross-contamination occurring during transit. These blank samples, including trip blanks, field blanks, and equipment rinsate blanks, used the QC sample identification scheme, listed below.

Sample Number

A sequential numeric designation was assigned to each type of blank on a daily basis.

Sample Date

The format MMDDYY (M=Month, D=Day, Y=Year) was used to indicate the day the sample was collected.

Example of the Quality Control Labels

The first field blank sample collected on December 4, 1996 would have had the sample identification label FB-01-120496.

Matrix spike and matrix spike duplicate (MS/MSD) samples were designated on the field documentation forms and sample labels.

2.1.11 Sample Handling

Sample Packaging and Shipping

Samples were packaged and shipped in accordance with Tetra Tech SOP SA-6.1. The field operations leader (FOL), or designate, was responsible for completing the following forms:

- Sample labels
- Chain-of-custody forms
- Appropriate labels applied to shipping coolers
- Chain-of-custody seals
- Federal Express air bills

Sample Custody

Custody of the samples was maintained and documented in accordance with procedures described in Tetra Tech SOP SA-6.3. Chain-of-custody began with the collection of the samples in the field.

Equipment Decontamination

Equipment involved in field sampling operations, including drilling rigs, backhoe, down-hole tools, augers, and all sampling equipment, was decontaminated before sampling, between individual samples, and after drilling or sampling activities.

The down-hole drilling equipment and sampling tools were cleaned using a high-pressure steam generator (steam jenny) before beginning work, between sample locations (such as test pits, soil borings, soil gas points, etc.), at the completion of the drilling program, and any time the drilling rig left a site before completing a boring. NAS JRB Willow Grove provided potable water directly from fire hydrants. Additional operations followed during drilling equipment decontamination are found in Tetra Tech SOP GH-1.6.

The sampling equipment used for collecting samples was decontaminated before the beginning of field sampling and between samples. The following decontamination steps were followed:

- Potable water rinse
- Alconox or liquinox detergent wash
- Potable water rinse
- Deionized water rinse
- Air dry

Field analytical equipment such as pH, conductivity, and temperature instrument probes were rinsed first with deionized water, then with the sample liquid.

2.2 COLLECTION OF BACKGROUND SAMPLES

Background samples were collected in and around NAS JRB Willow Grove from media similar in characteristics to on-site samples but from areas outside the known or suspected areas of influence of the sites. Site sampling data are compared to background to determine if contaminants are elevated at a site.

During the Phase II sampling, background samples were obtained from surface soils (BGSS01 through BGSS12) and surface water and associated sediments (BGSW01/BGSD01 through BGSW08/BGSD08). Background sample locations are indicated in Figure 2-8. Background surface soil samples were also used for comparison to subsurface soil samples. The significance, occurrence, and distribution of background results are discussed in Section 4. Results of background sample analysis for surface soils, surface water, and sediment may be found in Tables 2-7, 2-8, and 2-9, respectively. Tables 2-10 through 2-12 present summaries of background sample analytical statistics for each media sampled (groundwater background sampling was not attempted).

3.0 PHYSICAL CHARACTERISTICS OF THE SITE

3.1 HYDROLOGY

The ground surface in the vicinity of the Site 3 slopes at a grade of approximately five percent in a generally north-northwest direction toward the perimeter road and a stream that drains the storm water retention pond north of the site (Figure 3-1). Because of the topography, surface water runoff from the northern portion of Site 3 does not discharge to the pond, and instead flows toward the perimeter road and a small section of the stream downgradient from the storm water retention basin north of Site 3. The area is covered by a mixture of grass and woody vegetation, which serves to impede surface runoff and increase the infiltration of precipitation.

Surface water runoff from the site and any groundwater discharge to the surface drainages enters the stream downstream of the retention pond. The stream eventually flows toward the north into an unnamed tributary of Park Creek, approximately 1.5 miles upstream from its confluence with the Little Neshaminy Creek.

3.2 REGIONAL GROUNDWATER FLOW PATTERNS

Within the Triassic Basin, surface water and groundwater flow patterns are generally similar, and regional groundwater divides coincide with regional surface water divides. To determine the regional groundwater flow patterns on and near the Base, the USGS performed a regional groundwater study for the Navy (concurrent with this investigation and with the assistance of Tetra Tech) and constructed a regional potentiometric surface map (USGS, 2001). The results of the USGS investigation confirm that a topographic ridge trends from southeast toward northwest through the Base forming both a surface water divide and a groundwater divide. Groundwater north of the divide, including Site 3, flows regionally in a northwest direction toward the Neshaminy Creek watershed, and groundwater south of the divide flows regionally in a southeast direction toward the Pennypack Creek watershed.

3.3 BURIED WASTE

The following sections describe the results of the investigations performed to characterize and identify the extent of the buried waste at the site.

3.3.1 Test Pit Investigation

The Test Pit Investigation, conducted in April 2007, consisted of the excavation of fourteen test pits. Test pit locations were based upon historical information and observations made during field reconnaissance. Figure 3-2 shows the test pit locations superimposed on the results of the 2008 EM survey, described in Section 2.3. Table 3-1 summarizes the test pit details. Test pit logs are included in Appendix D. Photographs of the test pits are included in Appendix F. Of the fourteen test pits, four (03TP05, 03TP06, 03TP08, and 03TP18) encountered charred waste, three (03TP11, 03TP12, and 03TP14) encountered fill containing scattered debris, and the remaining seven (03TP07, 03TP09, 03TP10, 03TP13, 03TP15, 03TP16, and 03TP17) encountered only native soil. All of the test pits except 03TP14, which was excavated on the slope northwest of the baseball field and only 6 feet deep, encountered bedrock. The depth to bedrock ranged from 4 feet bgs in test pit 03TP16 to 10 feet bgs in test pits 03TP05, 03TP08, and 03TP09.

Test pits 03TP05 and 03TP06 were excavated in a wooded area of EM anomaly A shown on Figure 3-2. This area corresponds to “Area B”, or the “Old Landfill Area” in the Initial Assessment Study (IAS) report (NEESA, 1986). This area was reportedly one of the main disposal areas at the Ninth Street Landfill. Both of these test pits encountered charred waste and miscellaneous trash. The location of the waste in the two test pits corresponds with a surface topographic swale oriented northwest to southeast. Test pit 03TP05, which was excavated roughly perpendicular to the swale, encountered approximately 25 feet of waste, and test pit 03TP06, which was excavated at an oblique angle to the swale, encountered approximately 35 feet of waste. These two test pits appeared to intercept a former trench into which waste, some of it burned, had been deposited and then buried. (According to the IAS report, burning waste and burying the residue in trenches was the disposal method used at the Ninth Street Landfill.) The existing swale may have resulted from the settling of the buried material. At both locations, waste extended to the top of bedrock, which was encountered at 10 feet in 03TP05 and 8.5 feet in 03TP06. The buried waste consisted of a variety of materials, including general refuse (soda and beer bottles, eating utensils, china fragments), shop waste (engine parts, scrap metal, wire, cables, chains, saw blade, oil filter, auto parts, crushed empty drums), military refuse (perforated steel planking), and construction debris (cinder blocks, steel posts, asphalt). Much of the debris was charred or otherwise showed evidence of having been burned (some of the bottles were partially melted), and there was ash mixed with the soil. There was no obvious grossly contaminated hazardous material encountered. There was one elevated PID reading of approximately 150 ppm, which was encountered in a small area (approximately one square foot) of the excavated soil pile from the southern end of 03TP06. Sample 03TP06-0304-01 was collected from this soil. The soil was not wet or stained and exhibited only a faint odor. Although the soil was near a jet engine manifold, the manifold did not appear to be the source of the reading, since there were no additional elevated PID readings in its immediate vicinity.

Test pits 03TP15, 03TP16, and 03TP17 were excavated to delineate the lateral extent of the landfill encountered in test pits 03TP05 and 03TP06. Test pit 03TP15 was excavated approximately 60 feet south of test pit 03TP06, test pit 03TP16 approximately 90 feet west of test pit 03TP06, and test pit 03TP17 approximately 60 feet west of test pit 03TP05. None of these test pits encountered buried waste; each encountered native soil to the depth of bedrock, which was 9 feet bgs in 03TP15, 4 feet bgs in 03TP16, and 5 feet bgs in 03TP17.

Test pit 03TP18 was excavated approximately 60 feet northeast of test pit 03TP06 in a wooded area characterized by an uneven, hummocky ground surface. Weathered bedrock was encountered in the test pit at a depth of approximately 3 feet bgs. Buried waste consisting of charred debris, ash, wire, concrete, and metal and glass fragments was encountered at the northern end of the test pit. Excavation activities were halted when what appeared to be potential ordnance object was uncovered. The Base contact was notified, and security personnel and the Base fire department were called to secure the site. Explosive Ordnance Disposal (EOD) personnel from Fort Monmouth, New Jersey were called to the site. An inspection by EOD personnel revealed that the object was a 200 lb. “practice bomb” – an empty steel shell that could be filled with sand and used for training. The training device could be fitted with a black powder charge to produce smoke for spotters to see. The EOD personnel removed the object from the excavation and took it off-site for disposal. The excavation of test pit 03TP18 was ended at that point per NAS JRB Willow Grove direction, and the excavation was backfilled following clearance from the EOD specialists.

Test pits 03TP07 and 03TP08 were excavated in the area corresponding to an area of disturbed ground noted on a 1964 aerial photograph (EPA, 1995). Test pit 03TP07, which was excavated in a generally flat, wooded area, encountered undisturbed native soil to the depth of bedrock, approximately 5 feet. Test pit 03TP08 was excavated in a flat clearing adjacent to a short, steep slope that marks the edge of the raised land on which the baseball field is located. Approximately 18 feet of waste was encountered in the southeastern half of the test pit, which intercepted the slope. The waste was similar to that encountered in test pits 03TP05 and 03TP06, consisting of miscellaneous trash, charred debris, and ash. The area of waste was approximately 18 feet long by 5 feet deep. Bedrock was encountered at a depth of 6 feet in the portion of the test pit below the slope. The buried waste did not extend beyond the top of the slope in the up-slope direction.

Test pits 03TP10, 03TP11, and 03TP12 were excavated within or near the area referred to as “Area A” or the “Old Supply Scrapyard” in the IAS report, which was reportedly one of the main disposal areas. The area is currently a recreational baseball field. 03TP10 encountered undisturbed native soil to the depth of bedrock, approximately 8 feet bgs. Test pits 03TP11 and 03TP12 encountered fill to depths of approximately two feet bgs and three feet bgs, respectively, along their entire lengths. The former grade was marked by a layer of partially decomposed grass at both locations. The fill consisted of silty clay mixed

with miscellaneous debris consisting of metal and glass fragments, wire, and automobile parts. Underneath the former grade was undisturbed native soil. Bedrock was encountered at depths of 7 feet to 9 feet bgs in both of the test pits.

Test pits 03TP13 and 03TP14 were excavated on the same slope in which 03TP08 encountered waste, approximately 50 feet and 200 feet northeast of 03TP08, respectively, in order to determine the lateral extent of waste along the slope. 03TP13 encountered native soil to the depth of bedrock, approximately 5 feet. Test pit 03TP14 encountered a soil profile similar to that present in 03TP11 and 03TP12: fill to a depth of 3 feet, decomposed grass at the former grade, and native soil beneath. The fill consisted of silty clay and miscellaneous debris (metal, glass, and ceramic fragments). Neither of the two test pits encountered the charred waste that was found in test pit 03TP08.

3.3.2 Landfill Delineation Investigation

The Landfill Delineation Investigation, completed in January 2009, consisted of the excavation of thirteen additional test pits. The test pit locations were chosen to coincide with areas of EM anomalies identified during the April 2008 EM survey of Site 3. Figure 3-2 shows the test pit locations superimposed on the results of the EM survey. Table 3-1 summarizes the test pit details. Test pit logs are included in Appendix D. Photographs of the test pits are included in Appendix F.

Of the thirteen test pits completed, seven (03TP19, 03TP20, 03TP24, 03TP25, 03TP26, 03TP27, and 03TP30) encountered charred waste, four (03TP22, 03TP23, 03TP28, and 03TP29) encountered scattered trash and debris that had not been burned, one (03TP20) encountered suspected asbestos materials, and the remaining two test pits (03TP21A and 03TP21B) encountered only native soil. In all the test pits in which buried waste was encountered, the limits of the buried waste coincided well with the limits of the corresponding mapped EM anomaly. All the test pits except 03TP29, which was only 6 feet deep, encountered bedrock. The depth to bedrock ranged from six and a half feet in test pit 03TP23 to twelve feet in test pit 03TP20.

Test pits 03TP21A and 03TP21B were excavated at the location of an isolated EM anomaly on a slope approximately 50 feet northwest of the baseball field. Both test pits encountered undisturbed soil with no evidence of waste. The likely cause of the EM anomaly was a flat metal rail approximately 8 feet long and 1 foot wide, covered with vegetative debris that was later discovered on the ground surface in the immediate vicinity of the test pits.

Test pits 03TP19 and 03TP30 were excavated in EM anomaly area “C”, in the southern portion of the site, adjacent to Ninth Street. This area is approximately 150 feet long by 50 feet wide. 03TP19 was excavated

through the middle of the anomaly area, and 03TP30 was excavated at the southwestern end of the area. In 03TP19, a layer of charred debris approximately 1.5 feet to 7 feet bgs was observed, and in 03TP30 a similar layer was observed 2 feet to 8 feet bgs. The charred waste consisted of materials such as scrap metal, bottles, pieces of wood, china fragments, eating utensils, wire, and perforated steel planking.

Test pits 03TP20, 03TP24, and 03TP25 were excavated in EM anomaly area "B." Anomaly area "B" is approximately 200 feet by 150 feet and is located in the middle of the site. Test pit 03TP24 was excavated across the southwestern boundary of anomaly area "B" into anomaly area "A". Test pit 03TP24 encountered an area of charred debris approximately 24 feet wide at its northern end (in anomaly area "B") and scattered miscellaneous trash (not charred) at its southern end (in anomaly area "A"). The area between the two anomaly areas did not contain debris. Bedrock was 8 feet bgs at the northern end of the test pit and 6 feet bgs at the southern end. Test pit 03TP25 encountered a one-to-two-foot thick layer of cinders at a depth of approximately 1.5 feet bgs and charred debris from approximately 4 to 8 feet bgs. Bedrock was 8 feet bgs. While excavating near the middle of test pit 03TP25, soil exhibiting a strong solvent odor and elevated PID readings (up to 500 ppm) was encountered at a depth of approximately 5 feet bgs. Excavation activities were halted and a sample of the excavated soil (sample 03TP25-0506-01) was collected. A fragment of a crushed drum was observed with the soil. The soil was not stained and there was no evidence of free product. The excavation was resumed at the opposite end of the test pit. The area with the solvent-odor appeared to be of limited extent, comprising approximately 10 feet of the length of the test pit. Test pit 03TP20 was excavated at the northeastern end of EM anomaly area "B". A pocket of charred debris approximately 10 feet long was encountered near the northern end of the test pit at 7 to 12 feet bgs. Miscellaneous debris, including wire cable and tiles were encountered from the middle of the test pit to its southern end. A sample of the tiles (sample 03TP20-0506-02) was collected for asbestos analysis.

Test pits 03TP22, 03TP23, 03TP26, 03TP27, and 03TP28 were excavated in EM anomaly area "A". EM anomaly area "A" is a linear feature approximately 400 feet long by 50 feet wide, oriented northwest to southeast. Test pits 03TP22 and 03TP23 were excavated at the southeastern end of anomaly area "A". Both test pits encountered scattered trash consisting of bottles, tires, plastic, styrofoam, and some scrap metal. In test pit 03TP22, the trash was 1 foot to 3.5 feet bgs and in test pit 03TP23 the trash was 1 foot to 4 feet bgs. Test pits 03TP26, 03TP27, and 03TP28 were excavated near the northwestern end of anomaly area "A". Test pits 03TP26 and 03TP27 encountered miscellaneous trash and scrap metal, 2 feet to 8 feet bgs in 03TP26 and 1.5 feet to 5 feet bgs in 03TP27. In the northwestern portion of 03TP27, the debris was charred. Test pit 03TP28 encountered sparse miscellaneous trash from 1 foot to 3 feet bgs.

Test pit 03TP29 was excavated at the location of an isolated EM anomaly near the playground and picnic pavilion in the northern part of the site. This test pit encountered debris consisting of corroded scrap metal

from approximately 1.5 feet to 4 feet bgs. The excavation was stopped at 6 feet bgs to minimize disturbance to this area.

3.4 GEOLOGY AND HYDROGEOLOGY OF SITE 3

3.4.1 Geology

The geologic interpretation of the Ninth Street Landfill is based on the subsurface data (boring logs and geophysical logs) obtained during this current and previous site investigations. These data indicate that the local geology beneath this site is generally consistent with the regional geology (see Section 1.4).

Soil borings and monitoring well boreholes drilled in the vicinity of the site typically encountered the top of bedrock at a depth of 10 feet to 15 feet bgs. The overburden was characterized as silty to sandy clay that graded downward to weathered siltstone or shale. The overburden is generally thinnest in the northwest portion of the site, as illustrated by the monitoring well boreholes 03MW07S (3 feet of silty sandy fill material) and 03MW04I (5 feet of clayey silt).

The maximum depth of the monitoring well boreholes at Site 3 is 225 feet bgs. The bedrock to this depth typically consisted of alternating sequences of sandstone, siltstone, and shale. In general, the lithologic units at this site are rather thick and fairly continuous, although it is not unusual to encounter local, finer-grained lenses within a generally coarser matrix within any particular unit.

Structural geology beneath the site is illustrated by a pair of geologic cross-sections (Figures 3-3 and 3-4). These sections indicate that the structure (dip) of the bedrock is similar to that predicted by the regional geology. A three-point correlation of geophysical logs of boreholes from the nearby Site 5 produced a bedrock strike of North 76 degrees East and a bedrock dip of 7 degrees Northwest.

3.4.2 Hydrogeology

3.4.2.1 Monitoring Well Installation and Rationale

As part of the Phase II RI, seven additional monitoring wells were installed in 1997 to further delineate the nature and horizontal and vertical extent of groundwater contamination and to provide the additional hydraulic head data needed to refine the hydrogeologic interpretation of the site. Since 1997, two additional monitoring well clusters have been installed: 03MW08 in 2005 as part of the follow-on activities, and 03MW09 in 2010. There are a total of 22 Site 3 monitoring wells. The monitoring well locations are illustrated in Figure 3-1. Construction details for all existing and newly installed monitoring wells are listed in

Table 3-2. The monitoring wells were designated as overburden (O), shallow (S), intermediate (I), deep (D), or shallow-intermediate transitional (SI) monitoring wells. Well designations reflect the relative subsurface depths of the well screens, and do not necessarily imply any hydrogeological significance.

Monitoring well cluster 03MW06 was installed southeast of the landfill and adjacent to the Army Reserve Hangar (Building No. 177). The results of the Phase I RI indicated that groundwater at Site 3 flows in a generally north to northwest direction. Volatile organic contamination (PCE) was detected at the immediately up gradient Site 3 monitoring well location (03MW01) in the shallow (unconfined) and shallow-intermediate (transitional) groundwater zones, and in the most up gradient monitoring well (03MW05) in the shallow, unconfined zone (no deeper monitoring wells existed at this location). These data have been interpreted to indicate that the landfill may not be the sole source of the PCE detected in the monitoring wells installed down gradient from the landfill. To further investigate this hypothesis, a three-well cluster was installed at locality 03MW06 to obtain a depth profile of groundwater quality and hydraulic head.

A shallow-intermediate monitoring well (03MW05I) was installed at location 03MW05 to pair with the existing shallow well (03MW05S) to further evaluate other potential sources of groundwater contamination up gradient from Site 3. As discussed, both the shallow well at 03MW05 and the shallow-intermediate monitoring wells immediately down gradient from this location (03MW01) contained PCE during the Phase I RI.

Two monitoring wells were installed at the location of the existing shallow well 03MW02S to obtain groundwater quality and hydraulic head data for the deeper portions of the aquifer immediately down gradient from the landfill. Shallow-intermediate (03MW02SI) and intermediate (03MW02I) depth monitoring wells were installed to monitor the transitional and confined groundwater zones, respectively, immediately down gradient from the landfill.

Monitoring well 03MW07S was installed at the northwest corner of the site to monitor the groundwater quality and to obtain hydraulic head data within this generally down gradient location that had no existing monitoring wells.

Monitoring wells 03MW08S and 03MW08D were installed in October/November 2005 as a continuation of the effort to identify the up gradient source of PCE. The wells installed during the initial phase of field activities that are located hydraulically up gradient from the landfill (03MW05I, 03MW06S, 03MW06SI, and 03MW06I) all showed PCE contamination. Monitoring well cluster 03MW08 was installed further up gradient from these wells, between the oil/water separator and the Army Reserve vehicle maintenance shed, to determine if the separator or a further-up gradient location is the source of the PCE. The two monitoring wells of the 03MW08 cluster were given the designations “shallow” and “deep” by the contractor

that installed the wells, although based on their completion depths they more accurately fit the established designations of “shallow-intermediate” and “intermediate”.

Monitoring wells 03MW09O and 03MW09S were installed in January 2010, between well clusters 03MW03 and 03MW04 east of the perimeter road and fence that run between Site 3 and the adjacent golf course. The wells were installed to monitor the groundwater quality in the overburden (03MW09O) and in the shallow, unconfined aquifer (03MW09S) directly down gradient from EM anomalies B and C, in which VOCs were detected in subsurface soil during the Landfill Delineation Investigation.

3.4.2.2 Groundwater Occurrence and Flow Characteristics

The occurrence and distribution of groundwater within the bedrock is similar to that typically reported for aquifers within the Triassic Basin. During drilling, the bulk of the groundwater entered the boreholes through discrete water-entry zones. Subsequent analyses of the drilling logs, borehole video tape (when present), and borehole geophysical logs revealed that the discrete water-entry zones were either bedding-plane partings at lithologic contacts or fractures within a relatively homogeneous lithologic unit. Typically, both types of water-entry zones were present within any particular borehole. The primary porosity of the various lithologic units (particularly the sandstones) most likely contributed groundwater to each borehole, but the volume or yield could not be quantified due to the low volume of groundwater entering the borehole through the primary pore spaces relative to the volume of groundwater entering through the secondary openings.

The hydraulic head data collected during this investigation indicate that two hydrogeologic units, an upper unconfined zone and a deeper semi-confined to confined zone, exist beneath Site 3. Monitoring wells at the site are completed in both of these groundwater zones, based on the vertical distribution of hydraulic head. The confining conditions at any monitoring well cluster location are not created by the presence of any single confining layer or geologic unit and cannot be predicted solely by well depth, but are related to the surface elevation of that cluster location, the elevation of the recharge area for the hydrogeologic unit being monitored, and the subsurface depth (or elevation) of the well screen.

<u>Hydraulic gradients</u>

Flowmeter logs run in the open boreholes and the hydraulic head elevations measured in the completed monitoring wells indicate that both upward and downward vertical hydraulic gradients exist at Site 3. Six complete rounds of static-water level measurements were conducted. These data are included in Table 3-3. The magnitude of the vertical hydraulic gradient is quite variable. In general, the vertical gradient increases to the northwest (down gradient), based on the hydraulic head measurements at the monitoring well cluster locations (where wells monitor several subsurface depth zones at a single surface location).

The vertical gradients between the wells in the up gradient clusters, 03MW05, 03MW06, and 03MW08, are fairly low (in the range of hundredths of a foot of head difference per foot of vertical elevation), which suggests that these wells are monitoring different vertical zones within a common aquifer or hydrogeologic unit. The down gradient well clusters (03MW01, 03MW02, 03MW03, and 03MW04), however, show relatively strong vertical gradients (0.1 or greater). Monitoring well clusters 03MW01 and 03MW02 show slightly downward or flat vertical hydraulic gradients above the depth of the shallow intermediate well, and relatively strong upward gradients below this depth. Monitoring well cluster 03MW03 varied in its pattern of vertical hydraulic gradient. In both 2007 water level rounds, it showed a slightly upward gradient above the depth of the shallow intermediate well and slightly downward below this depth; in the 2008 and 2009 rounds, it showed an upward gradient at all depths. Monitoring well cluster 03MW04 shows a strong upward vertical hydraulic gradient throughout its entire depth range. Based on the observed vertical hydraulic gradients, semi-confined to confined conditions exist in wells 03MW01I, 03MW02I, 03MW03SI, 03MW03I, 03MW04SI, and 03MW04I.

The hydraulic head data for the 03MW06 cluster generally show a slight upward flow above 03MW6SI and slight downward flow below this well. The claystone layer between 03MW06S and 03MW06SI, which may act as a semi-confining layer, may explain this vertical flow pattern.

The horizontal gradient within the unconfined groundwater zone ranges from about 0.001 foot of head difference per foot of horizontal distance near the taxiway and hangar to about 0.04 foot of head difference per foot of horizontal distance northwest of well cluster 03MW05. The horizontal gradient in the confined zone ranges from approximately 0.02 foot to 0.03 foot of head difference per foot of horizontal distance.

Groundwater flow directions

Groundwater flow directions beneath the Ninth Street Landfill were determined from the contouring of the static-water level elevations measured in the site's monitoring wells. Groundwater elevation contour maps were constructed for the water elevations collected in August 1997, September 2006, and October 2008 for the unconfined groundwater zone (Figures 3-5, 3-6, and 3-7) and for the confined groundwater zone (Figures 3-8, 3-9, and 3-10).

The September 2006 groundwater elevations are generally higher than the August 1997 and October 2008 elevations. This difference can be explained by the amounts of precipitation that fell in the months preceding each measurement round. Based on data recorded at the Philadelphia International Airport by the National Weather Service, a below average amount of precipitation fell during the three months preceding the August 1997 water level measurement round (-1.43" for May, -2.25" for June, and -1.90" for July) and the October 2008 round (-1.15" for July, -1.38" for August, and 0.43 for September), and an above

average amount fell during the three months preceding the September 2006 measurement round (+4.66” in June, -0.12” in July, and +0.11” in August).

The groundwater elevation contour maps for the 1997, 2006, and 2008 data show the same general groundwater flow directions. The maps indicate that the groundwater flow direction beneath the Ninth Street Landfill differs between the unconfined and the confined groundwater zones. Groundwater at the water table and within the unconfined groundwater zone (which is influenced by the surface topography) flows in an overall northwestward direction. The configuration of the water table appears to be a subdued reflection of the surface topography, as is typical for this area.

Groundwater in the confined zone flows in a generally northward direction. The orientation of the piezometric contour lines for the confined groundwater zone is parallel to bedrock strike. This groundwater flow pattern may in part reflect steady-state drawdown conditions caused by an uncapped flowing artesian well (73 feet deep) that is located off-Base on private property (Commonwealth Country Club), about 400 feet to the northwest of monitoring well cluster 03MW04. It has been widely reported in many previous studies that drawdown cones within the Triassic Basin are preferentially elongated parallel to the strike of the bedrock.

The hydrogeologic cross-sections (Figures 3-11 through 3-14) illustrate the horizontal and vertical distribution of hydraulic head. Cross section A-A’ (Figures 3-11 and 3-12) is oriented in the general direction of bedrock dip, which is also the direction of the topographic gradient, and cross section B-B’ (Figure 3-13 through 3-14) is oriented in the general direction of bedrock strike. Cross section A-A’ shows groundwater flowing slightly downward in the up gradient well clusters (03MW08 and 03MW06), and generally flowing upward in the down gradient well clusters. The cross sections indicate that the transition from unconfined to confined conditions becomes shallower in the down gradient direction. At well cluster 03MW01, the transition occurs at a subsurface depth of approximately 100 feet, and at well cluster 03MW03, it occurs at a subsurface depth of approximately 35 feet. It is unlikely that the confined conditions extend much further up gradient than well cluster 03MW05, since the ground elevations of well clusters 03MW06 and 03MW08 are near the regional topographic high elevation and regional groundwater divide, which is located approximately 1000 feet southeast of well cluster 03MW06.

Off-Base Hydrogeological Investigations

In March 1998, the Navy performed an off-base hydrogeological investigation on two boreholes located north (and farther down gradient) of the Ninth Street Landfill in the area of the Commonwealth Country Club. This investigation was performed under access agreements with the owners of the properties. A third off-station borehole farther north of the Ninth Street Landfill was not accessible. The two boreholes were

geophysically logged by USGS and then sampled for VOC analysis. The first well was an irrigation well, later given the designation 03IW01, located approximately 400 feet northwest of monitoring well cluster 03MW04. The geophysical logging revealed that this well was 73 feet deep. At the time of the geophysical logging, the well was flowing at a rate of 10 gallons per minute (gpm). Only one significant water producing zone, a fracture at a subsurface depth of 65 feet, was identified. This depth corresponds stratigraphically with the screen depth intervals of 03MW03SI and 03MW04SI, which are both screened within the confined groundwater zone. The groundwater sampling results revealed PCE at a concentration of 15 ug/L.

The second well was one of two monitoring wells installed by ERM as part of a Phase II investigation performed for the property owner. This well is located approximately 2,200 feet north of the 03MW03 monitoring well cluster. The total depth of the well was 150 feet. Three significant water-producing zones were identified, at approximate subsurface depths of 35 feet, 90 feet, and 130 feet. The groundwater sampling results revealed no contamination in any of the three zones.

4.0 NATURE AND EXTENT OF CONTAMINATION

4.1 INTRODUCTION

This section evaluates sampling data from the 1991 Phase I RI, the 1997 Phase II RI, and subsequent investigations. Details of the samples collected (number of samples, location, sample identifier) during each phase are presented. Data were compared to federal and state human health-related benchmarks and Willow Grove background values, as detailed in Section 6.1.6. The complete analytical data are included in Appendix A.

4.2 SURFACE SOIL

During the Phase I RI (1991), surface soil samples were obtained from a depth of 0 to 6 inches bgs at 16 locations (03SS01 through 03SS16) and from a depth of 1.5 to 2 feet bgs at 14 locations (03SB01, 03SB03, and 03SB05 through 03SB16) and analyzed for full TCL and TAL parameters. These samples were collected over a 90-foot-by-90-foot grid on the baseball field, in response to the detection of PAHs in this area during the SI.

During the Phase II RI (1997), surface soil samples were obtained from 12 locations, 03SS01 through 03SS12, and analyzed for TAL metals, TCL SVOCs, and TCL pesticide/PCBs. Samples 03SS04 and 03SS08 were also analyzed for dibenzofuran and dibenzodioxins. There was one surface soil sample collected during the follow-on activities in March 2006, 03SB18-0002, which was collected from a depth of 0 to 2 feet bgs. This sample was collected from the hangar area as part of the investigation of potential source areas up gradient from the landfill.

During the Test Pit Investigation in October 2007, two surface soil samples were collected, 03TP12-0102-03 and 03TP16-0102-01, from a depth of 1 to 2 feet bgs. The samples were analyzed for full TCL/TAL analyses plus cyanide.

During the Landfill Delineation Investigation in December 2008, twelve surface soil samples (03SS17 through 03SS28) were collected from a depth of 0 to 6 inches bgs. The samples were analyzed for full TCL/TAL analyses plus cyanide.

In August 2009, twelve additional surface soil samples, 03SS31 through 03SS42, were collected from a depth of 0 to 2 feet bgs. The samples locations were in the immediate vicinity of sample locations 03SS12 through 03SS28. The samples were analyzed for full TCL/TAL analyses plus cyanide.

Tables 4-1 presents the occurrence and distribution of inorganic and organic chemicals detected in landfill area surface soil samples and compares them to background. Table 4-2 presents the occurrence and distribution of inorganic and organic chemicals detected in hangar area surface soil samples and compares them to background. Tables 4-3 and 4-4 present the background comparison test results for the landfill area surface soil. Table 4-5 presents the background comparison test results for the hangar area surface soil. Tables 4-6 and 4-7 present a comparison of detected compounds to federal and state benchmarks for the landfill area and hangar area, respectively. Figures 4-1A and 4-1B show sample locations and concentrations of compounds that exceed benchmarks in the southwestern and northeastern portions of the landfill area, respectively, and Figure 4-1C shows sample locations and concentrations of compounds that exceed benchmarks in the hangar area.

4.2.1 Inorganics

4.2.1.1 Phase I and II Investigations

Arsenic was detected in the majority of surface soil samples at concentrations exceeding screening concentrations; however, concentrations were within background concentrations. Cadmium and mercury were not detected in background samples but were detected in two surface soil samples at Site 3. Cadmium was detected at 03SS09 [18.4 milligrams per kilogram (mg/kg)] and 03SS12 (1.9 mg/kg). Mercury was detected in 03SS01 (0.12 mg/kg) and 03SS02 (0.1 mg/kg). Copper was detected in one sample (03SS09) at a level (81.3 mg/kg) significantly above background concentrations. Neither cadmium, copper nor mercury were detected at concentrations exceeding reference criteria. Other inorganics that statistically exceeded background concentrations, but not screening criteria, include aluminum, chromium, iron, nickel, and vanadium.

4.2.1.2 Test Pit and Landfill Delineation Investigations

Arsenic exceeded its screening concentrations in all of the surface soil samples, at concentrations ranging from 1.7 mg/kg to 6.9 mg/kg. These concentrations were within background concentrations, however. Chromium and vanadium exceeded their screening concentrations in all surface soil samples, at concentrations ranging from 6.4 mg/kg to 26.8 mg/kg (chromium) and from 16.5 mg/kg to 45.7 mg/kg (vanadium).

4.2.2 Organics

4.2.2.1 Phase I and II RI Investigations

No VOCs were detected in surface soil samples, and no SVOCs were detected at concentrations statistically greater than background concentrations. The following PAHs were detected at concentrations above screening concentrations: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene. The highest concentrations of PAHs were detected in sample 03SB06/06-D.

Dieldrin was detected in the majority of samples, frequently at concentrations exceeding screening criteria; however, detected concentrations were below background concentrations. Endosulfan I was detected in two samples [03SB11, 23 micrograms per kilogram (µg/kg)] and 03SB13, 30 µg/kg) below screening concentrations, and 4,4'-DDE, was detected in two samples (03SS04, 3.3J µg/kg; 03SS06, 9J µg/kg) below screening concentrations. One PCB isomer, Aroclor 1254, was detected in three samples (03SS04, 13 µg/kg; 03SS06, 22 µg/kg; and 03SS09, 84 µg/kg) below screening concentrations. These compounds were not detected in background samples.

Low concentrations of dibenzodioxin and dibenzofuran compounds were detected in both of the surface soil samples (03SS04 and 03SS08) that were analyzed for these compounds. No background samples were analyzed for these compounds. The concentrations in 03SS04 exceeded the screening concentrations for total TCDD equivalents.

4.2.2.2 Test Pit and Landfill Delineation Investigations

PAHs and pesticides were detected at concentrations above screening concentrations but below background concentrations. The highest concentrations of PAHs were detected in sample 03TP12-0102-03 from test pit 03TP12, which was excavated in an area of the baseball field in which elevated concentrations of PAHs were previously detected in shallow subsurface soils during the Phase I and Phase II investigations. Sample 03TP12-0102-03 contained benzo(a)anthracene [15,000J (J = estimated) µg/kg], benzo(a)pyrene (8,800J µg/kg), benzo(b)fluoranthene (8,600J µg/kg), benzo(k)fluoranthene (4,400J µg/kg) and indeno(1,2,3-cd)pyrene (7,400J µg/kg) at concentrations above screening concentrations.

In samples 03SS17 through 03SS28, benzo(a)pyrene exceeded screening concentrations in nine samples. The highest concentration was 87 µg/kg (average of duplicate sample results) in sample 03-SS-21/21D. Dibenz(a,h)anthracene exceeded screening concentrations in sample 03-SS-21/21D (19 µg/kg). Dieldrin exceeded screening concentrations in sample 03-SS-28 (280 µg/kg).

In samples 03SS31 through 03SS42 the following PAHs exceeded screening concentrations: benz(a)anthracene (up to 260 ug/kg), benzo(a)pyrene (up to 280 ug/kg), benzo(b)fluoranthene (up to 310 ug/kg), dibenz(a,h)anthracene (up to 46J ug/kg), and indeno(1,2,3-cd)prene (up to 210J ug/kg). Dieldrin exceeded screening concentrations in six samples at concentrations ranging from 32 ug/kg to 110 ug/kg.

4.3 SUBSURFACE SOIL RESULTS

During Phase I activities, subsurface soil samples were obtained from two locations within the baseball diamond (03SB02 and 03SB04) at a depth 1.5 to 2.5 bgs. These locations were identical to surface soil sample locations 03SS02 and 03SS04. In addition, eight samples were obtained from four test pits (03TP01 through 03TP04) excavated at the site. Samples were analyzed for full TAL metals and TCL organic parameters. During the Phase II investigation, three subsurface samples were obtained from location 03SB01 at depths of 2 to 4 feet bgs (03SB01-0204), 6 to 8 feet bgs (03SB01-0608), and 14 to 16 feet bgs (03SB01-1416) and analyzed for TCL VOCs.

During the follow-on activities in March 2006, 21 subsurface soil samples were collected from 10 soil boring locations and analyzed for VOCs and SVOCs. Eight of these soil borings (03SB17 through 03SB24) were advanced up gradient of the landfill in the Army Reserve Hangar area in order to determine if the oil/water separator or the maintenance shed are sources of the PCE in the Site 3 groundwater. The remaining two soil borings, 03SB25 and 03SB26, were advanced in areas where elevated PID readings were recorded during previous site investigation activities in order to resample the soils for VOCs using the Encore® sampling method.

During the Test Pit Investigation, 26 subsurface soil samples were obtained from fourteen test pits (03TP05 through 03TP18) and analyzed for full TCL/TAL parameters. Two of the soil samples collected during the Test Pit Investigation were also analyzed for dioxin. During the Landfill Delineation Investigation, 14 subsurface soil samples were collected from 12 test pits (03TP19 through 03TP30) and analyzed for full TCL/TAL parameters plus cyanide. One soil sample collected during the Landfill Delineation Investigation was also analyzed for dioxin.

Tables 4-8 and 4-9 present the occurrence and distribution of inorganic and organic chemicals detected in site-related subsurface soil samples and compare them to background. Tables 4-10, 4-11, and 4-12 present the background comparison test results. Tables 4-13 and 4-14 present a comparison of detected

compounds to federal and state benchmarks. Figure 4-2A shows sample locations and concentrations of compounds that exceed benchmarks for the landfill area and Figure 4-2B shows the sample locations and concentrations of compounds that exceed benchmarks for the Army Reserve Hangar area.

4.3.1 Inorganics

4.3.1.1 Phase I and Phase II RI Investigations

Arsenic was detected at concentrations exceeding screening concentrations at all sample locations; however, these concentrations were not above background. Manganese exceeded screening concentrations and background concentrations in sample 03TP04-4.

Three metals not detected in background samples were detected in subsurface samples at concentrations below screening concentrations. Antimony was detected in two samples (03TP02-2, 14.7 mg/kg; and 03TP04-2, 14.8 mg/kg). Cadmium was detected in seven samples at concentrations ranging from 1.3 mg/kg to 3.9 mg/kg. Silver was detected in two samples from test pit 03TP02 (03TP02-1 and 03TP02-2) at 3.9 mg/kg and 4.9 mg/kg, respectively. Of these three metals, cadmium and silver are considered statistically site related based on the background test results.

Other metals found at concentrations below the screening concentrations but statistically greater than background include aluminum, barium, chromium, cobalt, copper, nickel, and vanadium.

4.3.1.2 Test Pit Investigation

Arsenic, chromium and vanadium were detected at concentrations exceeding screening concentrations in all of the test pits. The arsenic concentrations ranged from 2L (L = biased low) mg/kg (in sample 03TP10-0304-02) to 10.7L mg/kg (in sample 03TP06-0607-04). Metals other than arsenic were detected at concentrations exceeding screening concentrations in five test pits: 03TP05, 03TP06, 03TP08, 03TP10, and 03TP18. Except for 03TP10, these were the test pits in which charred waste was encountered. The following metals exceeded screening concentrations: antimony (up to 113 mg/kg), cadmium (up to 155 mg/kg), cobalt (up to 82.8 mg/kg), chromium (up to 133 mg/kg), iron (up to 113,000 mg/kg), lead (up to 4,640 mg/kg), and manganese (up to 20,000 mg/kg). Based on the results of the background comparison tests, cadmium, cobalt, chromium, iron, lead, and manganese are statistically site-related.

4.3.1.3 Landfill Delineation Investigation

Arsenic, chromium, and vanadium exceeded screening concentrations in all of the test pit samples. The highest arsenic concentration was 32.4J (average of duplicate sample results), detected in sample 03TP27-0304-01/01D. Lead exceeded screening concentrations in seven test pits (03TP19, 20, 24, 25, 26, 27, and 30), at concentrations ranging from 555J mg/kg in sample 03TP24-0304-01 to 3,595 mg/kg (average of duplicate sample results) in sample 03TP27-0304-01/01D. In addition to lead and arsenic, the following metals (and their maximum concentrations) exceeded screening concentrations: antimony (251L mg/kg), cadmium (300 mg/kg), chromium (133 mg/kg), cobalt (121J mg/kg), iron (182,500 mg/kg), manganese (2,610 mg/kg), thallium (45.5J mg/kg), and vanadium (559J mg/kg). Based on the results of the background comparison tests, cadmium, chromium, cobalt, iron, lead, manganese, thallium, and vanadium are statistically site-related.

Asbestos containing material (ACM) was confirmed in test pit 03TP20. This material had the appearance of fragments of Transite panels from a demolished building siding or roof.

4.3.2 <u>Organics</u>

4.3.2.1 Phase I and Phase II RI Investigations

No VOCs were detected statistically above background or screening concentrations. Benzene (3J µg/kg), chlorobenzene (2J µg/kg), toluene (2J µg/kg), and TCE (2J µg/kg) were detected at low concentrations in 03SB02. 2-Butanone (14J µg/kg) and acetone (71J µg/kg) were detected at 03SB01-0608.

Two pesticides were detected on site at concentrations not statistically above background. Dieldrin exceeded screening concentrations at three locations: 03SB02 (63 µg/kg), 03SB04 (230 µg/kg), and 03TP02-1 (79 µg/kg). Endrin was detected in 03TP02-1 at 25 µg/kg, which is below screening concentrations.

Aroclor 1254 was detected above screening concentrations in samples 03TP02-1 (490 µg/kg) and 03TP02-2 (810 µg/kg). This compound was not detected in background.

Several VOCs and SVOCs were detected below screening concentrations but not in background. These include the VOCs 1,2-dichlorobenzene (up to 3,600 µg/kg) and 1,4-dichlorobenzene at 03TP04-2 (880J µg/kg), and the SVOCs 2-methylnaphthalene and 2-methylphenol. None of these compounds were present at concentrations statistically above background.

Screening concentrations were exceeded for six PAH compounds: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene benzo(k)fluoranthene, indeno(1,2,3,-cd)pyrene, and dibenz(a,h)anthracene. The highest PAH concentrations were associated with 03SB04. None of the PAHs were detected at concentrations statistically greater than background.

In the Army Reserve Hangar area, samples 03SB19-0204 and 03SB19-0408 contained the PAH compounds benz(a)anthracene (up to 4,200 µg/kg), benzo(a)pyrene (up to 3,200 µg/kg), benzo(b)fluoranthene (up to 4,200 µg/kg), indeno (1,2,3,-cd)pyrene (up to 2,000 µg/kg), and dibenz(a,h)anthracene (up to 580 µg/kg), at concentrations exceeding screening concentrations. Benzo(a)pyrene also exceeded screening concentrations in samples 03SB17-0406 (40J µg/kg) and 03SB21-1012/03SB-1012D (34J µg/kg/21J µg/kg). None of the PAH compounds were detected at concentrations statistically greater than background. There were no VOCs detected in the hangar area samples.

4.3.2.2 Test Pit Investigation

SVOCs, consisting of PAHs, were detected at concentrations above screening concentrations in four test pits: 03TP06, 03TP08, 03TP12, and 03TP14. The highest concentrations were detected in sample 03TP06-0708-02, which contained benz(a)anthracene (230J µg/kg), benzo(a)pyrene (390J µg/kg), and benzo(b)fluoranthene (290J µg/kg). Benzo(a)pyrene was the only SVOC that exceeded screening concentrations in subsurface soil samples from test pits 03TP08, 03TP012, and 03TP14. None of the PAHs were detected at concentrations statistically greater than background.

Pesticides were detected at concentrations above screening concentrations in five test pits: 03TP05, 03TP06, 03TP08, 03TP12, and 03TP14. None of the pesticides were statistically site-related. Dieldrin was the only pesticide detected above screening concentrations in test pits 03TP05, 03TP08, 03TP12, and 03TP14. The highest concentrations of pesticides were detected in sample 03TP06-0607-04 from test pit 03TP06. This sample contained heptachlor epoxide (390J µg/kg), dieldrin (10,000 µg/kg), dichlorodiphenyldichloroethylene (DDE) (8,700 µg/kg), dichlorodiphenyldichloroethane (DDD) (72,000 µg/kg), and dichlorodiphenyltrichloroethane (DDT) (270,000 µg/kg) at concentrations above screening concentrations.

PCBs were detected at concentrations exceeding screening concentrations in one test pit: 03TP06. Aroclor-1254 and Aroclor-1260 were detected in sample 03TP06-0708-02 at 450 µg/kg and 550 µg/kg, respectively, and in sample 03TP06-0809-03 at 620 µg/kg and 600 µg/kg, respectively. These compounds were not detected in background.

Dioxin was detected in both soil samples analyzed for dioxin at concentrations that exceeded screening concentrations. Sample 03TP05-0910-02 contained total 2,3,7,8-TCDD toxicity equivalents at 244 nanograms per kilogram (ng/kg) and sample 03TP06-0809-03 contained 272 ng/kg.

4.3.2.3 Landfill Delineation

One VOC, ethylbenzene, was detected at a concentration that exceeded screening concentrations. Ethylbenzene was detected at 7,000 µg/kg in sample 03TP25-0506-01, which exceeds its RBC of 5,700 µg/kg. Other VOCs detected in this sample were 1,2,3-trichlorobenzene (5,700 µg/kg), toluene (150,000 µg/kg), and total xylene (20,000 µg/kg). VOCs were also detected in the 6- to 7-foot bgs sample from 03TP25-0607-02, including benzene (78J µg/kg), ethylbenzene (550 µg/kg), toluene (4,300 µg/kg), total xylene (2,000 µg/kg), and tetrachloroethylene (PCE) (210J µg/kg). PCE was also detected at low levels in samples 03TP19-0304-02 (9.2J µg/kg) and 03TP24-0304-01 (32 µg/kg).

SVOCs, consisting of PAHs, were detected at concentrations above screening concentrations in five test pits: 03TP19, 03TP20, 03TP24, 03TP26, and 03TP30. Benzo(a)pyrene was the only SVOC that exceeded screening concentrations in test pits 03TP26 and 03TP30. The highest concentrations of PAHs were detected in test pit 03TP20. Sample 03TP20-0708-01 contained benzo(a)anthracene (15,000 µg/kg), benzo(a)pyrene (7,900J µg/kg), benzo(b)fluoranthene (9.900J µg/kg), benzo(k)fluoranthene (6,600J µg/kg), chrysene (23,000 µg/kg), dibenz(a,h)anthracene (1,100J µg/kg) and indeno(1,2,3-cd)pyrene (3,600J µg/kg), and naphthalene (14,000 µg/kg) at concentrations above screening concentrations. This sample was collected from the northern end of the test pit, where a pocket of charred debris was encountered at a depth of approximately 7 feet bgs. None of the compounds detected were statistically site related based on comparison to background concentrations.

The pesticide dieldrin was detected at concentrations above screening concentrations in seven test pits: 03TP19, 03TP20, 03TP23, 03TP25, 03TP26, 03TP27, and 03TP30. The highest concentration of dieldrin (120 µg/kg) was detected in sample 03TP26-0506-01. Dieldrin was not statistically site-related based on comparison to background concentrations.

PCBs were detected at concentrations exceeding screening concentrations in three test pits: 03TP20, 03TP24, and 03TP26. Aroclor-1254 was detected above its RBC of 220 µg/kg in sample 03TP24-0304-01 (4,000 µg/kg); Aroclor-1248 was detected above its RBC of 220 in sample 03TP26-0506-01 (560 µg/kg); and Aroclor-1260 was detected above its RBC of 220 µg/kg in sample 03TP20-0708-01 (340 µg/kg). These compounds were not detected in background.

Dioxin was detected in sample 03TP30-0506-01 and duplicate sample 03TP30-0506-01-D at 237 ng/kg (the average of the two results obtained as the duplicate sample) total 2,3,7,8-TCDD toxicity equivalents, which exceeds both the RBC (5 ng/kg) and the MSC (120 ng/kg).

4.4 SURFACE WATER RESULTS

The surface water samples collected during the Phase I RI and Phase II RI are not included in the present evaluation, as discussed in Section 2.1.4.

During the Landfill Delineation Investigation, six surface water samples were collected from the intermittent stream that drains the storm water retention basin. The samples consisted of an upstream sample (03SW17) collected from the retention basin discharge, a downstream sample (03SW12) collected at the Base property boundary, and four intermediate samples (03SW13 through 03SW16) collected along the stream length between these two locations. The samples were analyzed for full TCL/TAL analyses plus cyanide.

During each of the three rounds of the Interim Groundwater Monitoring in March 2008, October 2008, and April 2009, two surface water samples, 03SW10 and 03SW11, were obtained from the unnamed tributary to Park Creek north of the site, upstream and downstream, respectively, from the discharge point of the off-Base irrigation well on the golf course. The samples were analyzed for TCL VOCs.

Table 4-15 presents the occurrence and distribution of inorganic and organic chemicals detected in site-related surface water samples and compares them to background. Table 4-16 presents the background comparison test results. Table 4-17 presents a comparison of detected compounds to federal and state benchmarks. Figure 4-3 shows sample locations and concentrations of compounds that exceed human health risk benchmarks.

4.4.1 Inorganics

Barium exceeded screening concentrations in all the samples. Lead exceeded screening concentrations in sample 03SW16 (2.7 µg/L). Lead was the only inorganic constituent determined to be site-related based on the background comparisons.

4.4.2 Organics

Acetone was detected at trace levels in samples 03SW15, 03SW16, and 03SW17. Toluene was detected in 03SW10. PAHs were detected above screening concentrations in samples 03SW12,

03SW13, 03SW14, 03SW15, 03SW16, and 03SW17. The most frequently detected PAHs above screening concentrations and their maximum concentrations were benzo(b)fluoranthene (0.097 µg/L), benzo(k)flouranthene (0.085 µg/L), and indeno(1,2,3-cd)pyrene (0.042 µg/L). PAHs were not detected in background samples. The pesticide dieldrin was detected below screening concentrations in samples 03SW12 through 03SW17. Dieldrin was not detected in background samples.

4.5 SEDIMENT RESULTS

The sediment samples collected during the Phase I RI and Phase II RI are not included in the present evaluation, as discussed in Section 2.1.4.

During the Landfill Delineation Investigation, six sediment samples (03SD12 through 03SD17) were collected from the intermittent stream that drains the storm water retention basin. The samples were collected from the same locations as the corresponding surface water samples. The samples were analyzed for full TCL/TAL analyses plus cyanide. Table 4-18 presents the occurrence and distribution of inorganic and organic chemicals detected in site-related sediment samples and compares them to background. Table 4-19 presents the background comparison test results. Table 4-20 presents a comparison of detected compounds to federal and state concentration benchmarks. Figure 4-3 shows sample locations and concentrations of compounds that exceed reference criteria. The analytical results for sediment were compared to EPA Region 3 Freshwater Sediment Screening Benchmarks. VOCs, SVOCs, pesticides, and metals were identified at concentrations above these screening concentrations.

4.5.1 Inorganics

Metals exceeded screening criteria in samples 03-SD-14 and 03-SD-17. The highest concentrations were found in 03-SD-17, which contained arsenic (11.1 mg/kg), iron (37,600 mg/kg), lead (up to 95.6J mg/kg), and manganese (up to 631J mg/kg), and zinc (up to 134 mg/kg) at concentrations exceeding screening concentrations. Of these metals, only lead is statistically greater than background and considered site-related.

4.5.2 Organics

One VOC, carbon disulfide, exceeded screening concentrations. Carbon disulfide exceeded its freshwater sediment benchmark (0.851 µg/kg) in samples 03-SD-13 (6.2J µg/kg), 03-SD-15/15-D (2.6J µg/kg), and 03-SD-16 (2J µg/kg).

PAHs exceeded screening criteria in all the sediment samples. The highest concentrations of PAHs were detected in sample 03-SD-14, a midstream sample. Among the PAHs detected in this sample were benz(a)anthracene (1,200J µg/kg), benzo(k)fluoranthene (1,400J µg/kg), benzo(a)pyrene (1,400J µg/kg), chrysene (1,800J µg/kg), fluoranthene (9,600 µg/kg), indeno(1,2,3-cd)pyrene (1,300J µg/kg), phenanthrene (7,200 µg/kg), and pyrene (6,800 µg/kg). All of these compounds were determined to be site-related based on background comparison tests.

Pesticides exceeded screening concentrations in all the sediment samples. Pesticides that exceeded screening concentrations include 4,4-DDT (up to 11J µg/kg), aldrin (up to 8.1J µg/kg), and dieldrin (up to 47 µg/kg), alpha chlordane (up to 8.4J µg/kg), and gamma chlordane (5.7J µg/kg). Aldrin, dieldrin, alpha chlordane, and gamma chlordane were determined to be site-related based on background comparison tests.

4.6 GROUNDWATER RESULTS

During Phase I activities, groundwater samples were collected from five shallow zone wells (03MW01S through 03MW05S), three shallow-intermediate zone wells (03MW01SI, 03MW03SI, and 03MW04SI), and three intermediate zone wells (03MW01I, 03MW03I, and 03MW04I). During Phase II, samples were obtained from seven shallow zone wells (03MW01S through 03MW07S), four shallow-intermediate zone wells (03MW02SI, 03MW03SI, 03MW04SI, and 03MW06SI), and six intermediate zone wells (03MW01I through 03MW06I). Samples for both phases were analyzed for TAL metals and full TCL organic compounds. Metals for the Phase I investigation were analyzed for total and dissolved (filtered) fractions. Filtered samples were not prepared for Phase II investigation because low-flow sampling techniques were used.

During the Phase II follow-on activities, samples were collected from seven shallow zone wells (03MW01S through 03MW07S), six shallow-intermediate zone wells (03MW01SI, 03MW02SI, 03MW03SI, 03MW04SI, 03MW06SI, and 03MW08S), and six intermediate zone wells (03MW01I, 03MW02I, 03MW04I, 03MW05I, 03MW06I, and 03MW08D). There was no sample collected from 03MW03I because the well was obstructed. The samples from the two new wells, 03MW08S and 03MW08D, were analyzed for TCL VOCs and SVOCs. The samples from the remaining wells were analyzed for TCL VOCs only.

During the first two sampling rounds of the Interim Groundwater Monitoring, samples were collected from all 20 site monitoring wells: seven shallow zone wells (03MW01S through 03MW07S), six shallow-intermediate zone wells (03MW01SI, 03MW02SI, 03MW03SI, 03MW04SI, 03MW06SI, and 03MW08S), and seven intermediate zone wells (03MW01I, 03MW02I, 03MW03I, 03MW04I, 03MW05I, 03MW06I, and

03MW08D). During the third sampling round, samples were collected from seven site monitoring wells: 03MW03S, 03MW03SI, 03MW03I, 03MW04S, 03MW04SI, 03MW04I, and 03MW07S. A sample was also collected from an off-Base downgradient well (03IW01) and two surface water locations on the unnamed tributary to Park Creek during all three rounds. The first round samples were analyzed for TCL VOCs, 1,4-dioxane, and TAL metals (total and dissolved). The samples from eight wells (03MW01S, 03MW01I, 03MW03I, 03MW05S, 03MW05I, 03MW06S. 03MW06SI, and 03MW06I) were also analyzed for hexavalent chromium. The second and third round samples were analyzed for TCL VOCs only.

In February 2010, the recently installed monitoring wells 03MW09O and 03MW09S were sampled for TCL VOCs.

Table 4-21 presents the occurrence and distribution of inorganic and organic chemicals detected in site-related groundwater samples. Table 4-22 presents a comparison of organic detected compounds to concentration benchmarks. Figures 4-4 through 4-8 show sample locations and concentrations of compounds that exceed screening concentrations from the initial Phase II field activities, the Phase II follow-on field activities, and rounds 1, 2, and 3 of the Interim Groundwater Monitoring (IGWM).

4.6.1 Inorganics

Several unfiltered samples from Phase I exceeded reference criteria for various metals; the filtered results were reviewed to determine if the unfiltered concentrations were due to suspended solids. Filtered groundwater samples from two intermediate-depth wells, 03MW01I and 03MW03I, showed arsenic at 5.2 µg/L and 3.8 µg/L, respectively. These concentrations exceed screening concentrations. One shallow well groundwater sample (03MW01S-F) showed antimony at a concentration (47 µg/L) above screening concentrations.

During Phase II, metals exceeded screening concentrations in unfiltered samples from five wells: 03MW05I, 03MW06S, 03MW06SI, 03MW06I, and 03MW07S (Figure 4-4). Arsenic was detected at concentrations exceeding screening concentrations in 03MW01I (8.6J µg/L), 03MW03I (2.4 µg/L), and 03MW06I (4.9J µg/L). Other metals that exceeded screening concentrations included aluminum (up to 6970 µg/L), cobalt (up to 11.7 µg/L), iron (up to 8170 µg/L), and manganese (457 µg/L). There were no filtered samples collected.

During the March 2008 IGWM sampling event, arsenic exceeded screening concentrations in unfiltered samples from eleven wells: 03MW01I (6.0 µg/L), 03MW02SI (0.4J µg/L). 03MW02I (1J µg/L), 03MW03I (1.4J µg/L), 03MW03SI (0.5J µg/L), 03MW04I (0.6J µg/L), 03MW04SI (0.6J µg/L), 03MW05I (0.5J µg/L), 03MW06S (0.4J µg/L), 03MW06I (9.1 µg/L), and 03MW08D (0.5J µg/L). Filtered and unfiltered

groundwater samples were collected and submitted for analysis during the March 2008 IGWM event. Figure 4-6 shows the concentrations exceeding EPA Region 3 RBC tapwater screening levels at the time of the investigation. Arsenic exceeded screening concentrations in filtered samples from six wells: 03IW01 (0.5J µg/L), 03MW01I (6.4 µg/L), 03MW02I (1.1 µg/L), 03MW03I (1.5J µg/L), 03MW03SI (0.5J µg/L), and 03MW06I (10.1 µg/L). Aluminum and iron exceeded screening concentrations in unfiltered samples from 03MW01I and 03MW06I, and manganese exceeded its screening concentrations in 03MW06I. Hexavalent chromium was not detected.

Arsenic in Site 3 Groundwater

Arsenic was detected in Site 3 groundwater at a frequency of 11 detections out of 20 sample analyses. The positive detections ranged in concentration from 0.4J ug/L to 9.1 ug/L, with a mean concentration of 2.4 ug/L. The EPA MCL for arsenic is 10 ug/L, but the regional screening level (RSL) for tapwater is 0.045 ug/L (EPA, December 2009). The Site 3 human health risk assessment concluded that arsenic is a significant contributor of risk to Site 3 groundwater.

Multiple lines of evidence indicate that the arsenic detected in the Site 3 groundwater is naturally occurring and is not related to waste disposal activities.

- Arsenic was detected in all Site 3 surface soil samples (61 samples) and all subsurface samples (47 samples), but at concentrations that did not exceed the background concentrations for arsenic in soils. That is, the concentrations of arsenic in the Site 3 soils were consistent with the concentrations detected in areas that waste disposal did not occur, indicating that arsenic was not a significant component (or not a component at all) of the waste disposed at Site 3.

- The areal distribution of arsenic at Site 3 is not consistent with a contaminant source originating within the landfill. For example, the highest detected concentration of arsenic in groundwater (9.1 ug/L) was in monitoring well 03MW06I, which is an intermediate-depth well that is located well upgradient of the landfill.

- The arsenic concentrations detected at Site 3 are consistent with the concentrations detected at other Base sites. For example, at Site 5, arsenic was detected in 1 of 21 samples at a concentration of 2 ug/L. At Site 2, arsenic was detected in 1 of 7 samples at a concentration of 1.3 ug/L, and at Site 1, arsenic was detected in 2 of 18 samples at concentrations of 3.6 ug/L and 4.2 ug/L.

- Arsenic is a well-documented, naturally-occurring component of groundwater within the Newark Basin. Many public supply wells located within the Newark Basin of New Jersey and Pennsylvania

and that are far removed from any impacts from waste disposal have difficulty meeting the regulatory levels for arsenic. The USGS (2006) studied the distribution of arsenic in the Newark Basin of Southeastern Pennsylvania and concluded that about 10 percent of all wells in the basin contained arsenic at concentrations greater than 10 ug/L, and that in some areas the percentage was even higher. For example, near the Watson-Johnson Landfill in Bucks County, approximately 30 percent of the wells contained arsenic at concentrations greater than 10 ug/L; EPA and the USGS also concluded that this arsenic was probably not directly related to site disposal activities. The New Jersey Geological Survey (2004) analyzed the occurrence of arsenic in domestic wells in the Newark Basin of New Jersey, and found that 30 percent of the wells contained arsenic at concentrations exceeding 5 ug/L, and 15 percent of the wells contained arsenic at concentrations exceeding 10 ug/L. The Survey concluded that this regional occurrence of arsenic in groundwater is natural.

4.6.2 Organics

During Phase I, two VOCs, toluene and PCE, were detected. Toluene was detected in one well, 03MW01I, at a concentration (6 µg/L) well below screening criteria. PCE was detected in eight out of 11 wells at concentrations (5 µg/L to 61 µg/L) exceeding screening criteria. There were no SVOCs detected at concentrations exceeding reference criteria.

During Phase II, PCE was the only VOC detected. It was detected in eleven out of the seventeen wells sampled at concentrations (5J µg/L to 39 µg/L) exceeding screening criteria. Only one SVOC, bis(2-ethylhexyl) phthalate, was detected during the Phase II sampling round, in 03MW05I (6J µg/L) and 03MW06SI (11 µg/L). The 03MW06SI concentration exceeds reference criteria. Figure 4-5 shows the concentrations exceeding screening concentrations.

During the Phase II follow-on sampling activities, PCE was detected in 16 of 19 wells sampled, at concentrations (0.23J µg/L to 14 µg/L) exceeding screening criteria. Three other VOCs, carbon tetrachloride, chloroform, and 1,1-dichloroethane, were detected at concentrations exceeding reference criteria. Carbon tetrachloride was detected in 03MW02I (0.27J µg/L) and 03MW02SI (0.32J µg/L); chloroform was detected in 03MW04S (0.4J/0.17J µg/L) and 03MW04SI (0.32J µg/L); and 1,1-dichloroethane was detected in 03MW08D (1.5 µg/L). Several other VOCs were detected at concentrations below reference criteria. Most of these were detected in 03MW08D. There were no SVOCs detected in 03MW08S or 03MW08D, the only wells sampled for SVOCs. Figure 4-6 shows the concentrations exceeding screening concentrations.

During Round 1 of the IGWM, PCE was detected in 15 of 21 wells at concentrations (0.45J µg/L to 12 µg/L) exceeding screening criteria. Bromodichloromethane and dibromochloromethane were detected in

03MW04S at concentrations (1.1 µg/L and 1.5 µg/L, respectively) exceeding screening criteria. Carbon tetrachloride exceeded screening criteria in 03MW02I (0.38J µg/L) and 03MW08D (0.28J µg/L). Chloroform exceeded screening criteria in 03MW04S (0.4J µg/L) and 03MW04SI (0.22J µg/L). 1,1-Dichloroethane (6.3 µg/l) was detected in 03MW08D above screening criteria. Several other VOCs were detected in 03MW08D at concentrations below the screening criteria. Figure 4-7 shows the concentrations exceeding screening concentrations.

During Round 2 of the IGWM, PCE was detected in 14 of 21 wells at concentrations (0.41J µg/L to 12.4 µg/L) exceeding screening criteria. Chloroform was detected in 03MW03SI (0.57J µg/L), 03MW04S (1.6 µg/L), 03MW04SI (1.6 µg/L) and 03MW07S (1.6 µg/L) at concentrations exceeding screening criteria. 1,1-Dichloroethane (8.2 µg/L) and trichloroethene (3.1 µg/L) were detected in 03MW08D exceeding screening criteria. Several other VOCs were detected in 03MW08D at concentrations below the screening criteria. Figure 4-7 shows the concentrations exceeding screening concentrations.

During Round 3 of the IGWM, PCE was detected in all eight of the wells sampled at concentrations (0.74J µg/L to 10.8 µg/L) exceeding screening criteria. Two compounds, 1,1,2-trichlorotrifluoroethane and methyl tert-butyl ether (MTBE), were detected at concentrations below screening criteria. 1,1,2-trichlorotrifluoroethane was detected in monitoring well 03MW07S at 0.34J µg/L and in 03IW01 at 0.48J µg/L. MTBE was detected in sample 03MW03S/3D at 0.63J/0.42J µg/L. Figure 4-7 shows the concentrations exceeding screening concentrations.

During the February 2010 sampling of the 03MW09 well cluster, PCE was detected in both 03MW09O (0.35J µg/L) and 03MW09S (5.8 µg/L) at concentrations exceeding screening criteria. Chloroform was also detected in 03MW09S at a concentration (0.42 µg/l) exceeding screening criteria. Other compounds detected were toluene (0.16J µg/L) in 03MW09O and TCE (0.11J µg/L) in 03MW09S.

The areal distribution of PCE for the initial Phase II sampling round (June 1997), for the Phase II follow-on activities sampling round (February 2006), and for the second IGWM sampling round (October 2008) are illustrated in isoconcentration contour maps constructed for the shallow, shallow-intermediate depth, and intermediate depth wells in Figures 4-9 through 4-17.

Shallow Wells

The shallow monitoring wells are screened across or just below the water table. During Phase I investigations, PCE was detected above screening criteria in several wells. The highest PCE level was detected in 03MW04S (61 µg/L). This well is down gradient of the landfill. The farthest available (at that time) up gradient well (03MW05S) also showed PCE at 7 µg/L, indicating that a source existed up

gradient of the landfill and that further source characterization was required. PCE was also found above screening concentrations at 03MW01S (15 µg/L) and 03MW03S (8 µg/L).

During Phase II, two additional shallow zone wells were installed and sampled, 03MW06S and 03MW07S. Well 03MW06S, near the eastern corner of Building 177 (the Army Reserve Hangar), hydraulically up gradient of 03MW05S and of the other Site 3 wells, showed the highest PCE concentrations recorded during Phase II (29 µg/L). PCE was also detected at 03MW01S (6J µg/L), 03MW03S (5J µg/L), 03MW04S (21 µg/L), and 03MW05S (2J µg/L). Figure 4-9 shows the areal PCE distribution for the shallow wells during Phase II.

During the follow-on activities, the highest PCE concentration in the shallow groundwater zone was 14 µg/L in 03MW03S. PCE was also detected in 03MW01S (0.9J µg/L), 03MW04S (9.0 µg/L), 03MW05S (0.67J µg/L), and 03MW07S (1.4 µg/L). Figure 4-10 shows the areal PCE distribution for the shallow wells during the Phase II follow-on activities.

During IGWM Round 2, the highest PCE concentration in the shallow zone was in 03MW04S (2.7 µg/L). PCE was also detected in 03MW01S (2.6 µg/L), 03MW03S (2.6 µg/L), 03MW05S (0.49J µg/L), 03MW06S (1.8 µg/L), and 03MW07S (0.41J µg/L). Figure 4-11 shows the areal PCE distribution for the shallow wells during IGWM Round 2.

Shallow-Intermediate Wells

The shallow-intermediate wells are screened within the elevation interval of approximately 230 feet to 325 feet amsl, or approximately 50 feet to 100 feet below ground surface. During Phase I, the down gradient wells 03MW03SI and 03MW04SI showed PCE (35 µg/L and 56 µg/L, respectively) above screening criteria. The most up gradient available well (03MW01SI) showed PCE at 29 µg/L.

During Phase II, three additional shallow-intermediate wells were installed: 03MW02SI, 03MW05I, and 03MW06SI. The newly installed up gradient well (03MW06SI) did not show PCE; however, bis(2-ethylhexyl) phthalate was detected above screening concentrations at 11 µg/L. Down gradient wells 03MW02SI, 03MW03SI, and 03MW04SI showed PCE at 6 µg/L, 18 µg/L, and 21 µg/L, respectively. These concentrations exceed screening criteria. Figure 4-12 shows the areal PCE distribution for the shallow-intermediate wells during Phase II.

During the Phase II follow-on activities, the highest concentration of PCE in the shallow-intermediate zone wells was detected in 03MW03SI (12 µg/L). PCE was also detected in 03MW01SI (4.9 µg/L), 03MW02SI (1.9 µg/L), 03MW04SI (10 µg/L), and 03MW05I (0.7J µg/L). PCE was not detected in the newly installed

up gradient well 03MW08S. Figure 4-13 shows the areal PCE distribution for the shallow-intermediate wells during Phase II follow-on activities.

During IGWM Round 2, the highest PCE concentration in the shallow-intermediate zone was in 03MW03SI (12.4 µg/L). PCE was also detected in 03MW01SI (9.7 µg/L), 03MW02SI (3.3 µg/L), and 03MW04SI (3.9 µg/L). Figure 4-14 shows the areal PCE distribution for the shallow-intermediate wells during IGWM Round 2.

Intermediate Wells

The intermediate wells are screened within the elevation interval of approximately 140 feet to 225 feet amsl, or approximately 130 feet to 200 feet below ground surface. During Phase I, toluene was detected at 6 µg/L in 03MW01I. PCE was detected above screening concentrations in 03MW03I (5 µg/L).

Phase II results showed PCE above screening concentrations in 03MW02I (8 µg/L), 03MW03I (6J µg/L), and 03MW06I (39 µg/L). Figure 4-15 shows the areal PCE distribution for the intermediate wells during Phase II.

During the Phase II follow-on activities, the highest PCE concentration was detected in 03MW02I (2.4 µg/L). PCE was also detected in 03MW01I (0.23J µg/L), 03MW04I (0.52J µg/L), 03MW06I (0.79J µg/L), and 03MW08D (0.78J µg/L). 03MW08D also contained several additional VOC compounds that had not previously been detected in Site 3 wells: 1,1-DCA (5.9 µg/L), 1,1-DCE (2.5 µg/L), cis-1,2-DCE (0.90J µg/L), 1,1,1-TCA (3.0 µg/L), and TCE (1.5 µg/L). Of these compounds, TCE is the only one whose concentration exceeds reference criteria. Figure 4-16 shows the areal PCE distribution for the intermediate wells during Phase II follow-on activities.

During IGWM Round 2, the highest PCE concentration in the intermediate zone was in 03MW03I (10.4 µg/L). PCE was also detected in 03MW02I (7.5 µg/L) and 03MW08D (1.3 µg/L). Figure 4-17 shows the areal PCE distribution for the intermediate wells during IGWM Round 2.

Discussion

The presence of PCE in monitoring wells located hydraulically up gradient from the Site 3 landfill indicates that the landfill cannot be the only source of the PCE. However, despite extensive soil sampling, no up gradient source(s) of the PCE contamination has been identified. Soil samples collected during the follow-on activities up gradient of the site (in the vicinity of the oil/water separator and the Army Reserve Hangar) were non-detect for VOCs. The location(s) of the source(s) must therefore be inferred from the

distribution of contamination within the groundwater and from the groundwater flow directions. Hydrogeologic cross-sections were constructed for both the 1997 and the 2006 sampling data (Figures 4-18 through 4-21) to investigate the 3-dimensional distribution and migration of the PCE-contaminated groundwater.

Much of the additional hydrogeologic investigation at the 9th Street Landfill was focused on investigating the hypothesis that the site is not, in fact, the source (or the sole source) of the volatile organic groundwater contamination that is observed in the site's monitoring wells. The results of the initial Phase II investigation appeared to confirm this hypothesis. Figure 4-18 illustrates the analytical groundwater results for PCE from 1997 plotted on the dip cross-section A-A'. As shown on this figure, the highest concentrations of PCE were detected at monitoring well cluster 03MW06, which is located adjacent to the Army Reserve Hangar, and is topographically higher than the landfill. With the given interpretation of hydraulic head distribution and groundwater flow patterns, it is not possible for groundwater from the site to migrate up gradient to location 03MW06. It was thus concluded that the source of this PCE was either in the vicinity of, or further up gradient from, well cluster 03MW06. A predecessor to the oil/water separator at the Army Reserve Hangar, adjacent to well cluster 03MW06, is a potential historical source. The present oil water separator was installed in approximately 1995 to replace an existing oil water separator, which was itself a replacement of a previous oil water separator. There are no written records of these replacements.

Monitoring well cluster 03MW08 was installed during the follow-on activities in 2006 to delineate the up gradient limit of the PCE plume and to investigate if an adjacent Army Reserve truck maintenance facility and storage yard could be a source of the VOC contamination. Groundwater analytical results revealed that 03MW08S did not contain detectable concentrations of PCE and 03MW08D contained 0.78 µg/L PCE. 03MW08D also contained 1,1,1-trichloroethane (1,1,1-TCA) (3.0 µg/L); trichloroethene (TCE) (1.5 µg/L); 1,1-dichloroethane (1,1-DCA) (5.9 µg/L); 1,1-dichloroethene (1,1-DCE) (2.5 µg/L); and cis-1,2-dichloroethene (cis-1,2-DCE) (0.9J µg/L). The 2008 results were similar to the 2006 results for both wells. Figure 4-19 illustrates the analytical groundwater results for PCE from 2006 plotted on the dip cross-section A-A'. The non-detect result for the shallow well indicates that 03MW08S is located up gradient of the source of the PCE contamination in the shallow groundwater and that the Army Reserve truck maintenance facility and storage yard is not the source of the VOCs detected in the Site 3 plume. The compounds detected in the deeper well indicate that there is contamination migrating in the deeper groundwater from a further upgradient source. Based on the analytical data and the interpreted groundwater flow directions, this source is interpreted to be Site 5, the Fire Training Area, which is located approximately 1000 feet up gradient from this well.

The groundwater contamination at Site 5 consists of various VOCs, including PCE. The principal contaminants are 1,1,1-TCA, TCE, 1,1-DCE, and 1,2-DCE. The Site 5 monitoring well nearest to Site 3 is

05MW13I, which was installed in June 2005 to investigate the down gradient extent of the Site 5 contaminant plume (Remedial Investigation Addendum for Site 5 - Fire Training Area Groundwater, September 2006). Figure 4-22 shows the location of Site 3 relative to Site 5. Analytical results for this well from August 2005 revealed 1,1,1-TCA (28 µg/L); TCE (13 µg/L); 1,1-DCA (29 µg/L); 1,1-DCE (29 µg/L); cis-1,2-DCE (4.8 µg/L); and PCE (1 µg/L). These are the same compounds that were detected in 03MW08D, and, except for PCE, they have not been detected in any other Site 3 monitoring well. 05MW13I is 142 feet deep and approximately 450 feet southeast of 03MW08D, which is 173 feet deep. The hydraulic gradients at Site 5 in the vicinity of 05MW13I show that groundwater flows to the northwest and slightly downward. These data indicate that 03MW08D intercepts the down gradient edge of the Site 5 contaminant plume.

In June 1997 and February 2006, PCE was detected in both 03MW06S and 03MW06I, but not in the vertically intervening 03MW06SI. 03MW06S is a shallow water table well, 36 feet deep; 03MW06SI is 85 feet deep; and 03MW06I is 150 feet deep. Since 03MW06S intercepts the water table by only a few feet, it is reasonable to conclude that the source of the contamination in this shallow well is in the immediate vicinity of the well. It is unlikely that this source accounts for the contamination in 03MW06I, however, since the contamination would have to migrate vertically downward to reach this well, and thus should be present in 03MW06SI. In addition, based on the direction of the vertical hydraulic gradient, the direction of groundwater flow between 03MW06S and 03MW06SI is upward. It is also unlikely that Site 5 is the source of the contamination in 03MW06I, since PCE is the only contaminant detected in 03MW06I, and not any of the other VOCs that constitute the Site 5 contaminant plume. These data suggest that the source of contamination in 03MW06I is an unidentified source located up gradient from the 03MW06 well cluster, between well clusters 03MW06 and 03MW08. In this scenario, this portion of the plume would have migrated downward to depths beneath monitoring well 03MW06SI before reaching cluster 03MW06.

The concentration of PCE in 03MW06I decreased significantly (39 µg/L to 0.79J µg/L) from 1997 to 2006, and decreased to non-detect in October 2008. These data suggest that this historical contaminant source has been removed or is depleted and is no longer contributing to groundwater contamination.

The observed distribution of PCE concentrations in the unconfined groundwater zone from 03MW08 to 03MW01 is consistent with the interpretation of an advective plume migrating laterally away and vertically downward from a shallow source area located in the vicinity of 03MW06S. Down gradient from 03MW01, however, the PCE concentration increases significantly in monitoring wells 03MW03S, 03MW03SI, 03MW03I, 03MW04S, and 03MW04SI. The concentrations of PCE in these down gradient wells were greater than those found in the up gradient 03MW01 and 03MW05 well clusters during both the 1997 and the 2006 sampling rounds, and equal to or greater during the October 2008 sampling round. [In the October 2008 sampling round, the PCE concentration in the shallow wells 03MW03S (2.6 µg/L) and

03MW04S (2.7 µg/L) had decreased to approximately the same level as that in 03MW01S (2.6 µg/L); the PCE concentration in shallow-intermediate well 03MW03SI (12.4 µg/L) was greater than the concentration in 03MW01SI (9.7 µg/L).]

The PCE concentrations in 03MW03S in 2006 and 2008 (14 µg/L and 2.6 µg/L) and in 03MW03SI (12 µg/L and 12.4 µg/L) were greater than the PCE concentrations in 03MW06S (0.67J µg/L and 1.8 µg/L). This suggests that there is an additional source of PCE between well cluster 03MW01 and well cluster 03MW03. The only potential source that has been identified in this area is the Ninth Street Landfill.

With the interpreted groundwater flow patterns, any contamination originating in the vicinity of the landfill would migrate laterally to the northwest and vertically downward to a depth of approximately 40 feet (an elevation of approximately 275 feet msl), which is the interpreted depth of the transition zone between unconfined to confined conditions. The landfill cannot be ruled out as a contributing source of the contamination in the shallow wells 03MW03S, 03MW04S, and 03MW07S. This possibility is supported by the discovery of VOC-contaminated soil in the landfill during the Landfill Delineation Investigation.

During the Landfill Delineation Investigation, PCE was detected in soil samples from test pits 03TP19 (9.2J µg/kg), 03TP24 (32 µg/kg), and 03TP25 (210 µg/kg). Test pit 03TP25 also showed significant concentrations of other VOCs, including ethylbenzene (7,000 µg/kg), 1,2,3-trichlorobenzene (5,700 µg/kg), toluene (150,000 µg/kg), and total xylenes (20,000 µg/kg). These (other than PCE) VOCs have not been detected in the monitoring wells down gradient from the landfill.

Monitoring well cluster 03MW09 was installed directly down gradient from the VOC-contaminated soil of Areas “B” and “C” to determine their impact on the unconfined groundwater. Figure 4-23 shows the locations of the test pits and well cluster 03MW09. The February 2010 sampling results indicated PCE concentrations of 0.25 µg/l in 03MW09O and 5.9 µg/l in 03MW09S. The 03MW09S PCE concentration is similar to that detected in 03MW03S (3.1 µg/L) and 03MW04S (3.1 µg/L) during the most recent IGWM sampling round (April 2009). The soil contamination thus does not appear to be associated with groundwater contamination significantly greater than that observed in the surrounding area. The position of these wells immediately down gradient from the landfill and their shallow depths strongly implicate the landfill as the source of the observed PCE.

The landfill, however, is unlikely to be the source of the contamination in the deeper down gradient wells (03MW02SI, 03MW02I, 03MW03SI, 03MW03I, and 03MW04SI), since these wells are screened within the confined groundwater zone, where the vertical hydraulic head gradient is upward. The current hydrogeological interpretation indicates that the source of the contamination in the wells screened in the confined groundwater zone is up gradient from the landfill, and is potentially the same source as the source

of contamination in 03MW06I. Since this well is screened at an elevation near the projected elevation of the transition between the confined and unconfined groundwater conditions, PCE contamination may enter the confined zone in the vicinity of this well (03MW06I). The distribution of PCE in the wells between 03MW06I and the down gradient wells does not necessarily support this scenario, however. The PCE concentration observed in 03MW01I has been consistently lower than the concentrations in the up gradient well, 03MW06I, and the in the down gradient wells, 03MW03SI, 03MW03I, and 03MW04SI. Also, in 2006, the PCE concentrations in the down gradient wells 03MW03SI and 03MW04SI were greater than the concentration in 03MW06I. The contaminant concentration gradient in advective plumes typically decreases in the down gradient direction due to dispersion. A possible explanation for these inconsistencies is that 03MW06I and 03MW01I may not be positioned optimally to intercept the up gradient contamination within the confined groundwater zone.

The concentrations of PCE in the Site 3 groundwater appear to be decreasing with time. Table 4-23 displays the PCE concentrations detected in the Site 3 monitoring wells since the Phase I RI. Figure 4-24 shows the concentration of PCE in groundwater from 1991 through 2009. Of the 11 wells installed during the Phase I field activities, six wells, including the five most highly contaminated wells, have shown consistent decreasing trends in PCE concentrations: 03MW01S (from 15 µg/L to 2.6 µg/L), 03MW04S (from 61 µg/L to 3.1 µg/L), 03MW05S (from 7 µg/L to 0.49J µg/L), 03MW01SI (from 29 µg/L to 9.7 µg/L), 03MW03SI (from 35 µg/L to 10.8 µg/L), and 03MW04SI (from 56 µg/L to 5.7 µg/L). Of the remaining five wells, one (03MW03S) showed an increase in PCE concentration in 2006 (8 µg/L to 14 µg/L) and a decrease thereafter (to 3.1 µg/L); one (03MW03I) has shown little change; and three (03MW01I, 03MW04I and 03MW02S) have been either non-detect or have shown trace quantities. Of the seven wells installed during the initial Phase II field activities, three (03MW06S, 03MW02SI, and 03MW06I) have shown decreases in PCE concentrations, two (03MW07S and 03MW05I) have shown slight increases, one (03MW02I) has shown little change, and one (03MW06SI) has remained non-detect. The off-Base well 03IW01 has shown a consistent trend of decreasing PCE concentrations, from 15 µg/l in 1991 to 4.4 µg/l in 2009. The consistency and the magnitude of the decreases in PCE concentration among the most highly contaminated monitoring wells make it unlikely that the decreases are attributable to fluctuations in the data, and suggests that the original source (or sources) of the contamination has been depleted to the extent that it is no longer significantly contributing PCE to the contaminant plume.

In summary, the nature and extent of VOCs in Site 3 groundwater indicate that:

- There potentially is (was) a source of PCE near the hangar and/or oil-water separator.

- The landfill is a source of the PCE in the unconfined aquifer, although it cannot be the only source. There must be an additional source up gradient of the landfill to account for the contamination observed in 03MW06S.

- There must be an additional source of PCE located up gradient of the hangar (but down gradient of the former storage yard) to account for the PCE detected in the confined aquifer at (and down gradient of) the hangar.

- The deep well at the most up gradient cluster (03MW08) intercepts the distal edge of the Site 5 groundwater plume.

- Groundwater VOC concentrations are significantly decreasing over time, suggesting that the source(s) may have been removed or is now depleted.

4.7 CONCLUSIONS

Sample results indicate that the principal classes of contaminants in landfill soils are SVOCs, PCBs, pesticides, dioxin, and metals. VOCs, including PCE, were detected at three test pit locations. Ethyl benzene was the only VOC that exceeded screening concentrations in soil. Distribution of these substances in site soils at concentrations above regulatory screening values was sporadic, indicating localized disposal practices over time. Surface water and sediment show PAH and lead contamination. Groundwater upgradient of and beneath of the landfill contains PCE above the MCL, which has migrated off-site to the adjacent golf course property.

The present hydrogeologic interpretation and the existing analytical data suggest that there was more than one source of the PCE contamination in the groundwater at Site 3. One source of the contamination in the unconfined groundwater zone was likely in the vicinity of well cluster 03MW06, up gradient from the landfill. The landfill was a likely down gradient source of this contamination. The data suggest that the source of contamination in the confined groundwater zone is located up gradient of the 03MW06 well cluster. PCE has been detected in the soils of the landfill but not in the soils of the other two potential source areas. The historical analytical results indicate a significant decrease in the groundwater PCE concentrations since the Phase I investigation, which suggests that the sources have been removed or are depleted.

Arsenic found in Site 3 groundwater is a result of natural concentrations of arsenic in soil or rock. Multiple lines of evidence indicate that arsenic detected in Site 3 groundwater is naturally occurring and is not a result of disposal activities within the Site 3 landfill.

5.0 CONTAMINANT FATE AND TRANSPORT

The principal classes of contaminants detected in soils at the Ninth Street Landfill are SVOCs, pesticides, PCBs, dibenzodioxins, furans, and metals. One VOC (ethylbenzene) exceeded screening concentrations at one soil sampling location. Distribution of these substances in site soils at concentrations above regulatory screening values was sporadic, indicating localized disposal practices over time.

Chlorinated VOCs PCE, bromodichloromethane, chloroform, dibromochloromethane, and 1,1-DCA were detected at concentrations above regulatory screening values in groundwater samples obtained from monitoring wells. The metals aluminum, arsenic, barium, iron, and manganese were found in groundwater at concentrations above screening concentrations.

5.1 TRANSPORT AND TRANSFORMATION OF DETECTED CONTAMINANTS

Due to their partition coefficients, SVOCs, pesticides, PCBs, dibenzodioxins and furans in the environment will partition primarily to soils and sediments. Leaching to groundwater is not a dominant transport pathway for these large organic molecules. The principal mode of transport of SVOCs and other organics-contaminated soils is via overland transport of eroded soil particles during runoff. Microbial degradation is the primary degradation mechanism affecting organic compounds in soils.

Metals in soils are typically tightly adsorbed to the soil organic matter or mineral fractions but may be converted into soluble forms, which are susceptible to leaching and transport to groundwater. Adsorbed metals may migrate from a contaminated source via erosion of surface soils. Soluble forms of metals may dissolve in infiltrating precipitation and eventually impact groundwater. Metals do not tend to be degraded by microbial action but can change oxidation state (and toxicity) depending on conditions in their environment.

PCE and other VOCs are relatively soluble in water and exhibit little tendency to adsorb to soils. PCE and other VOCs in soils would be expected to be easily volatilized from surface soils or be transported to groundwater via rainwater infiltration. PCE was detected at low concentrations (less than screening concentrations) in subsurface soils at three locations in the landfill. Other VOCs detected in site soils, including ethyl benzene, were not detected in groundwater. Ethyl benzene is readily degraded in the aerobic groundwater conditions measured at the Site.

5. 2 CONCLUSIONS

Distribution of SVOCs, pesticides, PCBs, dibenzodioxins, furans, and metals detected in soils and sediment of the Ninth Street Landfill at concentrations above regulatory screening values is sporadic, indicating localized disposal practices over time. These contaminants do not appear to be migrating off-site. Intrusive activities below the current landfill surface could result in impacts to future human receptors and are evaluated in the human health risk assessment (Section 6). Some of these same compounds have been detected at low concentrations in sediments, potentially at levels of impact to ecological receptors, and are discussed in the ecological risk assessment (Section 7).

The detection of low concentrations of PCE in landfill soils indicates that the landfill was a likely contributing source of the down gradient PCE groundwater contamination. After extensive efforts to find an up gradient PCE source in soil were unsuccessful, it has been determined that any historical up gradient PCE source has either been removed (perhaps during the two replacements of the oil//water separator at the Army Reserve Hangar) or has dissipated. The decreasing trend in the groundwater PCE concentrations suggests that the sources are depleted; and PCE concentrations can be expected to continue to decline in the future.

Ethyl benzene was detected in soil at one sample location to a limited extent. Ethyl benzene was not found in groundwater down gradient, so it does not appear to be migrating at a significant rate or for a significant distance. This could be due to a very localized source combined with degradation in soil and groundwater.

Groundwater in the vicinity of Site 3 has been impacted by VOCs (mainly PCE) and metals. Metals found in groundwater include some of those found in Site 3 soils. Potential impacts to human health are discussed in the human health risk assessment (Section 6).

6.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the results of the HHRA for NAS JRB Willow Grove, which has been updated to evaluate current groundwater conditions, investigate the possibility of soil contamination in the former Ninth Street Landfill area and the Army Reserve hangar (Hangar) area located hydrologically upgradient of the Ninth Street Landfill, and apply current toxicity factors and risk assessment calculation methods to historical and new sample analytical data for all media in accordance with current EPA and Navy guidance.

The results of the HHRA are presented in eight sections, including:

- Data Evaluation
- Estimation of Exposure Point Concentrations
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization
- Uncertainty Analysis
- Risk Assessment Summary
- Selection of Candidate Chemicals of Concern

The tables associated with the HHRA are presented in Appendix J and follow the format adopted by EPA Risk Assessment Guidance for Superfund (RAGS), Volume I, Part D. Appendix J, Table 1.01 presents the candidate receptor exposure pathways associated with groundwater. Tables 1.02 and 1.03 present the candidate receptors and exposure pathways considered for surface and subsurface soil in the vicinity of the Hangar Area and the Ninth Street Landfill, respectively. Table 1.04 presents the candidate receptor exposure pathways considered for surface water and sediment from creeks.

6.1 DATA EVALUATION

6.1.1 Summary of Sampling Data for Each Exposure Medium

For the updated HHRA, the surface and subsurface soil sample results from the Phase II RI have been supplemented with additional soil samples collected between 2006 and 2009. The groundwater exposure evaluation considered only the most current monitoring well sampling data for VOCs and metals, since several years have elapsed since the Phase II RI groundwater data was collected in 1996. Groundwater results for pesticides and semi-volatiles were used from the 1997 low-flow rate well sampling event, which was the most recent data collection for these analytical fractions (note that additional sampling was not

needed given the lack of significant detections of target compounds for these analytical fractions). The analytical data for soil were grouped into separate data sets for the Hangar Area and the Ninth Street Landfill Area, and also segregated into depth groups for surface soil (zero to 2 feet depth) versus total soil (representing all soil samples down to a 10 foot depth). While current opportunities for human exposure to subsurface soil are limited, future contact may occur if subsurface soil were to be disturbed by construction or landscaping and redistributed at the ground surface.

Surface water and sediment exposure was evaluated based on recent sampling data collected from areas within Site 3 and along the downgradient pathway.

Background samples were collected during the Phase II RI sampling and included 12 soil samples, 8 surface water samples, and 8 sediment samples. As shown in Figure 2-8, background samples were collected in and around NAS JRB Willow Grove from locations outside known or suspected areas of influence of the sites. A quantitative comparison of site data to background was conducted based on current guidance (EPA, 2002a, and NFEC, 2004, 2003, and 2002).

6.1.2 Data Quality Evaluation

Prior to use of the data in risk assessment, a data quality evaluation was performed by reviewing validated data for any problems with detection limit adequacy, rejected data, blank qualified data, and bias or imprecision. Rejected or blank qualified data was eliminated from consideration, while estimated values were accepted for the risk assessment, but discussed with caveats in the HHRA uncertainty analysis.

6.1.3 Approach for Selection of Chemicals of Potential Concern (COPCs)

The selection of COPCs for each medium was based on a toxicity screening step to compare detected concentrations to toxicity-based benchmark concentrations. A substance was considered a candidate COPC for an exposure medium and a particular route of exposure if the maximum detected concentration was greater than the associated Regional Screening Level (RSL) based on a target cancer risk of 1×10^{-6} or a non-cancer hazard quotient (HQ) of 0.1. COPCs for soil, sediment, and groundwater exposure to all receptors (residents, industrial workers, recreational persons, and construction workers) were selected in a conservative manner, in most cases by comparing data to RSLs based on residential exposure assumptions. RSLs based on non-cancer effects were adjusted from a HQ of 1.0 to a HQ of 0.1 to protect against the possibility of additive toxic effects from multiple chemicals.

COPC selection for direct contact with groundwater via ingestion or dermal absorption was based on RSLs for residential tap water exposure to groundwater, using the most recent Oak Ridge National Laboratory (ORNL) RSLs (EPA, 2010a). The ORNL RSLs have replaced the previous Region 3 risk-based concentration tables that were phased out after 2007. Selection of COPCs for inhalation exposure to groundwater (either outdoor ambient air or indoor showering) was based on narrowing the list of groundwater COPCs to those with a Henry's law constant greater than $1x10^{-5}$ liter-atm./moleºK and a molecular weight less than 205.

ORNL RSLs for residential exposure to soil were utilized for selection of COPCs for the ingestion and dermal routes of exposure to soil (EPA, 2010a). Sediment screening was conducted using soil RSLs multiplied by an adjustment factor as explained below. ORNL RSLs for the inhalation pathway for residential soil exposure were utilized for selection of COPCs for the soil-to-air pathway (EPA, 2010a). These RSLs were based on the fugitive dust soil screening level (SSL), which incorporates a particulate emission factor (PEF), or the volatilization SSL, which uses a chemical-specific volatilization factor (VF).

Selection of COPCs for recreational exposure to surface water was based on a 10-fold multiple of the RSLs for residential tap water exposure because the average daily intake of water during recreation is expected to be less than one-tenth the intake rate from residential tap water use. Screening criteria for recreational exposure to sediment was also based on a 10-fold multiple of the RSLs for residential soil contact because the number of days per year of recreational exposure to sediment is assumed to much less than the almost daily exposure rates assumed for soil contact in a residential setting.

The screening approach for soil-to-groundwater migration was based upon comparing the maximum detected soil concentrations to EPA soil-to-groundwater screening levels (SSLs) (EPA, 2010a). The RSLs for soil-to-groundwater exposure were adjusted to a risk level corresponding to an HQ of 1 or a cancer risk of 1×10^{-6} and a site-specific dilution attenuation factor (DAF) of 1.1 (see Section 6.3.2.5 for details). The soil-to-groundwater screening results are qualitatively evaluated in the HHRA.

Chemical-specific considerations were applied to evaluate whether chemicals that do not have published RSL criteria should be selected as COPCs. Essential nutrients were not considered as COPCs, specifically calcium, chloride, magnesium, potassium, and sodium. Where possible, detected chemicals that do not have published toxicity criteria were compared to surrogate RSL criteria adopted from available RSLs for substances having similar chemical structure. For example, the RSL for fluorene was used as a surrogate for evaluating acenaphthylene and the RSL for pyrene was used as a surrogate for evaluating phenanthrene and benzo(g,h,i)perylene since these three substances do not have published RSLs. Lead was evaluated as a potential COPC in groundwater and surface water based upon comparison to its EPA Action Level (AL) of 15 ug/l (EPA, 2009b) and in sediment and soil by comparison

to the value of 400 mg/kg (EPA, 1994c). The RSL for trivalent chromium was used for COPC selection for groundwater because speciation data (i.e., total chromium versus hexavalent) were analyzed for eight groundwater samples collected in March, 2008, demonstrating that no hexavalent chromium was present in groundwater. Due to lack of speciation data for soil, sediment, or surface water, these media were screened using the RSLs for hexavalent chromium. The RSL for methyl mercury was used for COPC selection because the form of mercury at the site is unknown and methyl mercury is considered the most toxic form of mercury. The RSL screening for dioxin congeners was based on first computing the 2,3,7,8-TCDD toxicity equivalents (TE) for each sample, and comparing the maximum TE out of all samples to the RSL for 2,3,7,8-TCDD.

6.1.4 Approach for Background Comparison Tests

A statistical comparison to background was applied to soil, surface water, and sediment. The findings of background comparisons were applied to the risk assessment results. The initial risk estimates were prepared to include all COPCs, regardless of background tests, while a second set of risk tables was prepared that excluded metals demonstrated to be similar to background.

Statistical methods for background comparison adhered to published guidance (EPA, 2006b, 2006c, 2002a, 2000a, 1997a, 1996a, 1994a, 1994b, 1992a, 1992b, 1992c, and 1989a; Naval Facilities Engineering Command (NFEC), 2004, 2003, 2002) and other literature references (Brownlee, 1965; Gilbert, 1993 and 1987; Gehan, 1965; and Millard and Deverel, 1988). For this project, three categories of statistical tests were applied to compare site and background sample concentrations as follows:

- **Background Comparisons Using Test Form I:** The pooled sample results from an area of interest were compared to background data given an initial assumption or null hypothesis that site concentrations are not greater than background. Several statistical tests were performed that attempted to refute this hypothesis and show that concentrations exceed background. With each test, the chance of making an incorrect decision that site exceeds background (i.e., false positive result) was set equal to a probability level (alpha) of 0.05. This is interpreted as a 5 percent chance of a test outcome wrongly concluding that site exceeds background when in fact the site and background sample data belong to a common underlying population.

  The Test Form I statistical comparisons included the student's t-test or Satterthwaite's t-test, which evaluate differences in the means of site and background data; the Mann Whitney test or Gehan test, which compares site and background rank sums; and the quantile test, which focuses only on the upper ranked sample concentrations found in site and background data sets. If the prerequisite

assumptions were not met to allow use of any of the aforementioned tests, then the test of proportions or Fisher's exact test was applied.

- **Background Comparisons Using Test Form II:** If the Test Form I results suggested that site-wide concentrations exceeded background, then Test Form II was used to evaluate if the difference in the means or medians of the two populations was substantial versus minimal. The Form II null hypothesis assumed that site concentrations exceeded background by more than two standard deviations, and the test attempted to refute this hypothesis and show that concentrations were not different by two standard deviations. Test Form II was relevant if a COPC metal was considered to be a risk driver and above background in the first series of tests. Two standard deviations was added to each background sample concentration, then the modified background data set was compared to site data using the student's t-test or Satterthwaite's t-test and a test of rank sums (Mann Whitney test or Gehan test). The probability of a false positive outcome was set to 0.05, which allows a 5 percent chance that site concentrations could be mistakenly judged to be within two standard deviations of background levels, when in reality the site population was greater than the background population plus two standard deviations.

- **Individual Comparison Tests:** The 95 percent upper tolerance limit (UTL) or upper prediction limit (UPL) on background soil is meant to assist in finding locations where concentrations are elevated above background. The test is not meant to be used as a stand-alone evaluation tool, but may be used after other tests first determine that site-wide levels are above background for a particular metal. The software program ProUCL was applied to compute UTLs using an algorithm that imputes proxy concentrations to substitute for non-detected values (EPA, 2007a, 2007b). For normally distributed data sets with all positive detections, the 95 percent UTL was computed using parametric statistics (based on the t-distribution) as the mean plus a multiple of the standard deviation. If the data were not normally distributed, other methods of estimating background threshold values (BTVs) were based on the gamma distribution or distribution-free assumptions such as the 95th quantile, Support documentation for the calculation of UTLs/BTVs for each metal are presented in Appendix K.

- **Background Comparison Conclusions:** In weighing the relevance of the findings of site-wide statistical comparisons using Test Form I, a conservative approach was taken to declare a substance above background if any of the valid quantitative tests (t-test, Mann Whitney/Gehan test, or quantile test) found concentrations were elevated above background. The opposite conclusion (that site-wide concentrations do not exceed background) was reached if all of the Test Form I statistical comparisons were negative. If the Test Form I results indicated concentrations exceeded background, then Test Form II evaluated if the difference between site and background means or medians was substantial versus minimal (i.e., within two standard deviations). The two lines of

evidence were considered together in deciding if site concentrations should be included in the calculations.

Data Pretreatment: Before conducting any statistical tests, rejected and blank-qualified values were removed from the data sets and field duplicate pairs were averaged and considered as one result. For duplicates, if one result was positive and the other value nondetected, half the detection limit was averaged with the positive result. However, if the half-detection limit value exceeded the positive result, then the positive result was adopted as a representative value for the duplicate pair.

Handling of Nondetects: Only nonparametric site-wide background tests were employed if there were nondetects present among either the site data or the background data. Distributional shape tests were not applicable to any site-wide tests that involved nondetects. Note that Gehan's test can account for nondetected data in a valid fashion and that the quantile test was applied in a limited manner when there were nondetects, so that data points with a rank at or below the largest detection limit were not used.

Details and Assumptions of Statistical Tests: The t-test was only applicable if the site and background data matched the shape of a normal distribution, with the distributional shape determined using the Shapiro-Wilk W test at a significance level of 0.05 (EPA, 1992a). For the t-test, if site and background data sets exhibited equal standard deviations based upon Bartlett's test for equal variances, then the student's t-test was applied; otherwise, Satterthwaite's t-test was performed.

Gehan's test was used to determine whether site and background data belonged to populations with identical medians and rank distributions. The test procedure combined the two data sets, ranked results from smallest to largest, and evaluated if the data sets exhibited a similar rank-sum distribution. Test statistics were computed using appropriate score adjustments for tied values and a normal approximation to the critical value when sufficient data points were available; whereas, an exact computation of probabilities was used in situations where there were very few data points.

The quantile test assembled the site and background data into one data set, and then estimated whether an upper ranks subset displayed an unusually large proportion of data points belonging to the site data group rather than the expected proportions of site and background samples. The probability was calculated that the observed number (k) or more samples from an arbitrary number (r) of the largest data points in the combined data set belonged to the site data set, with the null hypothesis that that the site and background subgroups come from the same population. If there was less than a five percent chance that k or more site samples could be observed among a subset of the r largest upper ranks of the data, then the test concluded that k samples from the site data group had statistically elevated concentrations, which might reflect one or more hot spots.

The quantile test was computed multiple times, starting with the highest concentration (rank) data points, and then repeating the test after including the next lower concentration sample results from the combined subgroups of site and background data. The sequence of tests was terminated when the highest nondetected result was encountered or when the maximum size subgroup of data was found that has at least a probability (P-level) of 0.05 that this subset of data contains significantly more site samples than expected.

If the prerequisite assumptions could not be met to achieve a valid test outcome using any Test Form I statistical method listed above, then the test of proportions was used to determine if the percentage of detected results was statistically greater in site versus background. If there were 5 or more detects and 5 or more nondetects for each data set, then the test was performed using a normal approximation to the probability of proportions (the z-test approximation). If there were fewer than 5 detects/nondetects, the method was based upon combinatorial probabilities calculated using Fisher's exact test.

6.1.5 Applying the Results of Background Comparisons

COPC selection tables for the Landfill Area were prepared two ways to show the effects of background elimination -- one set of tables excluded metals statistically within the range of background, while the other set included all COPCs exceeding RSLs, regardless of background tests. Background elimination of COPCs was not applied to risk tables for surface water, sediment, or soil from the Hangar Area because, in the final analysis, the assessment of risk drivers was not affected by background tests for metals. For groundwater, a statistical treatment of background data using limited well locations was not practical. Instead, a qualitative approach was taken which applied various lines of evidence, including occurrence and distribution data from upgradient and side-gradient wells.

6.1.6 Groundwater COPCs

Groundwater COPCs were selected in Appendix J on Table 2.01 and are described below. Because 1,1-dichloroethane was encountered in monitoring well 03MW08D only (which monitors the far downgradient extent of the Site 5 plume, not Site 3 groundwater conditions, it will not be selected as a compound of concern later for the remedial action alternatives selection purposes.

Groundwater COPC Selection for Tap Water Exposure or Construction Worker Exposure

- 1,1-Dichloroethane
- Bromodichloromethane
- Dibromochloromethane
- Carbon Tetrachloride
- Trichloroethene
- Arsenic
- Cobalt
- Manganese

- Chloroform
- Tetrachloroethene
- Bis(2-ethylhexyl)phthalate

Table 3.01 indicates that for 1,1-dichloroethane, bromodichloromethane, dibromochloromethane, carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, arsenic, cobalt, and bis(2-ethylhexyl) phthalate, arithmetic means, exposure point concentrations (EPCs), and maximum detections exceeded their respective RSLs. Several groundwater COPCs were detected in less than 10 percent of groundwater samples (bis(2-ethylhexyl) phthalate 1,1-Dichloroethane, carbon tetrachloride, bromodichloromethane, dibromochloromethane, trichloroethene, and chloroform. Tetrachloroethene was present in about three-fourths of samples.

The subset of groundwater VOCs that met the Henry's Law and molecular weight criteria discussed earlier were applied to risk calculations for the groundwater volatilization pathway. Most of these VOCs were detected infrequently, as noted in the preceding paragraph.

6.1.7 Surface Soil COPCs

Soil was divided into two types of media for quantitative risk analysis; surface soil (samples collected in the 0- to 2-foot interval bgs) and total soil [soil comprised of a combination of samples collected in surface soil (0- to 2-foot interval bgs) and subsurface soil (all depths down to 10 feet bgs)].

COPCs are selected in Appendix J on Tables 2.04, 2.06, and 2.07 for Hangar Area and Landfill Area surface soil and are listed below. The one surface soil sample was labeled 03SB18-002.

Surface Soil COPC Selection for Hangar Area

- Benzo(a)pyrene
- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

The above-listed compounds exceeded their respective RSLs in the Hangar Area surface soil sample. Detected concentrations of PAHs selected as COPCs ranged from 180 to 1,100 ug/kg.

Surface Soil COPC Selection for Landfill Area

- Total 2,3,7,8-TCDD toxicity equivalents
- Aluminum
- Antimony
- Dieldrin
- Benzo(a)anthracene
- Benzo(a)pyrene

- Arsenic*
- Cadmium
- Chromium
- Cobalt
- Iron
- Manganese*
- Vanadium
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Phenanthrene

For Landfill Area surface soil, arithmetic means and EPCs for aluminum, arsenic, chromium, cobalt, iron, manganese, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and dieldrin also exceeded their respective RSLs. Most inorganic COPCs were detected in every surface soil sample, except for antimony and cadmium, which were detected in roughly one-third to one-half of samples. The organic COPCs had frequencies of detection of over 60 percent, except for naphthalene (detected in 4 out of 48 samples).

Total 2,3,7,8-TCDD toxicity equivalents were present in the two surface soil samples analyzed for chlorinated dioxins/furans. The arithmetic mean and maximum detection for total 2,3,7,8-TCDD toxicity equivalents exceeded the RSL. Total 2,3,7,8-TCDD toxicity equivalent concentrations ranged from 0.0045 to 0.0126 ug/kg.

Table 2.07 represents the selection of Landfill Area surface soil COPCs after background elimination. Arsenic and manganese, denoted with an asterisk (*) in the above table, were eliminated as COPCs based on background concentrations. Tables 4.03 and 4.04 contain the results of Test Form I and Test Form II site-wide statistical background comparison tests for Landfill Area surface soil, respectively.

6.1.8 Total Soil COPCs

Total soil COPCs are shown in Appendix J on Tables 2.05, 2.08, and 2.09 and are listed below. Subsurface samples were labeled 03SBXX-YYYY/MM/DD where 03SB represent Site 3 subsurface soil, XX represents the sampling location, and YYYY/MM/DD represents the date the sample was collected.

Total Soil COPC Selection for Hangar Area

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

For Hangar Area total soil, all COPCs exhibited arithmetic means and EPCs that exceeded their respective RSLs. These COPCs were detected in approximately one-fourth to one-third of samples.

Total Soil COPC Selection for Landfill Area

- Total 2,3,7,8-TCDD toxicity equivalents
- Aluminum
- Antimony
- Arsenic*
- Cadmium
- Chromium
- Cobalt
- Copper
- Iron
- Lead
- Manganese
- Mercury
- Nickel
- Silver
- Vanadium
- Zinc
- 4,4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- Aroclor-1248
- Aroclor-1254
- Aroclor-1260
- Dieldrin
- Heptachlor epoxide
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Phenanthrene
- Ethylbenzene

For Landfill Area total soil, arithmetic means and EPCs for aluminum, antimony, arsenic, cadmium, chromium, cobalt, copper, iron, manganese, 4,4'-DDD, 4,4'-DDT, Aroclor-1248, Aroclor-1254, dieldrin, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceeded their respective RSLs. The inorganic COPCs were detected in nearly all total soil samples, except for silver (detected in about one-third of samples) and antimony, cadmium, and mercury (each detected in about half of samples). DDT, DDD, and DDD were each detected in about one-third of samples, PCB Aroclors were each detected in about 10 percent of samples, dieldrin in about 75 percent of samples, heptachlor epoxide in about 20 percent of samples, ethylbenzene in 3 percent of samples, naphthalene in about 20 percent of samples, and eight other PAHs at frequencies of detection ranging from one-third to two-thirds of samples. Total 2,3,7,8-TCDD toxicity equivalents were present in all 5 total soil samples analyzed for this parameter.

Table 2.09 represents the selection of Landfill Area total soil COPCs after background elimination. Arsenic, denoted with an asterisk (*) in the above table, was eliminated as a COPC based on site concentrations not exceeding background in surface and subsurface soil. Tables 4.03 and 4.10 contain

the results of Test Form I site-wide statistical background comparison tests for Landfill Area surface and subsurface soil, respectively. Tables 4.04 and 4.11 contain the results of Test Form II site-wide statistical background comparison tests for Landfill Area surface and subsurface soil, respectively.

6.1.9 Soil-to-Air COPC Selection

Surface soil and total soil COPCs for soil-to-air exposure pathways for all potential receptors are shown in Appendix J on Tables 2.10 through 2.13. No substances were selected as volatilization pathway COPCs for the Hangar Area surface soil or total soil because either there were no published inhalation toxicity values or the substances were eliminated based on maximum values below RSLs for volatile emissions or fugitive dust emissions.

Surface Soil-to-Air COPC Selection for Landfill Area

- Chromium
- Naphthalene

The maximum detections for chromium and naphthalene exceeded their respective RSLs. The EPC and the arithmetic mean exceeded the RSL for chromium, while the EPC and mean were less than the RSL for naphthalene.

Total Soil-to-Air COPC Selection for Landfill Area

- Chromium
- Manganese
- Naphthalene
- Ethylbenzene

The maximum detections for chromium, manganese, naphthalene, and ethylbenzene exceeded their respective RSLs. The EPC and the arithmetic mean exceeded the RSL for chromium, while the EPCs and means were less than the respective RSLs for manganese, naphthalene, and ethylbenzene.

6.1.10 Soil-to-Groundwater COPC Selection

The maximum concentrations of substances in total soil (combination of surface and subsurface soil) were compared to their respective soil-to-groundwater screening levels (SSLs). SSLs were obtained from the latest EPA Region 3 RSL Table (EPA, 2010a) and are based upon simplified modeling equations documented in the SSL guidance (EPA, 1996a). SSLs were adjusted using a site-specific dilution attenuation factor (DAF) of 1.1. Uncertainties associated with this analysis are discussed in Section 6.6.

Total soil COPCs for the soil-to-groundwater exposure pathway are shown in Appendix J on Tables 2.02 and 2.03.

Soil-to-Groundwater COPC Selection for Landfill Area

- Total 2,3,7,8-TCDD toxicity equivalents
- Aluminum
- Antimony
- Arsenic
- Barium
- Cadmium
- Cobalt
- Copper
- Iron
- Lead
- Manganese
- Mercury
- Nickel
- Silver
- Vanadium
- Zinc
- 4,4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- Alpha-BHC
- Alpha-Chlordane
- Aroclor-1248
- Aroclor-1254
- Aroclor-1260
- Dieldrin
- Gamma-Chlordane
- Heptachlor
- Heptachlor epoxide
- 1,2,3-Trichlorobenzene
- 1,2,4-Trichlorobenzene
- 1,2-Dichlorobenzene
- 1,4-Dichlorobenzene
- 1-Methylnaphthalene
- 2-Methylnaphthalene
- Acenaphthene
- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Bis(2-ethylhexyl)phthalate
- Chrysene
- Dibenz(a,h)anthracene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Phenanthrene
- Pyrene
- Benzene
- Bromomethane
- Ethylbenzene
- Xylenes
- Styrene
- Tetrachloroethene
- Toluene
- Trichloroethene
- Total Xylenes

Since historical records for Site 3 indicate that disposal activities ceased in the 1960s, it is useful to evaluate the extent to which, 40 years later, the hypothetical impacts suggested by the highly conservative soil-to-groundwater screening model are reflected by current groundwater concentrations. Considering the lengthy list of Landfill Area soil-to-groundwater COPCs shown above, only arsenic, cobalt, manganese, bis(2-ethylhexyl) phthalate, tetrachloroethene, and trichloroethene were also selected as COPCs for groundwater. This observation might suggest that leaching may have contributed to the

observed groundwater concentrations for these substances. However, arsenic levels in soil were within the range of background and some portion of the soil concentrations of cobalt and manganese in Landfill Area soils may also be naturally occurring. In addition, TCE and PCE have been detected only at trace levels in onsite wells and TCE (but not PCE) has been documented as present at similar levels in offsite and upgradient wells. While leaching may have gradually depleted the readily leachable fraction of COPCs absorbed onto soils over decades, some amount of future soil-to-groundwater leaching cannot be completely ruled out.

Soil-to-Groundwater COPC Selection for Hangar Area

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Indeno(1,2,3-cd)pyrene

Of the Hangar Area soil-to-groundwater COPCs shown above, none were selected as COPCs for groundwater. Therefore, Hangar Area soils do not appear to have contributed to current groundwater conditions.

6.1.11 Surface Water COPCs

Surface water COPCs for potential receptors are selected in Appendix J on Table 2.14 and are listed below. Samples were labeled 03SWXX MM/DD/YY where 03SW represent Site 3 surface water, XX represents the sampling location, and MM/DD/YY represents the date the sample was collected.

Surface Water COPC Selection for Site 3

- Chromium
- Benzo(a)pyrene

For chromium and benzo(a)pyrene, arithmetic means and EPCs exceeded their respective RSLs. These COPCs were detected in approximately half to two-thirds of surface water samples.

6.1.12 Sediment COPCs

Sediment COPCs for all potential receptors are selected in Appendix J on Table 2.15 and are listed below for each sample. Samples were labeled 03SDXX MM/DD/YY where 03SD represent Site 3 sediment, XX represents the sampling location, and MM/DD/YY represents the date the sample was collected.

Sediment COPC Selection for Site 3

- Arsenic
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene

For arsenic, chromium, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene, arithmetic means and EPCs exceeded their respective RSLs. These COPCs displayed detection frequencies of 100 percent.

6.2 EXPOSURE POINT CONCENTRATIONS

The estimation of EPCs provides a statistical procedure for estimating the chemical input into each of the exposure pathways. The EPC represents an estimated chemical concentration to which a receptor is assumed to be continuously exposed while in contact with an environmental medium. The 95 percent upper confidence limit (UCL) on the mean of the data was considered the input concentration of a chemical used to estimate site-associated risks, unless there were too few samples to calculate a reliable statistical UCL. In particular, if there were less than 5 samples or if there were too few detected samples to estimate proxy concentrations for nondetected results, then the maximum detected concentration was selected as the EPC instead of using a statistical UCL.

A different method of calculating EPCs was applied for lead because the exposure model for lead is designed to accept the mean lead value and estimate the upper percentile of blood-lead concentrations from this quantity. Therefore, the EPC was selected as the arithmetic mean of the lead concentration in every case.

For each substance, a statistical estimate of the 95 percent UCL was calculated using the latest risk assessment guidance (EPA 2006d, 2002c), which allows for more than one method of UCL calculation. A decision scheme was followed to select the optimal type of 95 percent UCL for any given chemical data set, based on four primary considerations: (1) the number of detected and nondetected data points; (2) the estimated shape of the probability distribution of chemical concentration data (normal, lognormal, gamma, or nonparametric) as determined by distributional fit tests; (3) the estimated standard deviation of the log-transformed data; and (4) the estimated gamma distribution shape parameter (k), which is related to skewness.

The EPA-approved software program, ProUCL version 4.04, was used to perform associated UCL calculations and distributional tests (EPA, 2007a, 2007b, 2006d, 2002c). Numerical methods were employed to estimate a proxy value to substitute for each nondetected result in the data set, which improves the accuracy of the UCL estimation compared to simple substitution methods (such as half the

detection limit). Two approaches for estimating nondetects applied in the ProUCL software include Kaplan-Meier estimation and Regression on Order Statistics (ROS). Kaplan-Meier is a nonparametric approach for estimating the mean and standard deviation of censored data that is commonly used in survival analysis. The method provides an estimate of the sample distribution functions adjusting for censored data. The Kaplan-Meier parameter estimates can then be used to estimate the UCL parametrically or the mean estimator can be used in a bootstrap re-sampling algorithm. Alternatively, ROS estimates a linear model of the detected sample values versus the quantiles from a hypothesized probability distribution and then uses this linear model to assign values for the nondetects. The quantiles can be based on an assumed normal, lognormal, or gamma distribution. Although only two detected observations are required to estimate the ROS model; however, in practice the reliability of the assignment is highly dependent on having a significant number of detected values. ProUCL recommends at least 8 to 10 detected values are needed for a reliable ROS model. Both Kaplan-Meier and ROS can handle multiple detection limits. With multiple detection limits, ROS can assign values for nondetects that are higher than some detected values, which is not the case with Kaplan-Meier.

ProUCL 4.04 provides 15 UCL computation methods for full data sets without any nondetect sample results, including 5 parametric methods and 10 nonparametric methods. The nonparametric methods do not depend upon any assumptions about the data distributions. The five parametric UCL computation methods are student's t-UCL, approximate gamma UCL using chi-square approximation, adjusted gamma UCL (adjusted for level significance), Land's H-UCL, and Chebyshev inequality-based UCL [using minimum variance unbiased estimators (MVUEs) of parameters of a lognormal distribution]. The 10 nonparametric methods are the central limit theorem (CLT)-based UCL, modified-t statistic (adjusted for skewness)-based UCL, adjusted-CLT (adjusted for skewness)-based UCL, Chebyshev inequality-based UCL (using sample mean and sample standard deviation), jackknife method-based UCL, UCL based upon standard bootstrap, UCL based upon percentile bootstrap, UCL based upon bias-corrected accelerated (BCA) bootstrap, UCL based upon bootstrap t, and UCL based upon Hall's bootstrap.

Before any EPCs were calculated, the analytical database was manipulated to remove unusable data points qualified "R" or false positives attributable to blank contamination and qualified "B", and substituted the average values in place of field duplicate pairs.

EPCs for each selected COPC are presented in Appendix J on Tables 3.01 through 3.15. Supporting documentation associated with each EPC calculation is provided in Appendix K and includes distributional fit scores, standard deviation, log standard deviation, and gamma shape parameter.

6.3 EXPOSURE ASSESSMENT

The exposure assessment identifies categories of potential human health exposure based upon a characterization of the site setting, delineates potential receptors consistent with current and possible future land use patterns, outlines possible exposure routes by medium, documents the parameters and equations used in exposure estimates for each pathway, and explains the exposure evaluation used in blood-lead modeling. To determine whether there is an actual or potential exposure, the most likely pathways of contaminant release and transport, as well as the human and environmental activity patterns, are considered. A complete exposure pathway has three components: a source, a route of transport, and an exposure point for receptors.

The possible pathways for contaminant migration and exposure media which provide a potential route of contact with human receptors are shown in Figure 6-1. The potential human exposure risks that were assessed based on these pathways are shown in Figure 6-2 and include potable tap water usage, construction/excavation worker exposure to groundwater, contact with soils, and contact with surface water and sediment. Appendix J, Tables 1.01 through 1.04 delineate the details of the receptor exposure scenarios considered in this risk assessment and the rationale for including or excluding applicable exposure locations or routes of exposure for the receptors and receptor activities considered.

6.3.1 Potential Receptors

The potential receptors chosen for the HHRA are presented in this section. These receptors are not applicable to every area or medium of concern. The receptors were selected based on several criteria (current and anticipated future land use, accessibility of areas for potential recreation or residential development, and media of concern sampled).

- Current/Future Child Recreational Person - This receptor is a child (age 0 to 6) who visits an applicable area or medium of concern at the site. This receptor is potentially exposed to several types of media: ingestion and dermal absorption of COPCs in surface water and sediment during wading or other recreational activities; and contact with soil via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil during recreational activities.

- Current/Future Adult Recreational Person - This receptor is an adult who visits an applicable area or medium of concern at the site. This receptor is potentially exposed to several types of media: ingestion and dermal absorption of COPCs in surface water and sediment during wading or other recreational activities; and contact with soil via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil during recreational activities.

- Current/Future Lifetime Recreational Person - Lifetime exposure is a combination of the exposure scenarios for an adult and a child. This additive recreational exposure scenario is included to estimate the lifetime cancer risk under recreational land use scenarios. The lifetime cancer risk was estimated by adding the cancer risk for a 24-year adult exposure to the cancer risk for a 6-year child exposure. A 30-year cumulative exposure duration is based on the upper range (95th percentile) of time spent living at one residence from population mobility studies, and this approach accounts for both childhood and adult contributions to lifetime risk (EPA, 1997c). The lifetime receptor is potentially exposed to ingestion and dermal absorption of COPCs in surface water and sediment during wading or other recreational activities; and contact with soil via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil during recreational activities.

- Future Residential Child - This receptor is a child (age 0 to 6) who resides within the area of influence of groundwater or at a hypothetical future residence at the site. This receptor is potentially exposed to two types of media: ingestion and dermal absorption of COPCs in groundwater; and contact with soil via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil.

- Future Residential Adult - This receptor is an adult (24-year exposure duration) who resides within the area of influence of groundwater or at a hypothetical future residence at the site. This receptor is potentially exposed to two types of media: ingestion and dermal absorption of COPCs in groundwater; inhalation of VOC vapors generated during showering with groundwater; and contact with soil via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil.

- Future Lifetime Resident - Lifetime exposure is a combination of the exposure scenarios for an adult and a child. This additive recreational exposure scenario is included to estimate the lifetime cancer risk under residential land use scenarios. The lifetime cancer risk was estimated by adding the cancer risk for a 24-year adult exposure to the cancer risk for a 6-year child exposure. The lifetime receptor is potentially exposed to several types of media: ingestion and dermal absorption of COPCs in groundwater; inhalation of VOC vapors generated during showering with groundwater; and contact with soil via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil.

- Future Construction Worker - This receptor is an adult who uses an applicable area or medium of concern at the site for excavation-related construction purposes. This receptor is potentially exposed to COPCs via dermal contact with contaminants in groundwater and inhalation of VOCs in shallow

groundwater during excavation activities. This receptor is also potentially exposed to COPCs in total soil (comprised of a combination of surface soil and subsurface soil) via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil.

- Current/Future Industrial Worker - This receptor is an occupational worker or maintenance worker who has contact with soil while engaged in grounds keeping or other forms of outdoor work at the Site 3 Ninth Street Landfill or Hangar Area. This receptor is potentially exposed to COPCs in surface soil or total soil (comprised of a combination of surface soil and subsurface soil) via ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil.

6.3.2 Exposure Estimates

The exposure estimation routes, methods, and models presented in this section are consistent with EPA guidance (EPA, 1989b, 1992c, 1993a, 1994c, 1996b, 1996c, 1997c, 2001b, 2002b, 2002d, 2003a, 2003b, 2004, and 2006d, 2009a). Two types of exposure estimates are possible for use in the HHRA: reasonable maximum exposure (RME) and central tendency exposure (CTE). RME is the exposure that is expected to represent a high end, but not usually worst-case, exposure in a given medium of concern. CTE is the exposure that is expected to represent an average exposure to receptors in a given medium of concern. For RME and CTE risk estimates, the same EPC value was used usually based upon the 95 percent UCL. Therefore, in this risk assessment, CTE analysis involved changes to the input parameters for each exposure pathway but not to the EPC itself. CTE analysis was performed only for those exposure pathways where the estimated cancer risks were above 1×10^{-4} or the non cancer HIs based on the same target organ were above 1.0.

Noncarcinogenic risks were assessed by estimating a total annual exposure, then converting the dose to an average daily intake. When compared to toxicity benchmarks, daily intake represents the rate of exposure and does not suggest an increasing degree of cumulative toxicity according to years of exposure duration. The intake incorporates terms describing the exposure time and frequency that specifies the number of hours per day and the number of days per year that exposure occurs. The sum of exposures over one year was divided by 365 days of "averaging time" in order to convert the annual exposure to an average daily intake. Noncarcinogenic risks for some exposure routes (e.g., soil) were generally greater for children than for adults because of differences in body weight and intake.

Carcinogenic risk was estimated as a cumulative lifetime risk and, therefore, incorporated terms to sum the exposures over an expected exposure duration (years of exposure), and then divided by the total days in a typical lifetime (70 years). The carcinogenic exposure model accounts for the probability of developing cancer increasing with every additional year of cumulative exposure.

Appendix J, Tables 4.01 through 4.15 present the equations used to estimate chemical intake for both RME (high end exposure) and CTE (average exposure) scenarios.

6.3.2.1 Surface Soil and Total Soil Exposure Estimates

Three potential exposure routes are associated with direct exposure to surface soil and total soil, including:

- Ingestion
- Dermal absorption
- Inhalation of fugitive dust or ambient air VOCs emitted from soil

For surface and subsurface soils, ingestion, dermal absorption, and inhalation of fugitive dust or ambient air VOCs emitted from soil were evaluated for a future residential child, future residential adult, future lifetime resident (cancer risk only), current/future child recreational person, current/future adult recreational person, current/future lifetime recreational person (cancer risk only), current/future industrial worker, and future construction worker. For these receptors, RME parameters and equations used to calculate intake are shown in Appendix J on Tables 4.04.RME through 4.09.RME. CTE parameters and equations are shown in Tables 4.04.CTE through 4.09.CTE.

For surface soil and total soil exposure estimates, chemical-specific absorption factors associated with dermal absorption are not shown on the exposure input tables. These values were obtained from dermal guidance (EPA, 2004) and are presented in Appendix J on RAGS D Table 5s.

Derivations of the surface areas used in all dermal exposure equations for each potential receptor were based on surface areas for available body parts. These values were compiled from recent guidance (EPA, 2004).

The site-specific particulate emission factor (PEF) associated with modeling inhalation of fugitive dust was derived based on information presented in EPA's Soil Screening Guidance (EPA, 2002b, 1996b, and 1996c), Cowherd, 1984, and site-specific information. The PEF was calculated as follows:

$$PEF(m^3/kg) = \frac{Q/C \times 3600 s/h}{E_{10}}$$

where:

PEF	=	5.250 x 10^9 m^3/kg	= Particulate emission factor for Site 3 hangar area
PEF	=	3.236 x 10^9 m^3/kg	= Particulate emission factor for Site 3 landfill area
Q/C	=	87.37 (g/m^2-s)/(kg/m^3)	= Inverse of the ratio of the geometric mean air conc. to

			the emission flux at the center of hangar area, source size 0.5 acre (Q/C climate zones table in EPA, 2002b)
Q/C	=	53.85 $(g/m^2\text{-}s)/(kg/m^3)$	= Inverse ratio of the air conc. to emission flux at the center of landfill area, source size 9 acres
E_{10}	=	$0.036 \times (1-V) \times (U_m/Ut)^3 \times F(x)$	= Particulates less than 10 microns (PM_{10}) average annual emission flux (g/m^2-hr)
V	=	0.7	= Fraction of vegetative cover
U_m	=	4.3 m/sec	= Mean Annual Windspeed at 7 m (Philadelphia) (Table 4-1, Cowherd)
U_t	=	11.319 m/s	= Threshold value of windspeed at 7 m (equation, below)
F(x)	=	0.101	= Function where $x = 0.886 \times Ut/U_m$; Since X > 2, use $F(x)=0.18*(8x^3+12x)*\exp(-x^2)$ (Appendix B, Cowherd)
Ut	=	$U^* \times (1/0.4) \times \ln(z/z_0)$	

where:

$$Q/C = A \times \exp\left[\frac{(\ln A_{site} - B)^2}{C}\right]$$

A	=	14.0111	= Air dispersion constant in climate zone model (EPA, 2002b)
B	=	19.6154	= Air dispersion constant in climate zone model (EPA, 2002b)
C	=	225.3397	= Air dispersion constant in climate zone model (EPA, 2002b)
A_{site}	=	0.5 acre	= Approx. area of Site 3 hangar area
A_{site}	=	9 acres	= Approx. area of Site 3 Ninth Street landfill
Ut	=	11.319 m/s	= Wind speed at height z for Site 3
z	=	700 cm	= Height above surface (Cowherd)
z_0	=	0.5 cm	= Roughness height where annual windspeed was measured: assume unobstructed terrain for weather station (Figure 3-6, Cowherd)
U*	=	0.625 m/s	= Threshold friction velocity for assumed particle size 0.5 mm (Figure 3-4, Cowherd), corrected x 1.25 (EPA, 1996b)

The general input parameters and equations used to calculate site-specific and chemical-specific volatilization factors (VFs) associated with modeling volatiles released from soil were obtained from EPA soil screening guidance (EPA, 2002b, 1996b). Chemical-specific input parameters for the VF were obtained from tables presented in EPA's Soil Screening Guidance (EPA, 2002b, 1996b). An outdoor (ambient air) exposure model was applied to all receptors. Current soil and groundwater data do not suggest that indoor air vapor intrusion exposure would be likely to contribute to significant future risk, given that VOC detections are limited to a trace level range which rarely exceeded 1 to 20 ppb. The VF was calculated as follows:

$$VF(m^3/kg) = \frac{Q/C \times (3.14 \times D_A \times T)^{0.5} \times 10^{-4} (m^2/cm^2)}{(2 \times \rho_b \times D_A)}$$

where:

VF	=	m^3/kg	= Site- and chemical-specific volatilization factor
Q/C	=	87.37 (g/m^2-s)/(kg/m^3)	= Inverse of the ratio of the geometric mean air conc. to the emission flux at the center of hangar area, source size 0.5 acre (Q/C climate zones table in EPA, 2002b)
Q/C	=	53.85 (g/m^2-s)/(kg/m^3)	= Inverse ratio of the air conc. to emission flux at the center of landfill area, source size 9 acres
D_A	=	chemical specific	= Apparent diffusivity (cm^2/sec) (equation, below)
T	=	9.5 x 10^8 sec	= Exposure interval
ρ_b	=	1.5 g/cm^3	= Dry soil bulk density

where:

$$D_A = \frac{\left[\left(\theta_a^{10/3} D_i H' + \theta_w^{10/3} D_w\right)/n^2\right]}{\left(\rho_b K_d + \theta_w + \theta_a H'\right)}$$

ρ_s	=	2.65 g/cm^3	= Soil particle density
n	=	$1 - (\rho_b / \rho_s)$	= Total soil porosity (L_{pore} / L_{soil})
θ_w	=	0.15	= Water-filled soil porosity (L_{water} / L_{soil})
θ_a	=	$n - \theta_w$	= Air-filled soil porosity (L_{air} / L_{soil})
f_{oc}	=	0.006	= Fractional organic carbon in soil (g/g)
K_{oc}	=	chemical specific	= Soil organic carbon partition coefficient (cm^3/g)
K_d	=	K_{oc} x f_{oc}	= Soil-water partition coefficient (cm^3/g)
D_i	=	chemical specific	= Diffusivity in air (cm^2/sec)
D_w	=	chemical specific	= Diffusivity in water (cm^2/sec)
H'	=	chemical specific	= Dimensionless Henry's law constant

6.3.2.2 Sediment Exposure Estimates

Two potential exposure routes are associated with direct exposure to sediment:

- Ingestion
- Dermal absorption

For exposures to sediment, ingestion and dermal absorption were evaluated for a current/future child recreational person, current/future adult recreational person, current/future lifetime recreational person (cancer risk only), and future adult construction worker. For these receptors, RME parameters and

equations used to calculate intake are shown in Appendix J on Tables 4.13.RME through 4.15.RME. CTE parameters and equations are shown in Tables 4.13.CTE through 4.15.CTE.

For sediment exposure estimates, chemical-specific absorption factors associated with dermal absorption are not shown on the exposure input tables. These values were obtained from dermal guidance (EPA, 2004) and presented in Appendix J on RAGS D Table 5s.

The skin areas available for contact, sediment adherence factors, receptor body weights, and exposure durations used to evaluate exposure to soil were used to evaluate exposure to sediment.

6.3.2.3 Surface Water Exposure Estimates

Two potential exposure routes are associated with direct exposure to surface water:

- Ingestion
- Dermal absorption

For exposures to surface water during wading activities, ingestion and dermal absorption were evaluated for a current/future child recreational person, current/future adult recreational person, current/future lifetime recreational person (cancer risk only), and future adult construction worker. For these receptors, RME parameters and equations used to calculate intake are shown in Appendix J on Tables 4.10.RME through 4.12.RME. CTE parameters and equations are shown in Tables 4.10.CTE through 4.12.CTE.

For surface water exposure estimates, chemical-specific permeability constants associated with modeling of dermal absorption are not shown on the exposure input tables. These values were obtained from dermal guidance (EPA, 2004) and are presented in Appendix K.

Derivations of the surface areas used in all dermal exposure equations for each potential receptor were based on surface areas for available body parts. Surface areas were compiled from recent guidance (EPA, 1997c and EPA, 2004).

6.3.2.4 Groundwater Exposure Estimates

Three potential exposure routes are associated with groundwater:

- Ingestion
- Dermal absorption
- Inhalation of volatiles (during showering or construction activities)

Ingestion and dermal absorption were evaluated for a future residential child, future residential adult, future lifetime resident (cancer risk only), and a future adult construction worker (dermal absorption only). Additionally, for groundwater, inhalation of airborne vapors during showering was evaluated for a future residential adult, and inhalation of organic vapors volatilizing from groundwater in an open excavation area was evaluated for a future construction worker. For these receptors, RME parameters and equations used to calculate intake are shown in Appendix J on Tables 4.01.RME through 4.03.RME. CTE parameters and equations are shown in Tables 4.01.CTE through 4.03.CTE.

For groundwater exposure estimates, chemical-specific permeability constants associated with modeling of dermal absorption are not shown on the exposure input tables. These values were obtained from dermal guidance (EPA, 2004) and are presented in Appendix K.

Derivations of the surface areas used in all dermal exposure equations for each potential receptor were based on surface areas for available body parts. Surface areas were compiled from recent guidance (EPA, 1997c and EPA, 2004).

Showering exposure was considered for the residential adult only. The residential child was assumed to bathe, not shower. Chemical-specific parameters associated with modeling of inhalation of airborne vapors during showering are not shown on the exposure input tables. Henry's Law constants and other parameters used in this model were obtained from several sources, including EPA (1996c, 2002b) and Foster and Chrostowski (1987) and are presented in Appendix K for each COPC. Henry's Law constants published for 25 degrees C were corrected to account for an elevated showering temperature of 45 degrees C (EPA, 2001b).

For evaluating inhalation exposure to VOCs in groundwater during construction work, the American Society for Testing and Materials (ASTM) Guidance (Designation E 1739 – 95) presents a volatilization model for determination of a volatilization rate of VOCs from groundwater into air (ASTM, 1995). The following equations were utilized:

$$VF = \frac{H'}{1 + \left[\frac{U_{air} * S_{air} * L_{GW}}{W * D_{EFF-WS}} \right]} * 10^3 \, L/m^3$$

Where:

VF = Volatilization Factor for VOC in groundwater

H'	= dimensionless Henry's Law constant for VOC at 25 degrees C	
U_{air}	= 430 cm/sec	= annual wind speed above ground surface in the mixing zone
S_{air}	= 200 cm	= ambient mixing zone
L_{GW}	= 0.1 cm	= depth to groundwater, h_v+h_{cap}
h_v	= 0 cm	= thickness of the vadose zone
h_{cap}	= 0.1 cm	= thickness of the capillary fringe
D_{EFF-WS}	= effective diffusion between GW and Soil for VOC	
W	= 4900 cm	= width of the landfill area parallel to groundwater flow direction
W	= 3400 cm	= width of the hangar area parallel to groundwater flow direction

$$D_{EFF-WS} = \left(h_{cap} + h_v\right) * \left[\frac{h_{cap}}{D_{EFF-cap}} + \frac{h_v}{D_{EFF-s}}\right]^{-1}$$

Where:

D_{EFF-WS}	= effective diffusion between GW and Soil for VOC	
h_v	= 0 cm	= thickness of the vadose zone
h_{cap}	= 0.1 cm	= thickness of the capillary fringe
$D_{EFF-cap}$	= effective diffusion through capillary fringe for VOC	
D_{EFF-s}	= cm2/sec	= effective diffusion in soil based on vapor-phase concentration, chemical specific

Because h_v is equal to zero, this equation reduces to show that the effective diffusion between groundwater and surface soil (D_{EFF-WS}) is equal to the effective diffusion through the capillary fringe ($D_{EFF-cap}$).

$$D_{EFF-cap} = \left[D^{air} * \frac{Oa_{cap}^{3.33}}{Ot^2}\right] + \left[D^{wat} * \frac{1}{H'} * \left(\frac{Ow_{cap}^{3.33}}{Ot^2}\right)\right]$$

Where:

$D_{EFF-cap}$	= effective diffusion through capillary fringe for VOC	
D^{air}	= cm^2/sec	= diffusion coefficient in air for VOC
D^{wat}	= cm^2/sec	= diffusion coefficient in water for VOC
H'	= dimensionless Henry's Law constant for VOC	
Oa_{cap}	= 0.038 cm^3-air/cm^3-soil	= volumetric air content in capillary fringe soils (equals Ot minus Oa_{cap})
Ow_{cap}	= 0.342 cm^3-H2O/cm^3-soil	= volumetric water content in capillary fringe soils
Ot	= 0.38 cm^3/cm^3-soil	= total soil porosity

6.3.2.5 Soil-to-Groundwater Exposure Estimates

Soil-to-groundwater exposure was evaluated qualitatively based on comparing maximum soil concentrations against a site-specific dilution attenuation factor (DAF) multiplied by the Region 3 soil-to-groundwater screening level. The DAF equations were obtained from EPA guidance (EPA, 2002b):

DAF = 1.1 = 1+ ((11.1m/yr*0.022*{minimum of (7.6m,23.5m)}) / (0.15 m/yr*150m)) (DAF for Hangar Area)

Note that this DAF value is identical to the numerical result of the DAF calculation using a different source length area for the Ninth Street Landfill (49 m instead of 34 m).

Where:

hydraulic conductivity = 11.1 m/yr

Note that site-specific data were not available for hydraulic conductivity. This value is derived from a pumping test performed at Site 5, which is approximately 2000 feet east of Site 3.

gradient = 0.022 ft/ft = site-specific calculation derived using groundwater contour maps from March 2008, October 2008, and April 2009

source length parallel to groundwater flow = measured from site figures = 150 meters for landfill.

infiltration rate = 0.15 m/yr = default average value for Piedmont Province (EPA, 1996b, Table 6)

mixing zone value =

$$23.5m = ((0.0112*(150m)^{2})^{0.5})+(7.6m)*(1-exp\{(-150m)*(0.15m/yr)/[(11m/yr)*0.022*(7.6m)]\})$$

where:

aquifer thickness = 7.6 meters. Per EPA Region 3 guidance for areas with unsaturated overburden, this was assumed to equal the vertical distance between the top of rock (or the water table within the rock) and the shallowest nearby receptor depth. Based on RI data, the depth to the top of bedrock is about 15 feet, and groundwater is typically encountered right below the top of bedrock. The nearest receptor is the Horsham Township Municipal Well No. 26, which is cased to a depth of 40 feet, which yields a vertical separation of 25 feet.

Note that mixing zone depth in the DAF equation should be the lesser of the aquifer thickness (7.6 m) or the mixing zone value (23.5 m).

6.3.3 Blood-Lead Modeling

As outlined in OSWER Directive 9355.4-12, EPA (1994c, 2002d) has developed an approach to evaluating lead risks that recognizes the multimedia nature of lead exposures, incorporating absorption and pharmacokinetic information. Research has been conducted concerning lead intake and resultant blood-lead levels. Determinations of lead uptake from soil, sediment, drinking water, and surface water were considered. Potential blood-lead level increases were estimated and discussed, along with the potential implications of blood-lead results for residential children, recreational children, and industrial adults.

Blood-lead levels in residential children (age 0 to 6) were estimated using the Integrated Exposure and Uptake Biokinetic (IEUBK) Model (version 1.0) developed by EPA (EPA, 2002d). The model was applied using the average groundwater and soil concentrations at each applicable area or medium of concern where lead was selected as a COPC. For the assessment of ingestion of lead in groundwater and soil by residential children, default values in the model were used to represent respiratory rate, soil and water ingestion rates, the level of maternal contribution, and the percent of lead absorption by the various exposure routes. The output of the IEUBK Model is a histogram that presents the estimated percentage of children (age 0 through 6 years) with a blood-lead level above 10 ug/dL (considered to be the threshold significance level above which adverse effects cannot be ruled out). When the percentage of the population estimated to have blood-levels above 10 ug/dL is greater than 5 percent, then EPA considers the potential for adverse effects to be significant (EPA, 1994c).

For the evaluation of residential soil exposure, the site-specific average soil lead concentration was used together with the IEUBK model default value for groundwater lead concentration. For evaluation of groundwater exposure, the average lead groundwater concentration would be appropriate to combine with the model default soil lead concentration; however, the lead model was not required for groundwater as lead was not selected as a groundwater COPC. For the evaluation of combined soil and sediment exposures by potential recreational receptors, since exposure to lead in sediment is anticipated on an infrequent basis, a weighted lead concentration was considered that also includes site-specific soil contact, following the methodology presented in EPA's Assessing Intermittent or Variable Exposures at Lead Sites (EPA, 2003a). A weighted lead concentration for sediment and soil was anticipated for a scenario involving recreational exposure to both media, considering the following equation:

$$PbSw = EFsed \times [(Fsed \times Pbsed) + (Fsoil \times PbSsoil)] + (EFsoil \times PbSsoil) + EFbkg \times PbSbkg$$

Where:	PbSw	=	weighted lead surface soil/sediment concentration (mg/kg)
	EFsed	=	exposure frequency or fraction of the days/week receptor is exposed to sediment at the site = 2/7 (assumed for May to October)
	Fsed	=	fraction of time a receptor is exposed to sediment instead of soil when

the sediment locations on the site are visited (0.5 – if a sediment COPC)

Pbsed = average lead concentration in sediment (mg/kg)

EFsoil = exposure frequency or fraction of the days/week a receptor is exposed to surface soil at the site on days when they are not also exposed to sediment = 1/7 (assumed for May to October)

PbSsoil = average lead concentration in surface soil (mg/kg)

Fsoil = fraction of time a receptor is exposed to surface soil instead of sediment on days when they are also exposed to sediment = 1 – Fsed (0.5 – if lead is a sediment COPC)

EFbkg = exposure frequency or fraction of the days/week a receptor is exposed to background surface soil on days when they are not also exposed to soil or sediment from the site = 1 – (EFsed + EFsoil) = 4/7

Pbbkg = average lead concentration in background soil (mg/kg) (default value)

The RSL screening process did not select lead as a COPC for sediment; therefore, in order to evaluate soil lead exposures to recreational receptors, the term Fsed was assumed to be zero and the term Fsoil was assumed to be 1 in the above equation. Hence, the recreational exposure scenario applied in the above equation yields a weighted lead soil concentration of 3/7 x landfill area mean lead soil concentration plus 4/7 x mean lead background concentration. This is compared to the residential scenario where the landfill area mean lead soil concentration is input directly into the lead model.

Noncarcinogenic risks for recreational adults and construction workers from exposures to lead in soil or sediment and industrial workers from exposures to lead in soil were estimated using the Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil (EPA, 1996c). The model is based on a biokinetic slope factor that estimates fetal blood lead concentration in women exposed to lead in contaminated media. A simplified (linear) representation of lead biokinetics is used to predict quasi-steady state blood lead concentrations among adults who have relatively steady patterns of lead exposure. The intake assumptions used in the model were the average lead concentrations in solid media as described above, an ingestion rate, and an exposure frequency. Modeling of exposure to lead in surface water media was not applicable for adults because the adult lead model does not currently handle this pathway (in addition, lead was not selected as a COPC for surface water).

6.4 TOXICITY ASSESSMENT

The toxicity assessment identifies the potential health hazards associated with exposure to each COPC. Literature references establish that the selected COPCs have the potential to cause carcinogenic and/or noncarcinogenic health effects in humans. Dose-response relationships and the potential for exposure

must be evaluated before the risks to receptors can be determined. Dose-response relationships correlate the magnitude of the intake with the probability of toxic effects. As discussed below, dose-response values [reference doses (RfDs) and slope factors (SFs) for ingestion and reference concentrations (RfCs) and inhalation unit risks (IURs) for inhalation exposures] have been developed by EPA and other sources for many organics and inorganics. Oral RfDs and SFs and inhalation RfCs and IURs were obtained from the following primary recommended sources (ATSDR, 2009, EPA, 1997b, 2010a, 2010b, and 2010c):

- Integrated Risk Information System (IRIS) (Online Database)(EPA, 2010b).
- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) (EPA, 2010c) - The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical specific basis when requested by EPA's Superfund program.
- Other Toxicity Values - These sources may include but are not limited to the Agency for Toxic Substances and Disease Registry (ATSDR, 2009) Minimal Risk Levels (MRLs), and the Annual Health Effects Assessment Summary Tables (HEAST) (EPA, 1997b).

Although RfDs and SFs can be found in several toxicological sources, EPA's IRIS online database is the preferred source of toxicity values. This database is continuously updated and values presented have been verified by the agency's consensus peer review process. The EPA ORNL RSL Table (EPA, 2010a) was also used as a source of toxicity criteria not available from the above-referenced primary sources, except in the case of TCE, where an older cancer SF, 0.011 $(mg/kg/day)^{-1}$, that was developed by NCEA was applied as a temporary measure until inter-agency review establishes a new consensus peer reviewed cancer SF. Similarly, for PCE, an older cancer SF prepared by NCEA, 0.052 $(mg/kg/day)^{-1}$, was utilized in place of an EPA Region-specific value, pending adoption of a new peer reviewed SF. Risk tables were prepared using the withdrawn SFs for TCE and PCE, in conjunction with a discussion of the estimated cancer risks and uncertainty that would be associated with using the new draft values.

6.4.1 Reference Doses

The RfD is developed by EPA for chronic and/or subchronic human exposure to hazardous chemicals and is based solely on the noncarcinogenic effects of chemical substances. Subchronic RfDs are specifically developed to be protective for a portion of a lifetime exposure to a compound (as a Superfund program guideline, short term). Chronic RfDs are specifically developed to be protective for long-term exposure to a compound (as a Superfund program guideline, long term). The RfD is usually expressed as a dose (mg) per unit body weight (kg) per unit time (day). It is generally derived by dividing a No-Observed-(Adverse)-Effect-Level (NOAEL or NOEL) or a Lowest-Observed-Adverse-Effect-Level

(LOAEL) by an appropriate uncertainty factor. NOAELs, etc. are determined from laboratory or epidemiological toxicity studies. The uncertainty factor is based on the availability of toxicity data.

Uncertainty factors are generally applied as multiples of 10 to represent specific areas of uncertainty in the available data. A factor of 10 is used to account for variations in the general population (to protect sensitive subpopulations), when test results from animals are extrapolated to humans (to account for interspecies variability), when a NOAEL derived from a subchronic study (instead of a chronic study) is used to develop the RfD, and when a LOAEL is used instead of a NOAEL. In addition, EPA reserves the use of a modifying factor of up to 10 for professional judgment of uncertainties in the database not already accounted for. The default value of the modifying factor is 1.

The RfD incorporates the surety of the evidence for chronic human health effects. Even if applicable human data exist, the RfD (as diminished by the uncertainty factor) still maintains a margin of safety so that chronic human health effects are not underestimated. Thus, the RfD is an acceptable guideline for evaluation of noncarcinogenic risk, although the associated uncertainties preclude its use for precise risk quantitation. Oral and dermal RfDs, primary target organs, uncertainty/modifying factors and sources for selected COPCs in groundwater, surface soil, total soil, sediment, and surface water were provided in Appendix J on RAGS D Table 5.01. Inhalation reference concentrations (RfCs), primary target organs, uncertainty/modifying factors, and sources for selected COPCs were provided on RAGS D Table 5.02.

Target organ data was extracted from the Integrated Risk Information System (IRIS; EPA, 2010b), Health Effect Assessment Summary Tables (HEAST; EPA, 1997b), or other applicable sources. Only the target organs that were affected in the applicable study in which the RfDs were derived were utilized on RAGS D tables.

Noncarcinogenic risks for lead were not quantified and compared to RfDs because EPA has implemented an approach to evaluating lead risks that does not provide a single-point estimate output. Potential lead exposures were evaluated using a biokinetic model.

6.4.2 Cancer Slope Factors (SFs)

SFs are applicable for estimating the lifetime probability (assumed 70-year lifespan) of human receptors developing cancer as a result of exposure to known or potential carcinogens. The slope factor is generally reported in units of 1/(mg/kg/day), and for most substances is derived through an assumed low-dosage linear relationship extrapolated from high to low dose responses, typically based on animal studies. The value used in reporting the slope factor is the upper 95 percent confidence limit.

Oral and dermal SFs, weight of evidence, and sources for selected COPCs were provided in Appendix J on RAGS D Table 6.01. IURs, weight of evidence, and toxicity data sources for selected COPCs were provided in Appendix J on RAGS D Table 6.02.

6.4.3 Inhalation Toxicity

EPA recommends that the intake equation presented in RAGS, Part A (EPA, 1989b, Exhibit 6-16) should no longer be used when evaluating risk from the inhalation pathway. Instead, the equations from RAGS, Part F (EPA, 2009a) were applied. The net impact of this change was to use inhalation unit risks (IURs) instead of inhalation slope factors for cancer risk, and RfCs instead of inhalation RfDs for non-cancer hazards. In Appendix J on RAGS D Table 7s, chemical intakes were expressed as a time-averaged concentration, so body weights and inhalation rates were not directly input into risk calculations. If the exposure scenario of interest is less than 24 hours per day, the scenario-specific exposure time (ET) in hours per day should be used in the equations and the averaging time should be in units of hours.

6.4.4 EPA Weight of Evidence

A weight-of-evidence approach is used to classify the likelihood that a substance is a carcinogen. This qualitative information is important to consider when using SFs to estimate potential risk. Each substance is assigned a weight-of-evidence for carcinogenicity. EPA has recently revised their weight-of-evidence classifications. The updated categories are listed as follows (EPA, 2005a):

WEIGHT OF EVIDENCE CATEGORY	DEFINITION
Carcinogenic to Humans	There is strong evidence of human carcinogenicity
Likely to be Carcinogenic to Humans	The weight-of-evidence is adequate to demonstrate carcinogenic potential to humans, but does not reach the weight of evidence for the classification of “Carcinogenic to Humans”
Suggestive Evidence of Carcinogenic Potential	The weight of evidence is suggestive of carcinogenicity; a concern for potential carcinogenic effects in humans is raised, but the data are judged not sufficient for a stronger conclusion
Inadequate Information to Assess Carcinogenic Potential	Available data are judged inadequate for applying one of the other classifications
Not Likely to be Carcinogenic to Humans	The available data are considered robust enough for deciding that there is no basis for human health hazard

Weight-of-evidence classifications have not yet been updated for many substances. In these instances, it is appropriate to list the old weight-of-evidence classifications (EPA, 1986b). The older weight-of-evidence categories were used in Appendix J on RAGS D Table 6.01 and 6.02, and are listed as follows:

- Group A - Human Carcinogen (Sufficient evidence from epidemiological studies to support a causal association between exposure and cancer).
- Group B1 - Probable Human Carcinogen (Limited evidence of carcinogenicity in humans from epidemiological studies; sufficient evidence in animals).
- Group B2 - Probable Human Carcinogen (Sufficient evidence of carcinogenicity in animals and no or inadequate evidence in humans).
- Group C - Possible Human Carcinogen (Limited evidence of carcinogenicity in animals).
- Group D - Not Classified (Inadequate evidence of carcinogenicity in animals).
- Group E - No Evidence of Carcinogenicity (No evidence of carcinogenicity in at least two adequate animal tests or in both epidemiological and animal studies).

6.4.5 Adjustment of Dose-Response Parameters for Dermal Exposure

Risks associated with dermal exposures were evaluated using toxicity values that are specific to absorbed dermal doses. Most oral toxicity values are based on administered doses rather than absorbed doses. Therefore, in accordance with EPA guidance (EPA, 2004), the toxicity values based on administered doses were adjusted before they are used for evaluating absorbed doses.

Dermal RfDs and SFs were obtained from oral RfDs and SFs via the following relationships:

$$RfD_{Adjusted} = RfD_{Oral} \times GI_{Oral}$$

$$SF_{Adjusted} = SF_{Oral} / GI_{Oral}$$

where:

GI_{Oral} = Gastrointestinal (GI) Absorption Efficiency (EPA, 2004)

RfD_{Oral} = Oral Reference Dose (EPA, 2010b, 2010c, 1997b)

SF_{Oral} = Oral Slope Factor (EPA, 2010b, 2010c, 1997b)

Dermally adjusted RfDs and SFs for COPCs were presented In Appendix J on RAGS D Table 5s and 6s, respectively.

6.4.6 Toxicity Criteria for Chromium

For groundwater media, chromium speciation analysis was performed and the trivalent species was detected, but not hexavalent chromium. Therefore, the toxicity criteria for trivalent chromium were applied to the groundwater risk assessment. However, because speciation data (i.e., trivalent versus hexavalent) was not available for other media, the toxicity criteria for hexavalent chromium (Cr^{+6}) were used for soil,

sediment, and surface water in this risk assessment. Hexavalent chromium is considered to be more toxic than trivalent chromium; therefore, this assumption is conservative in nature.

6.4.7 Toxicity Criteria for Mercury

The toxicity criteria for methyl mercury were used in this risk assessment because data indicating the form of mercury in environmental media are not available. Methyl mercury is considered to be more toxic than inorganic mercury; therefore, this assumption is conservative in nature.

6.4.8 Carcinogenicity of PAHs

Carcinogenic PAHs are related by chemical structure. Only benzo(a)pyrene has an EPA-published SF (EPA, 2010b). Other carcinogenic PAHs, except carbazole, have SFs based on their potency relative to benzo(a)pyrene. EPA is in the process of revising their relative potency approach for PAHs, so that revised chemical-specific potencies may be adopted when the new approach is finalized. As of the date of this report, the relative potency factors (RPF) for carcinogenic PAHs are as follows (EPA, 2010b, 1993b):

- Benzo(a)pyrene (RPF = 1.0)
- Benz(a)anthracene (RPF = 0.1)
- Benzo(b)fluoranthene (RPF = 0.1)
- Benzo(k)fluoranthene (RPF = 0.01)
- Chrysene (RPF = 0.001)
- Dibenz(a,h)anthracene (RPF = 1.0)
- Indeno(1,2,3-cd)pyrene (RPF = 0.1)

6.4.9 Carcinogenicity of Mutagens

EPA has categorized PAHs and hexavalent chromium as mutagens having enhanced carcinogenic potency during early life periods of exposure. Based upon EPA guidance (EPA, 2005b), cancer slope factors for carcinogenic PAHs and hexavalent chromium should be multiplied by a factor of 10 for those periods of exposure occurring between 0 and 2 years of age, and by a factor of 3 for periods of exposure occurring between 2 and 16 years of age. A multiplier of 1 (no correction) applies to cancer slope factors that are outside of these critical age ranges. A receptor-specific age dependent adjustment factor (ADAF) is calculated and multiplied by the daily intake and the slope factor for mutagens as shown below:

Receptor	Medium	RME/CTE	ADAF for PAHs
Recreational Child	Surface water, sediment, soil	RME	5.33 = [(10 x 2 yrs) + (3 x 4 yrs)] / (2 + 4 yrs)
Recreational Child	Surface water, sediment, soil	CTE	3.0 = [(10 x 0 yr) + (3 x 2 yr)] / (0 + 2 yrs)
Recreational Adult	Surface water, sediment, soil	RME	1.83 = [(3 x 10 yrs) + (1 x 14 yrs)] / (10+14 yrs)
Recreational Adult	Surface water, sediment, soil	CTE	1.0 = [(3 x 0 yrs) + (1 x 7 yrs)] / (0 + 7 yrs)
Residential Child	Soil, groundwater	RME	5.33 = [(10 x 2 yrs) + (3 x 4 yrs)] / (2 + 4 yrs)
Residential Child	Soil, groundwater	CTE	3.0 = [(10 x 0 yr) + (3 x 2 yr)] / (0 + 2 yrs)
Residential Adult	Soil, groundwater	RME	1.83 = [(3 x 10 yrs) + (1 x 14 yrs)] / (10+14 yrs)
Residential Adult	Soil, groundwater	CTE	1.0 = [(3 x 0 yrs) + (1 x 7 yrs)] / (0 + 7 yrs)
construction worker	All	RME	1.0 (adult age 18 years or older)
construction worker	All	CTE	1.0 (adult age 18 years or older)
Industrial worker	Soil	RME	1.0 (adult age 18 years or older)
Industrial worker	Soil	CTE	1.0 (adult age 18 years or older)

6.4.10 Carcinogenicity of Dioxins/Furans

The cancer risk characterization for polychlorinated dibenzo-p-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) congeners was performed using toxicity equivalency factors (TEFs) that relate the toxicity of various congeners to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (EPA, 1989c). The TEF for an individual PCDD/PCDF congener is defined as the ratio of the oral carcinogenic slope factor for that congener relative to the slope factor for 2,3,7,8-TCDD. The TEFs for 2,3,7,8-substituted PCDDs/PCDFs have been published by the World Health Organization (van den Berg, et al., 2006).

For each soil sample, the sum of congener concentrations after each congener was multiplied by its respective TEF was calculated and referred to as the 2,3,7,8-TCDD toxicity equivalent (TE) concentration. Only detected congeners were summed within each sample to yield a total 2,3,7,8-TCDD TE concentration for that sample. The maximum TE of all samples was screened against the RSL criterion for 2,3,7,8-TCDD to determine if dioxin was to be selected as a COPC. After dioxin was selected as a surface soil and total soil COPC, the total TE from individual samples was used to estimate the 95 percent UCL for each data set. The UCL was then multiplied by the 2,3,7,8-TCDD cancer slope factor to yield an estimated cancer risk from exposures to all chlorinated dioxin and furan congeners present.

6.4.11 Chemicals Without Toxicity Criteria

EPA has not developed toxicity values for all chemicals for use in quantitative risk characterization. These COPCs include acenaphthylene, benzo(g,h,i)perylene, and phenanthrene. Therefore, risks for these chemicals were evaluated using surrogates (similar PAHs). The RSL and RfD for fluorene were used as surrogates for evaluating acenaphthylene, and the RSL and RfD for pyrene were used as surrogates for evaluating phenanthrene and benzo(g,h,i)perylene.

6.5 RISK CHARACTERIZATION

This section presents estimates of carcinogenic risks, noncarcinogenic risks, and lead risks for all applicable human receptors that may be exposed to COPCs present in various environmental media and at each site-related area of interest. The risk characterization quantitatively evaluates the potential for adverse health effects from exposure to COPC concentrations in environmental media by integrating information developed during the toxicity and exposure assessments.

Appendix J includes Table 7's for each receptor and route of exposure which list the chemical-specific intakes, non-cancer toxicity factors, and the calculated non-cancer hazard index. Table 7's also list the cancer slope factors, the chemical-specific cancer risks, and the cumulative cancer risk from exposure to carcinogens. Appendix J, Table 9's subdivide non-cancer risks listed according to target organ and total the cancer and non-cancer risks across all COPCs for each receptor.

6.5.1 Noncarcinogenic Risks

Noncarcinogenic risk was assessed using the concept of HQs and HIs. The HQ is defined as the ratio of the estimated intake and the RfD for a selected chemical of concern, as follows:

$$HQ = \frac{Intake}{RfD}$$

HIs were generated by summing individual HQs for COPCs. If the value of the HI exceeded unity (1.0), the potential for noncarcinogenic health risks associated with exposure to that particular chemical mixture could not be ruled out (EPA, 1986b). In that case, the target organ(s) affected by each chemical, which represent the most sensitive toxic endpoints, would be considered to develop the associated RfDs for each substance. A target organ-specific HI was calculated for the receptor by summing the HQs for all COPCs affecting the same target organ. If each target organ-specific HI is less than 1, then adverse effects are not anticipated. The HI is not defined as a mathematical prediction of the severity of toxic

effects; it is simply a numerical indicator of exceedance of the acceptable threshold for noncarcinogenic effects. Above an HI of 1, toxic effects would not necessarily occur but can no longer be ruled out.

6.5.2 Carcinogenic Risks

Incremental cancer risk (ICR) estimates were generated for each exposure pathway using the estimated intakes and published SFs, as follows:

$$Risk = Intake \times SF$$

If the above equation results in a risk greater than 0.01, the following equation should be used:

$$Risk = 1 - e^{-(Intake \times SF)}$$

The risk determined using these equations is defined as a unitless expression of an individual's increased likelihood of developing cancer as a result of exposure to carcinogenic chemicals. An ICR of 1×10^{-6} indicates that the exposed receptor has a one in one million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of 1,000,000 persons. The calculated cancer risks should be recognized as upper-limit estimates. SFs are defined as the upper 95 percent confidence limit of a dose-response curve generally derived from animal studies. Actual human risk, while not identifiable, is not expected to exceed the upper limit based on the SFs and may, in fact, be lower.

6.5.3 Groundwater Risks

Appendix J, Tables 9.01.RME through 9.04.RME summarize the non-cancer and cancer RME risks for receptors exposed to groundwater at Site 3. The estimated exposures to groundwater were potentially applicable to future residents and construction workers. Monitoring well data were used to calculate risks associated with these plumes. Background tests were not conducted for groundwater for the reasons discussed in Section 6.1.1.

The estimated RME ICR for the future lifetime resident exposed to groundwater was 1.3×10^{-4}, which is at the upper end of EPA's 1×10^{-4} to 1×10^{-6} acceptable risk range The primary contributor to cancer risk for groundwater was arsenic (ICR of 1.1×10^{-4}), from ingestion and dermal absorption exposures. Other contributors to estimated cancer risk included tetrachloroethene (ICR of 7.0×10^{-6}), 1,1-dichloroethane (ICR of 1.1×10^{-6}), bis(2-ethylhexyl) phthalate (ICR of 5.9×10^{-6}), dibromochloromethane (ICR of 2.8×10^{-6}), and bromodichloromethane (ICR of 2.0×10^{-6}). The RME ICR for the child resident was

5.6×10^{-5}; for the adult resident, the RME ICR was 7.7×10^{-5}. The RME ICR for the construction worker was less than the 1×10^{-6} lower limit of the acceptable risk range. In evaluating the groundwater risk drivers, it should be noted that the EPCs for several substances were less or approximately equal to their respective maximum contaminant levels (MCLs), including arsenic (EPC of 4 ug/L versus MCL of 10 ug/L), trichloroethene (EPC of 3 ug/L versus MCL of 5 ug/L), and tetrachlorothene (EPC of 5 ug/L versus MCL of 5 ug/L). In addition, the sum of the EPCs for trihalomethanes (1 ug/L for bromodichloromethane, 2 ug/L for dibromochloromethane, and 0.5 ug/L for chloroform) was less than the MCL for total trihalomethanes (80 ug/L). The EPC for bis(2-ethylhexyl) phthalate (11 ug/L) exceeded the MCL of 6 ug/L; however, this substance was detected in only 2 out of 19 groundwater samples.

Groundwater data for arsenic revealed detections in 11 out of 20 samples at a range from 0.4 ug/l to 9.1 ug/l. Of the four NAS JRB upgradient wells examined, the upgradient well 05MW11S was sampled in year 2000 and revealed arsenic at 3.3 ug/l, which is within the same general concentration range found at Site 3. Therefore, the infrequent detection of low levels of arsenic, which is a naturally occurring substance, in Site 3 groundwater appears consistent with regional upgradient conditions.

CTE ICRs for groundwater were within the acceptable risk range for the lifetime resident (2.6×10^{-5}), child resident (1.1×10^{-5}), and adult resident (1.5×10^{-5}). CTE risks are summarized in Appendix J on Tables 9.01.CTE through 9.03.CTE.

RME non-cancer hazards for groundwater yielded a total HI of 2.3 for the child resident. When grouped according to target organ, the target organs skin and vascular system displayed a HI exceeding 1, for which the only contributor to non-cancer risk was arsenic (HQ of 1.3). The non-cancer HI was less than 1 for the residential adult and the construction worker.

CTE non-cancer hazards for groundwater yielded a total HI of 1.3 for the child resident. When grouped according to target organ, no target organ-specific HI exceeded 1.0.

6.5.4 Soil Risks

6.5.4.1 Hangar Area Surface Soil

Appendix J, Tables 9.05.RME through 9.11.RME summarize the non-cancer and cancer RME risks for receptors exposed to Hangar Area surface soil. The estimated exposures to surface soil were potentially applicable to future residents, industrial workers, and recreational receptors.

The estimated RME ICR for the future lifetime resident exposed to Hangar Area surface soil was 8.8×10^{-5}, which is near the upper end of EPA's 1×10^{-4} to 1×10^{-6} acceptable risk range. The primary contributors to cancer risk were benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The RME ICRs for other receptors were also within the acceptable risk range (child resident -- 7.5×10^{-5}, adult resident -- 1.2×10^{-5}, industrial worker -- 6.1×10^{-6}, child recreational receptor -- 2.2×10^{-5}, adult recreational receptor -- 3.7×10^{-6}, and lifetime recreational receptor -- 2.6×10^{-5}).

Non-cancer risks from exposure to Hangar Area surface soil were not estimated because no COPCs were selected that were associated with non-cancer toxicity factors.

There were no metals among the COPCs selected for Hangar Area surface soil, therefore, it was not applicable for this data set to recalculate risks after background elimination.

6.5.4.2 Hangar Area Total Soil

Appendix J, Tables 9.12.RME through 9.19.RME summarize the non-cancer and cancer RME risks for receptors exposed to Hangar Area total soil. The estimated exposures to total soil were potentially applicable to future residents, industrial workers, construction workers, and recreational receptors.

The estimated RME ICR for the future lifetime resident exposed to Hangar Area total soil was 3.3×10^{-4}, which exceeds EPA's 1×10^{-4} to 1×10^{-6} acceptable risk range. The primary contributors to cancer risk were benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The RME ICR exceeded the acceptable risk range for the child resident (ICR of 2.8×10^{-4}), but was within the acceptable risk range for the adult resident (ICR of 4.6×10^{-5}), industrial worker (ICR of 2.3×10^{-5}), child recreational receptor (ICR of 8.3×10^{-5}), adult recreational receptor (ICR of 1.4×10^{-5}), lifetime recreational receptor (ICR of 9.7×10^{-5}), and the construction worker (ICR of 1.1×10^{-6}).

CTE ICRs for Hangar Area total soil were within the acceptable risk range for the lifetime resident (1.7×10^{-5}) and the child resident (1.5×10^{-5}). CTE risks are summarized in Appendix J on Tables 9.04.CTE through 9.06.CTE.

Non-cancer risks from exposure to Hangar Area total soil were not estimated because no COPCs were selected that were associated with non-cancer toxicity factors.

There were no metals among the COPCs selected for Hangar Area total soil, therefore, it was not applicable for this data set to recalculate risks after background elimination.

6.5.4.3 Landfill Area Surface Soil

Appendix J, Tables 9.20.RME through 9.26.RME summarize the non-cancer and cancer RME risks for receptors exposed to Landfill Area surface soil at Site 3. The estimated exposures to surface soil were potentially applicable to future residents, industrial workers, and recreational receptors.

The estimated RME ICR for the future lifetime resident exposed to Landfill Area surface soil was 5.7×10^{-4}, which exceeds EPA's 1×10^{-4} to 1×10^{-6} acceptable risk range. The primary contributors to cancer risk were total 2,3,7,8-TCDD equivalents (ICR of 2.8×10^{-6}), arsenic (ICR of 1.4×10^{-5}), chromium (ICR of 1.6×10^{-4}), benzo(a)pyrene (ICR of 2.9×10^{-4}), benz(a)anthracene (ICR of 3.8×10^{-5}), benzo(b)fluoranthene (ICR of 3.1×10^{-5}), benzo(k)fluoranthene (ICR of 2.1×10^{-6}), dibenz(a,h)anthracene (ICR of 1.8×10^{-5}), indeno(1,2,3-cd)pyrene (1.3×10^{-5}), and dieldrin (ICR of 4.6×10^{-6}).

RME ICRs also exceeded the acceptable risk range for the child resident (ICR of 4.8×10^{-4}), the lifetime recreational receptor (ICR of 1.7×10^{-4}), and the child recreational receptor (ICR of 1.4×10^{-4}), but were within the acceptable risk range for the adult resident (ICR of 8.6×10^{-5}), industrial worker (ICR of 4.6×10^{-5}), and adult recreational receptor (ICR of 2.5×10^{-5}).

CTE ICRs were within the acceptable risk range for the lifetime resident (ICR of 2.8×10^{-5}), the child resident (ICR of 2.5×10^{-5}), the adult resident (ICR of 3.6×10^{-6}), the lifetime recreational receptor (ICR of 6.3×10^{-6}), and the child recreational receptor (ICR of 5.5×10^{-6}). The CTE ICR was less than 1.0×10^{-6}, the lower end of the acceptable risk range, for the adult recreational receptor.

For exposure to Landfill Area surface soil, the estimated RME non-cancer HI for the future child resident was 2.6. When the contributors to this non-cancer HI were grouped and subtotaled according to target organ, none of the organ-specific HIs exceeded 1, which is the benchmark level below which adverse non-cancer effects are not expected. For the residential child, the target organ HI equaled 1.0 for the central nervous system (CNS) (primary HI contributor manganese), but was less than 1 for all other target organs. The RME HI was less than 1 for all other receptors, including the residential adult, industrial worker, recreational child, and recreational adult.

Of the COPCs contributing to cancer or non-cancer risk, elimination of metals within the range of background resulted in exclusion of arsenic and manganese from consideration. Appendix J, Tables

9.20a.RME through 9.26a.RME display the non-cancer and cancer RME risks after background elimination of metals for receptors exposed to Landfill Area surface soil.

6.5.4.4 Landfill Area Total Soil

Appendix J, Tables 9.27.RME through 9.34.RME summarize the non-cancer and cancer RME risks for receptors exposed to Landfill Area total soil at Site 3. The estimated exposures to total soil were potentially applicable to future residents, industrial workers, construction workers, and recreational receptors.

The estimated RME ICR for the future lifetime resident exposed to Landfill Area total soil was 6.8×10^{-4}, which exceeds EPA's 1×10^{-4} to 1×10^{-6} acceptable risk range. The primary contributors to cancer risk were benzo(a)pyrene (ICR of 2.0×10^{-4}), 2,3,7,8-TCDD equivalents (ICR of 5.4×10^{-5}), arsenic (ICR of 1.6×10^{-5}), chromium (2.9×10^{-4}), dieldrin (ICR of 2.3×10^{-5}), 4,4'-DDT (ICR of 1.0×10^{-5}), 4,4'-DDD (ICR of 1.9×10^{-6}), Aroclor-1248 (ICR of 2.5×10^{-6}), benzo(a)anthracene (ICR of 2.7×10^{-5}), benzo(b)fluoranthene (ICR of 2.2×10^{-5}), dibenz(a,h)anthracene (ICR of 1.9×10^{-5}), indeno(1,2,3-cd)pyrene (ICR of 8.8×10^{-6}), benzo(k)fluoranthene (ICR of 1.5×10^{-6}), naphthalene (ICR of 1.2×10^{-6}), and ethylbenzene (ICR of 3.0×10^{-6}). The RME ICRs for the future residential child and future residential adult were 5.6×10^{-4} and 1.2×10^{-4}, respectively, which contributed to the lifetime residential risk. The RME ICRs for the lifetime recreational receptor (2.0×10^{-4}) and child recreational receptor (1.7×10^{-4}) also exceeded the acceptable risk range.

The RME ICRs for other receptors were within the acceptable risk range (industrial worker - 7.4×10^{-5}, construction worker - 3.4×10^{-6}, and adult recreational receptor - 3.5×10^{-5}).

The CTE ICRs for Landfill Area total soil were within the acceptable risk range for the lifetime resident (ICR of 3.7×10^{-5}) and for the lifetime recreational receptor (ICR of 8.1×10^{-6}). Appendix J, Tables 9.15.CTE and 9.18.CTE display the Landfill Area total soil CTE risks for these receptors.

For exposure to Landfill Area total soil, the estimated RME non-cancer HI for the future child resident was 10. When the contributors to this non-cancer HI were grouped and subtotaled according to target organ, target organ exceedances occurred for the CNS (HI of 5.0, primary contributors 2,3,7,8-TCDD equivalents, aluminum, and manganese), liver (HI of 2.3, primary contributors antimony, iron, 4,4'-DDT, and dieldrin), GI tract (HI of 1.3, primary contributors copper, iron, and chromium), and blood (HI of 1.6, primary contributors iron and antimony). When grouped according to target organ, the RME HI also exceeded 1 for the recreational child (HI of 1.5 for the CNS). Target organ-specific HIs did not exceed 1 for the residential adult, the construction worker, the industrial worker, or the recreational adult.

When grouped according to target organ, the maximum CTE HI exceeded 1 for the residential child (HI of 1.5 for the CNS). Target organ-specific CTE HIs did not exceed 1 for the recreational child.

Of the COPCs contributing to cancer or non-cancer risk, elimination of metals within the range of background resulted in the exclusion of arsenic from consideration. Appendix J, Tables 9.27a.RME through 9.34a.RME display the non-cancer and cancer RME risks after background elimination of metals for receptors exposed to Landfill Area total soil. After background elimination, the lifetime residential RME cancer risk was reduced to 6.6×10^{-4} (compared to 6.8×10^{-4} before elimination), while the target organ HI exceedances were unchanged for the residential child.

6.5.5 Surface Water Risks

Appendix J, Tables 9.35.RME through 9.38.RME summarize the non-cancer and cancer RME risks for receptors exposed to surface water at Site 3. The RME ICR was less than the lower end of the acceptable risk range for a future construction worker and within the acceptable risk range for lifetime, child, and adult recreational receptors (ICRs of 1.9×10^{-5}, 1.5×10^{-5}, and 4.2×10^{-6}, respectively). Chromium and benzo(a)pyrene were the only substances selected as COPCs for surface water. RME HIs did not exceed 1 for any receptor exposed to surface water.

Since surface water cancer and non-cancer risks did not exceed the acceptable range there was no demonstrable advantage to recalculating risks after background elimination.

6.5.6 Sediment Risks

Appendix J, Tables 9.39.RME through 9.42.RME summarize the non-cancer and cancer RME risks for receptors exposed to sediment at Site 3. The estimated exposures to sediment were potentially applicable to future construction workers and recreational receptors.

The RME ICR was within the acceptable risk range for the future construction worker (ICR of 1.3×10^{-6}) and for the lifetime, child, and adult recreational receptors (ICRs of 4.1×10^{-5}, 2.9×10^{-5}, and 1.2×10^{-5}, respectively).

The RME HI was less than 1 for all receptors, including the construction worker, recreational child, and recreational adult.

Since sediment cancer and non-cancer risks did not exceed the acceptable range, there was no demonstrable advantage to recalculating risks after background elimination.

6.5.7 Lead Risks

Of the various media and areas of interest sampled at Site 3, lead was selected as a COPC only in Landfill Area total soil. Blood lead concentrations were predicted using the IEUBK model applied to residential and recreational children and the adult lead model applied to construction and industrial workers. The mean soil concentration was used as the EPC in the model, which predicted the upper 95 percent of blood lead concentrations of an exposed population as presented in Appendix K.

The assumptions for the IEUBK model were exposure to Landfill Area total soil on a daily basis throughout the year for residential children, and a somewhat lower frequency of exposure to Landfill Area soil by recreational children. Child recreational soil lead exposure was anticipated to include contact with Landfill Area total soil for 3 days out of each 7 day period, while the remaining 4 days per week would involve contact with a background soil lead concentration equal to the IEUBK model default value.

For residential children and recreational children exposed to Landfill Area total soil, the predicted percentages of an exposed population exhibiting a blood lead level above 10 ug/dl were 4.3% and 0.5%, respectively. These values are less than the protective level cutoff set at 5 percent of an exposed population and indicate that soil lead exposure to residential and recreational children under these conditions would not be expected to result in adverse effects.

The adult lead model was applied to predict blood lead levels in the fetus of a pregnant construction worker and a pregnant industrial worker. The mean soil concentration of lead was utilized for both scenarios. For pregnant construction workers exposed to Landfill Area total soil, the predicted percentage of an exposed population exhibiting fetal blood lead levels above 10 ug/dl was 6.1%. This exceeds the protective cutoff level of 5% of an exposed population and indicates that adverse effects to the fetus of a pregnant construction worker cannot be ruled out under these conditions. For pregnant industrial workers exposed to Landfill Area total soil, the predicted percentage of an exposed population exhibiting fetal blood lead levels above 10 ug/dl was 3.1%. This value is less than the protective cutoff level of 5% of an exposed population and indicates that adverse effects from lead exposures to a pregnant industrial worker would not be anticipated.

A CTE analysis was performed for lead exposure to construction workers. For pregnant construction workers exposed to Landfill Area total soil, CTE analysis predicted the percentage of an exposed population exhibiting fetal blood lead levels above 10 ug/dl would be 1.1%. %. This value is less than the protective cutoff level of 5% of an exposed population and indicates that adverse effects from lead exposures to a pregnant construction worker would not be anticipated under a CTE scenario.

6.6 UNCERTAINTY ANALYSIS

As discussed in EPA (1989b), the risk measures used in Superfund site risk assessments are not fully probabilistic estimates of risk but rather are conditional estimates based on a considerable number of assumptions about exposure and toxicity. There are uncertainties associated with each aspect of risk assessment, from environmental data collection through risk characterization. To support decision-making processes, significant uncertainties in the risk assessment are noted in the following categories:

6.6.1 Uncertainties Associated with Data Collection and Evaluation

Major uncertainties associated with data collection and evaluation are highlighted as follows:

6.6.1.1 Selection of Locations and Numbers of Samples

The areal extent of the samples (including the number collected and location of the sampling points) in a particular medium can impact the calculation of exposure point concentrations. The data were evaluated to determine the extent to which sampling results reflect actual site conditions and include areas thought to contain the most significant contamination or exposure problems. In addition, expanded areas of soil sampling and additional monitoring well installation and sampling were utilized where data gaps were identified from previous RI investigations. The following are issues related to sampling coverage:

Two surface soil samples were analyzed for dioxin (03SS04 and 03SS08) during the Phase II investigation in 1997. The three subsurface samples were collected from test pit excavations 03TP05 and 03TP06 during the Test Pit Investigation in 2007 and from test pit 03TP30 during the Landfill Delineation Investigation in 2008. The samples were collected from areas containing charred debris, in accordance with the Work Plan for Test Pit Investigation (Tetra Tech, 2007) and the Sampling and Analysis Plan for Landfill Delineation (Tetra Tech, 2008). The number of samples to be analyzed for dioxin was specified in the respective work plan/SAP: two samples for the Test Pit Investigation and one sample for the Landfill Delineation Investigation. Based on this rationale, the number of samples was adequate for a focused characterization of specific potential sources of dioxin.

The Hangar Area soil investigation was primarily focused on determination of whether this relatively small area might be an upgradient source of Site 3 groundwater contamination. Since the main focus was on vertical leaching from soil to groundwater, the Hangar Area sampling plan included more subsurface soil samples than surface soil samples. The total number of surface plus subsurface soil samples collected was sufficient to rule out a potential secondary source of VOCs in groundwater originating from near the

Hangar Area. Therefore, the degree of risk characterization uncertainty associated with sampling coverage of the Hangar Area is expected to be low.

6.6.1.2 Background Data Collection Impacts on Selection of COPCs and Risks

Background samples of soil, surface water, and sediment were collected in adequate quantity to be considered usable for statistical comparisons in the risk assessment analysis. Groundwater concentrations of inorganics were evaluated qualitatively rather than statistically because the NAS JRB is located at a topographic high point and contains other individual sites aside from Site 3, some of which could represent other sources.

For the risk drivers identified in Site 3 groundwater, regional background groundwater data were evaluated using NAS JRB monitoring wells that are either side-gradient to Site 3 or upgradient of Site 3 but downgradient or side-gradient to NAS JRB Site 5. Within NAS JRB, the upgradient well closest to Site 3 was 05MW15SI (screened at an intermediate aquifer depth interval), which was sampled for VOCs in August of 2005. In addition, a 3-well cluster exists side-gradient of Site 5, but upgradient of Site 3, including 05MW11S, 05MW11SI, and 05MW11I, which were sampled for metals and organics in 1998 and 2000.

Arsenic was the primary cancer risk driver in Site 3 groundwater and was detected in 11 out of 20 samples at a range from 0.4 ug/l to 9.1 ug/l. Of the four NAS JRB upgradient wells examined, the upgradient well 05MW11S was sampled in year 2000 and revealed arsenic at 3.3 ug/l, which is within the same general concentration range found at Site 3. The detection of low levels of arsenic, which is a naturally occurring substance at NAS JRB Willow Grove, in Site 3 groundwater appears consistent with regional upgradient conditions. This is discussed further in Section 6.8, Selection of Candidate Chemicals of Concern.

PCE was a contributor to cancer risk in Site 3 groundwater and was detected in 50 out of 66 samples at a range from 0.23 ug/l to 14 ug/l. Although the source of PCE does not appear to be the Hangar Area, since soil sampling did not encounter a current PCE source in soil in the Hangar Area, it is suspected that a former oil water separator (since removed, cleaned up and replaced) may have been the historical source of PCE in groundwater. Trace amounts of PCE were found in about 4 percent of over 100 soil samples collected in the Landfill Area (concentrations of 4.8 ug/kg to 200 ug/kg). Therefore, while the Landfill Area historically might have been a contributing source to the existing Site 3 groundwater PCE concentrations, it would appear that source depletion has occurred over the last four decades with only low residual levels of PCE remaining in Landfill Area soils.

TCE is discussed because it is often a solvent used in similar circumstances as PCE. However, TCE was a minimal contributor to groundwater cancer risks at Site 3 (the ICR was less than the lower end of the acceptable risk range). TCE was detected in 3 out of 63 samples at a range from 1.5 ug/l to 3.1 ug/l. The August, 2005 sampling of 05MW15SI revealed TCE at 1 ug/l and traces of other VOCs. The Site 5 well, 05MW11I, also revealed TCE at 1.2 ug/l in the 1998 sampling. These data indicate that the levels of TCE in Site 3 groundwater are similar to those found in multiple locations upgradient and regionally close to this site, so the source does not appear to be the Site 3 Ninth Street Landfill. Additional soil sampling at the Hangar Area also did not suggest the presence of any secondary soil source for the TCE found in Site 3 groundwater.

6.6.1.3 Analytical Data Usability

Only validated data were used in the quantitative risk assessment for all media. Navy and EPA data validation procedures have been applied to all new and historical data associated with the HHRA, to fully define uncertainties in terms of qualifying data as inaccurate or imprecise and eliminate data points that are unusable for risk assessment. This treatment does not eliminate all uncertainty but focuses attention on potential areas of concern regarding accuracy, precision, and data gaps.

6.6.1.4 Uncertainties in Risk-Based Screening Levels

Published RfDs and RSLs are not available for all substances, so surrogate screening RSLs were employed using similar compounds associated with published RfD and RSL values. Accounting for potential non-cancer risks in this manner reduces the chance of underestimating risks from compounds without published toxicity factors.

6.6.2 Uncertainties in the Selection of the EPC

The use of the exposure point concentration to estimate risk is generally regarded as a conservative procedure since it entails using the 95 percent UCL on the arithmetic mean (based on best fit to a normal, log-transformed, or gamma data distribution, or else assuming an unknown nonparametric distribution). In some cases, the maximum concentration was employed if this managed to yield a lower value for the EPC. The choice of the exposure point concentration as the value for input into the risk assessment generally lowers the chances of underestimation of the actual risk present in a pathway at a particular area of interest to a potential receptor.

While the use of the 95 percent UCL on the mean may overestimate the average exposure point concentration, a decision scheme recommended in recent guidance (EPA, 2002c, and Singh, 2007a) was

followed that reduces the degree of overestimation. Up to 15 UCL estimation methods were generated as appropriate to each situation based on the number of samples, the log-standard deviation, the skewness coefficient, the number of non-detects, and distribution fit tests. This approach has been tested by simulation studies and has been shown to successfully produce realistic UCL estimates that achieve 95 percent coverage of the population mean with a high degree of confidence.

The ability (power) of distributional fit tests to be able to correctly identify genuine differences between the shape of a sample population versus a reference normal, lognormal, or gamma probability distribution is reduced when too few samples are collected. If an incorrect distributional assumption is made based on these tests, this could lead to an over- or underestimate of the 95 percent UCL, which in turn would create some additional uncertainty as to whether the calculated risk is a reasonable approximation of high end exposure. If fewer than five samples or five detections in a data set were available, the distributional tests were not considered significant and the EPC was selected as the maximum value.

6.6.3 Uncertainties Associated with Exposure Assessment

Major uncertainties associated with Exposure Assessment are listed below.

6.6.3.1 Exposure Scenarios

The likelihood of the occurrence of the defined exposure scenarios is a source of uncertainty. The future anticipated land use near the site is expected to remain as industrial and recreational. However, other types of receptors, including hypothetical future residents, were evaluated to provide a comprehensive assessment of potential current and future risks from exposure.

6.6.3.2 Exposure Equations

There are limitations to using various models and equations to estimate exposure doses or contaminant concentrations. For example, the use of modeled concentrations (i.e., generated fugitive dust concentrations and generated volatile emissions) in place of monitored values may not be indicative of actual site conditions during exposure. Exposure to fugitive dust conservatively assumes that potential receptors will be exposed to the same concentration indoors as outdoors (a very conservative assumption), that soils within an area have unlimited erosion potential, that emissions can be estimated from mean annual wind speed and vegetative cover, and that dispersion concentrations can be estimated from source area and region-wide meteorological factors. For receptors exposed to fugitive dust emissions, it was assumed that future conditions would approximate current conditions in terms of a high relative fraction of vegetative cover. If future vegetative cover is different in a residential area, then dust

exposures could be lower or higher than estimated by the model. However, the impact of this error would not be significant because a worst-case (no vegetative cover) scenario would only increase exposures calculated by the model by a factor of 5, while inhalation exposures at typical sites fall in a range several orders of magnitude below levels of concern.

The model for dermal exposure to soil and sediment assumes that only a very thin, constant thickness layer of soil is available for contaminant transfer to the stratum corneum and that a constant amount of contaminant, proportional to the soil concentration, will be absorbed per unit area of skin and per exposure event. However, adherence to skin varies with such factors as particle size, soil type, and organic carbon content. As estimated by EPA (2004), the absorbed dermal dose could vary substantially from the model estimates, even assuming that activity patterns lead to the exposure duration applied in the experimental trials used to develop absorption factors. Because of the lack of reliable data regarding dermal absorption factors, the risk assessment provided default soil absorption factors for most substances, except a select few for which well-documented absorption factors are available.

Prediction of absorption rates for lipophilic compounds is difficult due to, among other reasons, the possibility of a second absorption pathway that depends on the lipid content of the stratum corneum at the application site. Experimental determination of absorption rates indicates that interspecies differences are considerable, which, along with other variability's related to condition and age of skin, differences in lag time, and site of application effects, yields appreciable uncertainty in estimated dermal exposures by using published chemical-specific permeation functions. In addition, literature data indicate a variation by as much as a factor of 300 in chemical absorption rates for skin in different anatomical areas of the body. It should also be noted that children generally have greater absorption rates than adults and their activity patterns often result in greater soil-to-skin adherence factors.

Exposure assumptions can add uncertainty into the risk assessment process based on input values selected for each exposure route. For example, not all people weigh 70 kilograms, drink 2 liters of water per day, and live at the same residence for 30 years. The rationale for each assumption was provided in each table of input parameters. Receptor characteristics, such as age and body weight, were based on published values. Conservative values (based on reasonable maximum exposure data or professional judgment) were used in combination with average values.

Uncertainties exist in the exposure model for the inhalation of volatiles during showering such as chemical-specific rates of volatilization, droplet size, and droplet residence time in the shower. Most of the inputs into the models are considered conservative; therefore, the output may overestimate the exposure for this route.

6.6.4 Uncertainties Associated With Toxicity Assessment

There is uncertainty associated with the RfDs and SFs. The uncertainty results from the extrapolation of animal data to humans, the extrapolation of carcinogenic effects from the laboratory high-dose to the environmental low-dose scenarios, and interspecies and intraspecies variations in toxicological sensitivity to chemical exposure. The use of EPA RfD values is generally considered to be conservative because the doses are based on no-effect or lowest-observed-effect levels and then further reduced with uncertainty factors to increase the margin of safety by a factor in the neighborhood of 10 to 1,000 fold.

There are uncertainties regarding non-threshold (carcinogenic) effects extrapolation, from the high doses administered to laboratory animals to the low doses received under more common human exposure scenarios. Uncertainties due to short-time toxicological study predictions of long-term effects are also present. Additionally, there is considerable interspecies variation in toxicological endpoints used in characterizing potential health effects resulting from exposure to a chemical, and there is considerable variability in sensitivity among individuals of any particular species.

The RfDs and SFs of some chemicals have not been established, and therefore toxicity cannot always be quantitatively assessed. In most cases, if RfDs are unavailable for carcinogens, the carcinogenic risk is considered to be much more significant since carcinogenic effects usually occur at much lower doses.

The uncertainty associated with the assessment of dermal exposure is high because of the derivation of the dermal slope factor and reference dose. The dermal toxicity factors are based on default oral absorption factors. This could result in an overestimation of the toxicity factors, depending upon the exact mechanism of action.

For some chemicals, alternative toxicity constants were utilized despite information having been withdrawn from IRIS, pending further agency review. In these cases, if additional information was available on quantitative toxicity factors from the NCEA, Cincinnati, Ohio, then SFs or RfDs cited in NCEA publications were utilized, based on the original or new studies that were the basis for considering a reevaluation of toxicological properties. This may add additional uncertainty for affected COPCs undergoing further agency review. Trichloroethene exhibited a cancer risk just under the minimum threshold of importance (1×10^{-6}) when the NCEA peer-reviewed cancer slope factor (0.011) was used to estimate risk. TCE risks would be a factor of two lower if the current California EPA-derived cancer slope factor (0.0059) were to be applied instead. Tetrachloroethene exhibited a cancer risk above the risk contribution limit (1×10^{-6}) when the NCEA peer-reviewed cancer slope factor (0.052) was used to estimate risk. PCE risks would be a factor of ten higher if the current California EPA-derived cancer slope

factor (0.54) were to be applied instead. Using either slope factor would not change the list of risk drivers for Site 3.

For groundwater at Site 3, speciation analysis was performed and demonstrated that hexavalent chromium is not present. Therefore, chromium was assumed to exist as the trivalent species in groundwater. However, for other media, chromium speciation analysis was not performed. Therefore, it was conservatively assumed that hexavalent chromium could be present and the hexavalent chromium RSLs and RfDs were used for surface water, sediment and soil. This may overestimate risks to an extent.

Incidental ingestion of iron contributed to the target organ HI exceeding 1 under certain exposure pathways and receptors. Currently, no toxicity values for iron are published in IRIS or in HEAST. The oral reference dose used to evaluate exposures to iron was obtained from the current EPA PPRTV guidance, which cites a provisional RfD that is based on the average adult intake of iron and not on any adverse health effects. Consequently, an HI greater than 1 for exposure to iron may simply indicate that the receptor is receiving more than the average adult intake of iron. In addition, iron is considered an essential nutrient and consequently the toxicity curve for iron is U-shaped. Therefore, iron may not warrant serious health concerns in media where exposures only slightly exceeded the screening value.

Inhalation risks are uncertain for several reasons. Inhalation risks are subject to modeling uncertainty with regards to accuracy of predictions for inter-media transfer. In addition, recent guidance was applied to estimate the inhalation unit risk (IUR) for carcinogenic risk and reference concentration (RfC) for non-cancer hazards, which does not directly adjust for the effect of breathing rate and body weight on the calculated risk. This approach is recommended in EPA RAGS Part F guidance because evidence suggests that this yields a more accurate estimate of risk.

6.6.5 Uncertainties Associated with Risk Characterization

ICRs and HIs were summed for all potential COPCs and for all applicable routes of exposure. Non-cancer risks were grouped and summed together for only those chemicals affecting the same target organ/organ system. However, summing these risks implies that no antagonistic or synergistic effects exist between chemicals. It also assumes that similar mechanisms of action and metabolism are prevalent. Therefore, the use of this approach may either underestimate or overestimate the risks, depending on the chemical-specific interactions, which cannot be predicted. The direction of the uncertainty cannot be defined, but the methodology used is based on current EPA guidance.

Risks to any individual may also be overestimated by summing multiple assumed exposure pathway risks for any single receptor. Although every effort was made to develop reasonable scenarios, not all individual receptors may be exposed via all pathways considered.

The IEUBK model accounts for the multimedia nature of lead exposure, incorporates absorption and pharmacokinetic information, and allows the risk manager to consider the potential distributions of exposure and risk likely to occur at a site (the model goes beyond providing a single point estimate output). Although uncertainties are associated with using this blood-lead model, the uncertainties are considered lower than those that conceivably would result from similar lead evaluations performed using a traditional toxicity slope-based approach. Important uncertainties and limitations in the use of the IEUBK model are listed below.

The IEUBK model was developed to model steady state blood-lead concentrations resulting from exposure occurring on a frequent or nearly continuous basis. For recreational exposure scenarios, this assumption is not adequately met because of exposure occurring only during warmer months and only for occasional days each week rather than daily. The output of the IEUBK model is considered at best only a rough approximation under these assumptions.

The IEUBK model is predictive of blood lead for residential children in the range of 6 months to 7 years of age, which typically is considered to be a more sensitive subpopulation than adults. The IUEBK model does not apply to adults in residential settings, who would be expected to have less chance of experiencing adverse effects. The adult lead model applies only to pregnant workers in order to assess potential effects only for the most sensitive subpopulation of workers, and is based on effects to the developing fetus. Other categories of adult workers would be expected to be somewhat less prone to experiencing potential adverse effects from lead exposures occurring in the same industrial setting.

The IEUBK model uses a default of 30 percent lead absorption from soil. However, the bioavailability of lead from different sources may be variable due to differences in lead speciation, particle size, and mineral matrix and may also vary as a function of physiological parameters such as age, nutritional status, gastric pH, and transit time. For example, lead absorption from paint chips in soil may be different than lead absorption from other chemical forms.

Blood-lead variability is characterized by a single number, the geometric standard deviation, which is set to a default value of 1.6 in the IEUBK model. This value represents the aggregate uncertainty in all sources of population variability, including biological, uptake, exposure, sampling, and analytical components.

Child blood-lead level predictions obtained using the IEUBK model reflect only the contributions of sources entered into the model and do not take into account any existing body burden that may be the result of prior exposures or any exposures that may have taken place at alternate locations away from the household or neighborhood level, such as parks or daycare centers.

6.7 RISK ASSESSMENT SUMMARY

The HHRA for Site 3 was performed to evaluate risks to current or future human receptors potentially exposed to groundwater, surface soil, total soil, surface water, and sediment. In Appendix J, RAGS D Tables 1 through 9 present the exposure scenarios, COPCs, EPCs, input parameters, cancer and noncancer toxicity factors, and associated risks to potentially exposed receptors. Table 9's list the cancer risks and non-cancer hazards estimated for each receptor. For the soil risk assessment, two sets of Table 9's (e.g., 9.01 and 9.01a) were included to differentiate estimated risks from exposure to all COPCs versus estimated risks after elimination of substances that did not exceed background levels based on statistical tests.

6.8 SELECTION OF CHEMICALS OF CONCERN (COCs)

In the last step of the risk assessment, a short list of chemicals, called chemicals of concern (COCs), was developed for each area of interest, consisting of those substances that contribute to potentially unacceptable human health risks (above the target acceptable risk range) and which do not appear to be attributable to background environmental conditions (outside of the realm of influence of the site). The following subsections evaluate risk drivers for each area of interest and medium and discuss the lines of evidence regarding selection of site-related COCs. Evidence used to select COC's included quantitative statistical background tests, qualitative assessment of contaminant patterns, concentration ranges, frequencies of detection, and other causative influences such as likely mineralogic or anthropogenic sources.

6.8.1 Risk Level Benchmarks to Define COCs with Unacceptable Risk

Estimated risks for an exposure medium were considered unacceptable if the total cancer risk from all COPCs exceeded 1×10^{-4}, if the total HI from combining the HQs for COPCs affecting the same target organ exceeded 1.0, or if exposures to lead yielded a predicted blood lead concentration above 10 ug/dL in greater than 5% of an exposed population. If total risks exceeded these benchmarks, then individual substances contributing to unacceptable risk were highlighted in bold in Appendix J on RAGS D Table 9's. These candidate COCs are listed in Table 6-1 for each medium, receptor, and area of interest. The threshold risk for including a substance as a significant contributor was based on an individual cancer risk exceeding 1.0×10^{-6}, a non-cancer HQ exceeding 0.20, or a predicted blood lead concentration

exceeding 10 ug/dl in greater than 5% of an exposed population. Table 6-1 includes candidate COCs associated with non-carcinogenic hazards or unacceptable blood lead levels, listed separately for child and adult residents and child and adult recreational receptors. Candidate COCs contributing to residential or recreational cancer risks are listed only for lifetime receptors, which represent a combination of child plus adult exposures.

6.8.2 COC Selection for Comparison to Background Concentration

In Table 6-1, candidate COCs that were judged to be associated with background conditions were annotated (BG). For soil samples, concentrations of some substances did not exceed background based on quantitative statistical tests presented in Section 4. Other, qualitative lines of evidence were considered on a case-by-case basis as discussed in Section 6.6. Sections 6.8.3 through 6.8.9 present the COCs for Site 3 by defined area and medium after elimination of non-site-related substances. The COCs for each medium will be used to develop chemical-specific remediation goals (RGs) in the FS report.

6.8.3 Hangar Area Surface Soil COCs

Several candidate COCs for Hangar Area surface soil were selected based on residential cancer risk: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Unacceptable non-cancer hazards were not identified. Lead was not selected as a COC. Quantitative statistical background tests were not very useful because the number of samples was limited. However, from a qualitative viewpoint, Table 4-2 shows that the PAH candidate COCs were detected in the majority of background soil samples, and that all Hangar Area surface soil PAH concentrations were within the approximate range of background. The presence of PAHs is not unusual since various anthropogenic sources of low level PAHs are often found in developed urban areas. Therefore, no candidate COCs were retained as COCs for Hangar Area surface soils.

6.8.4 Hangar Area Total Soil COCs

The candidate COCs for Hangar Area total soil included several contributors to lifetime residential cancer risk: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Unacceptable non-cancer hazards were not identified. Lead was not selected as a COC. As previously noted, PAH levels in surface soil were documented to be similar to background. As shown in Table 4-9, approximately 3 out of 12 Hangar Area subsurface soil samples exhibited detections of several risk driver PAHs, which was higher than the detection frequency for PAHs in background soil. In two Hangar Area subsurface soil samples, elevated concentrations of PAHs were

observed that were about 3-fold greater than the maximum levels found in background. Therefore, the following PAHs were retained as Hangar Area total soil COCs, although the hot spots for PAHs appear to be associated only with one soil boring location, 03SB19.

Hangar Area COCs

- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

6.8.5 Landfill Area Surface Soil COCs

The candidate COCs for Landfill Area surface soil were based on residential cancer risk: 2,3,7,8-TCDD equivalents, arsenic, chromium, benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and dieldrin. Unacceptable non-cancer hazards were not identified. Lead was not selected as a COC.

The background comparison tests in Table 4-3 determined that two of the risk drivers for Landfill Area surface soil, arsenic and dieldrin, exhibited concentrations that were not statistically greater than background. Chromium concentrations were noted to exceed background based on statistical tests. Although the risk driver PAHs were not shown to be statistically greater than background, the occurrence and distribution data presented in Table 4-1 reveal that the maximum detected concentrations of individual PAHs in Landfill Area surface soil were about 30 times greater than maximum background levels. Also, the maximum concentration of dieldrin was within the range of background. Therefore, 2,3,7,8-TCDD, chromium, and the aforementioned PAHs were retained as Landfill Area Surface Soil COCs for consideration in the FS. Note that the same list of COCs applies to the residential receptor and the recreational receptor.

6.8.6 Landfill Area Total Soil COCs

The candidate COCs for Landfill Area total soil associated with residential cancer risk were: 2,3,7,8-TCDD equivalents, arsenic, chromium, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, 4,4'-DDT, 4,4'-DDD, Aroclor-1248, and ethylbenzene. The candidate COCs for Landfill Area total soil associated with unacceptable target organ HIs for a child resident were: 2,3,7,8-TCDD equivalents, aluminum,

antimony, chromium, copper, iron, manganese, 4,4'-DDT, and dieldrin. Lead was only selected as a candidate COC for the construction worker based on modeling of blood lead concentrations.

To help judge which COCs are not site-related, examination of Table 4-3 shows that Landfill Area surface soil arsenic concentrations were not statistically greater than background, and Table 4-10 reveals that subsurface soil arsenic concentrations also did not exceed background. Aluminum, chromium, copper, iron, and manganese surface soil concentrations were noted to exceed background based on statistical tests, and all of these metals except manganese exceeded background in subsurface soil. Antimony was difficult to evaluate due to a limited number of unqualified analytical results in the background data set, so as a conservative approach it was assumed to be potentially site-related. When the grouped data representing Landfill Area surface soil samples or subsurface soil samples were compared to background, statistical tests did not suggest that PAH levels were above background. Despite this, certain sample locations appeared to exhibit notable PAH levels. For example, Table 4-1 reveals that the maximum concentrations of individual PAHs from Landfill Area surface soil were about 30 times greater than maximum background levels, while maximum subsurface soil PAH levels were about 7 times greater than background. Statistical tests for dieldrin indicated concentrations were not above background in the surface soil aggregate data set, and subsurface soil concentrations were also similar, with only one isolated subsurface soil location exhibiting an elevated dieldrin concentration (12 times greater than the maximum background level). Lead was found to statistically exceed background in subsurface soil but not surface soil. Naphthalene, 4,4'-DDT, 4,4'-DDD, Aroclor-1248, and ethylbenzene exhibited too few detections to allow statistically-based conclusions to be made regarding their site concentrations being above background. However, levels of naphthalene, 4,4'-DDT, 4,4'-DDD, Aroclor-1248, and ethylbenzene were above the maximum background concentration by a factor of 10 (or more) in some Landfill Area subsurface soil samples and, to a lesser extent, also in certain surface soil samples. Therefore, 2,3,7,8-TCDD, naphthalene, 4,4'-DDT, 4,4'-DDD, Aroclor-1248, ethylbenzene, aluminum, antimony, chromium, copper, iron, lead, manganese, dieldrin and the aforementioned PAHs were retained as Landfill Area total soil COCs for consideration in the FS. All COCs except for lead were applicable to a residential exposure risk scenario, while lead was the only COC for a construction worker. A subset of these risk drivers would comprise the list of COCs associated with unacceptable risk for recreational receptors (see RAGS D Tables 9.32 and 9.34 for risk drivers for the recreational receptor).
The following compounds were selected as Landfill Area total soil COCs.

<u>Landfill Area COCs</u>

- Total 2,3,7,8-TCDD Equiv.
- 4,4'-DDT
- 4,4'-DDD

- Dieldrin
- Aroclor-1248
- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Ethylbenzene
- Aluminum
- Antimony
- Chromium
- Copper
- Iron
- Lead
- Manganese

6.8.7 Groundwater Risks

Appendix J, Tables 9.01.RME through 9.04.RME summarize the non-cancer and cancer RME risks for receptors exposed to groundwater at Site 3. The estimated exposures to groundwater were potentially applicable to future residents and construction workers. Monitoring well data were used to calculate risks associated with hypothetical groundwater plume exposure. The candidate COCs for groundwater associated with residential cancer risk were: arsenic, bromodichloromethane, dibromochloromethane, 1,1-dichloroethane, tetrachloroethene, and bis(2-ethylhexyl) phthalate. Arsenic was the only candidate COC for groundwater associated with unacceptable target organ HIs for a child resident. Lead was not selected as a candidate COC.

Background tests were not conducted for groundwater for the reasons discussed in Section 6.1.1. Therefore, qualitative lines of evidence and comparisons to upgradient and side-gradient wells that are unaffected by the site were used to establish a list of potentially site-related COCs. As discussed in detail in Section 4.6.1, multiple lines of evidence indicate that the arsenic detected in Site 3 groundwater is naturally occurring and is not related to waste disposal activities:

- Arsenic was detected in site 3 soil samples at concentrations that did not statistically exceed background, which indicates that arsenic was not a significant component of waste disposed at Site 3 and hence, that there is not a site-related source of arsenic in soil that could contribute to groundwater levels via leaching.

- The areal distribution of arsenic in Site 3 monitoring wells is not consistent with a contaminant source originating within the Landfill. The highest detected groundwater arsenic concentration was noted in monitoring well 03MW06I, which is located upgradient of the site.

- The arsenic groundwater concentrations at Site 3 are consistent with those detected at other Base sites. For example, at Sites 1, 2, and 5, arsenic was detected in a small fraction of samples at levels ranging from 1.3 ug/L up to 4.2 ug/L. At Site 3, groundwater data for arsenic revealed detections in 11 out of 20 samples, with concentrations ranging from 0.4 ug/L to 9.1 ug/L and a mean concentration of 2.4 ug/L.

- Arsenic is a well-documented, naturally-occurring component of groundwater within the Newark Basin. Many public supply wells located within the Newark Basin of New Jersey and Pennsylvania exhibit the presence of arsenic. The USGS (2006) evaluated the arsenic groundwater distribution in the Newark Basin of Southeastern Pennsylvania and concluded that about 10 percent of all wells in the basin contain arsenic at concentrations above 10 ug/L, and in some areas the percentage was even greater than 10 percent.

- Of the four NAS JRB upgradient wells examined, the upgradient well 05MW11S was sampled in year 2000 and revealed arsenic at 3.3 ug/l, which is within the same general concentration range found at Site 3. In conclusion, the infrequent detection of low levels of arsenic, which is a naturally occurring substance, in Site 3 groundwater appears consistent with regional upgradient conditions.

The trihalomethanes, bromodichloromethane, dibromochloromethane, and chloroform were all detected in Site 3 groundwater. Both chlorobromomethanes (but not chloroform) were risk drivers. Chlorobromomethanes do not have current commercial uses, although generally speaking, former uses included foaming agents in fire extinguisher fluids, aerosol propellants, and refrigerants (ATSDR, 2005). The three trihalomethanes were detected together in one monitoring well (03MW04S) sampled in March 2008, which was before a months-long water main leak was repaired at Site 3. Monitoring well 03MW04S is located in a low-lying area that was inundated for several months with the runoff from the water main leak. The presence of the three trihalomethanes in 03MW04S this one sampling event is most likely related to trace level byproducts of routine chlorination in the public water supply leaked in the area. Figures 4-4 through 4-8 display the distribution of VOCs including trihalomethanes in groundwater

over the period 1997 through 2009, and show that chlorobromomethane concentrations were very low and isolated to just the one sample. The sum of the EPCs for the three trihalomethanes was 3.5 ug/L, which is less than one-twentieth of the MCL for total trihalomethanes (80 ug/L).

The EPC for bis(2-ethylhexyl) phthalate (11 ug/L) exceeded the MCL of 6 ug/L and the RSL of 4.8 ug/L by approximately a factor of 2. However, this substance was detected rarely (found in only 2 out of 19 groundwater samples) and was detected in Site 3 Landfill soil samples at concentrations mostly below or similar to the quantitation limits (BEHP was greater than 1000 ug/kg in only 3 out of 103 samples). Therefore, the occurrence and distribution data for bis(2-ethylhexyl) phthalate in groundwater and soil do not suggest a pattern of contamination associated with leaching of this substance from soil to groundwater at the Landfill.

1,1-Dichloroethane, tetrachloroethene, and trichloroethene belong to a common degradation pathway for chlorinated VOC sources. 1,1-Dichloroethane and tetrachloroethene were candidate COCs associated with unacceptable risk. Trichloroethene exhibited a cancer risk just under the minimum threshold of importance (1×10^{-6}) when the NCEA peer-reviewed cancer slope factor was used to estimate risk. TCE risks would be a factor of two lower if the current California EPA-derived cancer slope factor were to be applied instead. 1,1-Dichloroethane was detected in only one well, 03MW08D, which is located up gradient from all potential Site 3 contaminant source areas. As discussed in Section 4.6.2, the contamination in this well is interpreted to originate at Site 5.

Considering each of the lines of evidence discussed above, only tetrachloroethene was retained as a groundwater COC for consideration in the FS.

Site 3 Groundwater COC

- Tetrachloroethene

6.8.8 Surface Water Risks

Appendix J, Tables 9.35.RME through 9.38.RME summarize the non-cancer and cancer RME risks for receptors exposed to surface water at Site 3. Surface water cancer and non-cancer risks did not exceed the acceptable range, therefore, no COCs were selected for any receptor exposed to surface water.

6.8.9 Sediment Risks

Appendix J, Tables 9.39.RME through 9.42.RME summarize the non-cancer and cancer RME risks for receptors exposed to sediment at Site 3. Sediment cancer and non-cancer risks did not exceed the acceptable range, therefore, no COCs were selected for any receptor exposed to sediment.

7.0 ECOLOGICAL RISK ASSESSMENT

This ecological risk assessment (ERA) was conducted to evaluate the potential for adverse ecological impacts of site-related contamination at Site 3 and to determine the need for further investigation and/or remedial action. The ERA was conducted in accordance with EPA and Navy guidance (EPA, 1997a; 1998; DON, 1999; 2004).

This ERA consists of Steps 1 and 2 and the initial portion of Step 3 of the eight-step ERA process described by EPA (1997a). These three steps consist of the following:

Step 1 Screening-Level Problem Formulation and Ecological Effects Evaluation
Step 2 Screening-Level Exposure Estimate and Risk Calculation
Step 3A Refinement of Preliminary Chemicals of Potential Concern

The first phase in the ERA process is the screening level ERA (Steps 1 and 2). In this phase, conservative exposure estimates are made for general or specific groups of ecological receptors, and these exposure estimates are compared to screening-levels and toxicity threshold values. This ERA also contains the initial portion of Step 3 of a baseline ERA, which further refines the list of ecological chemicals of potential concern (COPCs). The initial portion of Step 3 will be referred to as Step 3A in this document.

Section 7.1 describes the screening level problem formulation, and Sections 7.2, 7.3, and 7.4 describe the ecological effects evaluation, exposure estimates, and risk characterization, respectively. Section 7.5 describes the refinement of preliminary chemicals of potential concern. Inherent uncertainties are discussed in Section 7.6. The summary and conclusions are provided in Section 7.7.

7.1 SCREENING LEVEL PROBLEM FORMULATION

The problem formulation phase addresses the environmental setting, ecological receptors, contaminant fate and transport, mechanisms of ecotoxicity, complete exposure pathways, and selection of endpoints.

7.1.1 Environmental Setting

The Ninth Street Landfill (Site 3) is located in the southwestern portion of NAS JRB Willow Grove, west of Runway 15/33. The area where soil samples have been collected comprises approximately 12 acres. The precise areal extent of the former landfill is not known with certainty, but is believed to be considerably less

than 12 acres. The areas in which evidence of buried waste has been found using EM surveys and test pits comprise about 2 acres.

A two-acre storm water retention basin formed by damming a small unnamed stream is located north of the former landfill area. The retention basin is shown on the National Wetlands Inventory map for this area as a palustrine, open water, impoundment (United States Department of Interior, undated).

The site is highest along Ninth Street, and the ground surface slopes to the northwest from Ninth Street down to the perimeter road along the western property line of the Navy property. Because of the topography, surface water runoff from the northern portion of Site 3 does not discharge to the pond, and instead flows toward the perimeter road and a small section of the stream downgradient from the pond near the perimeter road. Previous investigations have shown that contamination from Site 3 has not migrated into the retention basin, and the NAS JRB Partnering Team has concluded that the retention basin is not part of Site 3.

The stream flows roughly southwest from the retention basin and exits the Base as the stream passes under the Base perimeter road approximately 300 feet downstream from the pond. Immediately west of the Base perimeter road, which is identified on some maps as Dawes Road or Privet Road, the stream winds through a golf course, then turns northwest and flows approximately 1.8 miles where it discharges into Park Creek. Park Creek is a tributary of Little Neshaminy Creek.

The portion of the stream between the pond and the Base boundary is approximately 6 feet wide and is typically about 6 inches deep. This portion of the stream lies within a closed canopy of red maple (*Acer rubrum*), ash (*Fraxinus* spp.), tuliptree (*Liriodendron tulipifera*), willow (*Salix spp*.), and other deciduous trees. The stream is associated with a 0.3 acre wetland shown on the National Wetlands Inventory map as seasonal, palustrine, scrub shrub/emergent. Other portions of the area shown on Figure 7-1 as “deciduous wooded” consist of the same tree species as along the stream, plus black cherry (*Prunus serotina*), oaks (*Quercus spp*.), maple (*Acer spp.*) and sassafras (*Sassafras albidum*).

A picnic/recreation area is located within Site 3, and includes a playground and baseball field. Most of the picnic/recreation area consists of mowed grass, as does a large portion of the area north and west of the baseball field (Figure 7-1).

A small area dominated by coniferous trees such as Virginia pine (*Pinus virginiana*), other pines (*Pinus spp*), and red-cedar (*Juniperus virginiana*) is located in the south-central portion of the site (Figure 7-1).

An area in various stages of succession is located between the coniferous wooded area and the recreation

area; this habitat is labeled on Figure 7-1 as recently cleared/weedy. Some of this area was recently cleared when test pits were dug for the current investigation. The area is largely a mixture of old field vegetation that is dominated by broomsedge (*Andropogon glomeratus*), goldenrod (*Soildago* sp.), and blackberry (*Rubrus* spp.). Some portions of this area are more shrubby, with viburnums (*Viburnum* spp.), multiflora rose (*Rosa multiflora*), and chokecherry (*Prunus virginiana*), plus saplings of trees such as Virginia pine, red-cedar, black cherry, and sassafras.

Terrestrial receptors at the site consist of various mammals such as rabbits, raccoons, shrews, squirrels and other rodents, and deer. A few woodchuck burrows are located on the hillside downslope from Ninth Street. Reptiles and amphibians inhabit the site, particularly in the low areas along the stream. The more open grassy and herbaceous areas provide food sources (seeds, insects, worms, etc.) for a variety of birds and small mammals. Arboreal birds use the wooded and shrubby areas. Avian raptors undoubtedly forage in all habitats at the site.

7.1.2 Contaminant Fate and Transport

The contaminant source at Site 3 is the former landfill and open disposal area, which was active from 1960 to 1967. Wastes consisting of general refuse, paint wastes, sewage and industrial pretreatment plant sludge, petroleum, oils and lubricants were reportedly deposited, burned in trenches, and buried at the site. Between 1980 and 1983, the eastern portion of the site was used as a salvage yard, where fill and construction debris were deposited.

Potential contaminant release pathways at the site include erosion, overland runoff, and infiltration of contaminants. These are discussed in Section 7.1.4.

VOCs, PAH compounds, phthalates, pesticides, PCBs, metals, dioxins, and furans were detected in soil samples collected at Site 3. The discussion below is limited to a brief review of the fate and transport of these contaminant types at Site 3 as related to migration pathways and ecological exposure.

7.1.2.1 Volatile Organic Compounds (VOCs)

VOCs are poorly adsorbed to soil and sediment particles. VOCs are not typically detected at high concentrations in surface water, surface soil, and sediment because of their high volatility. VOCs in soil will dissolve in rain water to varying degrees and can be transported overland with runoff or into groundwater. Photolysis and hydrolysis are not significant mechanisms of VOC degradation. Aerobic biodegradation in soil and groundwater is significant, however, and anaerobic degradation can also occur in these media.

7.1.2.2 PAH compounds

PAHs are ubiquitous in the modern environment and are common constituents of coal tar, soot, vehicle exhaust, cigarette smoke, petroleum products, road tar, mineral oils, and creosote. PAHs are transferred from surface water by volatilization and sorption to settling particles. The compounds are transformed in surface water by photooxidation, chemical oxidation, and microbial metabolism. In soil and sediments, microbial metabolism is the major process for degradation of PAHs (ATSDR, 1989). High molecular weight PAHs tend to be immobile and insoluble, binding strongly to organic matter (reducing the potential for leaching to groundwater), and they are resistant to volatilization, photolysis, and biodegradation (Eisler, 2000). Upper tropic level wildlife are exposed to PAHs primarily through the diet, but most wildlife can metabolize and excrete PAHs. Vertebrates can readily metabolize PAHs, but invertebrates such as insects and worms cannot metabolize PAHs as quickly. PAHs may be absorbed by plants but are expected to be translocated, metabolized, and potentially photodegraded. Accumulation within plants is likely to occur only in heavily polluted locations where uptake exceeds metabolism and degradation (Edwards, 1983).

7.1.2.3 Phthalates

Phthalates are used in the production of plastics and are relatively persistent in the environment. Although numerous studies have demonstrated that phthalates undergo biodegradation, it is a slow process. Some microorganisms have been shown to excrete products that increase the solubility of phthalates and enhance their biodegradation (Gibbons and Alexander, 1989). Most phthalates are expected to sorb to soil or sediment particles after their release because of their high organic carbon absorption coefficient (K_{oc}) values.

7.1.2.4 Pesticides

Chlorinated pesticides are highly persistent in the environment, and tend to tightly sorb to organic matter. Degradation of chlorinated pesticides in sediment would eventually occur through volatilization, photolysis, and aerobic and anaerobic degradation. Due to the lipophilicity of organochlorine pesticides, they can bioaccumulate in animals. These compounds generally bioconcentrate in lower trophic level organisms and can be transferred and magnified in higher trophic level organisms.

7.1.2.5 PCBs

Two PCB compounds were detected in surface soil at Site 3 (Aroclor-1254 and Aroclor-1260). PCBs include a variety of mixtures of individual biphenyl isomers, each consisting of two joined benzene rings

and up to 10 chlorine atoms. PCBs adsorb strongly to soil particles with adsorption generally increasing with the degree of chlorination. PCBs released into water adsorb to sediments and other organic matter. Factors that determine the biodegradability of PCBs include the amount of chlorination, concentration, microbial population type, available nutrients, and the temperature (ATSDR, 1989). PCBs can significantly bioconcentrate in animals.

7.1.2.6 Dioxins and Furans

In soil, sediment, and water, dioxins and furans are primarily associated with particulate and organic matter. Dioxins and furans exhibit little potential for significant leaching or volatilization once sorbed to particulate matter. In general, dioxins become more environmentally and chemically stable with increasing halogen content, and exhibit a relative inertness to acids, bases, oxidation, reduction, and heat (Eisler, 2000). Due to the lipophilicity of dioxins, they can accumulate in animal fat.

7.1.2.7 Inorganics

Many metals occur naturally in soil, surface water, and sediment due primarily to chemical weathering of rocks. Most metals are toxic to biota above certain concentrations, with some metals being more toxic at lower concentrations than others. In addition, different chemical forms of metals are more toxic than others. For example, hexavalent chromium is typically more toxic than trivalent chromium. Factors such as pH, clay content, and organic matter content influence the bioavailability of metals to invertebrates in sediment. In water, most metals tend to adsorb to sediment or to suspended particles in the water column. However, because of dissolution, complexation, and sediment resuspension, metals are often detected in surface water. Some metals have the potential to accumulate in biota (EPA, 2000).

7.1.3 Ecotoxicity

VOCs readily volatilize, are poorly adsorbed to soil and sediment particles, and are typically detected in surface water, surface soil, and sediment only at low concentrations. VOCs do not bioaccumulate in ecological receptors, and their toxicity to most ecological receptors is relatively low.

PAHs in most animal species are metabolized by a mixed-function oxidase enzyme system into intermediates that may be toxic, mutagenic, or carcinogenic to the host. Some invertebrate species cannot efficiently metabolize PAHs (Eisler, 2000), and PAHs can be chronically toxic to invertebrates, but overall, very little is known about the toxicological mechanisms of PAHs in invertebrates (Erstfield and Snow-Ashbrook, 1999). PAHs can bind to cellular macromolecules and thereby disrupt their function in higher level organisms such as mammals and birds. Biological macromolecules include

polymers of carbohydrates (e.g., starch), amino acids (proteins), and nucleotides (e.g., DNA). The cellular functions of these polymers include structure, energy storage, energy transfer, material transport, and the storage and transmittal of genetic information. Adverse impacts to plants from PAHs are rare. Food chain uptake does not appear to be a major exposure source to PAHs for aquatic animals, and food-chain biomagnification of PAHs is typically minimal (ATSDR, 1989). Microbial metabolism is the major process for degradation of PAHs in soil (ATSDR, 1989).

In general, phthalates have a low acute toxicity to animals (Amdur et al., 1991). Chronic oral exposures, however, have been shown to result in liver toxicity in mammals. Ingested phthalates metabolize to monoesters in the gut and are subsequently absorbed. Following absorption, phthalates distribute primarily to the liver and kidneys and in some species, concentrate in the testes (Rhodes et al., 1986). Liver carcinogenesis has been observed (ATSDR, 1997). Many receptors are able to metabolize and excrete phthalate esters, so their ability to bioaccumulate varies among species.

Organochlorine pesticides are reproductive and nervous system toxins. The target organ for acute exposures is the nervous system, while chronic exposures can affect the liver and endocrine systems of higher animals. Organochlorine pesticides are lipophilic and can be stored in the fat tissue of organisms such as birds and mammals. In birds of prey they can cause reproductive failure through eggshell thinning and disruption of egg-laying and nesting cycles (Amdur et al., 1991). Organochlorine pesticides were developed to control insects on crops, and as a result, they are not highly toxic to plants.

PCBs are highly lipophilic, and can bioaccumulate in animals. PCBs can accumulate in offspring through placental transfer in mammals and accumulation in bird eggs, and can accumulate in upper trophic level animals such as carnivorous birds and mammals that feed on contaminated prey items (Eisler, 2000). In animals, the primary effect associated with PCB exposure is the induction of liver enzyme systems. These enzymes are associated with detoxification mechanisms and with the metabolism of hormones. Adverse reproductive effects observed with PCB exposure are associated with induction of the enzyme systems. The toxicity of PCBs to mammals and birds varies, depending on the particular PCB and the animal species. PCBs are not water soluble and accumulate to a much greater degree in animals than in plants. Nevertheless, plant-related effects of PCB exposure can include slower growth, reduced chlorophyll content, and diminished photosynthesis.

The toxicological properties of individual dioxin and furan congeners vary greatly. The most toxic of the dioxin and furan compounds is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (Eisler, 2000). Two surface soil samples collected in 1997 at Site 3 were analyzed for dioxins and furans. The dioxin and furan data in this ERA are expressed as total TCDD toxic equivalent (TEQ) concentrations, and were calculated following World Health Organization guidance described by EPA (2008). TEQs are used to address the

problem of evaluating the toxicity of mixtures of dioxin congeners. Toxicity Equivalency Factors (TEFs) for each compound are used to calculate the TEQs. The TEF denotes a given dioxin compound's toxicity relative to 2,3,7,8-TCDD, which is assigned the maximum TEF of 1.0. Other dioxin compounds have equal or lower TEFs, with each TEF proportional to its toxicity relative to that of 2,3,7,8-TCDD. The total TCDD TEQ concentration for a sample is the sum of individual TEQs for that sample. Three TCDD TEQs are presented in the ERA; one each for mammals, birds, and fish. The mammal TEQ was calculated using TEFs of Van den Berg et al (2006) while the fish and bird TEQs were calculated using TEFs of Van den Berg et al (1998) as presented in EPA (2008). Non-detected congeners were assigned a value of one-half the detection limit to calculate TEQ concentrations.

Toxic effects of dioxins in animals appear to be mediated by its binding to a cytoplasmic protein known as the aryl hydrocarbon (Ah) receptor (Eisler, 2000; EPA, 1993a). The binding of xenobiotic compounds to the Ah receptor is known to disrupt an organism's normal development and functioning. Demonstrated toxic effects of dioxins in fish, birds, and mammals include mortality, immunotoxicity; weight loss ("wasting syndrome"), reproductive effects (e.g., fetotoxicity, teratogenesis), carcinogenesis, adverse effects on endocrine functions, alterations in lipid metabolism and gluconeogenesis, thymic atrophy, and induction of certain enzyme systems (EPA, 1993a). Research indicates the Ah receptor mediates most if not all biological and toxic effects induced by dioxin-like chemicals, and dioxins must bind to the Ah receptor to cause toxicity (Birnbaum, 1994). Amphibians and reptiles are relatively insensitive to dioxins. Although Ah receptor homologs have been identified in amphibians and primitive fish, their toxicological significance is uncertain. A wide variety of invertebrates including amphipods, daphnids, midges, mosquito larvae, sandworms, oligochaete worms, snails, clams, and grass shrimp are insensitive to dioxin induced toxicity in long term exposures (EPA, 1993a). The insensitivity of invertebrates to dioxin toxicity is consistent with data showing that several invertebrate Ah receptor homologs lack the ability to bind with dioxins (Butler et al., 2001). Data indicate plants are relatively insensitive to dioxins (EPA, 1993a), and the uptake of dioxins by vegetation is considered to be negligible (Eisler, 2000).

It is difficult to make generalizations about the toxic actions of metals because of diverse affinities for organic molecules in biologic structures, a wide array of biological effects, and a multiplicity of target organs and systems (Amdur et al., 1991). At the molecular level, metals can manifest toxicity in many ways, including selectively accumulating in target organs (such as the kidneys), substituting for "essential" metals, and mimicking essential substrates (Clarkson, 1983). The reactions of metals at the molecular level typically affect enzyme systems, leading to disruption of cellular transport, cellular respiration, cell division, and other physiological processes. Metal toxicity to aquatic organisms is manifested through a broad spectrum of effects that range from a reduction in growth rate to death. Aquatic organisms are most sensitive to metal toxicity in the embryonic and larval stages of the life cycle.

7.1.4 Complete Exposure Pathways

Soil invertebrates are exposed to soil contaminants at Site 3 through ingestion and dermal contact.

Higher trophic level animals such as birds and small mammals can be exposed to contaminants through three pathways: oral, dermal, and inhalation. The dermal pathway is generally assumed to be minor because fur and feathers minimize transfer across dermal tissue, and the oral exposure pathway is the primary pathway of intake of most contaminants for terrestrial wildlife (Sample et al, 1997). The inhalation pathway at Site 3 is probably insignificant for at least two reasons. First, since most of the site is covered with grasses and other vegetation, aerial suspension of contaminated dust particles is minimized. Second, VOCs and SVOCs, which are the compounds most likely to present a risk through inhalation, are rapidly diluted and dispersed when exposed to air. Because of this, and since inhalation ecotoxicity data for chronic exposure are lacking, the air pathway was not evaluated for ecological receptors. The oral exposure pathway is the primary pathway of intake for terrestrial wildlife at Site 3. Animals such as birds and mammals are exposed to site-related contamination through ingestion of contaminated food items and incidental ingestion of contaminants in soil while grooming fur, preening feathers, digging, grazing close to the soil, or feeding on items to which soil has adhered. Terrestrial animals can also ingest contaminants in surface water through drinking.

Terrestrial vegetation could be exposed to contaminants via contact with soil and subsequent root translocation. Aerial deposition is currently a negligible pathway for plants and animals at Site 3 because the site is largely covered by vegetation, reducing the amount of bare soil and fugitive dust.

Aquatic and semi-aquatic organisms in the stream north of Site 3 can be exposed to contaminants through direct contact with surface water and sediments, incidental ingestion of surface water and sediments, and consumption of contaminated food items. For example, piscivorous (fish-eating) wildlife could feed on aquatic biota that have accumulated contaminants from surface water and sediment.

The site conceptual exposure model is designed to diagram the potentially exposed receptor populations and applicable exposure pathways, based on the physical nature of the site and the potential contaminant source areas. The contaminant transport pathways for Site 3 are shown schematically in Figures 7-2A and 7-2B. These pathways describe the movement from the source of contamination to potential ecological receptors; the linkage of these items is the conceptual site model.

Figures 7-2A and 7-2B show a complete exposure route for overland runoff and erosion, but since most of the site is heavily vegetated, runoff and erosion are probably minor under current conditions. However, if surface soil is disturbed through activities such as excavation, soils could serve as a source for

transport of contaminants to downgradient locations. Combustion was undoubtedly a major contaminant release mechanism during the period of active landfill operations, since waste material was burned in trenches. However, combustion is not a current contaminant release mechanism at Site 3 since burning activities have ceased. Infiltrating precipitation could cause contamination of subsurface soil and groundwater at the site. Shallow groundwater beneath Site 3 flows northwest, so some groundwater might discharge into the stream that exits the pond north of the site. The dermal contact exposure route is included in the conceptual model since it is occurs to some extent, but as mentioned earlier, it represents a minor exposure route.

7.1.5 Assessment Endpoints

For the screening level ERA, assessment endpoints are any adverse effects on ecological receptors (EPA, 1997a). Based on the habitats present and on the migration pathways and routes of exposure of chemicals at Site 3, the assessment endpoints for this ERA are the protection of the following groups of receptors from adverse effects of site-related contaminants on growth, survival, and reproduction:

- Soil invertebrates
- Terrestrial vegetation
- Insectivorous birds and mammals
- Herbivorous birds and mammals
- Benthic invertebrates
- Aquatic organisms
- Piscivorous birds and mammals

The assessment endpoints are discussed below.

7.1.5.1 Soil invertebrates

Earthworms, insect larvae, and other soil invertebrates at Site 3 aid in the formation of soil and the redistribution and decomposition of organic matter in soil. They can also accumulate bioaccumulative contaminants that can then be transferred to higher trophic-level organisms that consume soil invertebrates.

7.1.5.2 Terrestrial Vegetation

Terrestrial vegetation at Site 3 consists of numerous species of trees, shrubs, vines, and herbaceous plants. These plants serve as a food source and provide cover for many organisms, and they help to

prevent soil erosion, among other important functions. They can also accumulate certain contaminants that can then be transferred to the higher trophic-level organisms that consume plants.

7.1.5.3 Insectivorous Birds and Mammals

Strictly speaking, the term “insectivorous” refers to insect-eating organisms, while “vermivorous” refers to worm-eating organisms. However, most animals that consume worms also consume adult and larval insects and other soil invertebrates, and no animals at Site 3 are strictly insectivorous or strictly vermivorous. Henceforth in this ERA, the term “insectivorous” will be used in a broad sense and for brevity to describe birds and mammals that prey on a variety of soil invertebrates, such as adult and larval insects, centipedes, millipedes, other arthropods, and worms.

Insectivorous birds and mammals can be exposed to and accumulate contaminants present in the food items they consume. Numerous birds forage on soil invertebrates at Site 3. Most birds considered to be insectivorous also eat plant material such as berries and seeds. Several mammal species known or expected to occur at the site consume worms and other soil invertebrates. Shrews and moles forage only on soil invertebrates. Rodents at the site forage at least to some extent on soil invertebrates.

7.1.5.4 Herbivorous Birds and Mammals

Herbivores animals consume only plant tissue. Herbivorous birds and mammals can be exposed to and accumulate contaminants present in the food items (i.e., leaves, seeds, fruit) they consume. Most bird species forage on a combination of plant food and soil invertebrates, but species such as the Northern bobwhite quail forage primarily or almost exclusively on vegetation. Mammals such as deer, rabbits, woodchucks, and voles are herbivorous.

7.1.5.5 Benthic Invertebrates and Aquatic Organisms

Benthic invertebrates, fish, and other aquatic organisms in the stream north of the site could be directly exposed to contaminants in surface water and sediment. Many benthic invertebrates and aquatic organisms serve as a food source for higher trophic level organisms such as fish, birds, and mammals. Benthic invertebrates and aquatic organisms can accumulate contaminants that can then be transferred to higher trophic level organisms when consumed.

7.1.5.6 Piscivorous Birds and Mammals

The term “piscivorous” is used here in a broad sense to describe birds and mammals that prey upon not only fish, but on a variety of aquatic organisms. Piscivorous birds and mammals can be exposed to and accumulate site-related contaminants that have accumulated in prey items obtained from surface water. Piscivorous birds include belted kingfishers, and various wading birds such as herons and egrets. Piscivorous mammals include the river otter and mink. The raccoon is often thought of as piscivorous, and it does consume aquatic organisms, but the majority of its diet typically consists of non-aquatic animal and plant tissues (EPA, 1993b).

7.1.5.7 Other Potential Endpoints

As indicated in EPA guidance (EPA, 1997a), it is not practical to directly evaluate risks to all of the individual components of the ecosystem. Instead, assessment endpoints focus the ERA on particular components of the ecosystem that will tend to yield the highest risks; this should provide protection for endpoints that have lower risks. For example, omnivores were not selected as assessment endpoints because omnivores will be protected by protecting insectivores and herbivores. Large carnivorous birds (e.g. hawks and owls) and large carnivorous mammals (e.g. fox, bobcat) were not selected as assessment endpoints because their home range is much larger than the site and most of their food would come from other locations. Therefore, risks would be greater to small mammals and birds that obtain all of their food from the site. Threshold oral toxicity values for reptiles and amphibians are not available for most chemicals, so risks to reptiles and amphibians were not quantitatively evaluated.

7.1.6 Measurement Endpoints

Measurement endpoints are estimates of biological impacts (e.g., mortality, growth, reproduction) that are used to evaluate the assessment endpoints.

Adverse impacts on survival, growth, and reproduction of soil invertebrates and terrestrial vegetation were evaluated by comparing chemical concentrations in surface soil to soil ecological screening values (ESVs). Adverse impacts on survival, growth, and reproduction of benthic invertebrates were evaluated by comparing chemical concentrations in sediment to sediment ESVs. Adverse impacts on survival, growth, and reproduction of aquatic organisms were evaluated by comparing chemical concentrations in surface water to surface water ESVs.

Adverse impacts on survival, growth, and reproduction of piscivorous birds and mammals, insectivorous birds and mammals, and herbivorous birds and mammals were evaluated by comparing estimated

ingested doses of contaminants in surface water, sediment, and food items to no-observed-adverse effects levels (NOAELs) for representative wildlife species. Lowest-observed-adverse-effect levels (LOAELs) were not used to evaluate adverse impacts until Step 3A of this ERA (Section 7.5.3).

The assessment and measurement endpoints can be summarized as follows:

Assessment Endpoint	**Measurement Endpoint**	**Representative Receptor**
Soil invertebrates	Soil ESVs	Not applicable
Terrestrial vegetation	Soil ESVs	Not applicable
Benthic invertebrates	Sediment ESVs	Not applicable
Aquatic organisms	Surface Water ESVs	Not applicable
Insectivorous birds	Avian NOAELs	American robin (*Turdus migratorius*)
Insectivorous mammals	Mammalian NOAELs	Short-tailed shrew (*Blarina brevicauda*)
Herbivorous birds	Avian NOAELs	Northern bobwhite quail (*Colinus virginianus*)
Herbivorous mammals	Mammalian NOAELs	Meadow vole (*Microtus pennsylvanicus*) and Woodchuck (*Marmota monax*)
Piscivorous birds	Avian NOAELs	Green heron (*Butorides striatus)*
Piscivorous mammals	Mammalian NOAELs	Mink (Mustela vison)

Justification for using the seven representative receptors is provided below.

7.1.7 Selection of Representative Receptors

Potential risk can be evaluated for general or specific receptor groups. In many cases, receptors are adequately described by general categories such as sediment-dwelling biota. When ingestion is a major exposure route, selection of specific receptor groups is required so that intake through eating and drinking can be evaluated, and species are selected to represent the receptor group that is to be evaluated. Contaminant exposure through ingestion was evaluated through food chain modeling, which is described in Section 7.3.3. The seven species identified above (Section 7.1.6) were used to represent wildlife-related assessment endpoints in the food chain model. Exposure parameters (e.g., diet, body weight, food and water ingestion rates) for the representative species are discussed in Section 7.3.3.3. Life history information for the representative species is provided below.

7.1.7.1 American Robin

The American robin is common in Pennsylvania and the entire eastern United States in a variety of habitats such as parks, lawns, moist forests, swamps, open woodlands, and orchards. Major food items in spring and summer include insects and invertebrates, especially earthworms. Seeds and fruit are eaten more frequently in winter. During the non-breeding seasons, robins in Pennsylvania are joined by migratory individuals from more northern areas, roaming over large areas and usually forming communal roosts within 1 to 2 miles of foraging areas. All portions of Site 3 provide foraging habitat for robins. The home range during breeding season is approximately 0.5 to 2.0 acres (EPA, 1993b). Therefore, a robin might forage exclusively at Site 3 during nesting.

7.1.7.2 Short-Tailed Shrew

Short-tailed shrews are found in forested areas, brushy areas, and near marshes. They feed primarily on insects but will prey on earthworms, snails, centipedes, slugs, and even small vertebrates (Burt and Grossenheider, 1980). Short-tailed shrews have voracious appetites for their body size, and as a result, may receive high doses of contaminants relative to other small mammals. Their home range is approximately 0.5 to 2.4 acres (Cothran et al 1991; EPA, 1993b). The short-tailed shrew is found throughout Pennsylvania. Short-tailed shrews probably occur at Site 3 in all habitats, although to a lesser extent in the frequently mowed area.

7.1.7.3 Northern Bobwhite Quail

The Northern bobwhite quail, often known as the Northern bobwhite or bobwhite quail, is a ground-dwelling bird that inhabits brush, grasslands, idle fields, pastures, and open woodlands. Seeds comprise the majority of the adult diet. Average home range sizes in several studies reviewed by EPA (1993b) varied from 8.9 to 41.3 acres. The Northern bobwhite probably forages in much of Site 3.

7.1.7.4 Meadow Vole

The meadow vole is the most widely distributed small herbivore in North America, and is found throughout Pennsylvania. Meadow voles inhabit grassy fields, marshes, bogs, and sometimes grassy openings in forests (EPA, 1993b; Brown, 1997). Primary food items consist of green succulent vegetation, sedges, seeds, roots, bark, and fungi. Average home range sizes in several studies reviewed by EPA (1993b) varied from 0.0005 to 0.2 acres. Meadow voles would be found in much of Site 3.

7.1.7.5 Green Heron

The green heron is a common bird in wetland thickets throughout the eastern United States. It forages especially along forested margins of ponds, lakes, rivers, streams, marshes, and swamps, such as along the stream north of Site 3. It prefers thick vegetation, but will feed in the open when food is available. Small fish are the primary prey, but green herons also consume insects, and a variety of aquatic invertebrates. The green heron is typically a solitary bird, but it nests in colonies with other green herons or with other species (Davis and Kushlan, 1994). Home range data for the green heron were not located.

7.1.7.6 Mink

The mink is the most abundant and widespread carnivorous mammal in North America. Mink are found in freshwater and brackish coastal marshes, wetlands, swamps, and along the edges of rivers, streams, lakes, and ditches (EPA, 1993b). They are never found far from water (Lowery, 1974). Mink prefer irregular shorelines and tend to use brushy or wooded cover adjacent to the water, where prey is abundant and downfall and debris provide den sites. They are carnivorous opportunistic predators, taking whatever prey is abundant. They feed on fish, crustaceans, and amphibians in aquatic habitats. In nearby terrestrial habitats, mink prey on mice, rats, rabbits, birds, reptiles, and insects (Lowery, 1974; EPA, 1993b). Mink would be expected in the forested area along the stream north of Site 3. Home range sizes are highly variable, although values of 640 to 940 acres were the most common in a literature review of several studies, and home ranges measured in terms of distances along stream or river shoreline habitats were usually in the range of 0.6 to 1.8 miles of shoreline (EPA, 1993b).

7.1.7.7 Woodchuck

The woodchuck, also known as groundhog, is a large rodent of field borders, fencerows, forest edges, and brushy hillsides. Its geographical range includes most of eastern Canada and much of the eastern United States. Woodchucks dig burrows which often have two or more openings. The burrows often provide refuge for smaller mammal species, and for a variety of reptiles, amphibians, and arthropods. Woodchucks tend to be most active in the early morning and late afternoon and typically remain in the burrow during the middle of the day. They feed almost exclusively on herbaceous plants (Brown; 1997). Woodchucks typically hibernate from October or November to February or March. They can do considerable damage to crops (Brown; 1997; Burt and Grossenheider, 1980). Woodchucks become sexually mature at one year of age, but most are nearly two years old before becoming reproductively active (Brown; 1997). Their home range is often about 40 to 60 acres (Burt and Grossenheider, 1980), but woodchucks in areas of plentiful succulent vegetation (such as alfalfa and clover) often stay within

20 yards of their burrow (DeGraaf and Rudis, 1986). A few woodchuck burrows are located at Site 3 on the hillside west of Ninth Street.

7.2 SCREENING LEVEL ECOLOGICAL EFFECTS EVALUATION

The screening level ecological effects evaluation is an investigation of the relationship between the magnitude of exposure to a chemical and the nature and magnitude of adverse effects resulting from exposure. In this step, exposure levels that represent conservative thresholds for adverse ecological effects are established.

7.2.1 Screening Benchmarks

Soil ESVs were preferentially Ecological Soil Screening Levels (Eco-SSLs) established by EPA in 19 separate documents. NOAA's Screening Quick Reference Tables (Buchman 2008) were used for soil analytes that do not have an Eco-SSL.

Sediment ESVs used to evaluate potential risk to benthic organisms were preferentially EPA Region 3 BTAG Freshwater Sediment Screening Benchmarks (EPA, 2006a). Freshwater sediment screening values from Buchman (2008) were used for sediment analytes without ESVs in the EPA (2006a) document.

Surface water ESVs used to evaluate potential risk to aquatic organisms were preferentially EPA Region 3 BTAG Freshwater Screening Benchmarks (EPA, 2006b). Chronic freshwater screening values from NOAA's Screening Quick Reference Tables (Buchman 2008) were used for surface water analytes without ESVs in the EPA (2006b) document. Freshwater ESVs for some inorganics are hardness-dependent. The average hardness of surface water samples collected at Site 3 was 57 mg/L; this value was used to derive surface water ESVs for chromium, lead, nickel, and zinc.

If an ESV was not available for a particular chemical, that chemical was carried through the screening level assessment into Step 3A of the baseline risk assessment.

7.2.2 Wildlife Evaluation

Potential risks to piscivorous birds and mammals, insectivorous birds and mammals, and herbivorous birds and mammals from bioaccumulative compounds via the food chain were evaluated by estimating the chronic daily intake and comparing this to toxicity reference values (TRVs) representing acceptable daily doses in mg/kg/day. NOAEL-based values obtained from the literature for wildlife species or

surrogates were selected for use as TRVs in the screening level assessment. The TRVs were preferentially obtained from wildlife studies presented in the EPA Eco SSL documents (EPA, 2005). The Oak Ridge National Laboratory (ORNL) publication *Toxicological Benchmarks for Wildlife: 1996 Revision* (Sample et al., 1996) was the second choice as a source of TRVs. Other sources of TRVs were used when necessary.

Table 7-1 presents the TRVs that were used in this ERA. The values in Table 7-1 were derived from Table I-1 of Appendix I, which presents the toxicological basis for each TRV, such as species tested and endpoints (e.g., growth, reproduction). The NOAELs and LOAELs in Table I-1 of Appendix I were divided by 10 if the values were derived from a subchronic study, to account for uncertainty between subchronic and chronic effects. If only a NOAEL was available, the value was multiplied by 10 to estimate the LOAEL. If only a LOAEL was available, the value was divided by 10 to estimate the NOAEL.

All bioaccumulative chemicals detected in surface soil, sediment, or surface water were assessed in the food chain exposure model. Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs* (EPA, 2000) was the primary source used to identify bioaccumulative chemicals.

7.3 SCREENING LEVEL EXPOSURE ESTIMATE

Exposure concentrations must be established so that a chemical concentration or chemical dose can be determined for comparison to screening values or TRVs. Exposure concentrations that were used in the ERA are described below.

7.3.1 Soil Invertebrates and Vegetation

Exposure concentrations for soil invertebrates and terrestrial vegetation were maximum chemical concentrations in 68 surface soil samples. Prior to 2009, the surface soil dataset consisted of 56 samples collected in 1991, 1997, and 2008. Fifty-four of these 56 samples were collected from a depth of 0 to 6 inches below the ground surface, and two other samples were collected from a depth of 1 to 2 feet below the ground surface. EPA Region 3 BTAG expressed concern that the 56 samples might not adequately represent the biologically-active soil zone, and requested that additional soil samples be collected from the upper two feet of soil, or alternately, the depth corresponding to the O and A soil horizons. In soil science terminology, the O horizon is the layer dominated by the presence of large amounts of organic material in varying stages of decomposition, and is also known as humus. The A horizon is the top layer of mineral soil, and is also known as topsoil. The Navy collected 12 additional soil samples in August 2009. The Tetra Tech geologist in charge of the August 2009 soil sampling noted that the O and A soil

horizons could not be clearly differentiated, presumably due to past landfill operations and other activities throughout the site. Because the O and A soil horizons could not be clearly differentiated, each of the 12 additional samples was collected from the upper two feet of soil, i.e., from a depth of 0 to two feet below the ground surface.

Table 7-2 presents a summary of soil samples collected in 2009 compared to surface soil samples collected in 1991, 1997, and 2008. The 2009 soil data are generally similar to the pre-2009 surface soil data, so the 12 samples collected in 2009 were consequently combined with the 56 previously collected surface soil samples. For brevity, the resulting 68 sample dataset is referred to as the "surface soil" dataset in this ERA. Figures 7-3 through 7-5 provide sample collection dates and depths, and summarize the analytical data for these samples. Three figures (Figures 7-3 through 7-5) are presented because of the large number of surface soil samples to summarize. Note that in Figures 7-3 through 7-5 some *surface soil* samples contain an "SB" code in the sample identification number rather than the typical "SS" code. These samples were collected from 0 to 6 inches below the ground surface, so are considered surface soil samples, and should not be confused with SB-designated samples collected from deeper depths.

The *subsurface* soil dataset at Site 3 consists of six samples collected from 2 to 3 feet below the ground surface, 14 samples collected from 3 to 4 feet below ground surface, one sample collected from 2 to 4 feet below ground surface, as well as other samples collected from deeper than 4 feet. Figures 7-3 through 7-5 provide sample collection dates and depths, and summarize the analytical data for the 21 subsurface soil samples collected from 2 to 4 feet below ground surface (as well as the previously described surface soil samples). Subsurface soil samples collected deeper than 4 feet below ground surface were not evaluated in the ERA. With this in mind, the term "subsurface soil" as used in the ERA refers to samples collected from 2 to 4 feet below ground surface and excludes deeper samples.

7.3.2 Aquatic and Benthic Receptors

Exposure concentrations for the general receptor groups of aquatic and benthic organisms were maximum chemical concentrations in surface water and sediment. Six surface water and sediment samples were collected in December 2008 in the stream downgradient from the retention basin. One surface water/sediment sample pair (03SW/SD12) was collected just before the stream exits the Base boundary, and one surface water/sediment pair (03SW/SD17) was collected at the discharge of the pond. The other four sample pairs were collected from the stream between these two locations (Figures 7-6 and 7-7).

The surface water dataset also includes data from two sample locations (03SW10 and 03SW11) in the same stream but west (downstream) of the Base perimeter road. Surface water was collected from these two locations as part of a concurrent groundwater investigation. Location 03SW10 was approximately 800 feet downstream of the Base perimeter road and 03SW11 was located approximately 300 feet downstream of 02SW10 (Figure 7-6). Surface water was collected from 03SW10 and 03SW11 on 19 March 2008, 13 October 2008, and 1 April 2009. The two samples from the first sampling event were analyzed for metals and VOCs. Surface water samples from the latter two sampling events were analyzed only for VOCs. Sediment was not collected at sample locations 03SW10 and 03SW11.

7.3.3 Wildlife Receptors

The exposure of birds and mammals to bioaccumulative chemicals in surface soil, surface water, sediment, and food items was estimated using a food chain model. Risk via the food chain was evaluated using two scenarios. The initial "conservative" scenario used maximum detected chemical concentrations in surface soil, sediment, and surface water, and conservative assumptions for body weight, food consumption, and soil or sediment ingestion. The second scenario typically used average chemical concentrations, and less conservative values for body weight, food consumption, and soil ingestion. If a chemical's average concentration was greater than its maximum detected concentration, the second scenario used the maximum detected concentration. This situation occurred when the detection limits in "non-detected" samples exceeded the maximum detected concentrations, especially when the analyte was infrequently detected. In such cases, the average value calculated by assuming a value of one-half the detection limit for non-detected samples resulted in an average concentration that was greater than the maximum detected concentration.

For brevity, the first food chain model scenario is referred to as the conservative scenario, and the second scenario is referred to as the average scenario. For each scenario, ingested doses for birds and mammals were calculated using the following equation:

$$PD = [[(C_{food} \times I_f) + (C_s \times I_s) + (C_w \times I_w)] \times AUF]/BW \qquad \text{(Equation 1)}$$

where:

PD	=	predicted dose from the ingestion of food and water and the incidental ingestion of soil or sediment (mg/kg/day)
C_{food}	=	chemical concentration in food items (mg/kg)
I_f	=	food ingestion rate (kg/day)
C_s	=	chemical concentration in soil or sediment (mg/kg)
I_s	=	soil ingestion rate or sediment ingestion rate (kg/day)
C_w	=	chemical concentration in surface water (mg/L)
I_w	=	water ingestion rate (L/day)

AUF = area use factor (portion of food intake from Site 3)

BW = body weight of receptor (kg)

For the screening level ERA, all food and water were conservatively assumed to be obtained from the site. Thus, the area use factor (AUF) was assigned a value of 1.0 in Equation 1.

7.3.3.1 Chemical Concentrations in Food Items of Insectivorous and Herbivorous Wildlife

Chemical concentrations in food items (the "C_{food}" term in Equation 1) of insectivorous receptors represented by the shrew and robin were calculated using surface soil data and soil-to-earthworm biota accumulation factors (BAFs) shown in Table 7-3. A default BAF value of 1.0 was used if a chemical-specific soil-to-earthworm BAF was not available. Chemical concentrations in food items of herbivorous receptors represented by the quail, vole, and woodchuck were calculated using surface soil data and soil-to-plant BAFs (Table 7-3). A default BAF value of 1.0 was used if a chemical-specific soil-to-plant BAF was not available, except as noted in Table 7-3.

7.3.3.2 Chemical Concentrations in Food Items of Piscivorous Wildlife

The diet of piscivorous receptors represented by the mink and green heron was assumed to consist of fish and aquatic/sediment invertebrates. Chemical concentrations in food items (the "C_{food}" term in Equation 1) were estimated using biota sediment accumulation factors (BSAFs). The BSAFs are shown in Table 7-3 and were obtained from the following sources:

- Inorganic chemicals: *Biota Sediment Accumulation Factors for Invertebrates: Review and Recommendations for the Oak Ridge Reservation* (ORNL, 1998).

- Organics compounds: *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey* (EPA, 2004).

A default BSAF value of 1.0 was used if a chemical-specific BSAF was not available from either of the two above sources.

Concentrations of organic compounds in food items of the mink and green heron were estimated using the following equation (EPA, 2004):

$$C_f = BSAF(C_s/f_{oc})f_l \qquad \text{(Equation 2)}$$

where:

C_f	=	chemical concentration in food (mg/kg)
C_s	=	chemical concentration in sediment (mg/kg)
BSAF	=	biota-sediment accumulation factor
f_{oc}	=	TOC content of sediment expressed as a decimal fraction
f_l	=	organism lipid content expressed as a decimal fraction

TOC was not measured in sediment samples collected from the stream during the current investigation, so a default value of 1 percent (0.01) was used to represent TOC in the calculations of estimated organic compounds in food items of the mink and green heron.

The average whole body lipid contents presented in Table C-3b of EPA (1997b) for redbreast sunfish (*Lepomis auritis*), green sunfish (*L. cyanellus*), pumpkinseed (*L. gibbosus*), longear sunfish (*L. megalotis*), and bluegill sunfish (*L. macrochirus*) was 3.6 percent fresh weight. This value was divided by 0.25 to convert the average lipid content from a wet-weight value to a dry-weight value (14.4 percent), based on a 75 percent moisture content in fish (Sample et al., 1997). Thus, 0.144 was used to represent f_l in Equation 2 for organic compounds.

Because sediment-to-fish BSAFs are not available for metals, sediment-to-aquatic invertebrate BSAFs from ORNL (1998) were used to estimate tissue concentrations of metals in food items of the mink and green heron. The BSAFs for metals are not normalized to lipids or TOC, so concentrations of metals in food items were estimated by multiplying each chemical's sediment concentration by its associated BSAF.

7.3.3.3 Exposure Parameters

Exposure parameters in Equation 1 (e.g., body weight, food and water ingestion rates, incidental soil or sediment ingestion rates) for the representative wildlife receptors are summarized in Table 7-4 and were obtained preferentially from the *Wildlife Exposure Factors Handbook* (EPA, 1993b). The derivation of the exposure parameters is presented below and summarized in Table 7-5.

<u>American Robin</u>

Adult body weights for the American robin ranged from 0.0773 to 0.0862 kg in studies summarized by EPA (1993b). The average of these values is 0.0804 kg. A single water ingestion rate was available for the robin; 0.14 g/g/day (EPA, 1993b).

Food ingestion rates for the robin in the *Wildlife Exposure Factors Handbook* (EPA, 1993b) were 1.52 g/g body weight/day and 0.89 g/g body weight/day. However, these rates are based on diets comprised of berries (EPA, 1993b). Since the robin was used in the Site 3 ERA to represent birds that eat soil invertebrates, food ingestion rates for the robin at Site 3 were calculated using metabolic scaling for insectivorous birds from Nagy et al. (1999), resulting in a food ingestion rate of 0.01247 kg/day in the conservative scenario and 0.01188 kg/day in the average scenario (Tables 7-4 and 7-5).

Incidental soil ingestion rates shown in Table 7-4 and used in Equation 1 for the robin were derived by multiplying the conservative scenario food ingestion rate by 16.4 percent and multiplying the average scenario food ingestion rate by 6.4 percent. The 16.4 percent and 6.4 percent values are the 90th percentile and 50th percentile soil intake values, respectively, for the woodcock in Table 3 of Attachment 4-1 (*Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs*) of EPA's (2005) *Guidance for Developing Ecological Soil Screening Levels*. Incidental soil ingestion rates were not available for the robin, so the woodcock values were used as a surrogate. Woodcock food items are primarily earthworms and other soil invertebrates, so it was assumed that soil intake values would be similar between these two species.

Short-tailed Shrew

The adult body weight for the short-tailed shrew in various habitats ranged from 0.015 to 0.01921 kg (EPA, 1993b); the average of these values is 0.0161 kg. Two food ingestion rates for short tailed shrews were available: 0.49 and 0.62 g/g body weight/day (wet-weight) (EPA, 1993b); the average of these values is 0.555 g/g body weight/day. The water ingestion rate is 0.223 g/g/day. The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown in Table 7-5. The food ingestion rates were multiplied by 0.16 to convert the ingestion rate from a wet-weight value to a dry-weight value, based on an 84 percent moisture content in earthworms (EPA, 1993b).

Incidental soil ingestion rates shown in Table 7-4 and used in Equation 1 were derived by multiplying the conservative scenario food ingestion rate by 3.0 percent and multiplying the average scenario food ingestion rate by 0.9 percent. The 3.0 percent and 0.9 percent values are the 90th percentile and 50th percentile values, respectively, from Table 3 of Attachment 4-1 of EPA's (2005) *Guidance for Developing Ecological Soil Screening Levels*.

Bobwhite Quail

The adult body weight for the bobwhite quail ranged from 0.154 to 0.1939 kg with an average of 0.1751 kg in studies summarized by EPA (1993b). Food ingestion rates ranged from 0.067 to 0.093 g/g

body weight/day (dry-weight), with an average of 0.078 g/g/day. Water ingestion rates ranged from 0.10 to 0.13 g/g/day, for an average water ingestion rate of 0.11 g/g/day (EPA, 1993b). The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown in Table 7-5.

The incidental soil ingestion rates in Table 7-4 were calculated by multiplying the food ingestion rates by estimated incidental soil ingestion rates, which is 13.9 percent of the diet in the conservative scenario, and 6.1 percent in average scenario. Incidental soil ingestion rates were not available for the quail, so these estimated soil ingestion rates are based on the mourning dove (Table 3 of Attachment 4-1 of EPA's (2005) *Guidance for Developing Ecological Soil Screening Levels*), which like the bobwhite quail, consumes a diet primarily of seeds.

Meadow Vole

The adult body weight for the vole ranged from 0.017 to 0.0524 kg with an average of 0.0358 kg (EPA, 1993b. Two food ingestion rates were available; 0.30 and 0.35 g/g/day (wet-weight), with an average of 0.325 g/g/day. Water ingestion rates were 0.14 and 0.21 g/g/day, with an average of 0.175 g/g/day. The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown in Table 7-5.

The moisture content in food items of the meadow vole is quite variable, since food items consist of green succulent vegetation, sedges, seeds, roots, bark, and fungi. The moisture content in food items of the vole was conservatively assumed to be 70 percent, so food ingestion rates were multiplied by 0.30 to convert the ingestion rate from a wet-weight value to a dry-weight value.

Incidental soil ingestion rates shown in Table 7-4 and used in Equation 1 were derived by multiplying the conservative scenario food ingestion rate by 3.2 percent and multiplying the average scenario food ingestion rate by 1.2 percent. The 3.2 percent and 1.2 percent values are the 90th percentile and 50th percentile values, respectively, from Table 3 of Attachment 4-1 of EPA's (2005) *Guidance for Developing Ecological Soil Screening Levels*.

Woodchuck

Data for the woodchuck are not included in EPA's (1993b) *Wildlife Exposure Factors Handbook*. The mean body weight of woodchucks fed a "control" diet was 4.6 kg after 12 weeks of captivity in a feeding study of male woodchucks trapped in south central New York (Boyd et al, 1985). The average body weight of adult male woodchucks trapped or shot at Aberdeen Proving Ground, Maryland, was 4.63 kg (Johnson et al, 2004), so it is reasonable to assume that the woodchucks in the Boyd et al (1985) study had reached adult size. Therefore, a value of 4.6 kg was used as the BW term in Equation 1 for the

conservative scenario and the average scenario (Table 7-4). The maximum dry weight food ingestion rate for woodchucks on the control diet was 1050 g/week (Boyd et al, 1985). This equates to 0.15 kg/day, which was used as food ingestion in the conservative scenario (Table 7-4). Food ingestion declined to 900 g/week during the last three weeks of the Boyd et al (1985) study; the authors pointed out that the decline corresponded to the time (late September) when woodchucks spontaneously reduce food intake prior to hibernation. The 900 g/week value was converted to 0.129 kg/day and used as the dry weight food ingestion value in the average scenario.

Beyer et al. (1994) estimated that the woodchuck incidental soil ingestion rate is less than 2 percent. Based on this, the incidental soil ingestion values in Table 7-4 were derived by multiplying the conservative and average food ingestion rates by 2 percent. Because woodchucks dig and inhabit burrows, incidental soil ingestion from digging and grooming is probably related more to subsurface soil than to surface soil. Therefore, the incidental soil ingestion component of the woodchuck food chain model used the subsurface soil dataset described in Section 7.3.1. Food ingestion for the woodchuck, on the other hand, was modeled using surface soil data, since the woodchuck's diet is primarily herbaceous plants, and these plants are rooted mostly in shallow soil instead of subsurface soil.

Water ingestion data for the woodchuck was not located. Burrowing mammals such as woodchucks occupy microenvironments generally characterized by high humidity. Under such conditions, water loss from breathing and through the skin is minimal, and burrowing mammals that eat moist food can maintain water balance without drinking water (Vaughan, 1986). Because woodchucks typically emerge from their burrows in the early morning and late afternoon to eat and typically remain in the burrow during the middle of the day, and because they feed almost exclusively on succulent plants, they presumably get adequate water intake from dew and plant moisture. With these factors in mind, water ingestion was not included in the food chain model for the woodchuck.

Green Heron

Data for the green heron were not included in EPA's *Wildlife Exposure Factors Handbook* (EPA, 1993b). The mean adult body weight of 34 green herons in Florida was 212 g (Dunning, 1993). Minimum and maximum body weights were not provided, but the standard deviation was 5.92 g (Dunning, 1993). A value of 0.200 kg was used as the BW term in Equation 1 for the conservative scenario (Table 7-4). This value is the mean minus two standard deviations from Dunning's data. The BW term in Equation 1 for the average scenario was the mean (0.212 kg) from Dunning's data.

Food ingestion rates for the green heron were not available. Nagy (2001) provided allometric equations for several orders of birds but not for Ciconiiformes (herons). Dry weight food ingestion in the

conservative scenario (0.031 kg/day) was derived using the Nagy (2001) equation for “marine birds” based on a 0.224 kg bird. The 0.224 kg body weight value is the mean plus 2 standard deviations from Dunning’s (1993) green heron data (see paragraph immediately above); this value would approximate the 98th percentile, and thus, represents a conservative approach. Dry weight food ingestion in the average scenario (0.030 kg/day) was derived using the Nagy (2001) equation for marine birds based on a 0.212 kg bird, which is the mean body weight value from Dunning’s (1993) green heron data.

Water ingestion rates for the green heron were not available. Water ingestion in the conservative scenario (0.022 L//day was derived using equation 3-15 from the *Wildlife Exposure Factors Handbook* (EPA, 1993b) for a 0.224 kg bird. Water ingestion in the average scenario (0.021 L/day) was derived using equation 3-15 from EPA (1993b) for a 0.212 kg bird.

Sediment ingestion data for piscivorous birds were not available. A sediment ingestion rate of 5 percent for piscivorous birds was used in Equation 1. Unlike shorebirds, herons do not probe the sediment. Green herons and other wading birds typically capture prey with a darting stroke, grasping or spearing with the bill (Davis and Kushlan, 1994). Therefore, an assumed value of 5 percent for incidental sediment ingestion is probably a very conservative estimate for the green heron as well as for other piscivorous wading birds. The two sediment ingestion rates in Table 7-4 (0.0016 kg/day and 0.0015 kg/day) were calculated by multiplying the two food ingestion rates (0.031 kg/day and 0.030 kg/day) by 0.05, assuming that incidentally ingested sediment is 5 percent of the diet.

Mink

Adult mink body weights ranged from 0.55 to 1.734 kg with an average of 1.103 kg (EPA, 1993b). Food ingestion rates ranged from 0.12 to 0.22 g/g/day (wet-weight), and water ingestion rates ranged from 0.028 to 0.11 g/g/day (EPA, 1993b). The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown in Table 7-5. The food ingestion rates were multiplied by 0.25 to convert the ingestion rate from a wet-weight value to a dry-weight value, based on a 75-percent moisture content in fish (EPA, 1993b). The two incidental sediment ingestion rates in Table 7-4 (0.0057 kg/day and 0.0042 kg/day) were calculated by multiplying the two food ingestion rates by incidentally ingested sediment (9.4 percent of diet). The 9.4 percent value is based on the incidental soil/sediment ingestion rate of the raccoon (Beyer, et al., 1994), because sediment ingestion data were not available for mink.

7.4 SCREENING LEVEL RISK CALCULATION

The screening level risk calculation compares exposure concentrations to ecological screening values and estimated doses to TRVs. The result is a hazard quotient (HQ), which is derived by dividing the

exposure concentration by the ecological screening value or dividing the dose by the TRV. An HQ value greater than 1.0 indicates that ecological receptors are potentially at risk, and further evaluation or additional data may be necessary to determine with greater certainty whether ecological receptors are actually at risk, since most toxicity benchmarks are developed using conservative exposure assumptions and studies.

Chemicals in surface soil, sediment, or surface water were retained as ecological COPCs if they met any of the following criteria:

- Maximum detected concentrations exceeded screening values (i.e., HQ greater than 1.0).
- Ecological screening values were not available.
- The chemical was known to be bioaccumulative. These chemicals were retained as COPCs and included in the food chain model even if their screening HQ values were less than 1.0.

Chemicals that were retained as COPCs were further evaluated in Step 3A to help risk managers determine if further investigation was warranted. Non-bioaccumulative chemicals with screening HQs less than 1.0 were not retained as COPCs; such chemicals are unlikely to cause adverse effects to ecological receptors and were not evaluated further in the ERA.

7.4.1 Soil, Sediment, and Surface Water Screening

Seventeen inorganics, 20 pesticides, two PCBs, 28 SVOCs, six VOCs, and TCDD TEQ were retained as COPCs in surface soil (Table 7-6). Note in Table 7-6 that separate ESVs were obtained for soil invertebrates, terrestrial plants, and wildlife (birds and mammals). Table 7-7 presents the surface soil COPCs for each of these three assessment endpoints. The subsurface soil data are summarized in Table 7-8.

COPCs in sediment consisted of 14 inorganics, 15 pesticides, 20 SVOCs, and 3 VOCs (Table 7-9).

Surface water COPCs consisted of eight inorganics, one pesticide, and 14 SVOCs (Table 7-10).

7.4.2 Wildlife Screening

EPA (2000) was used to identify bioaccumulative chemicals for inclusion in the food chain models for piscivorous receptors. Chemicals in surface soil were included in the wildlife food chain models for

herbivorous and insectivorous receptors if the chemical was identified by EPA (2000) as bioaccumulative, or if the maximum detected concentration exceeded the "wildlife" ecological screening value in Table 7-7. Bioaccumulative chemicals detected in surface soil, sediment, and/or surface water consisted of 20 PAH compounds, 19 pesticides, TCDD TEQ, and 14 inorganics (Tables 7-7, 7-9, and 7-10).

Table 7-11 summarizes the results of the conservative food-chain modeling scenario for herbivorous birds and mammals represented by the bobwhite quail, meadow vole, and woodchuck, and insectivorous birds and mammals represented by the robin and short-tailed shrew. Appendix I contains the calculation worksheets. Based on maximum detected concentrations, conservative body weights, and conservative ingestion rates, food chain NOAEL HQs exceeded 1.0 for 14 PAH compounds, four pesticides, two Aroclors, TCDD TEQ, and 11 inorganics (Table 7-11).

Table 7-12 summarizes the results of the conservative food-chain modeling scenario for piscivorous birds and mammals represented by the green heron and mink. Appendix I contains the calculation worksheets. Based on maximum detected concentrations, conservative body weights, and conservative ingestion rates, food chain NOAEL HQs exceeded 1.0 for seven PAH compounds and five pesticides (Table 7-12).

7.5 REFINEMENT OF PRELIMINARY CHEMICALS OF POTENTIAL CONCERN

The ERA process includes a series of scientific/management decision points (SMDPs) (DON, 1999; EPA, 1997a). The first SMDP occurs at the end of Step 2 (Screening-Level Exposure Estimate and Risk Calculation), and requires the risk managers to evaluate and approve or redirect the work up to that point and determine whether the risk assessment will continue into Step 3 (Baseline Risk Assessment Problem Formulation). However, EPA recognizes that most ERAs will proceed into Step 3, and the risk assessment process for Site 3 will continue through the initial portion of Step 3. Chemicals that were identified as COPCs are further evaluated to narrow the list of COPCs to those most likely to contribute to ecological risk. This approach is intended to allow risk managers to make informed decisions regarding the need for more sampling. Step 3 begins with a more balanced evaluation of the conservativeness inherent in the first two steps of the risk assessment process (EPA, 1997a). The initial phase of Step 3 is known as Step 3A in Navy ecological risk assessments (DON, 1999), and consists of a refinement of the conservative exposure assumptions in order to more realistically estimate potential risks to ecological receptors.

The remainder of this section discusses soil COPCs as related to terrestrial invertebrates (Section 7.5.1), terrestrial plants (Section 7.5.2), benthic invertebrates (7.5.3), aquatic organisms (7.5.4), and wildlife via the food chain (Section 7.5.5).

Section 2 discusses the analyses of background samples collected from on-Base and off-Base locations. Background data were not used to determine or eliminate chemicals as ecological COPCs. Instead, background data were used in Sections 7.5.1 through 7.5.5 only to evaluate the possibility of whether contamination was site-related, and as such, background comparisons are included to assist risk managers in the risk management process. Similarly, the discussion of some sediment COPCs includes statements about concentrations in surface soil; such statements are included only to aid risk managers in making informed decisions.

Canadian Soil Quality Guidelines (SQGs) from the Canadian Council of Ministers of the Environment (CCME, 2007 and supporting documents) were used to evaluate some soil COPCs in Sections 7.5.1 and 7.5.2. The CCME documents provide SQGs for ecological risk based on soil contact or more broadly, ecological receptors. When the SQG was specific to a soil type (fine or coarse), the lowest value was presented in Sections 7.5.1 and 7.5.2.

Risk management is beyond the scope of this ERA.

7.5.1 Potential Risk to Terrestrial Invertebrates

7.5.1.1 Inorganics

Ten inorganics were COPCs in surface soil and pose potential risks to invertebrates (Table 7-7). Maximum concentrations of copper, iron, manganese, mercury, and zinc exceeded their respective invertebrate ESVs, while invertebrate ESVs were not available for aluminum, cyanide, silver, thallium, and vanadium (Tables 7-6 and 7-7).

Aluminum is considered to be a COPC in soil only when the soil pH is less than 5.5 (EPA, 2005). Soil pH was not measured at Site 3, but soil pH data are available from Site 5, which is approximately 2,000 feet southeast of Site 3. Soil pH was measured in 19 soil samples obtained from 0 to 24 inches below the ground surface at Site 5; the pH in these samples ranged from 5.5 to 7.6, with an average pH of 6.8 (Tetra Tech, 2004). The geology and soils of Sites 3 and 5 are similar, so the soil pH at Site 3 is probably similar to that at Site 5. If so, aluminum in Site 3 soil does not pose significant risks to soil invertebrates.

Copper concentrations exceeded the 80 mg/kg invertebrate screening value in only six of 68 surface soil samples, with a maximum concentration of 182 mg/kg (Figures 7-3 through 7-5). Copper concentrations in most subsurface samples were low, but concentrations exceeded the 80 mg/kg invertebrate ESV in seven of 21 subsurface samples, and were highest in test pits TP 17 and TP 19, with a maximum

concentration of 6340 mg/kg in sample 03TP19. The elevated average copper concentration of 713 mg/kg in subsurface samples (Table 7-8) is the result of the extremely high concentrations in TP 17 and TP 19.

Cyanide was detected in six of 68 surface soil samples and concentrations ranged from 0.11 mg/kg to 2.3 mg/kg (Table 7-6). Subsurface data (Table 7-8) were similar to surface soil data. Soil toxicity data are sparse for cyanide, but all concentrations were less than the Dutch target value of 5 mg/kg for total complex cyanide (Buchman, 2008), and surface soil concentrations in only two of 68 samples exceeded the 0.9 mg/kg Canadian SQG for free cyanide (CCME, 2007).

Iron concentrations exceeded the 200 mg/kg ESV in all surface and subsurface soil samples. A toxicity threshold for earthworms or soil invertebrates was not located, and the ESV is an ORNL soil micro-organism threshold value (Efroymson et al, 1997a). Iron is an essential element that is required by all forms of life, and EPA (2005) concludes that identifying a specific benchmark for iron in soil is difficult because iron toxicity depends on site-specific soil conditions such as pH, redox potential, and soil-water conditions.

Manganese was detected in all surface soil samples; concentrations ranged from 318 to 1780 mg/kg and averaged 633 mg/kg, compared to an invertebrate ESV of 450 mg/kg. The average background concentration was 642 mg/kg, and concentrations in only two Site 3 samples exceeded the maximum background value of 1,190 mg/kg (Table 7-13). The widespread occurrence of manganese throughout the site at concentrations comparable to background values indicates that potential risk posed by manganese to invertebrates at Site 3 is similar to risk posed by background conditions.

Mercury was detected in 29 of 68 surface soil samples and concentrations ranged from 0.021 to 0.77 mg/kg, compared to an invertebrate ESV of 0.1 mg/kg. Mercury concentrations in 17 surface soil samples exceeded the invertebrate ESV, with a maximum screening HQ of 7.7 (Table 7-13). Mercury concentrations were higher in subsurface samples, with detected concentrations of 0.024 to 6.7 mg/kg (Table 7-8). The 0.1 mg/kg invertebrate ESV is an ORNL value that was derived by Efroymson et al (1997a) from a study in which survival and reproduction of earthworms (*Octochaetus pattoni*) was reduced when the earthworms were exposed to $HgCl_2$ at 0.5 mg/kg, the lowest concentration tested.. Efroymson et al (1997a) applied a safety factor of 5 to the 5 mg/kg LOAEL in the study to derive the 0.1 mg/kg ESV. Efroymson et al (1997a) stated that the confidence in this ESV is low because of the limited amount of data. In summary, the degree of potential risk posed by mercury in soil is uncertain.

An ESV specific for invertebrates was not available for thallium, but the Canadian SQG for thallium is 1.4 mg/kg (CCME, 2007). Thallium was detected in 24 of 61 surface soil samples, and surface soil concentrations exceeded the Canadian SQG in two samples, both at 1.8 mg/kg.

An ESV specific for invertebrates was not available for vanadium, but the Canadian SQG is 130 mg/kg (CCME, 2007). The maximum surface soil concentration of vanadium (45.7 mg/kg) was well below the Canadian SQG.

Zinc concentrations exceeded the 120 mg/kg invertebrate ESV in eight of 68 surface soil samples (Figures 7-3 through 7-5). Based on the 120 mg/kg ESV, the maximum surface soil concentration (466 mg/kg) would result in an HQ of 3.9. Zinc concentrations in surface soil at Site 3 were similar to background values (Table 7-13), but subsurface concentrations of zinc were higher than in surface soil, and exceeded the ESV in six samples, with a particularly elevated maximum concentration of 13700 mg/kg in test pit TP 27. Most soil invertebrates do not typically inhabit soils deeper than about two feet below ground surface, so the exposure by invertebrates to the elevated zinc concentrations in subsurface soil is probably minimal under current conditions at the site.

An invertebrate ESV for silver was not located, so potential risks to soil invertebrates cannot be evaluated for silver.

7.5.1.2 Dioxins

Two surface soil samples (03SS04 and 03SS08) were analyzed for dioxins. An invertebrate ESV was not available, so potential risk to soil invertebrates cannot be evaluated. As discussed in Section 7.1.3, many invertebrate species are insensitive to dioxins because invertebrate Ah receptor homologs lack the ability to bind with dioxins and cause toxicity. With this in mind, dioxins at Site 3 probably do not pose significant risks to soil invertebrates.

7.5.1.3 Pesticides and PCBs

Invertebrate ESVs were not available for the organochlorine pesticides and PCBs detected in Site 3 soil, precluding a complete evaluation of their potential toxicity to soil invertebrates. Organochlorine pesticides and PCBs are no longer used in the United States, but are extremely persistent in soil. Several of the pesticides were infrequently detected in surface soil. Endrin, for example, was detected in only two of 67 surface soil samples at Site 3 (Table 7-13). Similarly, aldrin, BHC, heptachlor, and endosulfan were also detected infrequently in surface soil (Table 7-13). Subsurface concentrations of these pesticides (Table

7-8) tended to be similar to surface soil concentrations. Dieldrin was detected in most surface and subsurface samples, but its concentrations at Site 3 were similar to background values (Table 7-13). Aroclor-1254 and Aroclor-1260 were infrequently detected in surface soil (three of 68 samples), and were the only PCBs detected in surface soil at Site 3 (Table 7-13). The same two Aroclors were detected in subsurface soil, and two other PCBs (Aroclor-1242 and Aroclor 1248) were also detected in subsurface soil. Aroclor concentrations in surface and subsurface samples were relatively low except that Aroclor-1254, which was detected in only one of 20 subsurface samples, was detected at 4000 µg/kg in test pit TP 24 (Table 7-8).

7.5.1.4 SVOCs

Phthalates

Bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, and di-n-butyl phthalate were invertebrate COPCs because invertebrate ESVs were not available (Table 7-6). Butyl benzyl phthalate was detected in only one of 68 surface soil samples, di-n-butyl phthalate was detected in only two of 59 surface soil samples (Table 7-6), and neither of these phthalates were detected in subsurface samples (Table 7-8). Bis(2-ethylhexyl)phthalate was detected in approximately one-third of surface and subsurface samples. Phthalates are common environmental contaminants due to their use in plastics. Phthalates can also be an artifact of the sampling and/or analytical methods. Although invertebrate ESVs for these three phthalates were not available, the ORNL earthworm toxicity benchmark for dimethyl phthalate is 200,000 µg/kg (Efroymson et al., 1997a). The toxicity of phthalates is generally similar in magnitude, so this value provides a rough guide for evaluating the toxicity to invertebrates of the other phthalates detected at Site 3. With this in mind, the detected phthalate concentrations at Site 3 indicate that potential risk to earthworms and other soil invertebrates is not likely at the site.

PAHs

EPA has established invertebrate Eco-SSLs of 29000 µg/kg for low molecular weight PAHs and 1100 µg/kg for high molecular weight PAHs. Some surface and subsurface concentrations exceeded these values, and PAH concentrations were especially elevated in surface sample 03SB06; this sample was responsible for the maximum concentrations of most PAHs in surface soil (Table 7-13). PAH concentrations at Site 3 were similar to background values except in samples with especially high concentrations, such as surface samples 03SB06 and 03SB03, and subsurface samples 03TP04 and 03TP24 (Figures 7-3 through 7-5). The PAH concentrations in these and a few other samples indicate potential site-related impacts to soil invertebrates.

Other SVOCs

Benzaldehyde, carbazole, dibenzofuran, and 1,2-diclorobenzene were invertebrate COPCs because no ESVs were available (Table 7-6). 1,2-diclorobenzene was detected in seven of 68 surface soil samples and was not detected in subsurface samples, and its maximum detected value was 330 µg/kg. Although no invertebrate ESVs were available for this compound, the 330 µg/kg maximum value was well below the 20000 µg/kg ESVs for two similar compounds, 1,4-diclorobenzene and 1,2,4-triclorobenzene (Table 7-6). Therefore, potential impacts to invertebrates from 1,2-diclorobenzene is probably minor. Potential impacts to invertebrates from benzaldehyde, carbazole and dibenzofuran cannot be evaluated.

7.5.1.5 VOCs

Six VOCs were detected in surface soil (Table 7-6). The three VOCs most frequently detected in surface soil (acetone, 2-butanone, and toluene) were also detected in subsurface soil (Table 7-8). Concentrations of 2-butanone and toluene in surface soil were similar to those in subsurface soil, while acetone concentrations tended to be greater in surface soil than in subsurface soil. The lack of invertebrate ESVs for all six compounds detected in surface soil precludes an evaluation of their impacts to soil invertebrates. Canadian SQGs have been established for two of the six VOCs: 25000 µg/kg for benzene and 75000 µg/kg for toluene (CCME, 2007). The maximum concentrations of these two VOCs in surface and subsurface soil at Site 3 were well below these values.

7.5.1.6 Summary and Conclusions: Terrestrial Invertebrates

Several inorganics and organic compounds were detected in soil at concentrations that exceed their invertebrate ESVs.

PAH compounds were elevated in some samples and pose risks to soil invertebrates, especially in surface samples 03SB06 and 03SB03, and subsurface samples 03TP04 and 03TP24.

Copper concentrations exceeded the 80 mg/kg invertebrate screening value in only six of 68 surface soil samples, and the maximum surface concentration of 182 mg/kg was not greatly elevated relative to the 80 mg/kg invertebrate screening value. However, copper concentrations were elevated in a few subsurface samples, particularly in test pits TP 17 and TP 19, with a maximum concentration of 6340 mg/kg in sample 03TP19. Most soil invertebrates do not typically inhabit soils deeper than about two feet below ground surface, so the exposure by invertebrates to the elevated copper concentrations is probably minimal under current conditions at the site.

Soil concentrations of other metals and SVOCs tended to be low and pose negligible potential risks to invertebrates, or do not appear to be related to former activities at the landfill, or could not be evaluated due to the absence or paucity of invertebrate ESVs.

Potential risk from VOCs and dioxins are uncertain, but are probably minor.

ESVs were not available for PCBs and pesticides in soil. Pesticides were infrequently detected and/or were detected at concentrations similar to background values. PCBs were infrequently detected and at relatively low concentrations, except Aroclor-1254, detected in only one of 20 subsurface samples, was 4000 µg/kg in test pit TP 24 (Table 7-8). Potential ecological risk associated with this sample appears to be limited to a small area.

7.5.2 Potential Risk to Terrestrial Plants

7.5.2.1 Inorganics

Eleven inorganics were COPCs in surface soil and pose potential risks to terrestrial plants (Table 7-7). Maximum concentrations of aluminum, antimony, copper, manganese, mercury, nickel, thallium, vanadium, and zinc exceeded their respective plant ESVs, while plant ESVs were not available for cyanide and iron (Table 7-6).

Aluminum concentrations in surface soil ranged from 8200 to 24600 mg/kg, which greatly exceeded the plant ESV of 50 mg/kg. The 50 mg/kg plant ESV is an ORNL value that was derived by Efroymson et al (1997b) from a single study in which clover establishment was reduced by the addition of 50 mg/kg aluminum. Efroymson et al (1997b) stated, however, that the confidence in this ESV is low because of the limited amount of data. Aluminum is considered to be a COPC in soil only when the soil pH is less than 5.5 (EPA, 2005). As mentioned in Section 7.5.1.1, soil pH was not measured at Site 3, but soil pH data are available from Site 5, which is approximately 2,000 feet southeast of Site 3. The pH in Site 5 samples ranged from 5.5 to 7.6, with an average pH of 6.8 (Tetra Tech, 2004). The geology and soils of Sites 3 and 5 are similar, so the soil pH at Site 3 is probably similar to that at Site 5. Therefore, aluminum in Site 3 soil probably does not pose significant risks to plants.

Concentrations of antimony exceeded the 5 mg/kg plant ESV in only one surface soil sample (03SB01, at 10.4 mg/kg. Subsurface soil antimony concentrations tended to be higher, and concentrations exceeded the 5 mg/kg ESV in five samples, with a maximum concentration of 281 mg/kg in 03TP27 (Figures 7-3 through 7-5).

Copper concentrations exceeded the 70 mg/kg plant screening value in six of 68 surface soil samples, with a maximum concentration of 182 mg/kg (Figures 7-3 through 7-5). Copper concentrations in most subsurface samples were low, but some concentrations exceeded the 70 mg/kg plant ESV, and concentrations were highest in test pits TP 17 and TP 19, with a maximum concentration of 6340 mg/kg in sample 03TP19.

Cyanide was detected in six of 68 surface soil samples and concentrations ranged from 0.11 mg/kg to 2.3 mg/kg (Table 7-6). Subsurface data were similar to surface data (Table 7-8). A plant ESV was not located for cyanide, but all concentrations were less than the Dutch target value of 5 mg/kg for total complex cyanide (Buchman, 2008). Surface soil concentrations in only two of 68 samples exceeded the 0.9 mg/kg Canadian Soil Quality Guideline (SQG) for free cyanide (CCME, 2007).

An iron toxicity threshold for plants was not located. Iron is an essential element that is required by all forms of life, and EPA (2005) concludes that identifying a specific benchmark for iron in soil is difficult because iron toxicity depends on site-specific soil conditions such as pH, redox potential, and soil-water conditions.

Manganese was detected in all surface soil samples; concentrations ranged from 318 to 1780 mg/kg and averaged 633 mg/kg. All concentrations exceeded the plant ESV of 220 mg/kg, indicating that manganese poses risk to plants throughout the site. The average background concentration was 642 mg/kg, and concentrations in only two Site 3 samples exceeded the maximum background value of 1,190 mg/kg (Table 7-13). The widespread occurrence of manganese throughout the site at concentrations comparable to background values indicates that potential risk posed by manganese to plants at Site 3 is similar to risk posed by background conditions.

Mercury was detected in 29 of 68 surface soil samples and detected concentrations ranged from 0.021 to 0.77 mg/kg, compared to a plant ESV of 0.3 mg/kg. Mercury concentrations were higher in subsurface samples, with detected concentrations of 0.024 to 6.7 mg/kg (Table 7-8). Mercury concentrations in four surface soil samples and three subsurface samples exceeded the ESV (Figures 7-3 through 7-5). The 0.3 mg/kg plant ESV is an ORNL value that was derived by Efroymson et al (1997b) but the authors stated, however, that the confidence in this ESV is low because it is based on a secondary reference of unspecified toxic effects. With this in mind, the degree of potential risk to plants posed by mercury in soil is uncertain.

Nickel concentrations in surface soil exceeded the 38 mg/kg plant ESV only in the duplicate of sample 03SB06; the nickel concentration in the original sample 03SB06 was 29.9 mg/kg (Appendix A), so the

average nickel concentration in that sample was 34.5 mg/kg. With this in mind, nickel in surface soil poses negligible risks to plants.

Thallium was detected in 24 of 61 surface soil samples and concentrations ranged from 0.26 to 1.8 mg/kg, compared to a plant ESV of 1 mg/kg (Table 7-6). The plant ESV was exceeded in only two samples (03SS20 and 03SS27), both at 1.8 mg/kg (Figures 7-3 through 7-5). Because of the slight and infrequent exceedance of the ESV, risks to plants appear to be minor.

Vanadium was detected in all surface and subsurface samples, and concentrations in all samples exceeded the 2 mg/kg plant ESV, with maximum HQs of 22.9 for surface soil (Table 7-6) and 376 for subsurface soil (Table 7-8). The ESV is an ORNL value derived by Efroymson et al (1997b) but the authors stated, however, that the confidence in the 2 mg/kg ESV is low because no primary reference data were located. Surface soil concentrations (30.4 mg/kg average, Table 7-13) and subsurface soil concentrations (54 mg/kg average, Table 7-8) were high relative to the 2 mg/kg ESV, suggesting potential impacts to plants. Because confidence in the ESV is low, however, the degree of potential risk to plants posed by vanadium in soil is uncertain. The maximum surface soil vanadium concentration (45.7 mg/kg) was less than the Canadian SQG of 130 mg/kg (CCME, 2007). Subsurface vanadium concentrations exceeded the Canadian SQG only in 03TP27 (752 mg/kg) and in the duplicate of that sample (366 mg/kg). Vanadium concentrations in Site 3 surface soil tended to be greater than in background samples, but not greatly so (Table 7-13).

Zinc concentrations exceeded the 160 mg/kg plant ESV in six of 68 surface samples. Based on the 160 mg/kg ESV, the maximum surface soil concentration (466 mg/kg) would result in an HQ of 2.9. Zinc surface soil concentrations at Site 3 were similar to background values (Table 7-13). Subsurface concentrations of zinc were higher than in surface soil, and exceeded the ESV in six samples, with a particularly elevated maximum concentration of 13700 mg/kg in test pit TP 27.

7.5.2.2 Dioxins

Two surface soil samples were analyzed for dioxins. A plant ESV was not available. As discussed in Section 7.1.3, data indicate that plants are relatively insensitive to dioxins (EPA, 1993a), and the uptake of dioxins by vegetation is considered to be negligible (Eisler, 2000). With this in mind, dioxins at Site 3 probably pose negligible risks to plants.

7.5.2.3 Pesticides and PCBs

Maximum surface soil concentrations of aldrin, alpha- and gamma-chlordane, beta-BHC, and gamma-BHC (lindane) were less than their respective plant ESVs, so these pesticides pose no risks to plants at Site 3 (Table 7-13). Few subsurface soil concentrations of these pesticides exceeded their ESVs.

Plant-related ESVs were not available for alpha-BHC, dieldrin, endolsulfan compounds, endrin compounds, heptachlor compounds, methoxychlor, and DDT compounds. These organochlorine pesticides were manufactured largely for the control of insects on vegetable crops, so they are not typically toxic to plants.

Detected concentrations of all Aroclors were less than their plant ESVs, signifying no risks to plants from PCBs.

7.5.2.4 SVOCs

Phthalates

Bis(2-ethylhexyl)phthalate and butyl benzyl phthalate were plant COPCs because no plant ESVs were available (Table 7-6). Butyl benzyl phthalate was detected in only one of 68 surface soil samples and was not detected in subsurface samples (Table 7-8). Bis(2-ethylhexyl)phthalate was detected in approximately one-third of surface and subsurface samples. Although plant ESVs for these two phthalates were not available, the ORNL plant toxicity benchmark for di-n-butyl phthalate is 200,000 µg/kg and the ORNL plant toxicity benchmark for diethyl phthalate is 100,000 µg/kg (Efroymson et al., 1997b). The toxicity of phthalates is generally similar in magnitude, so these values provide a rough guide for evaluating the toxicity to plants of the phthalates detected at Site 3. With this in mind, the detected phthalate concentrations at Site 3 indicate that potential risk to plants is not likely at the site.

PAHs

Acenaphthene concentration in surface soil exceeded the 20000 µg/kg plant ESV in only one sample (03SB06), at 33000 µg/kg. The acenaphthene concentration in the duplicate of 03SB06 was 13000 µg/kg (Appendix A), which is less than the ESV. All subsurface concentrations of acenaphthene were less than the plant ESV. The generally low concentrations (relative to the ESV) of acenaphthene indicate potential risks are limited to the vicinity of sample 03SB06.

Plant-related ESVs were not available for the other PAHs detected in soils at Site 3, precluding a complete evaluation of PAH-related phytotoxicity. Eisler (2000) reviewed available literature on PAHs and concluded that PAH-induced phytotoxic effects are rare. Therefore, PAHs in Site 3 soils probably do not pose significant risks to plants at the site.

Other SVOCs

Benzaldehyde, carbazole, dibenzofuran, 1,2-diclorobenzene, 1,4-diclorobenzene, and 1,2,4-triclorobenzene were plant COPCs because no ESVs were available (Table 7-6). Potential impacts to plants from these compounds cannot be evaluated.

7.5.2.5 VOCs

Six VOCs were detected in surface soil (Table 7-6). The three VOCs most frequently detected in surface soil (acetone, 2-butanone, and toluene) were also detected in subsurface soil (Table 7-8). All toluene concentrations were well below the 200,000 µg/kg plant ESV. The absence of plants ESVs for the other five compounds detected in surface soil precludes an evaluation of their potential phytotoxicity. Canadian SQGs have been established for benzene (25000 µg/kg; CCME, 2007). The maximum concentrations of benzene in surface and subsurface soil at Site 3 were well below this value.

7.5.2.6 Summary and Conclusions: Terrestrial Plants

Several inorganics and organic compounds were detected in soil at concentrations that exceed their plant ESVs.

Surface soil concentrations of metals tended to be low and infrequently exceeded their plant ESVs. Subsurface concentrations of antimony, copper, vanadium, and zinc were elevated at some locations. Soil concentrations of other metals pose negligible potential risks to plants, or do not appear to be related to former activities at the landfill, or could not be evaluated due to the absence of plant ESVs.

Adverse impacts to plants from PAHs are rare, but PAH concentrations were especially elevated in surface soil sample 03SB06. Potential PAH-related phytotoxicity is largely limited to the vicinity of this sample. Potential risks from other SVOCs at the site are minor.

Dioxins, pesticides, and PCBs pose negligible risk to plants at the site.

Potential phytotoxicity at Site 3 from VOCs in soil is uncertain, but risks are probably minor.

7.5.3 Potential Risk to Benthic Organisms

The discussion of potential risks to benthic invertebrates is separate from the discussion of potential risks to aquatic organisms in this ERA, because benthic invertebrates and aquatic organisms represent different assessment endpoints, and the measurement endpoints used to evaluate risks to these assessment endpoints are different. Specifically, chemical concentrations in sediment are used to evaluate potential risks to benthic invertebrates, while chemical concentrations in surface water are used to evaluate potential risks to aquatic organisms. Nevertheless, benthic organisms are exposed to both surface water and sediment, as are many aquatic organisms, so risk managers typically consider both the surface water and sediment data when determining the need for further evaluation. Chemicals that were COPCs in sediment and pose potential risks to benthic organisms are discussed in this section, and chemicals that were COPCs in surface water are discussed in Section 7.5.3.

Maximum sediment concentrations of arsenic, iron, lead, manganese, zinc, carbon disulfide, several pesticides, and several PAHs exceeded their respective screening values (Table 7-9). ESVs were not available for three inorganics, three SVOCs, and two VOCs that were detected in sediment (Table 7-9). Bioaccumulative chemicals in Table 7-9 with screening HQs less than 1.0 (e.g., chromium, copper) pose negligible risks to benthic organisms.

7.5.3.1 Inorganics

Arsenic was detected in three of three sediment samples and concentrations in sediment exceeded the ESV in the most upstream sample (03SD17), with a maximum HQ of 1.1 (Table 7-14). Concentrations in the other two samples were 3.1 mg/kg and 5 mg/kg. Arsenic sediment concentrations in three other stream samples ranged from 0.9 to 1.9 mg/kg, and even though the arsenic data in these three samples were rejected due to blank contamination (Appendix A), it is clear that arsenic concentrations were well below the 9.8 mg/kg except in sample 03SD17. The very slight ESV exceedances in a single sample suggests that arsenic poses minor risk (at worst) to benthic receptors.

Barium and beryllium have not been evaluated for ecological toxicity in sediments to the extent that other metals have, and ESVs were not found. Beryllium, however, has limited solubility and mobility in sediment. Sediment barium concentrations in the stream near Site 3 were similar to background concentrations, and with one exception, beryllium concentrations in Site 3 sediment were similar to background concentrations (Table 7-14). The single exception was beryllium in sample 03SD17 (1.9 mg/kg), which exceeded the maximum background concentration of 1.2 mg/kg. However, the 1.9 mg/kg value in 03SD17 was “K qualified” (Appendix A). A “K” qualifier indicates that the result is

considered biased high due to technical quality control criteria. In summary, potential risks from barium and beryllium at Site 3 are uncertain, but are similar to risks posed by background conditions.

Sediment concentrations of iron exceeded its ESV in one sample (03SD17) at 37,600 mg/kg, with a maximum HQ of 1.9. Thus, iron in sediment in the vicinity of sample 03SD17 could pose ecological risk to benthic receptors. This sample was also the only sample in which concentrations exceeded background sediment values (Table 7-14). Note that most inorganics in sediment were greatest in sample 03SD17.

Lead was detected in all sediment samples and concentrations in two samples (03SD17 at 95.6 mg/kg and 03SD14 at 37.7 mg/k) exceeded the ESV, with a maximum HQ of 2.7 (Table 7-14). Sediment concentrations exceeded the maximum background value in the same two samples. Lead concentrations were less than the ESV in the two sediment samples farthest downstream (03SD12 and 03SD13). Thus, potential risk to benthic receptors from lead appears to be limited to a small area and does not extend downstream from the Base.

Sediment concentrations of manganese exceeded its ESV in only one sample (03SD17) at 631 mg/kg, with a maximum HQ of 1.4. The maximum concentration was less than the maximum background sediment concentration of 759 mg/kg (Table 7-14). The relatively low maximum HQ, the single ESV exceedance, and the background data indicate negligible site-related risk to benthic receptors from manganese.

Like arsenic, iron, and manganese, zinc concentrations in sediment exceeded the ESV only in sample 03SD17, the most upstream sample. The maximum HQ was 1.1 (Table 7-14). Zinc concentrations in other sediment samples were well below the ESV, ranging from 25.6 to 64.3 mg/kg, compared to the ESV of 121 mg/kg. Thus, potential risk to benthic receptors from zinc appears to be limited to a small area and does not extend downstream from NAS JRB Willow Grove. The relatively low maximum HQ of 1.1 does not suggest serious impacts to benthic receptors.

7.5.3.2 Pesticides

Pesticides detected in sediment at concentrations greater than ESVs consist of 4,4'-DDE, 4,4'-DDT, total DDT, aldrin, alpha-chlordane, gamma-chlordane, dieldrin, endosulfan II, endrin aldehyde, endrin ketone, and heptachlor epoxide (Table 7-9). These compounds are organochlorine pesticides or pesticide breakdown products and are no longer used in the United States, but are extremely persistent in soil and sediment. It is difficult to determine whether the presence of these pesticides at concentrations measured in the stream north of Site 3 is due to wastes from the former landfill, to upstream sources, to historical

use at the Base following label instructions for pest control, or to a combination of these or other sources. The distribution of these compounds shows no clear trends among the six sample locations, except that concentrations tended to be lowest in sample 03SD16 (Figure 7-6 and Appendix A). Note that aldrin was detected in only two of 58 surface soil samples at Site 3 (Table 7-6). Similarly, alpha- and gamma-chlordane were detected in only three of 52 and one of 53 surface soil samples, respectively, at Site 3, while endosulfan II, endrin aldehyde, and endrin ketone were also detected infrequently in surface soil at Site 3 (Table 7-6). Thus, it seems unlikely that the concentrations of aldrin, alpha-chlordane, gamma-chlordane, endosulfan II, endrin aldehyde, and endrin ketone in stream sediments are due to migration of soil from Site 3 into the stream. Heptachlor epoxide was detected in seven of 57 surface soil samples (Table 7-6) making it more likely that its presence in sediment is site-related, but its single detected value in sediment (2.9 µg/kg) was only slightly greater than the sediment ESV (2.47 µg/kg), with a screening HQ of 1.2 (Table 7-9). Sediment concentrations of DDT-related compounds and dieldrin are discussed below.

Dieldrin

Dieldrin was detected in most surface soil samples, so its migration from Site 3 into the stream is certainly a possibility. Dieldrin concentrations in sediment ranged from 4.4 to 46.5 µg/kg, and concentrations in all six sediment samples exceeded the 1.9 µg/kg ESV, with a maximum screening HQ of 24.5 (Table 7-14). Dieldrin in all stream samples also exceeded background dieldrin sediment concentrations (Table 7-14).

The sediment ESV for dieldrin (1.9 µg/kg) is a consensus-based threshold effect concentration (TEC) from MacDonald et al (2000). The TEC represents the geometric mean of toxicity thresholds in freshwater sediments from six published sources (MacDonald et al, 2000). The MacDonald study also developed consensus-based probable effect concentrations (PECs); the PECs represent the geometric means of five published sources that derived analogous thresholds for freshwater sediments (MacDonald et al, 2000). The TEC is a concentration below which toxic effects to sediment biota are not expected to occur, while the PEC is a concentration above which toxic effects are expected to frequently occur. The PEC for dieldrin is 61.8 µg/kg. No dieldrin concentrations exceeded the PEC, but concentrations in all six sediment samples exceeded the TEC, indicating potential risk to benthic receptors.

DDT

Sediment concentrations of 4,4'-DDT and 4,4'-DDE exceeded their respective ESVs in three of six sediment samples, and total DDT (defined as the sum of detected 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD) exceeded its ESV in four sediment samples (Table 7-14). Maximum screening HQs were 2.6 for 4,4'-DDT, 9.2 for 4,4'-DDE, and 7.6 for total DDT (Table 7-14).

One or more DDT-related compounds were detected in 12 of 58 surface soil samples, and although the highest soil concentrations tended to be in locations in the southern portion of the site (Figures 7-3 through 7-5) and thus, furthest from the stream, migration into the stream cannot be ruled out.

The sediment ESVs for 4,4'-DDT and 4,4'-DDE, and total DDT are consensus-based TECs from MacDonald et al (2000). The PECs for the same compounds are 62.9 µg/kg (4,4'-DDT), 31.3 µg/kg (4,4'-DDE), and 572 µg/kg (total DDT) (MacDonald et al, 2000). Concentrations of 4,4'-DDE approached the 31.3 µg/kg PEC in sample 02SD14, at 29 µg/kg. All other 4,4'-DDE sediment concentrations were well below the PEC. All sediment concentrations of 4,4'-DDT and total DDT were well below their PECs.

7.5.3.3 SVOCs

Carbazole was detected in three of six sediment samples, at concentrations of 79, 230, and 240 µg/kg. No screening values were available, so its potential toxicity cannot be evaluated. Carbazole was not detected in background sediment samples, but the detection limits in background samples ranged from 380 to 645 µg/kg (Table 2-9). Carbazole was detected in only three of 26 surface soil concentrations.

Fifteen PAH compounds plus total PAHs were detected in sediment at concentrations greater than their ESVs, and ESVs were not available for three detected PAHs (Table 7-9). Concentrations were highest in samples 03SD12 and 03SD14 (Figure 7-6). PAHs almost always occur in field-collected sediments as a mixture of compounds, and the toxicity of PAHs is typically assumed to be additive, so evaluating PAH toxicity in sediment by examining total PAH concentrations is especially useful when, as at Site 3, several PAHs were detected at concentrations exceeding their respective screening values. The ESV for total PAHs (1610 µg/kg) is the consensus-based TEC from MacDonald et al (2000). The PEC for total PAHs (22800 µg/kg) was exceeded in sample 03SD12 (25580 µg/kg) and 03SD14 (35749 µg/kg). Thus, PAH concentrations in these two samples indicate toxic effects to benthic organisms. Total PAH concentrations in the other four sediment samples ranged from 1030 to 3403 µg/kg (Figure 7-6), so toxic effects are less likely in these samples.

Concentrations of some PAHs in samples 03SD12 and 03SD14 were much greater than in background samples (Table 2-9), but the background comparison for some PAHs is limited by the detection limits in background samples. Specifically, background sediment detection limits ranged from 380 to 645 µg/kg for most PAHs (Table 2-9), while many detected PAH concentrations in the stream at Site 3 were less than these values. Surface soil concentrations of some PAHs at Site 3 were elevated (Figures 7-3 through 7-5), so the elevated high PAH concentrations in some sediment samples could be the result of migration from the landfill through erosion.

7.5.3.4 VOCs

Sediment toxicity screening values were not available for acetone or 2-butanone, so their potential toxicity in sediment cannot be evaluated.

Carbon disulfide was detected in three of 6 sediment samples, with a maximum concentration of 6.2 µg/kg. It was not detected in surface water or surface soil. Carbon disulfide occurs naturally in sediments since it is a natural product of anaerobic biodegradation. Worldwide, at least 40 percent and possibly as much as 80 percent of releases are a result of natural or biogenic activity (IPCS, 2002). Carbon disulfide was not detected in background sediments, but detection limits in background sediments ranged from 12 to 19.5 µg/kg, which exceeded the maximum detected concentration at Site 3. The maximum carbon disulfide concentration of 6.2 µg/kg is within the range of concentrations typically seen in swamp sediments.

7.5.3.5 Summary and Conclusions: Sediment

Several metals and organochlorine pesticides were detected in sediment at concentrations that exceed their ESVs. Statements below regarding background data are not pertinent to the evaluation of potential risk, but are included for consideration by risk managers.

Sediment concentrations of metals tended to be low and pose negligible potential risks to benthic organisms, or do not appear to be related to former activities at the landfill. However, sediment concentrations of most metal COPCs were greatest in sample 03SD17, so cumulative toxicity from multiple metals in the vicinity of this sample is possible. Otherwise, potential risks from metals appear to be minor at worst.

Potential risk from VOCs are uncertain, but are probably minor.

Potential risks to benthic invertebrates from most pesticides are minor or do not appear to be site-related. There is uncertainty regarding dieldrin-related risks, since concentrations were within the TEC and the PEC. The source of dieldrin in sediment is also unclear. Sediment concentrations of dieldrin in the stream at Site 3 exceeded background sediment concentrations, suggesting either an upstream source or Site 3 as a source. Dieldrin was detected in most surface and subsurface soil samples, but most concentrations were similar to background values.

Concentrations of several PAH compounds were elevated in sediment; most notably in sample 03SD14 (35,749 ug/kg) and 03SD12 (25,580 ug/kg) exceeding background sediment values (Figure 7-7). PAHs at Site 3 are elevated in surface soils, so their presence in sediments might be site-related. However,

surface water runoff from most of the site flows northwest toward the perimeter road (Privet Road) instead of toward the stream. A small ditch alongside the eastern edge of Privet Road collects runoff during major storm events; storm water in this ditch drains northeast where it discharges into the stream in the vicinity of 03SD12. Surface water runoff in the extreme northernmost tip of Site 3 might discharge directly into the stream in the vicinity of 03SD12 but not as far north as 03SD14. Elevated PAHs in sediment sample 03SD12 could conceivably be due to runoff from Site 3, but elevated PAHs in sediment sample 03SD14 are in all probability due to other sources.

A dam on the stream approximately 400 feet northeast of the north end of Site 3 has formed a two-acre pond that is used as a storm water retention basin. The pond is not part of Site 3. Sediment PAH concentrations were elevated in some samples from the pond in previous investigations. Specifically, the maximum total PAH concentration in sediment samples collected from the pond was 114,860 µg/kg (B&RE, 1998), compared to a maximum total PAH concentration of 35,749 µg/kg in stream sample 03SD14 in the current Site 3 study.

With the above factors in mind, and since sediment PAHs were similar to background concentrations in four of six stream samples, Site 3 is probably not the source of elevated PAHs in stream samples 03SD12 and 03SD14.

7.5.4 Potential Risk to Aquatic Organisms

Maximum surface water concentrations of aluminum, barium, iron, lead, manganese, benzo(a)anthracene, benzo(a)pyrene, fluoranthene, and pyrene exceeded their surface water screening values (Table 7-10). ESVs were not available for benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, and dibenzo(a,h)anthracene, which were detected in surface water (Table 7-10). All other surface water COPCs shown in Table 7-10 were COPCs because they are bioaccumulative chemicals with the potential to be toxic via the food chain (e.g., chromium, dieldrin); bioaccumulative chemicals with maximum surface water concentrations less than surface water ESVs pose negligible risks to aquatic receptors.

This section discusses the surface water data for aluminum, barium, iron, lead, manganese, benzo(a)anthracene, benzo(a)pyrene, fluoranthene, and pyrene, and the four PAHs without ESVs.

7.5.4.1 Inorganics

Surface water concentrations of aluminum in seven of eight surface water samples exceeded the ESV, with a maximum HQ of 3.6 (Table 7-15). Freshwater organisms usually are not adversely affected when pH is between 6.5 and 9.0 (EPA, 1988). The pH in surface water at Site 3 was not determined, but the

pH in most surface water samples previously collected from a stream at Site 2 were within this range. The stream at Site 2 is less than a mile from Site 3, and the substrate and physical conditions of the two streams are similar, so assuming the pH at Site 3 is similar to that at Site 2, then the aluminum concentrations at Site 3 do not pose significant potential risks to aquatic organisms. All aluminum concentrations at Site 3 were less than background concentrations (Table 7-15), so any potential aluminum-related risks at Site 3 are similar to background risks.

Barium concentrations exceeded the 4 µg/L ESV in all surface water samples, with a maximum HQ of 28 (Table 7-15). Barium concentrations in the six surface water samples collected nearest Site 3 (between the pond and the Base perimeter road) ranged from 32.5 to 57.9 µg/L (Figure 7-6). The two highest barium concentrations (84.1 and 113 µg/L) were collected in samples 03SW10 and 03SW11, located on the golf course, which suggests a source of barium other than Site 3. Barium concentrations in the six surface water samples nearest Site 3 (32.5 to 57.9 µg/L) were less than background concentrations (Table 7-15), so any potential barium-related risks at Site 3 are similar to risks throughout the region.

Surface water concentrations of iron in the six surface water samples collected between the pond and the Base perimeter road ranged from 185 to 245 µg/L (Appendix A), which are less than the 300 µg/L ESV. The only samples in which iron concentrations exceeded the ESV were 03SW10 (430 µg/L) and 03SW11 (1060 µg/L). As was the case for barium, the higher concentrations in the two golf course samples suggest a source of iron other than Site 3. Iron concentrations in the six surface water samples nearest Site 3 were less than the ESV, and pose no risks to aquatic receptors.

Lead concentrations in surface water exceeded the hardness-specific ESV (1.4 µg/L) in six of eight samples, with a maximum HQ of 1.9 (Table 7-15). Unlike the barium and iron data, lead concentrations in the two golf course samples downstream from Site 3 (03SW10 and 03SW11) were lower than in the six samples nearest the site. Lead concentrations were 0.07 µg/L and 0.9 µg/L in 03SW10 and 03SW11 and ranged from 2.2 µg/L to 2.7 µg/L in the other six samples. The maximum HQ of 1.9 is not particularly high, but it does indicate potential risk to aquatic receptors. The surface water data were unfiltered, and the resulting data for lead and other metals might have been affected by particulate interference.

Surface water concentrations of manganese in one of eight samples exceeded the ESV and background values, with a maximum HQ of 1.6 (Table 7-15). The single ESV exceedance was in 03SW11 (197 µg/L), located 1100 feet downstream of the Base perimeter road. Manganese concentrations in the six surface water samples collected between the pond and the Base perimeter road ranged from 30.9 to 53 µg/L (Appendix A), which are less than the 120 µg/L ESV.

7.5.4.2 PAHs

Eight PAH compounds were detected in surface water. Maximum screening HQs for PAHs in surface water ranged from 1.3 to 3.1, and four detected PAH compounds did not have ESVs (Table 7-10). The stream where the six surface water samples were collected was only a few inches deep, and the surface water PAH data might be due to suspended particulate matter rather than to dissolved PAHs. PAH compounds are typically adsorbed very strongly to sediments and particulate matter. Surface water PAH concentrations were greatest in sample 03SW14, which was collected at the same location at which sediment concentrations of PAHs were highest (Table 7-9). PAHs were elevated in several soil samples, so migration from soil into the stream is certainly possible. PAHs were either not detected or PAH concentrations were less than ESVs in 03SW12 and 03SW13, which are the two sample locations between 03SW14 and the Base boundary. Therefore, based on the low concentrations in the two samples just upstream from the Base boundary, PAHs do not appear to be significantly migrating off-site to downstream locations. Note that PAHs were not analyzed in the two samples collected from the golf course west of the Base boundary.

7.5.4.3 Summary and Conclusions: Surface Water

Maximum surface water concentrations of aluminum, barium, iron, lead, manganese, and three PAHs exceeded their ESVs, while ESVs were not available for four PAHs.

Surface water concentrations of aluminum were less than background concentrations, so any potential aluminum-related risks at Site 3 are similar to risks throughout the region. Surface water concentrations of barium, iron, and manganese in samples nearest the former landfill were either less than their ESVs or less than background concentrations.

Lead concentrations in surface water exceeded the hardness-specific ESV (1.4 µg/L) in six of eight samples, with a maximum HQ of 1.9. The maximum HQ of 1.9 is not particularly high, but it does indicate potential risk to aquatic receptors. The surface water data were unfiltered, and the resulting data might have been affected by particulate interference.

Maximum screening HQs for PAHs in surface water ranged from 1.3 to 3.1. The stream where the six surface water samples were collected was only a few inches deep, and the surface water PAH data might be due to suspended particulate matter rather than to dissolved PAHs. Surface water PAH concentrations were greatest in sample 03SW14, which was collected at the same location at which sediment concentrations of PAHs were highest. Based on low PAH concentrations in the two samples

nearest the Base boundary, PAHs do not appear to be significantly migrating off-site to downstream locations.

7.5.5 Potential Risks to Wildlife Receptors

Bioaccumulative chemicals were included in food chain models to evaluate potential risks to herbivorous birds and mammals, insectivorous birds and mammals, and piscivorous birds and mammals.

7.5.5.1 Risks to Herbivorous Receptors

Based on maximum detected concentrations, conservative body weights, and conservative ingestion rates, bobwhite quail food chain NOAEL-HQs exceeded 1.0 for copper, lead, mercury, vanadium, and four PAHs (Table 7-11). Meadow vole NOAEL-HQs in the conservative scenario exceeded 1.0 for dieldrin, antimony, cadmium, mercury, thallium, and six PAHs (Table 7-11). Woodchuck NOAEL-HQs in the conservative scenario exceeded 1.0 for antimony, mercury, thallium, and pyrene (Table 7-11).

Based on the average scenario, all food chain NOAEL-HQs were less than 1.0 for the meadow vole, and mercury was the only COPC with an HQ greater than 1.0 for the bobwhite quail, with a NOAEL HQ of 1.1 (Table 7-16). Antimony (HQ = 2.7) and thallium (HQ = 3.7) were the only COPCs with HQs greater than 1.0 for the woodchuck in the average scenario (Table 7-16).

The average food chain scenario provides a less conservative evaluation of risk than the maximum food chain scenario, but it is still conservative. The food chain HQs assume an area use factor (AUF) of 1.0, meaning the representative receptors are assumed to forage exclusively in the area where samples were collected. Herbivorous birds forage over large areas and would obtain only a fraction of their food from the areas where elevated concentrations were measured. Thus, the bobwhite quail food chain HQs in Table 7-16 are based on reasonable estimates of exposure, and risks to herbivorous birds represented by the bobwhite are negligible.

Herbivorous mammals such as meadow voles forage within much smaller areas than birds, so voles could be exposed to “hot spots” of contamination for a significant portion of their lives. In the conservative scenario, the meadow vole food chain NOAEL HQ was 27.1 for mercury, and the mercury LOAEL HQ was 5.4 (Table 7-11). Meadow vole food chain NOAEL HQs in the conservative scenario were highest for pyrene, with an HQ of 38.1, and five other PAHs had NOAEL HQs greater than 1.0 for the vole (Table 7-11). However, vole HQs based on LOAELs were less than 1.0 for all PAHs (Table 7-11). Mammal LOAELs for high molecular weight PAHs were about 62 times greater than NOAEL values (38.4 mg/kg/day versus 0.615 mg/kg/day; Table 7-1). Thus, NOAEL HQs for the vole are about 62 times

greater than LOAEL HQs for these PAHs. The rather large difference between NOAEL and LOAEL values results in uncertainty regarding potential risks posed by these compounds. Overall, the food chain modeling indicates that mercury poses potential risk to herbivorous mammals with small home ranges (such as voles) in the vicinities of elevated mercury concentrations. There is uncertainty regarding potential risks posed by PAHs. Meadow vole food chain HQs for other COPCs in Table 7-11 are not particularly high in view of conservative assumptions in the food chain model.

The woodchuck often forages within areas of 40 to 60 acres, but woodchucks in areas of plentiful succulent vegetation forage within much smaller areas. Based on habitat conditions at Site 3 (where abundant succulent vegetation does not exist near existing woodchuck burrows), the woodchuck HQs in Tables 7-11 and 7-16 are not particularly high in view of conservative assumptions in the food chain model, and soil COPCs pose minor potential risk to burrowing mammals represented by the woodchuck.

7.5.5.2 Risks to Insectivorous Receptors

Several bioaccumulative COPCs had food chain HQs greater than 1.0 for insectivorous receptors represented by the robin and short-tailed shrew in the conservative scenario (Table 7-11). In the average scenario, food chain HQs exceeded 1.0 only for Aroclor-1260, dieldrin, antimony, cadmium, lead, mercury, thallium, vanadium, and TCDD TEQ (Table 7-16).

The robin (or any bird) would not forage exclusively in a small area, so the robin HQs in Table 7-16 are not indicative of significant risk.

The short-tailed shrew has a relatively small home range (about 0.5 to 2.4 acres; Cothran et al 1991; EPA, 1993b), and thus, could forage exclusively in small hot spots of contamination. The NOAEL HQ for dieldrin was 46.1 for the shrew in the conservative scenario (Table 7-11) and 6.1 in the average scenario (Table 7-16). Dieldrin concentrations in surface soil at Site 3 were similar to background concentrations (Table 7-13), so potential dieldrin-related risk to insectivorous receptors is similar to risk posed by background conditions. Most shrew HQs are not particularly high in view of conservative assumptions in the food chain model. For example, the thallium NOAEL HQ for the shrew was 5.1 (Table 7-16). The only available TRV for thallium, however, was a subchronic LOAEL of 0.74 mg/kg/day in a rat study (Appendix I, Table I-1). The 0.74 mg/kg/day LOAEL was divided by 10 because it was derived from a subchronic study, and was divided again by 10 to estimate the NOAEL, because a NOAEL was not available. Thus, the estimated NOAEL of 0.0074 mg/kg/day in Table 7-1 (and upon which the NOAEL-HQ is based) is actually an estimated value using a safety factor of 100. Furthermore, soil-to-earthworm BAFs were not available for thallium or antimony, so a default BAF of 1.0 was used as a BAF for these two COPCs. The use of these surrogate BAFs assumes that concentrations of thallium and antimony in

earthworms are equal to concentrations in soil; the actual BAFs are probably much less for these two metals. Some PAHs had NOAEL HQs indicative of potential risk for the shrew, with pyrene having the highest NOAEL HQ value (HQ = 43.1; Table 7-11). However, all shrew LOAEL HQs for PAHs were less than 1.0 (Table 7-11). As discussed above (Section 7.5.5.1), the rather large difference between available NOAEL and LOAEL values for some PAHs results in uncertainty regarding potential risks posed by these compounds. Similarly, the TCDD LOAEL is 10 times greater than the TCDD NOAEL (Table 7-1), resulting in uncertainty regarding potential risk posed by dioxin-related compounds. In addition, only two surface soil samples were analyzed for dioxins, resulting in additional uncertainty posed by dioxins. Overall, the food chain modeling indicates that shrew HQs are not particularly high in view of conservative assumptions in the food chain model. There is uncertainty regarding potential risks posed by PAHs, and possibly TCDD TEQ, to insectivorous mammals represented by the shrew.

7.5.5.3 Risks to Piscivorous Receptors

NOAEL-based HQs exceeded 1.0 for seven PAHs and five pesticides in the conservative food chain model scenario (Table 7-12). Piscivorous birds and mammals, however, would not forage exclusively in small areas represented by maximum concentrations, and thus, average concentrations are appropriate to use in evaluating risk to these receptors. In the average scenario, NOAEL-based HQs exceeded 1.0 for the green heron for dieldrin, endrin aldehyde, and endrin ketone (Table 7-17). Dieldrin was the only COPC with a NOAEL-based HQ greater than 1.0 for the mink in the average scenario (Table 7-17).

The HQs in Table 7-17 assume that piscivorous birds and mammals represented by the green heron and mink derive 100 percent of their diet from Site 3. Piscivorous species are wide-ranging, so the HQs in Table 7-17 are very conservative.

As mentioned in Section 7.1.7.6, mink home range sizes are highly variable; although values of 640 to 940 acres were the most common in a literature review of several studies, some were as high as 1,900 acres. Mink home ranges measured in terms of distances along stream or river shoreline habitats were usually in the range of 0.6 to 1.8 miles of shoreline (EPA, 1993b).

Home range data for the green heron was not located. Peters (1983) used data from several studies to develop the following formula for the relationship of body size to home range for predatory birds:

$$\text{home range } (km^2) = 8.3\ W^{1.37} \qquad \text{where } W = \text{body mass (kg)}$$

Using the above formula and a body weight of 212 g (0.212 kg), the estimated home range for a green heron would be 0.99 km^2 (245 acres).

The precise area-use factor (AUF) for piscivorous birds and mammals foraging at Site 3 cannot be determined with available data, and any assigned AUF would be speculative, but based on the above information, the HQs in Table 7-17 do not appear to be particularly high. In other words, a mink or green heron would have to derive about 40 percent of its diet (AUF = 0.4) from Site 3 for the highest HQ (2.5 for endrin aldehyde) to be greater than 1.0. Based on habitat conditions at the site, this is unlikely.

7.6 UNCERTAINTY

Uncertainty is associated with all aspects of the ecological assessment methodology. Some uncertainties were discussed in Section 7.5. This section provides a summary of the uncertainties, and focuses on those that have not been previously discussed.

The stream north of Site 3 is typically about 6 inches deep, and at times is nearly dry. Based on these conditions, the extent to which the stream provides permanent habitat for aquatic and benthic organisms, and the degree to which piscivorous birds and mammals forage on these organisms in the stream, are uncertain. Therefore, the extent to which screening HQs actually represent potential risks is uncertain.

The extent to which terrestrial animals such as herbivorous and insectivorous birds and mammals forage at Site 3 is uncertain. For example, average home range sizes for bobwhite quail varied from 8.9 to 41.3 acres in a literature of several studies (EPA, 1993b). Depending on the habitat quality, this species (as well as other insectivorous and herbivorous bird and mammal species) might forage totally within the site (with a resulting high likelihood of exposure to site contaminants), or such animals might obtain only a small portion of their diet from the site; the latter situation would result in a small or negligible exposure to site contaminants. To be conservative, the ecological risk assessment attempted to err on the side of caution.

The extent to which ecological receptors are exposed to contaminated subsurface soil is uncertain. Tree roots can also extend several feet deep, introducing the possibility of phytotoxicity through root uptake. Most soil invertebrates inhabit shallow soil only, but there is great variation in the depths to which earthworms will burrow, depending on soil type, moisture, etc. Some earthworm species never go much deeper than the topsoil, but some can burrow a few feet below ground surface. Birds would be exposed only to surface soil, but some burrowing mammals such as woodchucks can dig burrows several feet deep, thus being exposed to subsurface concentrations of contaminants. Risks to burrowing herbivorous mammals represented by the woodchuck were evaluated in the ERA, and the woodchuck food chain model incorporated incidental soil ingestion using subsurface soil collected from 2 to 4 feet below the ground surface. Incidental soil ingestion of soil deeper than four feet below the ground surface was not evaluated in the food chain model, resulting in some uncertainty. Overall, however, elevated subsurface

concentrations of COPCs are primarily limited to the areas where former wastes pits are located, so the extent of potential risks to plants and animals is largely limited to these areas.

Exposure factors have not been established for most reptile and amphibian species, and toxicity data are very limited for reptiles and amphibians. This adds some uncertainty to the evaluation of risk at Site 3.

Laboratory-derived NOAELs and LOAELs might not adequately represent toxicity thresholds for wildlife receptors under field conditions. In addition, NOAELs and LOAELs for species used in toxicity tests and reported in the literature might not adequately represent toxicity thresholds for other species. These uncertainties may overestimate or underestimate potential risks.

The chemical doses for wildlife receptors were calculated using an equation that incorporated ingestion rates, body weights, bioaccumulation factors, and other factors. These factors were obtained from literature studies or predicted using various equations. Ingestion rates and body weights vary between species, especially between species inhabiting different areas.

Ecological screening values and toxicity thresholds were not available for some detected chemicals, and thus, potential toxicity could not be evaluated.

Site-specific tissue samples (i.e., earthworms, plants, and fish) were not collected as part of this investigation. Therefore, tissue concentrations were estimated using BAFs and BSAFs in order to estimate concentrations in food items of wildlife receptors. These bioaccumulation factors were derived from the literature, and do not take into account site-specific factors such as pH that can affect bioaccumulation.

Incidental soil ingestion rates for birds represented by the robin and bobwhite quail could not be located, introducing uncertainty in the food chain modeling. Instead, soil ingestion by the robin was based on woodcock data, and soil ingestion by the quail was based on mourning dove data. Similarly, incidental sediment ingestion for birds represented by the green heron and mammals represented by the mink could not be located. Sediment ingestion by the mink was based on the raccoon. Sediment ingestion by the green heron was estimated to be 5 percent; this value is believed to be a conservative estimate, because green herons and most other wading birds capture prey with a darting stroke rather than probing sediment.

Maximum detected chemical concentrations were initially used to represent the chemical concentrations to which ecological receptors would be exposed. If the maximum concentration of a chemical in a given medium was collected in a "hot spot" of contamination and was much higher than the remaining values in

the data set, potential risks may be over-estimated. Conversely, if samples were not collected from hot spots of contamination, then potential risks could be under-estimated. Undiscovered hot spots could result if not enough samples were collected or if portions of the site are not represented by the available data set. However, uncertainties related to the location of samples were reduced in this risk assessment (especially for soil) by the rather large number of surface soil samples collected relative to the size of the former landfill. The Site 3 soil investigation was largely focused on discovering and determining the extent of contamination in the former burn pits, so as a whole, the soil dataset is probably biased high.

The surface soil data evaluated in the ERA were obtained from samples collected in 1991, 1997, 2008, and 2009. The extent to which the 1991 and 1997 soil data represent current conditions is uncertain. The surface soil dataset, however, probably does adequately represent current conditions at Site 3. Most of the site is covered by grass and other vegetation, and has been since the initial samples were collected in 1991 and 1997. Thus, the uncertainty regarding the older data is probably not significant.

Total organic carbon (TOC) was not measured in sediment samples collected from the stream during the current investigation, so a default value of 1 percent was used to represent TOC in the calculations of estimated organic compounds in food items of the mink and green heron. The average TOC measured in six sediment samples from a stream at Site 2 (Antenna Field Landfill), which is located 4,000 feet southeast of Site 3, was 32,800 mg/kg, which equates to 3.28 percent (Tetra Tech, 2009). The bioavailability of organic compounds decreases as TOC increases, so assuming that TOC at Site 3 is similar to that at Site 2, then the piscivorous food chain HQs for organic compounds would be less than those shown in Tables 7-12 and 7-17.

The assessment of risks to upper-level receptors via the food chain is hindered by uncertainties such as the derivation of the toxicity reference values, the process used to derive bioaccumulation factors, and the choice of the best species to represent mammal and bird receptors. A weight-of-evidence approach to assess risks was used to reduce the overall uncertainty in these situations.

Many years of anthropogenic activities in the vicinity of NAS JRB Willow Grove have contributed metals, pesticides, PAHs, and other chemical compounds to the area, and Site 3 has probably received contaminant inputs from sources other than the former landfill. For example, the stream north of the former landfill receives runoff (and potentially, contaminants) from other areas at the Base. The extent to which upstream sources are responsible for the presence of surface water and sediment COPCs is uncertain.

As a result of anthropogenic contamination and natural conditions, and especially since metals occur naturally to varying degrees in soil, surface water, and sediment, concentrations of several COPCs at

Site 3 were similar to background concentrations. Comparing background data to Site 3 data is useful in determining attribution, but the ERA did not use background comparisons to eliminate chemicals as COPCs. Instead, background data were mentioned in Section 7.5 only as a tool for stakeholders to use in the risk management process, which is beyond the scope of this ERA. Risk management suggestions are not included in the ERA.

Uncertainty in risk characterization results from the lack of data regarding the toxicity of multiple chemicals. For example, sediment concentrations of most inorganic COPCs were greatest in sample 03SD1. The extent to which elevated concentrations of multiple chemicals might contribute to cumulative toxicity is uncertain.

7.7 SUMMARY AND CONCLUSIONS

Several chemicals that were detected in surface soil, surface water, and sediment at Site 3 were retained as COPCs because their chemical concentrations exceeded screening values, screening values were not available, or the chemicals were bioaccumulative. These chemicals were then evaluated in Step 3A of this ERA (Refinement of Preliminary COPCs) to determine which chemicals have the greatest potential for causing risks to ecological receptors. The ecological endpoints evaluated in this ERA were terrestrial invertebrates, terrestrial plants, aquatic and benthic organisms, birds and mammals that consume terrestrial invertebrates/plants, and birds and mammals that consume aquatic/benthic organisms.

Surface soil concentrations of metals tended to be low in most samples and pose negligible potential risks to soil invertebrates and plants. Subsurface soil concentrations of metals tended to be higher than in surface samples. Antimony, copper, vanadium, zinc, and other metals were considerably elevated in some subsurface soil samples. To the extent that receptors are exposed to subsurface soil, the elevated subsurface concentrations of these metals and other COPCs pose risks to receptors.

PAH compounds were elevated in some soil samples and pose risks to soil invertebrates, especially in surface samples 03SB06 and 03SB03, and subsurface samples 03TP04 and 03TP24. Potential PAH-related risks to plants are largely limited to the vicinity of sample 03SB06. Potential risks to soil invertebrates and plants from other SVOCs at the site are minor.

Soil concentrations of pesticides, dioxins, and VOCs indicate negligible or minor potential risks to plants and soil invertebrates, or risks that are similar to risks posed by background conditions.

PCBs were infrequently detected and at relatively low concentrations in soil, except the concentration of Aroclor-1254 was 4000 µg/kg in a subsurface sample from test pit TP 24. Potential PCB-related risk to

invertebrates in this sample appears to be limited to a small area in the vicinity of this sample. PCBs in soil pose negligible risks to plants.

Sediment concentrations of metals tended to be low and pose negligible potential risks to benthic organisms, or do not appear to be related to former activities at the landfill. Cumulative toxicity to benthic receptors from multiple metals is possible in the vicinity of sediment sample 03SD17, where concentrations of several metals were greatest, however, metals at this sample location are believed to be from the retention basin or other upgradient sources not Site 3. Potential metal-related toxicity to benthic organisms at downstream locations appears to be minor. Concentrations of several PAH compounds were elevated in sediment, and exceeded background sediment values. Sediment concentrations of total PAHs exceeded the MacDonald et al (2000) consensus-based PEC of 22800 µg/kg (the concentration above which toxic effects are expected to frequently occur) in samples 03SD12 and 03SD14 which are believed to be from the retention basin or other upgradient sources, not Site 3. The surface water and sediment data indicate that potential risks from other COPCs are probably minor.

The food chain modeling indicates that mercury in soil poses potential risk to herbivorous mammals with small home ranges (such as voles) in a few areas. PAHs in soil might pose risks to herbivorous mammals with small home ranges (such as voles) and to insectivorous mammals with small home ranges (such as shrews) in a few areas. Bioaccumulative COPCs in sediment and surface water pose minor risks via the food chain.

It appears that Site 3 soil will require remediation for human health concerns for several of the same PAH compounds present in sediments. It is likely that any remedy to address human health risk will also reduce potential ecological risk originating from Site 3 soil contamination.

The extensive background data set generated for this study should be utilized in risk management decisions regarding elevated concentrations of COPCs at Site 3.

8.0 SUMMARY, CONCLUSIONS, AND RISK MANAGEMENT

8.1 SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

Analytical results from the soil and groundwater samples indicate that the principal classes of contaminants in Site 3 Landfill soils are VOCs, SVOCs, pesticides, PCBs, dioxins/furans, and metals. VOCs, including PCE, were detected at three test pit locations. Surface water and sediment samples indicate PAH and metals contamination. Groundwater upgradient of and beneath the landfill contains PCE contamination, which has migrated off-Base to the adjacent golf course property.

The hydrogeologic interpretation and the existing analytical data suggest that there was more than one source of the PCE contamination in the groundwater at Site 3. One source of the contamination in the unconfined groundwater zone was likely in the vicinity of well cluster 03MW06, up gradient from the landfill. The landfill was a likely secondary source of PCE to groundwater. The data suggest that the source of contamination in the confined groundwater zone is also located up gradient of the 03MW06 well cluster. PCE has been detected in the soils of the landfill but not in the soils of the other two potential source areas. The historical analytical results indicate a significant decrease in the groundwater PCE concentrations since the Phase I investigation, which suggests that the sources are depleted.

8.2 HUMAN HEALTH RISK EVALUATION

The HHRA for Site 3 was performed to evaluate risks posed to current or future human receptors from exposure to groundwater, surface soil, total (surface and subsurface) soil, surface water, and sediment. The following receptors were evaluated: current/future child recreational person, current/future adult recreational person, current/future lifetime recreational person, future residential child, future residential adult, future lifetime resident, future construction worker, and current/future industrial worker. Potential exposure routes include ingestion, dermal contact, and inhalation.

The estimated RME cancer risk for the most restrictive land use scenario, future lifetime resident, exceeded the upper limit of EPA's target risk range of 10^{-4} to 10^{-6} for landfill area surface soil (4.5×10^{-4}), landfill area total soil (4.6×10^{-4}) and Hangar area total soil (3.3×10^{-4}), and was at the upper limit for groundwater (1.3×10^{-4}). For the lifetime recreational scenario, the estimated cancer risk was at the upper limit of the target risk range for landfill area surface soil (1.3×10^{-4}) and landfill area total soil (1.3×10^{-4}). The primary contributors to cancer risk for landfill area surface soil were arsenic, chromium, PAHs, and dioxin; for landfill area total soil were arsenic, chromium, ethylbenzene, PAHs, pesticides, PCBs, and dioxin; and for hangar area total soil were PAHs. The primary contributor to cancer risk for groundwater was arsenic.

Target-organ specific non-cancer HIs developed for the most restrictive future land use scenario (future lifetime child resident) exceeded 1 for groundwater and landfill area total soil. The maximum target organ HI for groundwater was 1.2 and for landfill area total soil was 5.0.

8.3 ECOLOGICAL RISK ASSESSMENT

The ecological endpoints evaluated in the ERA were terrestrial invertebrates, terrestrial plants, aquatic and benthic organisms, birds and mammals that consume terrestrial invertebrates/plants, and birds and mammals that consume aquatic/benthic organisms. Several chemicals that were detected in surface soil, surface water, and sediment at Site 3 were retained as COPCs because their chemical concentrations exceeded screening values, screening values were not available, or the chemicals were bioaccumulative. These chemicals were then evaluated in Step 3A of the ERA (Refinement of Preliminary COPCs) to determine which chemicals have the greatest potential for causing risks to ecological receptors.

Background concentrations were discussed in Step 3A of the ERA, but background concentrations were not used to screen out COPCs. Other factors for risk managers to consider include the spatial extent of potential risk, comparisons of surface water and sediment concentrations to alternate toxicity guidelines, and the current and future expected use of the site.

Surface soil concentrations of metals tended to be low in most samples and pose negligible potential risks to soil invertebrates and plants. Subsurface soil concentrations of metals tended to be higher than in surface samples. Antimony, copper, vanadium, zinc, and other metals were considerably elevated in some subsurface soil samples. To the extent that receptors are exposed to subsurface soil, the elevated subsurface concentrations of these metals and other COPCs pose risks to receptors.

PAH compounds were elevated in some soil samples and pose risks to soil invertebrates, especially in surface samples 03SB06 and 03SB03, and subsurface samples from test pits 03TP04 and 03TP24. Potential PAH-related risks to plants are largely limited to the vicinity of sample 03SB06. Potential risks to soil invertebrates and plants from other SVOCs at the site are minor.

Soil concentrations of pesticides, dioxins, and VOCs indicate negligible or minor potential risks to plants and soil invertebrates, or risks that are similar to risks posed by background conditions.

PCBs were infrequently detected and at relatively low concentrations in soil, except the concentration of Aroclor-1254 was 4,000 µg/kg in a subsurface sample from test pit TP 24. Potential PCB-related risk to invertebrates in this sample appears to be limited to a small area in the vicinity of this sample. PCBs in soil pose negligible risks to plants.

Food chain modeling indicates that mercury poses potential risk to herbivorous mammals with small home ranges (such as voles) in a few localized areas of the site. PAHs in soil might pose risks to herbivorous mammals with small home ranges (such as voles) and to insectivorous mammals with small home ranges (such as shrews) in a few localized areas of the site.

Sediment concentrations of metals tended to be low and pose negligible potential risks to benthic organisms, or do not appear to be related to former activities at the landfill. Potential metal-related toxicity to benthic organisms downgradient of the Landfill appears to be minor. Concentrations of several PAH compounds were elevated in sediment, and exceeded background sediment values. Sediment concentrations of total PAHs exceeded the MacDonald et al (2000) consensus-based probable effects concentration (PEC) of 22,800 µg/kg (the concentration above which toxic effects are expected to frequently occur) in samples 03SD12 (25,580 µg/kg) and 03SD14 (35,749 µg/kg). However, the PAHs found in samples 03SD12 and 03SD14 are believed to be from the retention basin or other upgradient sources, not Site 3. The surface water and sediment data indicate that potential risks from other COPCs are probably minor.

Bioaccumulative COPCs in sediment and surface water pose minor risks via the food chain.

8.4 CONCLUSIONS

Protection of Human Health

Results of the RI at Site 3 indicate a wide range of materials have been deposited at the site over the years. Contaminants in Site 3 media include SVOCs, pesticides, PAHs, PCBs, dioxins/furans, metals, VOCs including PCE, and ethyl benzene. Distribution of the contaminants in site soils at concentrations above regulatory screening values was sporadic, indicating localized disposal practices over time. Groundwater in the vicinity of the landfill shows PCE contamination, which has migrated off-Base to the adjacent golf course property. Estimated risks to future human receptors exceed EPA acceptable maximum ranges for various future scenarios.

The wide ranging investigation performed in multiple stages over many years has provided sufficient data to ensure that the Navy, EPA, and PADEP have adequately identified the nature and extent of contamination to proceed with an FS for Site 3.

Protection of the Environment

It is likely that any remedy to address human health will also reduce potential ecological risk originating from Site 3 soil contamination. Based on the results of the comprehensive ERA screening, no further action is warranted or recommended for Site 3 to be protective of the environment.

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TABLES

TABLE 2-1

SURFACE SOIL SAMPLING SUMMARY
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sampling Event		Number of Surface Soil Sample Locations	Number of Surface Soil Samples[1]	Analytical Parameters
Phase I RI		16	16	Full TCL/TAL parameters
Phase II RI	Site 3	12	13	TAL metals, TCL semivolatiles, TCL pesticides/PCBs, and Cyanide.
			2	Dioxin
	Background	12	13	TAL metals, TCL semivolatiles, TCL pesticides/PCBs, and Cyanide.
Follow-On Activities		1	1	TCL volatiles and semivolatiles
Test Pit Investigation		2	3	Full TCL/TAL parameters
Landfill Delineation		24	28	Full TCL/TAL parameters

1 Includes field duplicates

TABLE 2-2

SUBSURFACE SOIL SAMPLING SUMMARY
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sampling Event	Number of Subsurface Soil Sample Locations	Number of Subsurface Soil Samples[1]	Analytical Parameters
Phase I RI	20[2]	24	Full TCL/TAL parameters
Phase II RI	1	3	TCL VOC
Follow-On Activities	10	21	TCL VOC, TCL SVOC
Test Pit Investigation	22	24	Full TCL/TAL parameters
	2	3	Full TCL/TAL parameters, dioxin
Landfill Delineation	13	15	Full TCL/TAL parameters,
	1	2	Full TCL/TAL parameters, dioxin
	1	1	Asbestos

1 Includes field duplicates

2 Includes four test pit locations

TABLE 2-3

SURFACE WATER SAMPLING SUMMARY
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sampling Event		Number of Surface Water Sample Locations	Number of Surface Water Samples[1]	Analytical Parameters
Phase I RI		4	4	Full TCL/TAL parameters
Phase II RI	Site 3	2	2	Full TCL/TAL parameters
	Offsite	8	9	Full TCL/TAL parameters
Follow-On Activities		0	0	NA
IGWM	Round 1	2	2	TCL VOCs, 1,4-Dioxane, TAL Metals
	Round 2	2	2	TCL VOCs
	Round 3	2	2	TCL VOCs

1 Includes field duplicates

TABLE 2-4

SEDIMENT SAMPLING SUMMARY
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sampling Event		Number of Sediment Sample Locations	Number of Sediment Samples[1]	Analytical Parameters
Phase I RI		6	6	Full TCL/TAL parameters
Phase II RI	Site 3	3	3	Full TCL/TAL parameters, TOC, and grain size
	Offsite	8	9	Full TCL/TAL parameters, TOC, and grain size
Follow-On Activities		0	0	NA
Landfill Delineation		6	7	Full TCL/TAL parameters

1 Includes field duplicates

TABLE 2-5

PHASE II RI MONITORING WELL CONSTRUCTION SUMMARY
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Monitoring Well	Borehole Depth (feet)	Screen Interval (ft bgs)	Sand-Pack Interval (ft bgs)	Elevation (ft amsl)	
				Ground	PVC Casing
Initial Phase II RI					
03MW02SI	144	55 - 65	52 - 70	324.52	326.33
03MW02I		134 - 144	130 - 144	224.52	326.38
03MW05I	150	82 - 92	78 - 96	358.97	390.93
03MW06S	85	26 - 36	25 - 38	364.85	367.00
03MW06SI		75 - 85	72 - 85	364.85	366.86
03MW06I	150	140 - 150	136 - 150	364.69	366.82
03MW07S	75	34 - 44	30.5 - 50	323.08	324.90
Follow-on Activities					
03MW08S	225	38 - 68	33 - 73	364.25	365.59
03MW08D		163 - 173	158 - 178		365.63
03MW09O	10	5 – 10	4 – 10	316.41	319.22
03MW09S	33	18 – 33	16 – 33	316.07	318.24
Off-Base Well*					
03IW01	73	NA	NA	NA	NA

* This well, a golf course irrigation well, is an open borehole well with one water-producing fracture at 65 feet bgs.

TABLE 2-6

PHASE II RI FIELD ACTIVITIES - GROUND WATER SAMPLING SUMMARY
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sampling Event	Number of Groundwater Sample Locations (Wells)	Number of Environmental Groundwater Samples[(1)]	Analytical Parameters
Initial Phase II RI	17	19	TCL VOC, TCL semivolatiles, TCL pesticides/PCBs, TAL metals, and Cyanide.
Follow-on Activities	19	22	TCL VOC (plus TCL semivolatiles for the 2 new wells)
IGWM Round 1	20	22	TCL VOC, 1,4-dioxane, TAL metals
IGWM Round 2	21	23	TCL VOC
IGWM Round 3	7	8	TCL VOC
03MW09 Well Cluster Sampling	2	2	TCL VOC

1 Includes field duplicates

TABLE 2-7

ANALYTICAL RESULTS FOR SURFACE SOIL - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**BGSS01** **04/07/97** **BGSS01-DUP**		**BGSS01-DUP** **04/07/97** **BGSS01**		**BGSS02** **04/07/97**		**BGSS03** **04/07/97**		**BGSS04** **04/07/97**		**BGSS05** **04/07/97**		**BGSS06** **04/07/97**		**BGSS07** **04/07/97**		**BGSS08** **04/07/97**	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	10500		8570		9090		12300		12800		9240		15000		11900		10500	
Antimony	5.6	UJ	5.2	UJ	8.4	R	5.8	UJ	7.5	R	7.6	R	9.6	R	8.2	R	5.6	R
Arsenic	6.1	J	7		3.7	K	10.6		4.4	K	5.6		5.6	J	7.5		8	
Barium	95.7		89.9		77.8		108		111		79.5		111		97.9		96.4	
Beryllium	0.89		0.86		0.75		1.2		1.2		0.79		1.2		0.84		0.98	
Cadmium	1.4	U	1.3	U	1.3	U	1.4	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U
Calcium	766		690		1530		914		685		939		1500		763		1010	
Chromium	16.3		14		20.8		15.7		15.9		13.2		17.9		14.5		13.5	
Cobalt	8.1		8.2		9.3		6.8		7.8		8.3		8.3		8.5		7.1	
Copper	11.3		10.2		11.9		11.7		8		9.8		10.7		10.7		10.1	
Cyanide	0.69	U	0.65	U	0.64	U	0.7	U	0.66	U	0.67	U	0.64	U	0.66	U	0.64	U
Iron	13200		11500		15700		13200		14100		13900		17600		16900		12800	
Lead	37.2		29.8		22.9		29.9		64.7		25.2		19.5		18.1		56.7	
Magnesium	1430		1210		1670		1450		1370		1480		1940		1500		1410	
Manganese	621		644		514		527		1190		538		684		538		667	
Mercury	0.14	U	0.13	U	0.13	U	0.14	U	0.13	U	0.14	U	0.13	U	0.13	U	0.13	U
Nickel	9		9.2		9.8		10.3		11.2		9.3		10.4		10.4		9.5	
Potassium	418	U	392	U	627		433	U	402	U	771		750		436		618	
Selenium	0.28	UL	1.3	UL	1.3	UL	1.4	UL	0.27	UL	1.4	UL	1.3	UL	1.3	UL	1.3	UL
Silver	1.4	U	1.3	U	1.3	U	1.4	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U
Sodium	112	U	104	U	103	U	115	U	107	U	109	U	103	U	105	U	106	U
Thallium	0.28	U	0.26	U	0.26	U	0.3		0.27	U	0.27	U	0.28		0.34		0.27	U
Vanadium	25.4		22.1		28.2		24.4		24.9		23.8		28.2		25.3		23	
Zinc	53.1		42.9		49.4		54.2		597		38.7		47.2		31.7		53	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,4-Trichlorobenzene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
1,2-Dichlorobenzene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
1,3-Dichlorobenzene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
1,4-Dichlorobenzene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2,2'-Oxybis(1-chloropropane)	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2,4,5-Trichlorophenol	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
2,4,6-Trichlorophenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2,4-Dichlorophenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2,4-Dimethylphenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2,4-Dinitrophenol	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
2,4-Dinitrotoluene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2,6-Dinitrotoluene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2-Chloronaphthalene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2-Chlorophenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2-Methylnaphthalene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
2-Methylphenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U

TABLE 2-7

ANALYTICAL RESULTS FOR SURFACE SOIL - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**BGSS01** **04/07/97** **BGSS01-DUP**		**BGSS01-DUP** **04/07/97** **BGSS01**		**BGSS02** **04/07/97**		**BGSS03** **04/07/97**		**BGSS04** **04/07/97**		**BGSS05** **04/07/97**		**BGSS06** **04/07/97**		**BGSS07** **04/07/97**		**BGSS08** **04/07/97**	
2-Nitroaniline	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
2-Nitrophenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
ORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
3,3'-Dichlorobenzidine	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
3-Nitroaniline	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
4,6-Dinitro-2-methylphenol	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
4-Bromophenyl Phenyl Ether	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
4-Chloro-3-methylphenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
4-Chloroaniline	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
4-Chlorophenyl Phenyl Ether	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
4-Methylphenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
4-Nitroaniline	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
4-Nitrophenol	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
Acenaphthene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	61	J
Acenaphthylene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	57	J
Anthracene	460	U	430	U	420	U	46	J	440	U	68	J	420	UJ	65	J	110	J
Benz(a)anthracene	460	U	430	U	96	J	220	J	100	J	310	J	33	J	270	J	480	
Benzo(a)pyrene	460	U	430	U	110	J	350	J	110	J	400	J	420	UJ	270	J	720	
Benzo(b)fluoranthene	460	U	430	U	160	J	540		160	J	550		420	UJ	340	J	990	
Benzo(g,h,i)perylene	460	U	430	U	52	J	180	J	440	U	180	J	420	UJ	110	J	300	J
Benzo(k)fluoranthene	460	U	430	U	420	U	310	J	98	J	310	J	420	UJ	270	J	660	
Bis(2-chloroethoxy)methane	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Bis(2-chloroethyl)ether	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Bis(2-ethylhexyl)phthalate	67	B	130	B	100	B	480	B	60	B	130	B	160	B	150	B	240	B
Butylbenzylphthalate	460	U	430	U	280	J	480	U	180	J	83	J	420	UJ	430	UJ	440	U
Carbazole	460	U	430	U	420	U	140	J	440	U	80	J	420	UJ	430	UJ	270	J
Chrysene	460	U	430	U	130	J	470	J	130	J	460		43	J	320	J	790	
Di-n-butylphthalate	820	B	790	B	400	B	840	B	1100	B	1100	B	420	UJ	430	UJ	81	B
Di-n-octylphthalate	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Dibenz(a,h)anthracene	460	U	430	U	420	U	52	J	440	U	52	J	420	UJ	430	UJ	83	J
Dibenzofuran	460	U	430	U	420	U	51	J	440	U	450	U	420	UJ	430	UJ	120	J
Diethylphthalate	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Dimethylphthalate	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Fluoranthene	62	J	51	J	270	J	1200		270	J	1000		49	J	670	J	2000	
Fluorene	460	U	430	U	420	U	59	J	440	U	450	U	420	UJ	430	UJ	160	J
Hexachlorobenzene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Hexachlorobutadiene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Hexachlorocyclopentadiene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Hexachloroethane	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Indeno(1,2,3-cd)pyrene	460	U	430	U	62	J	240	J	49	J	220	J	420	UJ	140	J	400	J
Isophorone	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
N-Nitroso-di-n-propylamine	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U

TABLE 2-7

ANALYTICAL RESULTS FOR SURFACE SOIL - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**BGSS01** **04/07/97** **BGSS01-DUP**		**BGSS01-DUP** **04/07/97** **BGSS01**		**BGSS02** **04/07/97**		**BGSS03** **04/07/97**		**BGSS04** **04/07/97**		**BGSS05** **04/07/97**		**BGSS06** **04/07/97**		**BGSS07** **04/07/97**		**BGSS08** **04/07/97**	
N-Nitrosodiphenylamine (1)	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Naphthalene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Nitrobenzene	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Pentachlorophenol	1200	U	1100	U	1100	U	1200	U	1100	U	1100	U	1100	UJ	1100	UJ	1100	U
ORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Phenanthrene	460	U	430	U	120	J	990		110	J	650		420	UJ	490	J	1500	
Phenol	460	U	430	U	420	U	480	U	440	U	450	U	420	UJ	430	UJ	440	U
Pyrene	51	J	46	J	220	J	870		250	J	810		56	J	610	J	1600	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	4.4	U
4,4'-DDE	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	4.4	U
4,4'-DDT	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	6.2	J
Aldrin	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Alpha-BHC	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Alpha-Chlordane	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Aroclor-1016	46	U	43	U	42	U	48	U	44	U	45	U	42	U	43	U	44	U
Aroclor-1221	93	U	88	U	86	U	97	U	89	U	91	U	86	U	88	U	89	U
Aroclor-1232	46	U	43	U	42	U	48	U	44	U	45	U	42	U	43	U	44	U
Aroclor-1242	46	U	43	U	42	U	48	U	44	U	45	U	42	U	43	U	44	U
Aroclor-1248	46	U	43	U	42	U	48	U	44	U	45	U	42	U	43	U	44	U
Aroclor-1254	46	U	43	U	42	U	48	U	44	U	45	U	42	U	43	U	44	U
Aroclor-1260	46	U	43	U	42	U	48	U	44	U	45	U	42	U	43	U	44	U
Beta-BHC	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Delta-BHC	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Dieldrin	13		14		4.2	U	760		13	J	220		14		86		420	
Endosulfan I	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Endosulfan II	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	4.4	U
Endosulfan Sulfate	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	4.4	U
Endrin	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	4.4	U
Endrin Aldehyde	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	4.4	U
Endrin Ketone	4.6	U	4.3	U	4.2	U	4.8	U	4.4	U	4.5	U	4.2	U	4.3	U	4.4	U
Gamma-BHC (Lindane)	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Gamma-Chlordane	2.4	U	2.2	U	2.2	U	10	J	2.3	U	2.3	U	2.2	U	2.2	U	34	
Heptachlor	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	2.3	U
Heptachlor Epoxide	2.4	U	2.2	U	2.2	U	2.5	U	2.3	U	2.3	U	2.2	U	2.2	U	33	
Methoxychlor	24	U	22	U	22	U	25	U	23	U	23	U	22	U	22	U	23	U
Toxaphene	240	U	220	U	220	U	250	U	230	U	230	U	220	U	220	U	230	U

TABLE 2-7

ANALYTICAL RESULTS FOR SURFACE SOIL - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**BGSS09** **04/07/97**		**BGSS10** **04/07/97**		**BGSS11** **04/07/97**		**BGSS12** **04/07/97**		**---** **---**		**---** **---**		**---** **---**	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**							
Aluminum	12000		10700		11900		10300							
Antimony	8.7	R	6.4	R	8.1	R	8.8	R						
Arsenic	6.1	J	7.4		8		6.3							
Barium	89.7		90		111		83.7							
Beryllium	0.79		1		1.3		0.92							
Cadmium	1.2	U	1.3	U	1.3	U	1.3	U						
Calcium	614		762		1160		1600							
Chromium	12.4		13.8		15.3		16							
Cobalt	8.2		6.9		8.5		7							
Copper	13.4		9.3		9.3		12.7							
Cyanide	3.8		0.7		0.64	U	0.66	U						
Iron	15700		13300		16700		15500							
Lead	16.3		29	K	20.5		31.4							
Magnesium	1530		1300		1480		1550							
Manganese	429		667		844		477							
Mercury	0.12	U	0.13	U	0.13	U	0.13	U						
Nickel	10.4		7.4		9.6		10.1							
Potassium	460		531		388	U	396	U						
Selenium	1.2	UL	1.3	UL	1.3	UL	1.3	UL						
Silver	1.2	U	1.3	U	1.3	U	1.3	U						
Sodium	120		106	U	103	U	112							
Thallium	0.25		0.3		0.29		0.28							
Vanadium	20.9		23.7		26.2		26.5							
Zinc	21.7		44.6		49.4		45.8							
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**							
1,2,4-Trichlorobenzene	390	U	440	U	430	U	440	U						
1,2-Dichlorobenzene	390	U	440	U	430	U	440	U						
1,3-Dichlorobenzene	390	U	440	U	430	U	440	U						
1,4-Dichlorobenzene	390	U	440	U	430	U	440	U						
2,2'-Oxybis(1-chloropropane)	390	U	440	U	430	U	440	U						
2,4,5-Trichlorophenol	990	U	1100	U	1100	U	1100	U						
2,4,6-Trichlorophenol	390	U	440	U	430	U	440	U						
2,4-Dichlorophenol	390	U	440	U	430	U	440	U						
2,4-Dimethylphenol	390	U	440	U	430	U	440	U						
2,4-Dinitrophenol	990	U	1100	U	1100	U	1100	U						
2,4-Dinitrotoluene	390	U	440	U	430	U	440	U						
2,6-Dinitrotoluene	390	U	440	U	430	U	440	U						
2-Chloronaphthalene	390	U	440	U	430	U	440	U						
2-Chlorophenol	390	U	440	U	430	U	440	U						
2-Methylnaphthalene	390	U	440	U	430	U	440	U						
2-Methylphenol	390	U	440	U	430	U	440	U						

TABLE 2-7

ANALYTICAL RESULTS FOR SURFACE SOIL - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**BGSS09** **04/07/97**		**BGSS10** **04/07/97**		**BGSS11** **04/07/97**		**BGSS12** **04/07/97**		**---** **---**	**---** **---**	**---** **---**	**---** **---**
2-Nitroaniline	990	U	1100	U	1100	U	1100	U				
2-Nitrophenol	390	U	440	U	430	U	440	U				
ORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**					
3,3'-Dichlorobenzidine	390	U	440	U	430	U	440	U				
3-Nitroaniline	990	U	1100	U	1100	U	1100	U				
4,6-Dinitro-2-methylphenol	990	U	1100	U	1100	U	1100	U				
4-Bromophenyl Phenyl Ether	390	U	440	U	430	U	440	U				
4-Chloro-3-methylphenol	390	U	440	U	430	U	440	U				
4-Chloroaniline	390	U	440	U	430	U	440	U				
4-Chlorophenyl Phenyl Ether	390	U	440	U	430	U	440	U				
4-Methylphenol	390	U	440	U	430	U	440	U				
4-Nitroaniline	990	U	1100	U	1100	U	1100	U				
4-Nitrophenol	990	U	1100	U	1100	U	1100	U				
Acenaphthene	390	U	64	J	430	U	55	J				
Acenaphthylene	390	U	54	J	430	U	62	J				
Anthracene	390	U	130	J	430	U	160	J				
Benz(a)anthracene	390	U	590		430	U	940					
Benzo(a)pyrene	390	U	830		430	U	1100					
Benzo(b)fluoranthene	390	U	1000		430	U	1500					
Benzo(g,h,i)perylene	390	U	320	J	430	U	490					
Benzo(k)fluoranthene	390	U	820		430	U	920					
Bis(2-chloroethoxy)methane	390	U	440	U	430	U	440	U				
Bis(2-chloroethyl)ether	390	U	440	U	430	U	440	U				
Bis(2-ethylhexyl)phthalate	92	B	110	B	110	B	130	B				
Butylbenzylphthalate	390	U	440	U	430	U	440	U				
Carbazole	390	U	310	J	430	U	260	J				
Chrysene	390	U	860		430	U	1200					
Di-n-butylphthalate	460	B	1000	B	740	B	660	B				
Di-n-octylphthalate	390	U	440	U	430	U	440	U				
Dibenz(a,h)anthracene	390	U	96	J	430	U	160	J				
Dibenzofuran	390	U	120	J	430	U	61	J				
Diethylphthalate	390	U	440	U	430	U	440	U				
Dimethylphthalate	390	U	440	U	430	U	440	U				
Fluoranthene	390	U	2300		430	U	2600					
Fluorene	390	U	160	J	430	U	120	J				
Hexachlorobenzene	390	U	440	U	430	U	440	U				
Hexachlorobutadiene	390	U	440	U	430	U	440	U				
Hexachlorocyclopentadiene	390	U	440	U	430	U	440	U				
Hexachloroethane	390	U	440	U	430	U	440	U				
Indeno(1,2,3-cd)pyrene	390	U	420	J	430	U	640					
Isophorone	390	U	440	U	430	U	440	U				
N-Nitroso-di-n-propylamine	390	U	440	U	430	U	440	U				

TABLE 2-7

ANALYTICAL RESULTS FOR SURFACE SOIL - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**BGSS09** **04/07/97**		**BGSS10** **04/07/97**		**BGSS11** **04/07/97**		**BGSS12** **04/07/97**		**---** **---**	**---** **---**	**---** **---**	**---** **---**
N-Nitrosodiphenylamine (1)	390	U	440	U	430	U	440	U				
Naphthalene	390	U	440	U	430	U	440	U				
Nitrobenzene	390	U	440	U	430	U	440	U				
Pentachlorophenol	990	U	1100	U	1100	U	1100	U				
ORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**					
Phenanthrene	390	U	1600		430	U	1700					
Phenol	390	U	440	U	430	U	440	U				
Pyrene	390	U	1700		430	U	2100					
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**					
4,4'-DDD	3.9	U	4.3	U	4.3	U	4.3	U				
4,4'-DDE	3.9	U	4.3	U	4.3	U	4.3	U				
4,4'-DDT	3.9	U	8.3	J	4.3	U	4.3	U				
Aldrin	2	U	2.2	U	2.2	U	2.2	U				
Alpha-BHC	2	U	2.2	U	2.2	U	2.2	U				
Alpha-Chlordane	2	U	2.2	U	2.2	U	2.2	U				
Aroclor-1016	39	U	43	U	43	U	43	U				
Aroclor-1221	80	U	88	U	87	U	88	U				
Aroclor-1232	39	U	43	U	43	U	43	U				
Aroclor-1242	39	U	43	U	43	U	43	U				
Aroclor-1248	39	U	43	U	43	U	43	U				
Aroclor-1254	39	U	43	U	43	U	43	U				
Aroclor-1260	39	U	43	U	43	U	43	U				
Beta-BHC	2	U	2.2	U	2.2	U	2.2	U				
Delta-BHC	2	U	2.2	U	2.2	U	2.2	U				
Dieldrin	3.9	U	550		4.3	U	63	J				
Endosulfan I	2	U	2.2	U	2.2	U	2.2	U				
Endosulfan II	3.9	U	4.3	U	4.3	U	4.3	U				
Endosulfan Sulfate	3.9	U	4.3	U	4.3	U	4.3	U				
Endrin	3.9	U	4.3	U	4.3	U	4.3	U				
Endrin Aldehyde	3.9	U	4.3	U	4.3	U	4.3	U				
Endrin Ketone	3.9	U	4.3	U	4.3	U	4.3	U				
Gamma-BHC (Lindane)	2	U	2.2	U	2.2	U	2.2	U				
Gamma-Chlordane	2	U	48	J	2.2	U	3.2					
Heptachlor	2	U	2.2	U	2.2	U	2.2	U				
Heptachlor Epoxide	2	U	47		2.2	U	3.4	J				
Methoxychlor	20	U	22	U	22	U	22	U				
Toxaphene	200	U	220	U	220	U	220	U				

TABLE 2-7

ANALYTICAL RESULTS FOR SURFACE SOIL - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**BGSS09**	**BGSS10**	**BGSS11**	**BGSS12**	---	---	---	---
Sample Date:	**04/07/97**	**04/07/97**	**04/07/97**	**04/07/97**	---	---	---	---
Duplicate:								

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contaminatio
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detecte
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.

TABLE 2-8

ANALYTICAL RESULTS FOR SURFACE WATER - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	BGSW01		BGSW02		BGSW03		BGSW03-DUP		BGSW04		BGSW05		BGSW06		BGSW07		BGSW08	
Sample Date:	03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97	
Duplicate:					BGSW03-DUP		BGSW03											
INORGANICS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Aluminum	226	U	247	U	284	U	561		267	U	236	U	163	U	177	U	301	U
Antimony	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Arsenic	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Barium	93		95.9		93.6		97.2		105		112		87.3		110		109	
Beryllium	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cadmium	5	UL	5	UL	5	UL	5	UL	5	UL	5	UL	5	UL	5	UL	5	UL
Calcium	34900		34400		26800		27700		28000		15800		22400		18500		15800	
Chromium	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Cobalt	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Copper	10	U	10	U	10	U	16.6		10	U	10	U	10	U	10	U	10	U
Cyanide	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Iron	222		351		519		751		366		273		85.3		311		326	
Lead	1	U	1	U	1	U	1.1		1	U	1	U	1	U	1	U	1	U
Magnesium	12100		11800		9740		10100		9750		6290		8260		6940		6250	
Manganese	75.7		92		98.5		122		65.8		56.7		26.7		45.1		64.2	
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nickel	20	U	20	U	20	U	31.4		20	U	20	U	20	U	20	U	20	U
Potassium	2860		2570		1930		1950		2110		1870		1750		1500	U	1500	U
Selenium	1	UL	1	UL	5	U	1	U	1	UL	5	U	5	U	5	U	5	U
Silver	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Sodium	34000		36200		22500		17400		23300		10700		13200		12700		10800	
Thallium	1	UL	1	UL	1	UL	1	UL	1	UL	1	UL	1	UL	1	UL	1	UL
Vanadium	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Zinc	5	U	7.8		6.8		18.9		9.1		5	U	5	U	5	U	5	U
SEMIVOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2,2'-Oxybis(1-chloropropane)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2,4,5-Trichlorophenol	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
2,4,6-Trichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2,4-Dinitrophenol	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U

TABLE 2-8

ANALYTICAL RESULTS FOR SURFACE WATER - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	BGSW01		BGSW02		BGSW03		BGSW03-DUP		BGSW04		BGSW05		BGSW06		BGSW07		BGSW08	
Sample Date:	03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97	
Duplicate:					BGSW03-DUP		BGSW03											
ORGANICS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
2-Nitroaniline	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
3-Nitroaniline	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
4,6-Dinitro-2-methylphenol	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
4-Bromophenyl Phenyl Ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
4-Chlorophenyl Phenyl Ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
4-Nitroaniline	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
4-Nitrophenol	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
Acenaphthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Benz(a)anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Bis(2-chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Bis(2-chloroethyl)ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Bis(2-ethylhexyl)phthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Butylbenzylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Carbazole	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Chrysene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Di-n-butylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Di-n-octylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Dibenz(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Diethylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Dimethylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Fluorene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U

TABLE 2-8

ANALYTICAL RESULTS FOR SURFACE WATER - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	BGSW01		BGSW02		BGSW03		BGSW03-DUP		BGSW04		BGSW05		BGSW06		BGSW07		BGSW08	
Sample Date:	03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97	
Duplicate:					BGSW03-DUP		BGSW03											
ORGANICS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Isophorone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
N-Nitrosodiphenylamine (1)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Pentachlorophenol	25	U	25	U	25	U	25	U	25	U	25	U	25	U	250	U	25	U
Phenanthrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Phenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
Pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	100	U	10	U
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethene (Total)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Benzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon Disulfide	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon Tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Methylene Chloride	10	U	10	U	20	U	13	U	16	U	11	U	23	U	7	U	15	U
Styrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

TABLE 2-8

ANALYTICAL RESULTS FOR SURFACE WATER - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	BGSW01		BGSW02		BGSW03		BGSW03-DUP		BGSW04		BGSW05		BGSW06		BGSW07		BGSW08	
Sample Date:	03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97	
Duplicate:					BGSW03-DUP		BGSW03											
ORGANICS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl Chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Xylene (Total)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
PESTICIDES/PCBS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
4,4'-DDD	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDE	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDT	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Aldrin	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Alpha-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Alpha-Chlordane	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Aroclor-1016	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor-1221	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Aroclor-1232	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor-1242	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor-1248	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor-1254	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Aroclor-1260	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Beta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Delta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Dieldrin	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endosulfan I	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Endosulfan II	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endosulfan Sulfate	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin Aldehyde	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin Ketone	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Gamma-BHC (Lindane)	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Gamma-Chlordane	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Heptachlor	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Heptachlor Epoxide	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Methoxychlor	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toxaphene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U

Data Qualifiers:
U -- Value is a non-detected result as reported by the laboratory.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.

TABLE 2-9

ANALYTICAL RESULTS FOR SEDIMENT - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**BGSD01** **03/13/97**		**BGSD02** **03/13/97**		**BGSD03** **03/13/97** **BGSD03-DUP**		**BGSD03-DUP** **03/13/97** **BGSD03**		**BGSD04** **03/13/97**		**BGSD05** **03/13/97**		**BGSD06** **03/13/97**		**BGSD07** **03/13/97**		**BGSD08** **03/13/97**	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	8950		7330		5750		10900		6000		3610		8510		4690		5580	
Antimony	12.6	R	5.5	UJ	7.8	UJ	7.8	UJ	6.2	UJ	4.6	UJ	11.1	R	5.1	UJ	5.5	R
Arsenic	7.2		3.7		5		5.6		4.1		3.2		4		4.9		4	
Barium	105		54.6		142		179		106		76.2		81.2		82.4		120	
Beryllium	1.2		0.52		1.1		1.3		0.81		0.6		1.1		0.61		0.98	
Cadmium	1.2	UL	1.4	UL	2	UL	1.9	UL	1.6	UL	1.1	UL	1.2	UL	1.3	UL	1.4	UL
Calcium	14800		744		1850		2070		1060		878		18200		1080		1130	
Chromium	34.5		9.7		10.9		16.5		13.5		6.8		29.3		8.7		9.2	
Cobalt	12.4		5.8		5.5		7.7		6.8		4.5		9.8		4.9		6.9	
Copper	27.8		11.3		11.9		13.7		10.9		5.8		22.1		7.4		8.8	
Cyanide	0.61	U	0.68	U	0.97	U	0.96	U	0.77	U	0.56	U	0.58	U	0.62	U	0.67	U
Iron	35400		10500		11400		15000		13700		9540		25400		9660		14300	
Lead	18.7		20.4		26.8		28.4		19.6		6.4		8.6		10.6		10.4	
Magnesium	9100		1000		1130		1670		999		1350		10600		1450		1600	
Manganese	759		384		416		551		573		376		529		388		618	
Mercury	0.12	U	0.14	U	0.2	U	0.19	U	0.16	U	0.11	U	0.12	U	0.13	U	0.14	U
Nickel	22.7		6.8	K	12.5		16.1		9.1		7.8	K	19.1		10.1		9.7	
Potassium	2330		514		586	U	825		467	U	775		2330		721		921	
Selenium	0.24	UJ	0.27	UJ	0.44	J	0.51	J	0.36	J	0.23	UJ	0.23	UJ	0.25	UJ	0.27	UJ
Silver	1.2	U	1.4	U	2	U	1.9	U	1.6	U	1.1	U	1.2	U	1.3	U	1.4	U
Sodium	560		109	U	156	U	155	U	125	U	91.7	U	240		101	U	109	U
Thallium	0.24	U	0.27	U	0.39	U	0.39	U	0.31	U	0.23	U	0.23	U	0.25	U	0.27	U
Vanadium	52.6		12.2		20.3		25.8		18.8		7.9		42.8		11.9		11.9	
Zinc	97.6		39.5		43.9		60		51.3		25.4		80.4		28.2		35	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,4-Trichlorobenzene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
1,2-Dichlorobenzene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
1,3-Dichlorobenzene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
1,4-Dichlorobenzene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2,2'-Oxybis(1-chloropropane)	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2,4,5-Trichlorophenol	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
2,4,6-Trichlorophenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2,4-Dichlorophenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2,4-Dimethylphenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2,4-Dinitrophenol	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
2,4-Dinitrotoluene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2,6-Dinitrotoluene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2-Chloronaphthalene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2-Chlorophenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2-Methylnaphthalene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
2-Methylphenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U

TABLE 2-9

ANALYTICAL RESULTS FOR SEDIMENT - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	BGSD01		BGSD02		BGSD03		BGSD03-DUP		BGSD04		BGSD05		BGSD06		BGSD07		BGSD08	
Sample Date:	03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97	
Duplicate:					BGSD03-DUP		BGSD03											
ORGANICS	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
2-Nitroaniline	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
2-Nitrophenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
3,3'-Dichlorobenzidine	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
3-Nitroaniline	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
4,6-Dinitro-2-methylphenol	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
4-Bromophenyl Phenyl Ether	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
4-Chloro-3-methylphenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
4-Chloroaniline	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
4-Chlorophenyl Phenyl Ether	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
4-Methylphenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
4-Nitroaniline	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
4-Nitrophenol	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
Acenaphthene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Acenaphthylene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Anthracene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Benz(a)anthracene	580		450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Benzo(a)pyrene	530	J	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Benzo(b)fluoranthene	670	J	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Benzo(g,h,i)perylene	400	UJ	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Benzo(k)fluoranthene	300	J	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Bis(2-chloroethoxy)methane	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Bis(2-chloroethyl)ether	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Bis(2-ethylhexyl)phthalate	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Butylbenzylphthalate	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Carbazole	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Chrysene	640		450	U	130	J	90	J	110	J	380	U	380	U	420	U	450	U
Di-n-butylphthalate	400	UJ	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Di-n-octylphthalate	400	UJ	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Dibenz(a,h)anthracene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Dibenzofuran	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Diethylphthalate	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Dimethylphthalate	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Fluoranthene	510		100	J	210	J	140	J	170	J	380	U	380	U	420	U	450	U
Fluorene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Hexachlorobenzene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Hexachlorobutadiene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Hexachlorocyclopentadiene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Hexachloroethane	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Indeno(1,2,3-cd)pyrene	400	UJ	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U

TABLE 2-9

ANALYTICAL RESULTS FOR SEDIMENT - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	BGSD01		BGSD02		BGSD03		BGSD03-DUP		BGSD04		BGSD05		BGSD06		BGSD07		BGSD08	
Sample Date:	03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97		03/13/97	
Duplicate:					BGSD03-DUP		BGSD03											
ORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Isophorone	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
N-Nitroso-di-n-propylamine	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
N-Nitrosodiphenylamine (1)	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Naphthalene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Nitrobenzene	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Pentachlorophenol	1000	U	1100	U	1600	U	1600	U	1300	U	950	U	960	U	1100	U	1100	U
Phenanthrene	260	J	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Phenol	400	U	450	U	650	U	640	U	510	U	380	U	380	U	420	U	450	U
Pyrene	1300		100	J	190	J	120	J	150	J	380	U	380	U	420	U	450	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
1,1,2,2-Tetrachloroethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
1,1,2-Trichloroethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
1,1-Dichloroethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
1,1-Dichloroethene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
1,2-Dichloroethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
1,2-Dichloroethene (Total)	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
1,2-Dichloropropane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
2-Butanone	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
2-Hexanone	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
4-Methyl-2-pentanone	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Acetone	38	U	51	U	20	U	19	U	91	U	12	U	12	U	13	U	14	U
Benzene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Bromodichloromethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Bromoform	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Bromomethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Carbon Disulfide	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Carbon Tetrachloride	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Chlorobenzene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Chloroethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Chloroform	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Chloromethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
cis-1,3-Dichloropropene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Dibromochloromethane	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Ethylbenzene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Methylene Chloride	8	U	9	U	20	U	19	U	11	U	12	U	12	U	13	U	14	U
Styrene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Tetrachloroethene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Toluene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
trans-1,3-Dichloropropene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U

TABLE 2-9

ANALYTICAL RESULTS FOR SEDIMENT - SITE BACKGROUND
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**BGSD01**		**BGSD02**		**BGSD03**		**BGSD03-DUP**		**BGSD04**		**BGSD05**		**BGSD06**		**BGSD07**		**BGSD08**	
Sample Date:	**03/13/97**		**03/13/97**		**03/13/97**		**03/13/97**		**03/13/97**		**03/13/97**		**03/13/97**		**03/13/97**		**03/13/97**	
Duplicate:					**BGSD03-DUP**		**BGSD03**											
ORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Trichloroethene	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Vinyl Chloride	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
Xylene (Total)	12	U	14	U	20	U	19	U	16	U	12	U	12	U	13	U	14	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
4,4'-DDE	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
4,4'-DDT	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
Aldrin	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Alpha-BHC	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Alpha-Chlordane	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Aroclor-1016	40	U	45	U	65	U	64	U	51	U	38	U	38	U	42	U	45	U
Aroclor-1221	82	U	91	U	130	U	130	U	100	U	77	U	78	U	85	U	91	U
Aroclor-1232	40	U	45	U	65	U	64	U	51	U	38	U	38	U	42	U	45	U
Aroclor-1242	40	U	45	U	65	U	64	U	51	U	38	U	38	U	42	U	45	U
Aroclor-1248	40	U	45	U	65	U	64	U	51	U	38	U	38	U	42	U	45	U
Aroclor-1254	40	U	45	U	65	U	64	U	51	U	38	U	38	U	42	U	45	U
Aroclor-1260	40	U	45	U	65	U	64	U	51	U	38	U	38	U	42	U	45	U
Beta-BHC	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Delta-BHC	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Dieldrin	4	U	4.5	U	3.1	J	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
Endosulfan I	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Endosulfan II	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
Endosulfan Sulfate	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
Endrin	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
Endrin Aldehyde	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
Endrin Ketone	4	U	4.5	U	6.4	U	6.4	U	5.1	U	3.8	U	3.8	U	4.2	U	4.5	U
Gamma-BHC (Lindane)	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Gamma-Chlordane	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Heptachlor	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Heptachlor Epoxide	2.1	U	2.3	U	3.3	U	3.3	U	2.6	U	1.9	U	2	U	2.1	U	2.3	U
Methoxychlor	21	U	23	U	33	U	33	U	27	U	20	U	20	U	22	U	23	U
Toxaphene	210	U	230	U	330	U	330	U	270	U	200	U	200	U	220	U	230	U

Data Qualifiers:
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.

TABLE 2-10

BACKGROUND STATISTICS - SOIL DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection Min.		Max.	Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL) Back. Mean	Std.Dev. Back.	t Value	N, Q, or Other***	Back. UTL
aluminum	12/12	9090	-	15000	11300	BGSS06 04/07/97	11300	1720	2.7360	N*	16000
antimony	0/2		-			NA					
arsenic	12/12	3.7	-	10.6	6.65	BGSS03 04/07/97	6.65	1.83	2.7360	N*	11.7
barium	12/12	77.8	-	111	95.7	BGSS04 04/07/97	95.7	12.3	2.7360	N*	129
beryllium	12/12	0.75	-	1.3	0.987	BGSS11 04/07/97	0.987	0.192	2.7360	N*	1.51
cadmium	0/12		-			NA					
calcium	12/12	614	-	1600	1020	BGSS12 04/07/97	1020	352	2.7360	N*	1980
chromium	12/12	12.4	-	20.8	15.3	BGSS02 04/07/97	15.3	2.28	2.7360	N*	21.6
cobalt	12/12	6.8	-	9.3	7.9	BGSS02 04/07/97	7.9	0.788	2.7360	N*	10.1
copper	12/12	8	-	13.4	10.7	BGSS09 04/07/97	10.7	1.54	2.7360	N*	14.9
cyanide	2/12	0.7	-	3.8	0.649	BGSS09 04/07/97	0.649				
iron	12/12	12350	-	17600	14800	BGSS06 04/07/97	14800	1760	2.7360	N*	19600
lead	12/12	16.3	-	64.7	30.6	BGSS04 04/07/97	30.6	15.2		gamma***	60.8
magnesium	12/12	1300	-	1940	1500	BGSS06 04/07/97	1500	172	2.7360	N*	1970
manganese	12/12	429	-	1190	642	BGSS04 04/07/97	642	206		gamma***	1030
mercury	0/12		-			NA					
nickel	12/12	7.4	-	11.2	9.79	BGSS04 04/07/97	9.79	0.954	2.7360	N*	12.4
potassium	7/12	436	-	771	434	BGSS05 04/07/97	599	132		KM UPL***	1090
selenium	0/12		-			NA					
silver	0/12		-			NA					
sodium	2/12	112	-	120	63.7	BGSS09 04/07/97	116				
thallium	7/12	0.25	-	0.34	0.226	BGSS07 04/07/97	0.291	0.027		KM UPL***	0.4
vanadium	12/12	20.9	-	28.2	24.9	BGSS02 04/07/97	24.9	2.13	2.7360	N*	30.7
zinc	12/12	21.7	-	597	90.1	BGSS04 04/07/97	90.1	160		Q***	597
4,4'-DDD	0/12		-			NA					
4,4'-DDE	0/12		-			NA					
4,4'-DDT	2/12	6.2	-	8.3	3.01	BGSS10 04/07/97	3.01				
Aroclor-1254	0/12		-			NA					
Aroclor-1260	0/12		-			NA					
beta-BHC	0/12		-			NA					
dieldrin	9/12	13	-	760	179	BGSS03 04/07/97	179				

TABLE 2-10

BACKGROUND STATISTICS - SOIL DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL) Back. Mean	Std.Dev. Back.	t Value	N, Q, or Other***	Back. UTL
endosulfan I	0/12	-			NA					
endrin	0/12	-			NA					
heptachlor	0/12	-			NA					
heptachlor epoxide	3/12	3.4	47	7.79	BGSS10 04/07/97	7.79				
1,2,4-trichlorobenzene	0/12	-			NA					
1,2-dichlorobenzene	0/12	-			NA					
1,4-dichlorobenzene	0/12	-			NA					
2-methylnaphthalene	0/12	-			NA					
2-methylphenol	0/12	-			NA					
acenaphthene	3/12	55	64	178	BGSS10 04/07/97	178				
acenaphthylene	3/12	54	62	177	BGSS12 04/07/97	177				
anthracene	6/12	46	160	154	BGSS12 04/07/97	154				
benz(a)anthracene	9/12	33	940	306	BGSS12 04/07/97	306				
benzo(a)pyrene	8/12	110	1100	394	BGSS12 04/07/97	394				
benzo(b)fluoranthene	8/12	160	1500	507	BGSS12 04/07/97	507				
benzo(g,h,i)perylene	7/12	52	490	225	BGSS12 04/07/97	225				
benzo(k)fluoranthene	7/12	98	920	370	BGSS12 04/07/97	370				
butylbenzylphthalate	3/12	83	280	208	BGSS02 04/07/97	208				
carbazole	5/12	80	310	212	BGSS10 04/07/97	212				
chrysene	9/12	43	1200	420	BGSS12 04/07/97	420				
di-n-butylphthalate	0/2	-			NA					
dibenz(a,h)anthracene	5/12	52	160	161	BGSS12 04/07/97	161				
dibenzofuran	4/12	51	120	172	BGSS08 04/07/97	172				
fluoranthene	10/12	49	2600	902	BGSS12 04/07/97	902				
fluorene	4/12	59	160	184	BGSS08 04/07/97	184				
indeno(1,2,3-cd)pyrene	8/12	49	640	251	BGSS12 04/07/97	251				
N-nitrosodiphenylamine (1)	0/12	-			NA					
naphthalene	0/12	-			NA					
phenanthrene	8/12	110	1700	667	BGSS12 04/07/97	667				
pyrene	10/12	48.5	2100	723	BGSS12 04/07/97	723				

TABLE 2-10

BACKGROUND STATISTICS - SOIL DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection		Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL)				
		Min.	Max.			Back. Mean	Std.Dev. Back.	t Value	N, Q, or Other***	Back. UTL

Notes:
Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean includes positive detections and non-detected results for organics, with detection limits divided by two. Mean for metals data represents detected substances.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.
The Upper Tolerance Limit (UTL) or the Upper Prediction Limit (UPL) is an estimate of the concentration limit that includes 95 % of the background population.

Abbreviations:

N, Q, or other UTL*** — UTL is based on a 95 % upper limit (using t-value) when data are normal (N). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.

KM — Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.

TABLE 2-11

BACKGROUND STATISTICS - SURFACE WATER DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection Min.		Max.	Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL) Back. Mean	Std.Dev. Back.	t Value	N, Q, or Other***	Back. UTL
aluminum	1/1	561	-	561	561	BGSW03 03/13/97	145				
antimony	0/8		-			NA					
arsenic	0/8		-			NA					
barium	8/8	87.3	-	112	101	BGSW05 03/13/97	101	9.19	3.1880	N	130
beryllium	0/8		-			NA					
calcium	8/8	15800	-	34900	24600	BGSW01 03/13/97	24600	7720	3.1880	N	49300
chromium	0/8		-			NA					
cobalt	0/8		-			NA					
copper	1/8	10.8	-	10.8	5.73	BGSW03 03/13/97	5.73				
cyanide	0/8		-			NA					
iron	8/8	85.3	-	635	321	BGSW03 03/13/97	321	156	3.1880	N	817
lead	1/8	0.8	-	0.8	0.538	BGSW03 03/13/97	0.538				
magnesium	8/8	6250	-	12100	8910	BGSW01 03/13/97	8910	2350	3.1880	N	16400
manganese	8/8	26.7	-	110.25	67.1	BGSW03 03/13/97	67.1	26.2	3.1880	N	150
nickel	1/8	20.7	-	20.7	11.3	BGSW03 03/13/97	11.3				
potassium	6/8	1750	-	2860	1830	BGSW01 03/13/97	1830				
sodium	8/8	10700	-	36200	20100	BGSW02 03/13/97	20100	10300	3.1880	N	52900
vanadium	0/8		-			NA					
zinc	3/8	7.8	-	12.85	5.28	BGSW03 03/13/97	5.28				
dieldrin	0/8		-			NA					
bis(2-ethylhexyl)phthalate	0/8		-			NA					
di-n-butylphthalate	0/8		-			NA					
4-methyl-2-pentanone	0/8		-			NA					
acetone	0/8		-			NA					

TABLE 2-11

BACKGROUND STATISTICS - SURFACE WATER DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection		Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL)				
		Min.	Max.			Back. Mean	Std.Dev. Back.	t Value	N, Q, or Other***	Back. UTL

Notes: Units are ug/L.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean includes positive detections and non-detected results for organics, with detection limits divided by two. Mean for metals data represents detected substances.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.
The Upper Tolerance Limit (UTL) or the Upper Prediction Limit (UPL) is an estimate of the concentration limit that includes 95 % of the background population.

Abbreviations:

N, Q, or other UTL*** UTL is based on a 95 % upper limit (using t-value) when data are normal (N). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.

KM Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.

TABLE 2-12

BACKGROUND STATISTICS - SEDIMENT DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection Min.		Max.	Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL) Back. Mean@	Std.Dev. Back.@	t Value	N, L, Q, or Other***	Back. UTL
aluminum	8/8	3610	-	8950	6620	BGSD01 03/13/97	6620	1950	3.1880	N	12800
antimony	0/5		-			NA					
arsenic	8/8	3.2	-	7.2	4.55	BGSD01 03/13/97	4.55	1.26	3.1880	N	8.56
barium	8/8	54.6	-	160.5	98.2	BGSD03 03/13/97	98.2	32.5	3.1880	N	202
beryllium	8/8	0.52	-	1.2	0.878	BGSD01 03/13/97	0.878	0.28	3.1880	N	1.77
cadmium	0/8		-			NA					
calcium	8/8	744	-	18200	4980	BGSD06 03/13/97	4980				
chromium	8/8	6.8	-	34.5	15.7	BGSD01 03/13/97	2.59	0.585	3.1880	L	86.1
cobalt	8/8	4.5	-	12.4	7.21	BGSD01 03/13/97	7.21	2.64	3.1880	N	15.6
copper	8/8	5.8	-	27.8	13.4	BGSD01 03/13/97	13.4	7.64	3.1880	N	37.7
cyanide	0/8		-			NA					
iron	8/8	9540	-	35400	16500	BGSD01 03/13/97	9.6	0.473	3.1880	L	66600
lead	8/8	6.4	-	27.6	15.3	BGSD03 03/13/97	15.3	7.34	3.1880	N	38.7
magnesium	8/8	999	-	10600	3440	BGSD06 03/13/97	3440				
manganese	8/8	376	-	759	514	BGSD01 03/13/97	514	135	3.1880	N	944
mercury	0/8		-			NA					
nickel	8/8	6.8	-	22.7	12.5	BGSD01 03/13/97	12.5	5.74	3.1880	N	30.7
potassium	7/8	514	-	2330	1050	BGSD01 03/13/97	6.7	0.771	3.1880	L	9460
selenium	2/8	0.36	-	0.475	0.198	BGSD03 03/13/97	0.198				
sodium	2/8	240	-	560	143	BGSD01 03/13/97	143				
thallium	0/8		-			NA					
vanadium	8/8	7.9	-	52.6	22.6	BGSD01 03/13/97	2.91	0.669	3.1880	L	155
zinc	8/8	25.4	-	97.6	51.2	BGSD01 03/13/97	51.2	25.6	3.1880	N	133
aldrin	0/8		-			NA					
alpha-chlordane	0/8		-			NA					
Aroclor-1260	0/8		-			NA					
dieldrin	1/8	3.1	-	3.1	2.26	BGSD03 03/13/97	2.26				
endosulfan I	0/8		-			NA					
gamma-chlordane	0/8		-			NA					

TABLE 2-12

BACKGROUND STATISTICS - SEDIMENT DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL) Back. Mean@	Std.Dev. Back.@	t Value	N, L, Q, or Other***	Back. UTL
2,4-dinitrotoluene	0/8	-			NA					
2,6-dinitrotoluene	0/8	-			NA					
2-methylnaphthalene	0/8	-			NA					
acenaphthene	0/8	-			NA					
acenaphthylene	0/8	-			NA					
anthracene	0/8	-			NA					
benz(a)anthracene	1/8	580	580	275	BGSD01 03/13/97	275				
benzo(a)pyrene	1/8	530	530	268	BGSD01 03/13/97	268				
benzo(b)fluoranthene	1/8	670	670	286	BGSD01 03/13/97	286				
benzo(g,h,i)perylene	0/8	-			NA					
benzo(k)fluoranthene	1/8	300	300	240	BGSD01 03/13/97	240				
bis(2-ethylhexyl)phthalate	0/8	-			NA					
butylbenzylphthalate	0/8	-			NA					
carbazole	0/8	-			NA					
chrysene	3/8	110	640	238	BGSD01 03/13/97	238				
dibenz(a,h)anthracene	0/8	-			NA					
dibenzofuran	0/8	-			NA					
fluoranthene	4/8	100	510	221	BGSD01 03/13/97	221				
fluorene	0/8	-			NA					
indeno(1,2,3-cd)pyrene	0/8	-			NA					
N-nitrosodiphenylamine (1)	0/8	-			NA					
naphthalene	0/8	-			NA					
phenanthrene	1/8	260	260	235	BGSD01 03/13/97	235				
pyrene	4/8	100	1300	315	BGSD01 03/13/97	315				
2-butanone	0/8	-			NA					
acetone	0/5	-			NA					
ethylbenzene	0/8	-			NA					
toluene	0/8	-			NA					

TABLE 2-12

BACKGROUND STATISTICS - SEDIMENT DATA
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	95 % Upper Tolerance Limit (UTL) Back. Mean@	Std.Dev. Back.@	t Value	N, L, Q, or Other***	Back. UTL

Notes: Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean includes positive detections and non-detected results for organics, with detection limits divided by two. Mean for metals data represents detected substances.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.
The Upper Tolerance Limit (UTL) or the Upper Prediction Limit (UPL) is an estimate of the concentration limit that includes 95 % of the background population.

Abbreviations:

N, L, Q, or other UTL*** UTL is based on a 95 % upper limit (using t-value) when data are normal (N) or lognormal (L). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.

KM Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.

TABLE 3-1

TEST PIT DETAILS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Test Pit	Total Length (ft)	Total Depth (ft bgs)	Waste or Debris Encountered? (Yes/No)	Number of Samples Collected[1]
03TP05	50	10	YES	2
03TP06	53	8.5	YES	4
03TP07	51	5	NO	2
03TP08	50	10	YES	3
03TP09	50	10	NO	2
03TP10	50	8	NO	2
03TP11	50	9	YES	2
03TP12	50	9	YES	2
03TP13	25	5	NO	1
03TP14	17	6	YES	1
03TP15	25	9	NO	1
03TP16	25	4	NO	1
03TP17	27	5	NO	1
03TP19	71	10	YES	2
03TP20	47	12	YES	2
03TP21A	28	11	NO	0
03TP21B	18	9	NO	0
03TP22	36	9	YES	0
03TP23	36	6.5	YES	1
03TP24	64	8	YES	1
03TP25	49	8	YES	2
03TP26	51	51	YES	1
03TP27	46	7	YES	2
03TP28	47	7	YES	1
03TP29	25	4	YES	1
03TP30	19	9	YES	1

ft bgs – feet below ground surface
[1] Does not include duplicate samples.

TABLE 3-2

WELL CONSTRUCTION DETAILS
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Well Designation	Well Diameter (inches)	Screen Interval (feet bgs)	Elevation TOC (feet AMSL)	Monitored Depth Zone
03MW01S	4	12 - 32	347.49	Shallow
03MW01SI	4	60 - 80	346.98	Shallow-Intermediate
03MW01I	4	159 - 179	346.57	Intermediate
03MW02S	4	4.5 - 22.5	326.15	Shallow
03MW02SI	2	55 - 65	326.33	Shallow-Intermediate
03MW02I	2	134 - 144	326.38	Intermediate
03MW03S	4	5 - 20	312.96	Shallow
03MW03SI	4	58 - 81	313.75	Shallow-Intermediate
03MW03I	4	148.5 - 168.5	314.08	Intermediate
03MW04S	4	5 - 35	324.49	Shallow
03MW04SI	4	60 - 80	323.87	Shallow-Intermediate
03MW04I	4	148 - 168	323.93	Intermediate
03MW05S	4	17 - 37	361.98	Shallow
03MW05I	2	82 - 92	360.93	Shallow-Intermediate
03MW06S	2	26 - 36	367.00	Shallow
03MW06SI	2	75 - 85	366.86	Shallow-Intermediate
03MW06I	2	140 - 150	366.82	Intermediate
03MW07S	2	34 - 44	324.90	Shallow
03MW08S	2	38 - 68	365.59	Shallow-Intermediate
03MW08D	2	163 - 173	365.63	Intermediate
03MW09O	2	5 - 10	319.22	Overburden
03MW09S	2	18 - 33	318.24	Shallow

TABLE 3-3

STATIC-WATER-LEVEL MEASUREMENTS
SITE 3 – NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Well Number	TOC Elevation	Date	Depth to Water (feet below TOC)[1]	Groundwater Elevation (feet amsl)	Date	Depth to Water (feet below TOC)[1]	Groundwater Elevation (feet amsl)	Date	Depth to Water (feet below TOC)[1]	Groundwater Elevation (feet amsl)
03MW01S	347.49	07/02/97	25.31	322.18	08/07/97	24.48	323.01	09/28/06	21.80	325.69
03MW01SI	346.98	07/02/97	28.89	318.09	08/07/97	28.33	318.65	09/28/06	23.53	323.45
03MW01I	346.57	07/02/97	15.76	330.81	08/07/97	14.45	332.12	09/28/06	9.88	336.69
03MW02S	326.15	07/02/97	13.51	312.64	08/07/97	12.37	313.78	09/28/06	11.32	314.83
03MW02SI	326.33	07/02/97	14.63	311.70	08/07/97	13.77	312.56	09/28/06	12.05	314.28
03MW02I	326.38	07/02/97	8.96	317.42	08/07/97	8.24	318.14	09/28/06	4.14	322.24
03MW03S	312.96	07/02/97	7.45	305.51	08/07/97	6.56	306.40	09/28/06	4.95	308.01
03MW03SI	313.75	07/02/97	3.45	317.20	08/07/97	3.45	317.20	09/28/06	---	---
03MW03I	314.08	07/02/97	-2.15	316.23	08/07/97	-1.15	315.23	09/28/06	-8.04	322.12
03MW04S	324.49	07/02/97	15.19	309.30	08/07/97	14.37	310.12	09/28/06	12.99	310.88
03MW04SI	323.87	07/02/97	7.46	316.41	08/07/97	6.73	317.14	09/28/06	2.38	322.11
03MW04I	323.93	07/02/97	-5.75	329.68	08/07/97	-5.75	329.68	09/28/06	-7.73	331.66
03MW05S	361.98	07/02/97	31.79	330.19	08/07/97	30.82	331.16	09/28/06	27.45	334.53
03MW05I	360.93	07/02/97	31.10	329.83	08/07/97	30.10	330.83	09/28/06	26.03	334.90
03MW06S	367.00	07/02/97	36.64	330.36	08/07/97	33.63	333.37	09/28/06	32.22	334.78
03MW06SI	366.86	07/02/97	34.88	331.98	08/07/97	33.79	333.07	09/28/06	29.06	337.80
03MW06I	366.82	07/02/97	35.06	331.76	08/07/97	33.91	332.91	09/28/06	29.24	337.58
03MW07S	324.90	07/02/97	16.20	308.70	08/07/97	14.69	310.21	09/28/06	12.43	312.47
03MW08S	365.59	07/02/97	NA	NA	08/07/97	NA	NA	09/28/06	25.79	339.80
03MW08D	365.63	07/02/97	NA	NA	08/07/97	NA	NA	09/28/06	27.31	338.32

[1] TOC = Top of Casing
NA = Not Available. Well had not been installed at time of sampling round.

TABLE 3-3

STATIC-WATER-LEVEL MEASUREMENTS
SITE 3 – NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

Well Number	TOC Elevation	Date	Depth to Water (feet below TOC)[1]	Groundwater Elevation (feet amsl)	Date	Depth to Water (feet below TOC)[1]	Groundwater Elevation (feet amsl)	Date	Depth to Water (feet below TOC)[1]	Groundwater Elevation (feet amsl)
03MW01S	347.49	03/18/08	21.68	325.81	10/14/08	24.03	323.46	04/01/09	24.52	322.97
03MW01SI	346.98	03/18/08	20.41	326.57	10/14/08	23.39	323.59	04/01/09	26.29	320.69
03MW01I	346.57	03/18/08	6.18	341.32	10/14/08	13.10	334.40	04/01/09	11.96	335.54
03MW02S	326.15	03/18/08	9.72	316.43	10/14/08	12.71	313.44	04/01/09	10.90	315.25
03MW02SI	326.33	03/18/08	10.00	316.33	10/14/08	12.88	313.45	04/01/09	12.91	313.42
03MW02I	326.38	03/18/08	1.06	325.32	10/14/08	4.32	322.06	04/01/09	6.62	319.76
03MW03S	312.96	03/18/08	1.85	311.11	10/14/08	3.82	309.14	04/01/09	5.15	307.81
03MW03SI	313.75	03/18/08	-0.91	314.66	10/14/08	-7.44	321.19	04/01/09	-5.95	319.70
03MW03I	314.08	03/18/08	-11.35	326.35	10/14/08	-8.32	323.32	04/01/09	-6.55	321.55
03MW04S	324.49	03/18/08	10.94	313.55	10/14/08	10.63	313.86	04/01/09	13.66	310.83
03MW04SI	323.87	03/18/08	-0.69	324.56	10/14/08	-1.90	325.77	04/01/09	4.90	318.97
03MW04I	323.93	03/18/08	-12.00	336.85	10/14/08	-6.31	336.85	04/01/09	-7.52	332.37
03MW05S	361.98	03/18/08	24.53	338.37	10/14/08	29.72	333.18	04/01/09	30.33	332.57
03MW05I	360.93	03/18/08	22.86	340.07	10/14/08	28.49	334.44	04/01/09	28.70	334.23
03MW06S	367.00	03/18/08	29.32	337.68	10/14/08	34.48	332.52	04/01/09	35.10	331.90
03MW06SI	366.86	03/18/08	25.41	341.45	10/14/08	32.40	334.46	04/01/09	31.30	335.56
03MW06I	366.82	03/18/08	25.86	340.96	10/14/08	32.56	334.26	04/01/09	31.07	335.75
03MW07S	324.90	03/18/08	10.58	314.32	10/14/08	12.30	312.60	04/01/09	13.02	311.88
03MW08S	365.59	03/18/08	22.15	343.44	10/14/08	29.40	336.19	04/01/09	28.30	337.29
03MW08D	365.63	03/18/08	24.57	341.06	10/14/08	30.75	334.88	04/01/09	28.59	337.04

[1] TOC = Top of Casing
NA = Not Available. Well had not been installed at time of sampling round.

TABLE 4-1

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN LANDFILL AREA SURFACE SOIL SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data						
	Freq. of	Range of Positive Detection		Mean of	Sampling Round and	Freq. of	Range of Positive Detection		Mean of	Sampling Round and	Range of Detection Limits	
Substance	Detection	Min.	Max.	All Data	Location of Maximum	Detection	Min.	Max.	All Data	Location of Maximum	Min.	Max.
Total 2,3,7,8-TCDD Equiv.	0/0	-				2/2	4.5	12.6	8.55	03SS04_19970408	-	
Aluminum	12/12	8570	15000	11300	BGSS06 04/07/97	68/68	8200	24600	15700	03SS41	-	
Antimony	0/2	-				21/51	0.22 L	10.4	2.39	03SB01_19910906	0.2	10.1
Arsenic	12/12	3.7 K	10.6	6.65	BGSS03 04/07/97	61/61	0.37 J	13	4.92	03SB10_19910906	-	
Barium	12/12	77.8	111	95.7	BGSS04 04/07/97	68/68	47.6	246	105	03SS37	-	
Beryllium	12/12	0.75	1.3	0.987	BGSS11 04/07/97	42/42	0.62	2 K	1.01	03-SS-23	-	
Cadmium	0/12	-				23/49	0.22 J	18.4	1.83	03SS09_19970408	0.03	1.4
Calcium	12/12	614	1600	1020	BGSS12 04/07/97	68/68	372	86400	3110	03SB06_19910906	-	
Chromium	12/12	12.4	20.8	15.3	BGSS02 04/07/97	68/68	6.4	35.8	20.5	03SS35	-	
Cobalt	12/12	6.8	9.3	7.9	BGSS02 04/07/97	68/68	5.2	12.2	8.5	03SB15_19910906	-	
Copper	12/12	8	13.4	10.7	BGSS09 04/07/97	68/68	9.9	182 K	30.8	03SS37	-	
Cyanide	2/12	0.7	3.8	0.649	BGSS09 04/07/97	6/68	0.11	2.3	0.633	03SS09_19970408	0.13	2.9
Iron	12/12	11500	17600	14800	BGSS06 04/07/97	68/68	13800	70900 J	20600	03SS35	-	
Lead	12/12	16.3	64.7	30.6	BGSS04 04/07/97	68/68	3.2	379 J	37.9	03SS35	-	
Magnesium	12/12	1210	1940	1500	BGSS06 04/07/97	68/68	553	50200	2520	03SB06_19910906	-	
Manganese	12/12	429	1190	642	BGSS04 04/07/97	68/68	318	1780	633	03SS11_19910905	-	
Mercury	0/12	-				29/68	0.021 J	0.77	0.098	03-SS-23	0.09	0.14
Nickel	12/12	7.4	11.2	9.79	BGSS04 04/07/97	68/68	6.3	39	13	03SB06_19910906-D	-	
Potassium	7/12	436	771	434	BGSS05 04/07/97	66/68	245	2130	737	03SS11_19970408	390	416
Selenium	0/12	-				1/33	0.36 L	0.36 L	0.423	03SS32	0.3	1.2
Silver	0/12	-				12/66	0.36 K	26.3 J	0.833	03SS35	0.035	1.6
Sodium	2/12	112	120	63.7	BGSS09 04/07/97	37/58	26.2 L	884	327	03SB12_19910906	95.2	1010
Thallium	7/12	0.25	0.34	0.226	BGSS07 04/07/97	24/61	0.26 L	1.8 J	0.316	03-SS-20	0.15	0.73
Vanadium	12/12	20.9	28.2	24.9	BGSS02 04/07/97	68/68	16.5	45.7	30.4	03-SS-25	-	
Zinc	12/12	21.7	597	90.1	BGSS04 04/07/97	68/68	16.9	466	65.7	03-SS-23	-	
4,4'-DDD	0/12	-				13/68	1.2 J	45	11.2	03-SS-18	2	190
4,4'-DDE	0/12	-				17/68	0.57 J	210	16.2	03SS35	2	190
4,4'-DDT	2/12	6.2 J	8.3 J	3.01	BGSS10 04/07/97	17/67	1.1 J	450	24.2	03SS35	2	190
Aldrin	0/12	-				5/68	0.27 J	1.6 J	4.76	03SS34	2	94
Alpha-BHC	0/12	-				3/68	0.86 J	5.6	4.85	03SS38	2	94
Alpha-Chlordane	0/12	-				9/61	0.53 J	23 J	42	03TP12-0102-03-20070504	2	940
Aroclor-1254	0/12	-				3/68	13 J	84 J	86.5	03SS09_19970408	19	1900
Aroclor-1260	0/12	-				3/68	12 J	150 J	87.5	03SS35-D	19	1900
Beta-BHC	0/12	-				2/66	0.8 J	0.98 J	4.62	03-SS-24	1	94
Dieldrin	9/12	13	760	179	BGSS03 04/07/97	59/67	1.6 J	620 J	75.2	03SS12_19970408	3.9	43
Endosulfan I	0/12	-				6/68	0.25 J	30	5.41	03SB13_19910906	2	94
Endosulfan II	0/12	-				5/68	0.49 J	16 J	9.69	03SS35-D	2	190
Endosulfan Sulfate	0/12	-				2/68	1.3 J	3.2 J	9.49	03SS34	2	190
Endrin	0/12	-				2/67	0.61 J	16 J	9.82	03SS35-D	2	190
Endrin Aldehyde	0/12	-				11/38	0.61 J	8 J	4.35	03SS32	2	49
Endrin Ketone	0/12	-				5/68	0.29 J	9.6 J	9.64	03SS38	2	190
Gamma-BHC (Lindane)	0/12	-				1/68	1.1 J	1.1 J	4.78	03TP12-0102-03-20070504	2	94
Gamma-Chlordane	4/12	3.2	48 J	8.67	BGSS10 04/07/97	6/64	0.58 J	33 J	40.5	03SS35-D	2	940
Heptachlor	0/12	-				2/68	0.71 J	3.9	4.82	03SS31	2	94

TABLE 4-1

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN LANDFILL AREA SURFACE SOIL SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Range of Detection Limits Min. - Max.
Heptachlor Epoxide	3/12	3.4 J	47	7.79	BGSS10 04/07/97	12/67	0.55 J	20 J	5.52	03SS35-D	2 - 94
Methoxychlor	0/12	-				1/68	5 J	5 J	47.5	03SS32	3.8 - 940
1,2-Dichlorobenzene	0/12	-				7/68	39 J	330 J	231	03SB07_19910906	4.8 - 19000
1,4-Dichlorobenzene	0/12	-				12/68	39 J	160 J	219	03SB01_19910906	4.8 - 19000
1-Methylnaphthalene	0/0	-				8/12	0.74 J	3.5 J	3.37	03-SS-27	11 - 13
2-Methylnaphthalene	0/12	-				19/68	0.93 J	9500 J	385	03SB06_19910906	9.9 - 20000
Acenaphthene	3/12	55 J	64 J	178	BGSS10 04/07/97	23/68	0.8 J	33000	535	03SB06_19910906	9.9 - 740
Acenaphthylene	3/12	54 J	62 J	177	BGSS12 04/07/97	26/68	0.86 J	160 J	389	03SB01_19910906	200 - 20000
Anthracene	6/12	46 J	160 J	154	BGSS12 04/07/97	34/68	0.86 J	66000	1090	03SB06_19910906	350 - 740
Benz(a)anthracene	9/12	33 J	940	306	BGSS12 04/07/97	55/68	4.2 J	65000	1210	03SB06_19910906	370 - 430
Benzaldehyde	0/0	-				2/26	29 J	77 J	492	03SS40	200 - 20000
Benzo(a)pyrene	8/12	110 J	1100	394	BGSS12 04/07/97	55/68	5.1 J	48000	934	03SB06_19910906	370 - 430
Benzo(b)fluoranthene	8/12	160 J	1500	507	BGSS12 04/07/97	59/68	7.2 J	58000	1020	03SB06_19910906	370 - 430
Benzo(g,h,i)perylene	7/12	52 J	490	225	BGSS12 04/07/97	45/68	3.7 J	13000 J	398	03SB06_19910906	350 - 450
Benzo(k)fluoranthene	7/12	98 J	920	370	BGSS12 04/07/97	53/68	5.2 J	31000	687	03SB06_19910906	370 - 450
Bis(2-ethylhexyl) Phthalate	0/0	-				22/56	38 J	690	484	03SS36	200 - 20000
Butyl Benzyl Phthalate	3/12	83 J	280 J	208	BGSS02 04/07/97	1/68	330 J	330 J	432	03SS09_19970408	200 - 20000
Carbazole	5/12	80 J	310 J	212	BGSS10 04/07/97	3/38	79 J	3200 J	226	03TP12-0102-03-20070504	200 - 460
Chrysene	9/12	43 J	1200	420	BGSS12 04/07/97	62/68	6.6 J	52000	1050	03SB06_19910906	370 - 400
Di-n-butyl Phthalate	0/2	-				2/59	60 J	370 J	477	03SS07_19910905	200 - 20000
Dibenz(a,h)anthracene	5/12	52 J	160 J	161	BGSS12 04/07/97	26/65	1.7 J	4800 J	333	03SB06_19910906	350 - 20000
Dibenzofuran	4/12	51 J	120 J	172	BGSS08 04/07/97	4/68	73 J	29000	631	03SB06_19910906	200 - 20000
Fluoranthene	10/12	49 J	2600	902	BGSS12 04/07/97	65/68	15	150000	2700	03SB06_19910906	380 - 400
Fluorene	4/12	59 J	160 J	184	BGSS08 04/07/97	27/68	0.73 J	41000	653	03SB06_19910906	11 - 740
Indeno(1,2,3-cd)pyrene	8/12	49 J	640	251	BGSS12 04/07/97	45/68	4.4 J	19000	489	03SB06_19910906	350 - 740
Naphthalene	0/12	-				4/48	3.1 J	13000 J	593	03SB06_19910906	200 - 20000
Phenanthrene	8/12	110 J	1700	667	BGSS12 04/07/97	64/68	5.6 J	210000	3460	03SB06_19910906	380 - 400
Pyrene	10/12	46 J	2100	723	BGSS12 04/07/97	65/68	11	140000	2510	03SB06_19910906	380 - 400
1,2,4-Trichlorobenzene	0/12	-				1/68	150 J	150 J	239	03SB07_19910906	4.8 - 19000
2-Butanone	0/0	-				15/50	4 J	20	7.41	03SS40	5 - 19
Acetone	0/0	-				20/37	89	270	82.5	03-SS-26	11 - 22
Benzene	0/0	-				1/56	1.4 J	1.4 J	2.99	03SS32	4.8 - 8
Chloromethane	0/0	-				3/56	2.1 J	3.6 J	4.43	03SS32	4.8 - 12
Methyl Acetate	0/0	-				1/26	5.5 J	5.5 J	3.18	03-SS-21	4.8 - 8
Toluene	0/0	-				9/56	1.7 J	15	3.16	03-SS-18	4.8 - 7.8

Notes:

Units are mg/kg for inorganics, ug/kg for organics except dioxin, ng/kg for 2,3,7,8-TCDD Toxicity Equivalents.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-2

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN HANGAR AREA SURFACE SOIL SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data					
	Freq. of	Range of Positive Detection		Mean of	Sampling Round and	Freq. of	Range of Positive Detection		Mean of	Sampling Round and	Range of Detection Limits	
Substance	Detection	Min.	Max.	All Data	Location of Maximum	Detection	Min.	Max.	All Data	Location of Maximum	Min.	Max.
2-Methylnaphthalene	0/12	-				1/1	18 J	18 J	18	03SB18-0002	-	
Acenaphthene	3/12	55 J	64 J	178	BGSS10 04/07/97	1/1	62 J	62 J	62	03SB18-0002	-	
Acenaphthylene	3/12	54 J	62 J	177	BGSS12 04/07/97	1/1	96 J	96 J	96	03SB18-0002	-	
Anthracene	6/12	46 J	160 J	154	BGSS12 04/07/97	1/1	260 J	260 J	260	03SB18-0002	-	
Benz(a)anthracene	9/12	33 J	940	306	BGSS12 04/07/97	1/1	780	780	780	03SB18-0002	-	
Benzo(a)pyrene	8/12	110 J	1100	394	BGSS12 04/07/97	1/1	860	860	860	03SB18-0002	-	
Benzo(b)fluoranthene	8/12	160 J	1500	507	BGSS12 04/07/97	1/1	1100	1100	1100	03SB18-0002	-	
Benzo(g,h,i)perylene	7/12	52 J	490	225	BGSS12 04/07/97	1/1	740	740	740	03SB18-0002	-	
Benzo(k)fluoranthene	7/12	98 J	920	370	BGSS12 04/07/97	1/1	410	410	410	03SB18-0002	-	
Bis(2-ethylhexyl) Phthalate	0/0	-				1/1	52 J	52 J	52	03SB18-0002	-	
Butyl Benzyl Phthalate	3/12	83 J	280 J	208	BGSS02 04/07/97	1/1	33 J	33 J	33	03SB18-0002	-	
Carbazole	5/12	80 J	310 J	212	BGSS10 04/07/97	1/1	120 J	120 J	120	03SB18-0002	-	
Chrysene	9/12	43 J	1200	420	BGSS12 04/07/97	1/1	960	960	960	03SB18-0002	-	
Dibenz(a,h)anthracene	5/12	52 J	160 J	161	BGSS12 04/07/97	1/1	180 J	180 J	180	03SB18-0002	-	
Dibenzofuran	4/12	51 J	120 J	172	BGSS08 04/07/97	1/1	63 J	63 J	63	03SB18-0002	-	
Fluoranthene	10/12	49 J	2600	902	BGSS12 04/07/97	1/1	2100	2100	2100	03SB18-0002	-	
Fluorene	4/12	59 J	160 J	184	BGSS08 04/07/97	1/1	110 J	110 J	110	03SB18-0002	-	
Indeno(1,2,3-cd)pyrene	8/12	49 J	640	251	BGSS12 04/07/97	1/1	680	680	680	03SB18-0002	-	
Phenanthrene	8/12	110 J	1700	667	BGSS12 04/07/97	1/1	1400	1400	1400	03SB18-0002	-	
Pyrene	10/12	46 J	2100	723	BGSS12 04/07/97	1/1	1500	1500	1500	03SB18-0002	-	

Notes:

Units are mg/kg for inorganics, ug/kg for organics except dioxin, ng/kg for 2,3,7,8-TCDD Toxicity Equivalents.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-3

STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 LANDFILL AREA SURFACE SOIL TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		Site 3 ss Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are Site 3 ss?				Ranks of Site 3 ss > bkg.?				Site 3 ss Mean > bkg. Mean ?					Site 3 ss Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:		#ND & Pos.>=5 or use Fisher				Data fit normal or gamma distrib., or nonparametric					# Site 3 ss (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 ss & bkg. both normally distributed						
Test Criterion:		P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
		bkg.	Site 3 ss	P	YN	Back.	Std.Dev.	t	N, Q, or	Back.	r	k	P	YN	P	Test	Used	YN	bkg.	Site 3 ss	t	t	YN	bkg.	Site 3 ss	Std.Dev.	Std.Dev.	F	F	YN
Concentration > background? Y		Freq.	Freq.	Value		Mean	Back	Value	Other***	UTL			Value		Value				Mean	Mean	Value	Table		Distrib.	Distrib.	bkg.	Site 3 ss	Value	Table	
Total 2,3,7,8-TCDD Equiv.	NA	0/0	2/2		NA									NA				NA		8.55			NA							NA
Aluminum	**Y**	12/12	68/68		NA	11300	1720	2.7360	N	16000	56	55	<.0001	**Y**	<.0001	Gehan	Test	**Y**	11300	15700			NA	lognor.	nonpar.					NA
Antimony	NA*	0/2	21/51		NA						1	1	0.9623	N				NA		2.39			NA							NA
Arsenic	N	12/12	61/61		NA	6.65	1.83	2.7360	N	11.7	1	1	0.8356	N	0.9968	Gehan	Test	N	6.65	4.92			NA	lognor.	nonpar.					NA
Barium	**Y**	12/12	68/68		NA	95.7	12.3	2.7360	N	129	22	22	0.0148	**Y**	0.2523	Gehan	Test	N	95.7	105			NA	lognor.	nonpar.					NA
Beryllium	N	12/12	42/42		NA	0.987	0.192	2.7360	N	1.51	11	10	0.2292	N	0.5333	Gehan	Test	N	0.987	1.01			NA	lognor.	lognor.					NA
Cadmium	**Y**	0/12	23/49		NA						21	21	0.0032	**Y**				NA		1.83			NA							NA
Calcium	**Y**	12/12	68/68		NA	1020	352	2.7360	N	1980	24	24	0.0093	**Y**	0.0320	Gehan	Test	**Y**	1020	3110			NA	lognor.	nonpar.					NA
Chromium	**Y**	12/12	68/68		NA	15.3	2.28	2.7360	N	21.6	54	53	<.0001	**Y**	0.0001	Gehan	Test	**Y**	15.3	20.5			NA	lognor.	nonpar.					NA
Cobalt	**Y**	12/12	68/68		NA	7.9	0.788	2.7360	N	10.1	29	28	0.0256	**Y**	0.0639	Gehan	Test	N	7.9	8.5			NA	normal	nonpar.					NA
Copper	**Y**	12/12	68/68		NA	10.7	1.54	2.7360	N	14.9	46	46	<.0001	**Y**	<.0001	Gehan	Test	**Y**	10.7	30.8			NA	normal	nonpar.					NA
Cyanide	NA*	2/12	6/68		NA	0.649								NA	0.9880	Gehan	Test	N	0.649	0.633			NA	nonpar.	nonpar.					NA
Iron	**Y**	12/12	68/68		NA	14800	1760	2.7360	N	19600	45	45	<.0001	**Y**	<.0001	Gehan	Test	**Y**	14800	20600			NA	lognor.	nonpar.					NA
Lead	N	12/12	68/68		NA	30.6	15.2		gamma***	60.8	26	24	0.1761	N	0.4758	Gehan	Test	N	30.6	37.9			NA	lognor.	nonpar.					NA
Magnesium	**Y**	12/12	68/68		NA	1500	172	2.7360	N	1970	45	44	0.0003	**Y**	0.0041	Gehan	Test	**Y**	1500	2520			NA	lognor.	nonpar.					NA
Manganese	N	12/12	68/68		NA	642	206		gamma***	1030	25	23	0.2026	N	0.6088	Gehan	Test	N	642	633			NA	lognor.	nonpar.					NA
Mercury	N	0/12	29/68	0.0026	**Y**						13	13	0.0995	N				NA		0.098			NA							NA
Nickel	**Y**	12/12	68/68		NA	9.79	0.954	2.7360	N	12.4	57	56	<.0001	**Y**	<.0001	Gehan	Test	**Y**	9.79	13			NA	normal	nonpar.					NA
Potassium	**Y**	7/12	66/68	0.0006	**Y**	599	132		KM UPL***	1090	30	30	0.0020	**Y**	0.0009	Gehan	Test	**Y**	434	737			NA	normal	nonpar.					NA
Selenium	NA*	0/12	1/33		NA									NA				NA		0.423			NA							NA
Silver	N	0/12	12/66		NA						4	4	0.5053	N				NA		0.833			NA							NA
Sodium	**Y**	2/12	37/58		NA	116								NA	<.0001	Gehan	Test	**Y**	63.7	327			NA	nonpar.	nonpar.					NA
Thallium	N	7/12	24/61		NA	0.291	0.027		KM UPL***	0.4	2	2	0.6963	N	0.2276	Gehan	Test	N	0.226	0.316			NA	nonpar.	nonpar.					NA
Vanadium	**Y**	12/12	68/68		NA	24.9	2.13	2.7360	N	30.7	40	40	0.0001	**Y**	0.0005	Gehan	Test	**Y**	24.9	30.4	5.7675	1.6787	**Y**	normal	normal	2.13	5.92	11.9170	3.8431	N
Zinc	N	12/12	68/68		NA	90.1	160		Q***	597	16	15	0.2520	N	0.7256	Gehan	Test	N	90.1	65.7			NA	nonpar.	nonpar.					NA
4,4'-DDD	NA*	0/12	13/68		NA									NA				NA		11.2			NA							NA
4,4'-DDE	NA*	0/12	17/68		NA						3	3	0.6100	N				NA		16.2			NA							NA
4,4'-DDT	NA*	2/12	17/67		NA	3.01					5	5	0.4285	N	0.2438	Gehan	Test	N	3.01	24.2			NA	nonpar.	nonpar.					NA
Aldrin	NA*	0/12	5/68		NA									NA				NA		4.76			NA							NA
Alpha-BHC	NA*	0/12	3/68		NA									NA				NA		4.85			NA							NA
Alpha-Chlordane	NA*	0/12	9/61		NA									NA				NA		42			NA							NA
Aroclor-1254	NA*	0/12	3/68		NA									NA				NA		86.5			NA							NA
Aroclor-1260	NA*	0/12	3/68		NA									NA				NA		87.5			NA							NA
Beta-BHC	NA*	0/12	2/66		NA									NA				NA		4.62			NA							NA
Dieldrin	N	9/12	59/67		NA	179					47	41	0.3378	N	0.6803	Gehan	Test	N	179	75.2			NA	lognor.	lognor.					NA
Endosulfan I	NA*	0/12	6/68		NA									NA				NA		5.41			NA							NA
Endosulfan II	NA*	0/12	5/68		NA									NA				NA		9.69			NA							NA
Endosulfan Sulfate	NA*	0/12	2/68		NA									NA				NA		9.49			NA							NA
Endrin	NA*	0/12	2/67		NA									NA				NA		9.82			NA							NA
Endrin Aldehyde	NA*	0/12	11/38		NA									NA				NA		4.35			NA							NA
Endrin Ketone	NA*	0/12	5/68		NA									NA				NA		9.64			NA							NA
Gamma-BHC (Lindane)	NA*	0/12	1/68		NA									NA				NA		4.78			NA							NA
Gamma-Chlordane	NA*	4/12	6/64		NA	8.67								NA	0.9932	Gehan	Test	N	8.67	40.5			NA	nonpar.	nonpar.					NA
Heptachlor	NA*	0/12	2/68		NA									NA				NA		4.82			NA							NA
Heptachlor Epoxide	NA*	3/12	12/67		NA	7.79								NA	0.8895	Gehan	Test	N	7.79	5.52			NA	nonpar.	nonpar.					NA
Methoxychlor	NA*	0/12	1/68		NA									NA				NA		47.5			NA							NA
1,2,4-Trichlorobenzene	NA*	0/12	1/68		NA									NA				NA		239			NA							NA
1,2-Dichlorobenzene	NA*	0/12	7/68		NA									NA				NA		231			NA							NA
1,4-Dichlorobenzene	NA*	0/12	12/68		NA									NA				NA		219			NA							NA
1-Methylnaphthalene	NA	0/0	8/12		NA									NA				NA		3.37			NA							NA
2-Methylnaphthalene	NA	0/12	19/68		NA						1	1	0.8500	N				NA		385			NA							NA
Acenaphthene	NA*	3/12	23/68		NA	178					3	3	0.6100	N	0.7439	Gehan	Test	N	178	535			NA	nonpar.	nonpar.					NA
Acenaphthylene	NA*	3/12	26/68		NA	177								NA	0.9976	Gehan	Test	N	177	389			NA	nonpar.	nonpar.					NA
Anthracene	N	6/12	34/68	0.6229	N	154					6	6	0.3642	N	0.8719	Gehan	Test	N	154	1090			NA	nonpar.	nonpar.					NA
Benz(a)anthracene	N	9/12	55/68	0.4463	N	306					6	6	0.3642	N	0.9819	Gehan	Test	N	306	1210			NA	lognor.	nonpar.					NA
Benzaldehyde	NA*	0/0	2/26		NA									NA				NA		492			NA							NA

TABLE 4-3

STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 LANDFILL AREA SURFACE SOIL TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Benzo(a)pyrene	N	8/12	55/68	0.2263	N	394					5	5	0.4336	N	0.9848	Gehan	Test	N	394	934			NA	lognor.	nonpar.					NA
Benzo(b)fluoranthene	N	8/12	59/68	0.0991	N	507					4	4	0.5149	N	0.9977	Gehan	Test	N	507	1020			NA	lognor.	nonpar.					NA
Benzo(g,h,i)perylene	N	7/12	45/68	0.4219	N	225					5	5	0.4336	N	0.9882	Gehan	Test	N	225	398			NA	normal	nonpar.					NA
Benzo(k)fluoranthene	N	7/12	53/68	0.1391	N	370					5	5	0.4336	N	0.9935	Gehan	Test	N	370	687			NA	lognor.	nonpar.					NA
Bis(2-ethylhexyl) Phthalate	NA	0/0	22/56		NA									NA				NA		484			NA							NA
Butyl Benzyl Phthalate	NA*	3/12	1/68		NA	208								NA	0.9978	Gehan	Test	N	208	432			NA	nonpar.	nonpar.					NA
Carbazole	N	5/12	3/38	0.9987	N	212					1	1	0.7600	N	0.9952	Gehan	Test	N	212	226			NA	normal	nonpar.					NA
Chrysene	N	9/12	62/68	0.1291	N	420					4	4	0.5149	N	0.9860	Gehan	Test	N	420	1050			NA	lognor.	nonpar.					NA
Di-n-butyl Phthalate	NA*	0/2	2/59		NA									NA				NA		477			NA							NA
Dibenz(a,h)anthracene	N	5/12	26/65		NA	161								NA	0.9745	Gehan	Test	N	161	333			NA	nonpar.	nonpar.					NA
Dibenzofuran	NA*	4/12	4/68		NA	172					1	1	0.8500	N	0.7040	Gehan	Test	N	172	631			NA	nonpar.	nonpar.					NA
Fluoranthene	N	10/12	65/68	0.1599	N	902					4	4	0.5149	N	0.9718	Gehan	Test	N	902	2700			NA	lognor.	nonpar.					NA
Fluorene	N	4/12	27/68		NA	184					4	4	0.5149	N	0.9078	Gehan	Test	N	184	653			NA	nonpar.	nonpar.					NA
Indeno(1,2,3-cd)pyrene	N	8/12	45/68	0.6327	N	251					3	3	0.6100	N	0.9962	Gehan	Test	N	251	489			NA	lognor.	nonpar.					NA
Naphthalene	NA*	0/12	4/48		NA						1	1	0.8000	N				NA		593			NA							NA
Phenanthrene	N	8/12	64/68	0.0154	**Y**	667					4	4	0.5149	N	0.9899	Gehan	Test	N	667	3460			NA	lognor.	nonpar.					NA
Pyrene	N	10/12	65/68	0.1599	N	723					6	6	0.3642	N	0.9802	Gehan	Test	N	723	2510			NA	lognor.	nonpar.					NA
2-Butanone	NA	0/0	15/50		NA									NA				NA		7.41			NA							NA
Acetone	NA	0/0	20/37		NA									NA				NA		82.5			NA							NA
Benzene	NA	0/0	1/56		NA									NA				NA		2.99			NA							NA
Chloromethane	NA	0/0	3/56		NA									NA				NA		4.43			NA							NA
Methyl Acetate	NA	0/0	1/26		NA									NA				NA		3.18			NA							NA
Toluene	NA	0/0	9/56		NA									NA				NA		3.16			NA							NA

**** Site 3 concentrations in soil are compared to background soil (ss).**

Interpretation of Z-Test or Fisher's Exact Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data's detection frequency is greater than the background data detection frequency.
Interpretation of Quantile Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more upper rank values relative to the background data set.
Since "k" samples from the top "r" ranks of the combined data set belonged to the site soil subgroup, this would be unlikely if the site and background data sets came from the same population.
Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more values ranked greater than the ranks of background data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians.
Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site data set belongs to a population having a greater mean relative to the mean of the background population.
Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 ss to bkg. soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 ss > bkg.) for each chemical appears at the left and is based on four criteria:
(1) Overall decision is YES if any one of the Mann-Whitney/Gehan, Quantile Test, or T-Test is YES, regardless of other test results.
(2) Overall decision is NO if at least one of Mann-Whitney/Gehan, Quantile Test, or T-Test is NO, and none of the aforementioned tests are YES.
(3) Overall decision is YES/NO if Z/Fisher Test is YES/NO, respectively, and other tests are NA. Z-test is treated as lowest priority since it relies on detection frequency, not magnitude of results.
(4) Overall decision is NA if all tests are NA. (Might occur if too few detections to be capable of detecting a statistically significant difference even if one exists.)
NOTE: This decision scheme does not utilize the UTL test because random false positive exceedances of the background UTL are probable if there are many site samples, even if site distribution matches background.

* Low power because either N is small or very low frequency of detected values with detections close to the detection limits, which interferes with the power of statistical tests to detect a significant difference between groups.

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 ss (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 ss results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 ss > bkg. with 95 % confidence.
N, Q, or other UTL***	UTL is based on a 95 % upper limit (using t-value) when data are normal (N). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.
KM	Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.
r,k	The Quantile test calculates the probability that k or more samples from the top r ranks of the combined Site 3 ss and bkg. data set are comprised of Site 3 ss data if both populations are in fact equal.

TABLE 4-4

TEST FORM II COMPARISON OF METALS IN LANDFILL AREA SURFACE SOIL TO BACKGROUND SURFACE SOIL
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		Ranks of Site 3 ss < bkg.+2σ?				Site 3 ss Mean < bkg. Mean + 2σ ?					Site 3 ss Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:						#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 sb & bkg. both normally distributed						
Test Criterion:		P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
Site Conc.< background + 2σ?	Y/N	P Value	Test	Used	YN	Site 3 ss Mean@	bkg.+ 2σ Mean@	t Value	t Table	YN	Site 3 ss Distrib.	bkg. Distrib.	Std.Dev. Site 3 ss@	Std.Dev. bkg. ss@	F Value	F Table	YN
Aluminum	N	0.7847	Gehan	Test	N	15700	14700			NA	nonpar.	normal					NA
Arsenic	**Y**	<.0001	Gehan	Test	**Y**	4.92	10.3			NA	nonpar.	normal					NA
Chromium	N	0.7074	Gehan	Test	N	20.5	19.9			NA	nonpar.	normal					NA
Copper	N	0.9651	Gehan	Test	N	30.8	13.8			NA	nonpar.	normal					NA
Iron	N	0.9078	Gehan	Test	N	20600	18300			NA	nonpar.	normal					NA
Manganese	**Y**	<.0001	Gehan	Test	**Y**	633	1050			NA	nonpar.	lognor.					NA

**** Site 3 Landfill Area metals concentrations in surface soil are compared to background surface soil (SS).**

Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the background data plus 2σ has a distribution with more values ranked greater than the rank site data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians

Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the background da belongs to a population having a greater mean relative to the mean of the site population.

Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 ss to bkg. Soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 ss < bkg. + 2σ) for each chemical appears at the left and is based on the criteria: Overall decision is YES if either one of the Mann-Whitney/Gehan or T-Test is YES.
NOTE: The Test Form 2 results do not utilize the UTL test or quantile test because the minimum detectable difference (MDD) is applied to the entire data set for a comparison of arithemetic mean or rank su

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 ss (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 ss results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 ss < bkg. + 2σ with 95 % confidence.
@	For the t-test, the arithmetic mean and standard deviation of un-transformed data are shown in every case, since the t-test cannot be run if site and background do not both match a normal distribution.

TABLE 4-5

STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 HANGAR AREA SURFACE SOIL TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		hangr.ss Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are hangr.ss?								hangr.ss Mean > bkg. Mean ?					hangr.ss Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:		#ND & Pos.>=5 or use Fisher				Data fit normal or gamma distrib., or nonparametric					# hangr.ss (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, hangr.ss & bkg. both normally distributed						
Test Criterion:		P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
Concentration > background?	Y/N	bkg. Freq.	hangr.ss Freq.	P Value	YN	Back. Mean	Std.Dev. Back	t Value	N, Q, or Other***	Back. UTL	r	k	P Value	YN	P Value	Test	Used	YN	bkg. Mean	hangr.ss Mean	t Value	t Table	YN	bkg. Distrib.	hangr.ss Distrib.	Std.Dev. bkg.	Std.Dev. hangr.ss	F Value	F Table	YN
2-Methylnaphthalene	NA*	0/12	1/1	0.0769	N									NA				NA		18			NA							NA
Acenaphthene	NA*	3/12	1/1	0.3077	N	178								NA	0.5000	Gehan	Test	N	178	62			NA	nonpar.	unknow.					NA
Acenaphthylene	**Y**	3/12	1/1	0.3077	N	177								NA	0.0078	Gehan	Test	**Y**	177	96			NA	nonpar.	unknow.					NA
Anthracene	**Y**	6/12	1/1	0.5385	N	154					1	1	0.0769	N	0.0078	Gehan	Test	**Y**	154	260			NA	nonpar.	unknow.					NA
Benz(a)anthracene	N	9/12	1/1	0.7692	N	306					2	1	0.1538	N	0.1043	Gehan	Test	N	306	780			NA	lognor.	unknow.					NA
Benzo(a)pyrene	N	8/12	1/1	0.6923	N	394					2	1	0.1538	N	0.1029	Gehan	Test	N	394	860			NA	lognor.	unknow.					NA
Benzo(b)fluoranthene	N	8/12	1/1	0.6923	N	507					2	1	0.1538	N	0.1110	Gehan	Test	N	507	1100			NA	lognor.	unknow.					NA
Benzo(g,h,i)perylene	N	7/12	1/1	0.6154	N	225					1	1	0.0769	N	0.0550	Gehan	Test	N	225	740			NA	normal	unknow.					NA
Benzo(k)fluoranthene	N	7/12	1/1	0.6154	N	370					4	1	0.3077	N	0.2408	Gehan	Test	N	370	410			NA	lognor.	unknow.					NA
Bis(2-ethylhexyl) Phthalate	NA	0/0	1/1		NA									NA				NA		52			NA							NA
Butyl Benzyl Phthalate	NA*	3/12	1/1	0.3077	N	208								NA	0.8014	Gehan	Test	N	208	33			NA	nonpar.	unknow.					NA
Carbazole	N	5/12	1/1	0.4615	N	212								NA	0.7629	Gehan	Test	N	212	120			NA	normal	unknow.					NA
Chrysene	N	9/12	1/1	0.7692	N	420					2	1	0.1538	N	0.1038	Gehan	Test	N	420	960			NA	lognor.	unknow.					NA
Dibenz(a,h)anthracene	**Y**	5/12	1/1	0.4615	N	161					1	1	0.0769	N	0.0067	Gehan	Test	**Y**	161	180			NA	nonpar.	unknow.					NA
Dibenzofuran	NA*	4/12	1/1	0.3846	N	172								NA	0.7207	Gehan	Test	N	172	63			NA	nonpar.	unknow.					NA
Fluoranthene	N	10/12	1/1	0.8462	N	902					3	1	0.2308	N	0.1715	Gehan	Test	N	902	2100			NA	lognor.	unknow.					NA
Fluorene	NA*	4/12	1/1	0.3846	N	184					2		1.0000	N	0.7360	Gehan	Test	N	184	110			NA	nonpar.	unknow.					NA
Indeno(1,2,3-cd)pyrene	N	8/12	1/1	0.6923	N	251					1	1	0.0769	N	0.0564	Gehan	Test	N	251	680			NA	lognor.	unknow.					NA
Phenanthrene	N	8/12	1/1	0.6923	N	667					4	1	0.3077	N	0.2415	Gehan	Test	N	667	1400			NA	lognor.	unknow.					NA
Pyrene	N	10/12	1/1	0.8462	N	723					4	1	0.3077	N	0.2494	Gehan	Test	N	723	1500			NA	lognor.	unknow.					NA

**** Site 3 Hangar Area concentrations in soil are compared to background soil (ss).**

Interpretation of Z-Test or Fisher's Exact Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data's detection frequency is greater than the background data detection frequency.
Interpretation of Quantile Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more upper rank values relative to the background data set.
Since "k" samples from the top "r" ranks of the combined data set belonged to the site soil subgroup, this would be unlikely if the site and background data sets came from the same population.
Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more values ranked greater than the ranks of background data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians.
Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site data set belongs to a population having a greater mean relative to the mean of the background population.
Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 Hangar Area ss to bkg. soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 Hangar Area ss > bkg.) for each chemical appears at the left and is based on four criteria:
(1) Overall decision is YES if any one of the Mann-Whitney/Gehan, Quantile Test, or T-Test is YES, regardless of other test results.
(2) Overall decision is NO if at least one of Mann-Whitney/Gehan, Quantile Test, or T-Test is NO, and none of the aforementioned tests are YES.
(3) Overall decision is YES/NO if Z/Fisher Test is YES/NO, respectively, and other tests are NA. Z-test is treated as lowest priority since it relies on detection frequency, not magnitude of results.
(4) Overall decision is NA if all tests are NA. (Might occur if too few detections to be capable of detecting a statistically significant difference even if one exists.)
NOTE: This decision scheme does not utilize the UTL test because random false positive exceedances of the background UTL are probable if there are many site samples, even if site distribution matches background.

* Low power because either N is small or very low frequency of detected values with detections close to the detection limits, which interferes with the power of statistical tests to detect a significant difference between groups.

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 Hangar Area ss (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 Hangar Area ss results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 Hangar Area ss > bkg. with 95 % confidence.
N, Q, or other UTL***	UTL is based on a 95 % upper limit (using t-value) when data are normal (N). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.
KM	Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.
r,k	The Quantile test calculates the probability that k or more samples from the top r ranks of the combined hangr.ss and bkg. data set are comprised of hangr.ss data if both populations are in fact equal.

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB01		03SB03		03SB05		03SB06		03SB06-D		03SB07		03SB08		03SB09	
Sample Date:					9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991	
Duplicate:											03SB06-D		03SB06							
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	13600		15500		14200		9010		11400		15000		15200		14800	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	10.4		9.3	U	10.1	U	9.8	U	9.9	U	9.7	U	9.6	U	9.8	U
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	5.9		3.9		5.2		4.6		4.9		4		4.9		4	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	103		77.9		74.9		47.6		69.9		96.8		79.4		76.8	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	1.4		1.2		1.3		1.1		1.1		1.3		1.3		1.3	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	3.6		2.7		3.1		1.7		2.9		2.6		2.6		2.2	
Calcium	NA	NA	NA	NA	11100		4840		2370		86400		22500		3760		1790		1750	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	25.6		23.3		25.6		15.7		21.6		25		24.6		24.9	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	7.7		9.3		8.3		5.2		7.7		9.5		10.1		9.8	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	37.6		17.6		18		10.7		13.9		26		14.8		15.1	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	2.4	U	1.6	U	2.5	U	1.4	U	1.9	U	2.1	U	2.1	U	2.3	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	24400		23900		23100		14000		18500		24000		24700		23100	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	59.6		35.7		44.5		22.8		29.1		61.7		18.6		21.5	
Magnesium	NA	NA	NA	NA	6980		3790		2340		50200		12800		2730		2330		2160	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	432		437		360		318		425		518		499		425	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.1		0.11	U	0.1	U	0.09	U	0.1	U	0.11	U	0.1	U	0.1	U
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	13.4		12.5		11.7		29.9		39		12.3		10.9		11.6	
Potassium	NA	NA	NA	NA	823		883		845		570		658		923		952		779	
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	1.4	U	1.2	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Sodium	NA	NA	NA	NA	1010	U	924	U	1000	U	973	U	981	U	957	U	953	U	971	U
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.45		0.41		0.55		0.57		0.53		0.66		0.47		0.56	
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	34.9		34.9		32.8		18.6		24		34.9		33.6		35.1	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	78		48		49.9		35.2		37.5		49.5		40.5		46.9	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	390	U	630	J	370	U	9500	J	4300	J	740	U	370	U	390	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	95	J	3200		110	J	33000		13000		740	U	370	U	390	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	160	J	3000	U	38	J	19000	U	7500	U	740	U	370	U	390	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	340	J	8300		440		66000		27000		740	U	370	U	390	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	1600		12000		1100		65000		24000		280	J	110	J	99	J
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	1400		9300		870		48000		20000		310	J	120	J	120	J
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	1600		11000		890		58000		17000		330	J	370	U	120	J
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	390		2400	J	280	J	13000	J	6400	J	98	J	50	J	46	J
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	1100		7400		780		31000		18000		320	J	370	U	100	J
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	84	J	3000	U	87	J	19000	U	7500	U	740	U	38	J	68	J
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U
Carbazole	NA	NA	**9.0E+05**	4.0E+06	NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	1500		11000		1000		52000		21000		300	J	110	J	120	J
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	70	B	3000	U	89	B	19000	U	7500	U	740	U	88	B	85	B
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	49	J	420	J	93	J	4800	J	810	J	740	U	370	U	390	U
Dibenzofuran	NA	NA	NA	NA	140	J	3000	U	73	J	29000		11000		740	U	370	U	390	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	3000		28000		2000		150000		62000		440	J	220	J	240	J
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	290	J	4900		150	J	41000		16000		740	U	370	U	390	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	520		3500		370	U	19000		8600		740	U	59	J	58	J
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	99	J	3000	U	370	U	13000	J	7500	U	740	U	370	U	390	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	2600		34000		1700		210000		92000		190	J	140	J	150	J
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	3200		25000		2300		140000		48000		490	J	210	J	220	J

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB01		03SB03		03SB05		03SB06		03SB06-D		03SB07		03SB08		03SB09	
Sample Date:					9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991	
Duplicate:											03SB06-D		03SB06							
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	2	B	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	6	U	6	U	2	B	6	U	6	U	6	U	6	U	6	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	390	U	3000	U	370	U	19000	U	7500	U	150	J	370	U	390	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	170	J	3000	U	41	J	19000	U	7500	U	330	J	39	J	390	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	160	J	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	12	U	12	U	11	U	11	U	11	U	11	U	12	U	12	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	2	B	5	B	5	B	12	B	6	B	5	B	8	B	12	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	5	B	3	B	2	B	2	B	6	U	2	B	2	B	1	B
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	580		210		140		260		220		290		91		120	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg																
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SB01**	**03SB03**	**03SB05**	**03SB06**	**03SB06-D**	**03SB07**	**03SB08**	**03SB09**
Sample Date:					**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**
Duplicate:								**03SB06-D**	**03SB06**			
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB10		03SB11		03SB12		03SB13		03SB14		03SB14-D		03SB15		03SB16		03SS01		03SS01	
Sample Date:					9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/5/1991		4/8/1997	
Duplicate:													03SB14-D		03SB14									
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		0 - 0.5		0 - 0.5	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	15700		16200		19400		15100		14500		14100		16000		13900		12700		16100	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	10	U	8.9	U	8.9	U	8.9	U	9.1	U	9.5	U	10	U	9.6	U	7.4	B	6.5	R
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	13		4.4		4		4.3		3.8		3.6		3.2		3.3		3.8	J	5.7	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	78.5		84.6		139		81.3		81.3		79.4		78.4		68.7		66		85.7	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	1.3		1.2		1.2		1.2		1.2		1.3		1.3		1.3		0.71	B	0.71	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	2.9		2.6		2.4		2.4		3.2		1.9		3.3		1.7		1.2	B	1.2	U
Calcium	NA	NA	NA	NA	4760		3240		24400		2840		2080		2940		2270		2640		3260		624	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	25.1		26.6		21.7		23.8		24.3		21.1		26.3		19.9		24.4		14.5	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	10		8.3		8.1		7.9		8.3		8.7		12.2		6.2		8.3		9.1	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	14.7		15.1		11.2		13.8		23.5		15.2		11.1		12.4		17.3		20	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	2.1	U	2.1	U	2.3	U	2.2	U	2.1	U	2.2	U	2	U	2.2	U	2.4	U	0.61	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	25100		24900		21000		22700		23100		20700		29700		18400		21800		19400	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	39.2		24.9		14.9		27.7		33.1		22		16.2		12		16.5		10.2	
Magnesium	NA	NA	NA	NA	3570		2530		5870		2420		2260		2330		2820		1860		2400		1310	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	412		566		955		334		473		467		444		394		423	J	550	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.09	U	0.09	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.11	U	0.12		0.12	U
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	12.7		12.5		10.1		10.6		12.2		10.4		13.4		9.4		10.3		11	
Potassium	NA	NA	NA	NA	1010		942		1130		861		823		804		1570		593		821		454	
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U	1.3	U	1.3	U	1.3	U	1.2	UL	1.2	U
Sodium	NA	NA	NA	NA	989	U	882	U	884		876	U	902	U	940	U	991	U	935	U	649		97.7	U
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.59		0.58		0.42		0.45		0.49		0.43	U	0.52		0.5		0.22	U	0.35	L
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	36.7		37.5		30.8		33.3		33.2		30.2		38.1		27.8		32.6		27.1	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	41.4		42.6		33.9		44.1		41.5		40.6		40.1		30		48.3	J	29.1	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	380	U	560	U	370	U	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	380	U	560	U	370	U	380	U	740	U	130	J	360	U	370	U	380	U	400	UJ
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	380	U	560	U	370	U	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	380	U	150	J	370	U	380	U	200		450	J	360	U	370	U	100	J	400	UJ
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	100	J	450	J	120	J	120	J	1200		1100		150	J	120	J	410		400	UJ
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	100	J	400	J	130	J	120	J	1700		880		170	J	120	J	450		400	UJ
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	120	J	430	J	140	J	130	J	1700		880		180	J	150	J	420		400	UJ
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	47	J	110	J	43	J	54	J	840		390	J	79	J	370	U	180	J	400	UJ
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	90	J	400	J	110	J	100	J	1200		810		130	J	130	J	520	J	400	UJ
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	56	J	79	J	370	U	52	J	740	U	760	U	360	U	360	J	110	J	120	B
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	380	U	560	U	370	U	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ
Carbazole	NA	NA	**9.0E+05**	4.0E+06	NA		NA		NA		NA		NA		NA		NA		NA		NA		400	UJ
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	120	J	450	J	130	J	140	J	1300		1000		150	J	140	J	490		400	UJ
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	82	B	560	U	45	B	45	B	740	U	760	U	55	B	72	B	380	U	400	UJ
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	380	U	560	U	370	U	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ
Dibenzofuran	NA	NA	NA	NA	380	U	560	U	370	U	380	U	740	U	120	J	360	U	370	U	380	U	400	UJ
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	240	J	880		290	J	250	J	2200		2300		270	J	230	J	910		400	UJ
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	380	U	560	U	370	U	380	U	87	J	240	J	360	U	370	U	380	U	400	UJ
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	55	J	140	J	53	J	68	J	930		490	U	94	J	46	J	210	J	400	UJ
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	380	U	560	U	370	U	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	170	J	600		160	J	150	J	1100		2300		130	J	130	J	490		400	UJ
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	270	J	1000		270	J	240	J	2300		2400		330	J	240	J	930		400	UJ

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB10		03SB11		03SB12		03SB13		03SB14		03SB14-D		03SB15		03SB16		03SS01		03SS01	
Sample Date:					9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/6/1991		9/5/1991		4/8/1997	
Duplicate:													03SB14-D		03SB14									
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		1.5 - 2		0 - 0.5		0 - 0.5	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	6	U	3	B	6	U	6	U	5	U	6	U	5	U	6	U	6	U	NA	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	6	U	6	U	6	U	6	U	5	U	6	U	5	U	6	U	6	U	NA	
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	380	U	560	U	370	U	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	380	U	82	J	370	U	380	U	290	J	320	J	360	U	370	U	64	J	400	UJ
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	380	U	560	U	370	U	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	12	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U	NA	
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	7	B	11	U	11	U	11	U	11	U	11	U	6	B	11	U	11	U	NA	
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	1	B	6	U	6	U	6	U	5	U	6	U	5	U	2	B	2	B	NA	
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	6	U	6	U	6	U	6	U	5	U	6	U	5	U	6	U	6	U	NA	
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	18	U	18	U	18	U	18	U	89	U	18	U	17	U	19	U	18	U	4	UJ
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	18	U	18	U	18	U	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	18	U	18	U	18	U	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	9.2	U	9	U	9	U	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	9.2	U	9	U	9	U	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	92	U	90	U	90	U	92	U	440	U	91	U	87	U	89	U	91	U	2.1	UJ
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	180	U	180	U	180	U	180	U	890	U	180	U	170	U	180	U	180	U	40	UJ
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	180	U	180	U	180	U	180	U	890	U	180	U	170	U	180	U	180	U	40	UJ
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	9.2	U	9	U	9	U	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	95		120		27		130		290		150		17	U	18	U	68		4.5	J
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	9.2	U	23		9	U	30		44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	18	U	18	U	18	U	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	NA		NA		NA		NA		NA		NA		NA		NA		NA		4	UJ
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	18	U	18	U	18	U	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	9.2	U	9	U	9	U	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	92	U	90	U	90	U	92	U	490	U	91	U	87	U	89	U	91	U	2.1	UJ
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	9.2	U	9	U	9	U	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ
DIOXINS/FURANS	**ng/kg**	**ng/kg**	**ng/kg**	**ng/kg**																				
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SB10**	**03SB11**	**03SB12**	**03SB13**	**03SB14**	**03SB14-D**	**03SB15**	**03SB16**	**03SS01**	**03SS01**
Sample Date:					**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/5/1991**	**4/8/1997**
Duplicate:									**03SB14-D**	**03SB14**				
Depth Range (feet):					**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**1.5 - 2**	**0 - 0.5**	**0 - 0.5**
	Region 3 Residential SL	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**										
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**		**03SS05**		**03SS05**		**03SS06**		**03SS06**	
Sample Date:					**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:																							**03SS06-D**	
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	14500		8200		12600		21400		14500		15200		14800		11000		14700		12800	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	6.8	UL	5.2	UJ	8.3	B	4.8	UJ	9.8	B	8.6	R	5.5	UL	5.2	UJ	5.7	UL	5.2	UJ
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	7	J	5.6		7.1	J	4.6	J	8.3	J	3	J		R	3.9	J		R	0.96	J
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	95.7		88.3		113		133		100		86.1		107		78.7		100		91.5	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	0.85	B	0.73		0.67	B	0.76		0.82	B	0.75		0.69	B	0.62		0.71	B	0.75	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	0.85	U	1.3	U	0.67	U	1.2	U	0.65	U	1.2	U	0.69	U	1.3	U	0.71	U	1.3	U
Calcium	NA	NA	NA	NA	1180		870		989		492		1080		707		1210		763		12500		856	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	19.7		12.5		15.8		12.6		20.3		19.9		19		13.6		18.9		17.8	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	7.4		5.6		7.5		10.6		8.2		8.8		7.8		8.6		8.8		8.2	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	12.5		10		11.6		26.2		14.2		19.1		13		24.3		12.9		19.2	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	2	U	0.65	U	2	U	0.59	U	2.1	U	0.6	U	2.1	U	0.65	U	2.2	U	0.64	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	16400		14300		15100		20100		17000		24200		17300		16400		17300		20900	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	22.1		25.2		40.5		8.9		28.4		16.8		27.8		70.5		21.8		28.5	
Magnesium	NA	NA	NA	NA	1760		1060		1550		1030		1750		1910		1760		1080		1980		1580	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	589	J	424		793	J	767		754	J	474		742	J	494		670	J	563	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.1		0.13	U	0.09	U	0.12	U	0.09	U	0.12	U	0.11	U	0.13	U	0.09	U	0.13	U
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	12.1		6.3		10.5		12.6		10.8		13.3		12.4		10.6		11.7		10.7	
Potassium	NA	NA	NA	NA	650		390	U	536		484		593		717		545		460		553		505	
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	1.5	UL	1.3	U	1.2	UL	1.2	U	1.1	UL	1.2	U	1.2	UL	1.3	U	1.2	UL	1.3	U
Sodium	NA	NA	NA	NA	459		104	U	412		95.2	U	437		104		426		104	U	399		104	U
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.21	U	0.28	L	0.16	U	0.26	L	0.2	U	0.28	L	0.15	U	0.26	UL	0.18	U	0.33	L
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	27.4		22.8		23.6		26.4		28.1		33.8		27.5		25.4		27.8		29.4	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	44.5	J	36.3		42.1	J	24.5		44.8	J	43.7		44.4	J	50.6		42.6	J	50.1	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	49	J	46	J	48	J	390	UJ	46	J	400	UJ	380	U	430	UJ	50	J	53	J
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	54	J	50	J	62	J	390	UJ	59	J	400	UJ	380	U	430	UJ	57	J	64	J
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	76	J	430	UJ	82	J	390	UJ	84	J	400	UJ	46	J	430	UJ	77	J	150	J
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	370	U	430	UJ	39	J	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	44	J	430	UJ	65	J	390	UJ	44	J	400	UJ	380	U	430	UJ	53	J	430	UJ
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	42	J	180	B	48	J	120	B	380	U	160	B	380	U	210	B	360	U	170	B
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Carbazole	NA	NA	**9.0E+05**	4.0E+06	NA		430	UJ	NA		390	UJ	NA		400	UJ	NA		430	UJ	NA		430	UJ
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	68	J	65	J	84	J	390	UJ	85	J	400	UJ	47	J	50	J	77	J	85	J
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Dibenzofuran	NA	NA	NA	NA	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	150	J	120	J	190	J	390	UJ	200	J	48	J	85	J	77	J	190	J	140	J
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	370	U	430	UJ	45	J	390	UJ	380	U	400	UJ	380	U	430	UJ	39	J	430	UJ
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	82	J	71	J	120	J	390	UJ	150	J	400	UJ	60	J	50	J	150	J	79	J
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	110	J	100	J	130	J	390	UJ	140	J	44	J	87	J	72	J	130	J	130	J

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS02		03SS02		03SS03		03SS03		03SS04		03SS04		03SS05		03SS05		03SS06		03SS06	
Sample Date:					9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997	
Duplicate:																							03SS06-D	
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	6	U	NA		6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	6	U	NA		6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ	380	U	430	UJ	360	U	430	UJ
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	370	U	430	UJ	40	J	390	UJ	380	U	400	UJ	43	J	430	UJ	46	J	430	UJ
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	11	U	NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	4	B	NA		11	U	NA		4	B	NA		15	B	NA		4	B	NA	
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	2	B	NA		2	B	NA		2	B	NA		6	U	NA		6	U	NA	
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	6	U	NA		6	U	NA		6	U	NA		6	U	NA		6	U	NA	
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ	18	U	4.3	UJ	18	U	4.3	UJ
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	18	U	4.3	UJ	18	U	3.9	UJ	18	U	3.3	J	18	U	4.3	UJ	18	U	9	J
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4.1	J	18	U	4.3	UJ	18	U	11	J
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ	9.2	U	2.2	UJ	8.8	U	2.2	UJ
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ	9.2	U	2.2	UJ	8.8	U	2.2	UJ
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	90	U	2.2	UJ	90	U	2	UJ	92	U	2	UJ	92	U	2.2	UJ	88	U	2.2	UJ
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	180	U	43	UJ	180	U	39	UJ	180	U	13	J	180	U	43	UJ	180	U	22	J
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	180	U	43	UJ	180	U	39	UJ	180	U	40	UJ	180	U	43	UJ	180	U	43	UJ
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ	9.2	U	2.2	UJ	8.8	U	2.2	UJ
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	37		18	J	140		3.9	UJ	75		5.1	J	47		11	J	28		6.3	J
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ	9.2	U	2.2	UJ	8.8	U	2.2	UJ
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ	18	U	4.3	UJ	18	U	4.3	UJ
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	NA		4.3	UJ	NA		3.9	UJ	NA		4	UJ	NA		4.3	UJ	NA		4.3	UJ
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ	18	U	4.3	UJ	18	U	4.3	UJ
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ	9.2	U	2.2	UJ	8.8	U	2.2	UJ
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	90	U	2.2	UJ	90	U	2	UJ	92	U	2	UJ	92	U	2.2	UJ	88	U	2.2	UJ
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	9	U	2.2	UJ	12		2	UJ	9.2	U	2	UJ	9.2	U	2.2	UJ	8.8	U	2.2	UJ
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg											ng/kg									
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		86.8		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		13.1		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		1.3		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		1.4		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		8.3		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		1.8		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		2.4		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		3.1		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		0.91		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		5.2		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		3.5		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		5.2		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		20.9		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		15890		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		16.4		NA		NA		NA		NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		10.7		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		10.5		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		184		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		21.4		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		32.8		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SS02**	**03SS02**	**03SS03**	**03SS03**	**03SS04**	**03SS04**	**03SS05**	**03SS05**	**03SS06**	**03SS06**
Sample Date:					**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**
Duplicate:														**03SS06-D**
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	27.3	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.1	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	53.1	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.6	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	153	NA	NA	NA	NA

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS06-D		03SS07		03SS07		03SS08		03SS08		03SS09		03SS09		03SS10		03SS10		03SS11	
Sample Date:					4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991	
Duplicate:					03SS06																			
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	10700		14300		12100		14600		9630		14000		11700		13900		13500		13900	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	5.9	R	9	B	5.6	R	9.5	B	5	UJ	9.3	B	8.2	R	7.2	B	5.4	UJ	7.2	B
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	5.2		6.8	J	0.74	J		R	0.37	J	7.6	J	4.8	J		R	6.6		7.3	J
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	81.6		106		75.8		98.4		84.2		103		72.6		104		92.5		176	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	0.72		0.71	B	0.73		0.66	B	0.88		0.68	B	0.65		0.67	B	0.97		0.85	B
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	1.3	U	0.71	U	1.4	U	0.89	U	1.3	U	0.91	U	18.4		0.9	U	1.4	U	0.85	U
Calcium	NA	NA	NA	NA	872		980		1020		1080		913		1090		1080		1060		372		889	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	16.2		18.1		18.3		19.3		13.7		18.8		20.9		18.8		17.6		22.2	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	7.3		8.2		9.3		8.2		7		8.1		9.9		8.5		9.8		10.6	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	15.8		10.8		13.8		11.7		11.8		12.2		81.3		12.1		24.6		10.6	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	0.64	U	2.4	U	0.68	U	2.1	U	0.62	U	2.3	U	2.3		2.2	U	0.66	U	2.2	
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	19000		15800		20100		16100		14600		16500		23400		16500		18200		17800	J
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	23.7		25.4		35		24.6		28.8		22.2		74.8		24.4		90.5		19.4	
Magnesium	NA	NA	NA	NA	1420		1660		1710		1710		1230		1670		1450		1710		1420		1620	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	474		749	J	485		782	J	648		710	J	509		679	J	768		1780	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.13	U	0.1	U	0.14	U	0.11	U	0.13	U	0.1	U	0.12	U	0.11	U	0.14	U	0.09	U
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	8.8		11.5		10.9		11.1		9.7		12.7		17.3		11.4		10.8		11.2	
Potassium	NA	NA	NA	NA	524		538		550		613		515		473		387		564		530		426	
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	1.3	U	1.2	UL	1.4	U	1.6	UL	1.3	U	1.6	UL	1.2	U	1.6	UL	1.4	U	1.5	UL
Sodium	NA	NA	NA	NA	103	U	353		109	U	374		101	U	379		121		365		108	U	370	
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.26	L	0.17	U	0.27	L	0.17	U	0.28	L	0.17	U	0.24	UL	0.2	U	0.27	UL	0.16	U
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	29		24.8		33.4		26.4		24		26.9		29.1		26.7		29.8		28.1	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	44.3		41.3	J	50.3		43.9	J	36.7		43.7	J	136		46.8	J	42.6		40	J
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	42	J	450	UJ	370	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	160	J	380	U	44	J	370	U	420	UJ	42	J	100	J	93	J	33	J	370	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	180	J	380	U	52	J	370	U	420	UJ	47	J	130	J	97	J	52	J	370	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	210	J	45	J	120	J	53	J	81	J	59	J	170	J	110	J	73	J	370	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	82	J	380	U	450	UJ	370	U	420	UJ	350	U	72	J	54	J	450	UJ	370	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	140	J	40	J	450	UJ	370	U	420	UJ	55	J	110	J	94	J	450	UJ	370	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	210	B	380	U	210	B	370	U	170	B	350	U	760	B	380	U	160	B	370	U
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	330	J	380	U	450	UJ	370	U
Carbazole	NA	NA	**9.0E+05**	4.0E+06	430	UJ	NA		450	UJ	NA		420	UJ	NA		400	UJ	NA		450	UJ	NA	
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	230	J	49	J	73	J	53	J	46	J	66	J	150	J	120	J	65	J	370	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	430	UJ	370	J	450	UJ	370	U	420	UJ	350	U	60	J	380	U	450	UJ	370	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
Dibenzofuran	NA	NA	NA	NA	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	380	J	100	J	130	J	120	J	85	J	150	J	230	J	320	J	120	J	65	J
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	120	J	380	U	450	UJ	370	U	420	UJ	350	U	79	J	63	J	450	UJ	370	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	220	J	68	J	76	J	75	J	59	J	83	J	110	J	230	J	90	J	38	J
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	350	J	75	J	100	J	77	J	74	J	100	J	210	J	210	J	97	J	47	J

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS06-D		03SS07		03SS07		03SS08		03SS08		03SS09		03SS09		03SS10		03SS10		03SS11	
Sample Date:					4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991		4/8/1997		9/5/1991	
Duplicate:					03SS06																			
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA		6	U
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA		6	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ	370	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	430	UJ	380	U	450	UJ	39	J	420	UJ	350	U	400	UJ	40	J	450	UJ	45	J
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA		11	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	NA		12	B	NA		6	B	NA		11	U	NA		11	U	NA		11	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	NA		3	B	NA		6	U	NA		5	U	NA		6	U	NA		6	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA		6	U
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ	18	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	11	J	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ	18	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	9.5	J	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ	18	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ	9	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ	9	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2.2	UJ	91	U	2.3	UJ	90	U	2.1	UJ	85	U	2.1	UJ	93	U	2.3	UJ	90	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	20	J	180	U	45	UJ	180	U	41	UJ	170	U	84	J	190	U	45	UJ	180	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	43	UJ	180	U	45	UJ	180	U	41	UJ	170	U	40	UJ	190	U	45	UJ	180	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ	9	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	11	J	42		76	J	160		8.3	J	31		45	J	41		1100	R	18	U
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ	9	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ	18	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	4.3	UJ	NA		4.5	UJ	NA		4.1	UJ	NA		4	UJ	NA		4.5	UJ	NA	
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ	18	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ	9	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2.2	UJ	91	U	2.3	UJ	90	U	2.1	UJ	85	U	2.1	UJ	93	U	2.3	UJ	90	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	2.2	UJ	9.1	U	2.3	UJ	15		2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ	9	U
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg									ng/kg											
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		93		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		6.8		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		1.6	U	NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		2.1	U	NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		2.8		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		2.4		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		0.88		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		3.5		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		0.9	U	NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		0.6	U	NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		1.6	B	NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		1.2	U	NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		1.2	U	NA		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		8510		NA		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		8.9	U	NA		NA		NA		NA		NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		4.18		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		2.81		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		243		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		8.8		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		33.9		NA		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**		**03SS11**	
Sample Date:					**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**	
Duplicate:					**03SS06**																			
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**		**0 - 0.5**	
Total HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		9.2		NA		NA		NA		NA		NA	
Total PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		2.9	U	NA		NA		NA		NA		NA	
Total PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		7.6		NA		NA		NA		NA		NA	
Total TCDD	NA	NA	NA	NA	NA		NA		NA		NA		0.88	B	NA		NA		NA		NA		NA	
Total TCDF	NA	NA	NA	NA	NA		NA		NA		NA		8.3		NA		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS11		03SS12		03SS12		03SS13		03SS14		03SS15		03SS16		03SS16-D		03TP12-0102-03	
Sample Date:					4/8/1997		9/5/1991		4/8/1997		9/5/1991		9/5/1991		9/5/1991		9/5/1991		9/5/1991		5/4/2007	
Duplicate:																	03SS16-D		03SS16			
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		1 - 2	
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	10400		16100		11400		13700		14100		13200		12500		14800		11100	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	9.7	R	12.8	B	5.5	UJ	11.6	B	7.1	B	8.3	B	5.7	UL	8	B	0.38	UL
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	2.8	J	7.9	J	6.4			R		R	8.6	J		R		R	4.1	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	114		117		95.9		95.9		112		98.5		101		113		74.9	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	0.94		0.93	B	0.94		0.79	B	0.84	B	0.7	B	0.71	B	0.89	B	1	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	1.3	U	0.93	U	1.9		0.79	B	0.84	U	0.7	U	0.71	U	0.89	U	0.083	U
Calcium	NA	NA	NA	NA	906		1750		1500		1110		927		826		1080		1140		2050	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	20.2		24.3		19		22		18.3		17.2		16.6		19.9		14.4	K
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	12		9.3		7.8		8.5		8.4		7.4		7.7		7.8		6.1	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	14		12.1		12.7		13.4		9.9		9.9		10.1		10.6		13.8	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	0.66	U	2.9	U	0.69	U	2.3	U	2	U	2.5	U	2.6	U	2.4	U	0.6	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	27200		19800		15000		22400		15700		14800		14500		16400		14600	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	30.6		24.7		54.3		22.7		20.5		20		21.5		21.9		19	
Magnesium	NA	NA	NA	NA	2560		1990		1380		1720		1660		1550		15600		1780		1860	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	510		834	J	683		678	J	688	J	686	J	678	J	854	J	383	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.13	U	0.1	U	0.14	U	0.11	U	0.1	U	0.11	U	0.11	U	0.09	U	0.097	L
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	11.7		13.1		10.2		13.2		11.1		9.9		8.9		11.3		9.2	
Potassium	NA	NA	NA	NA	2130		603		416	U	637		462		436		463		581		497	
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	1.3	U	1.6	UL	1.4	U	1.4	UL	1.5	UL	1.2	UL	1.2	UL	1.6	UL	0.11	B
Sodium	NA	NA	NA	NA	131		441		117		476		350		309		306		355		34	L
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.3	L	0.24	U	0.28	UL	0.17	U	0.16	U	0.19	U	0.19	U	0.2	U	0.55	UL
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	32.1		33.6		25.5		30.1		24.8		24.1		24.2		27		23.6	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	46.1		47.6	J	174		52.1	J	42.5	J	34.5	J	39.3	J	44.5	J	34.6	
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	20000	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	78	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	2200	J
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	20000	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	110	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	11000	J
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	750	J	370	U	100	J	39	J	370	U	48	J	390	U	380	U	15000	J
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	1100	J	370	U	150	J	49	J	370	U	43	J	390	U	380	U	8800	J
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	1400	J	49	J	170	J	68	J	370	U	54	J	45	J	380	UJ	8600	J
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	540	J	370	U	76	J	370	U	370	U	370	U	390	U	380	U	6800	J
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	490	J	39	J	140	J	56	J	370	U	47	J	390	U	380	U	4400	J
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	170	B	370	U	220	B	44	J	370	U	370	U	47	J	41	J	20000	U
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	20000	U
Carbazole	NA	NA	**9.0E+05**	4.0E+06	79	J	NA		460	UJ	NA		NA		NA		NA		NA		3200	J
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	920	J	49	J	180	J	68	J	370	U	65	J	43	J	380	UJ	13000	J
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	20000	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	150	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	20000	U
Dibenzofuran	NA	NA	NA	NA	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	20000	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	840	J	110	J	370	J	160	J	70	J	140	J	95	J	70	J	31000	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	2600	J
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	600	J	370	U	88	J	370	U	370	U	370	U	390	U	380	U	7400	J
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	20000	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	430	J	68	J	280	J	110	J	42	J	44	J	58	J	44	J	37000	
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	820	J	75	J	300	J	110	J	48	J	99	J	65	J	50	J	33000	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS11		03SS12		03SS12		03SS13		03SS14		03SS15		03SS16		03SS16-D		03TP12-0102-03	
Sample Date:					4/8/1997		9/5/1991		4/8/1997		9/5/1991		9/5/1991		9/5/1991		9/5/1991		9/5/1991		5/4/2007	
Duplicate:																	03SS16-D		03SS16			
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		1 - 2	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	5	U
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	5	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	5	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	5	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	440	UJ	56	J	460	UJ	57	J	56	J	59	J	68	J	380	UJ	5	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	5	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	NA		11	U	NA		11	U	11	U	11	U	10	B	8	B	20	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	NA		NA		NA		NA		NA		NA		NA		NA		5	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	3.5	B
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	5	U
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	2	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	0.68	J
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	1.1	J
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	0.69	J
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2.3	UJ	90	U	2.4	UJ	91	U	89	U	89	U	94	U	93	U	23	J
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	44	UJ	180	U	46	UJ	180	U	180	U	180	U	190	U	190	U	20	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	44	UJ	180	U	46	UJ	180	U	180	U	180	U	190	U	190	U	20	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	230	J	25		620	J	73		18	U	18	U	19	U	19	U	100	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	2	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	4.4	UJ	NA		4.6	UJ	NA		NA		NA		NA		NA		2	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	0.29	J
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	1.1	J
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2.3	UJ	90	U	2.4	UJ	91	U	89	U	89	U	94	U	93	U	16	J
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	1.4	J
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg																		
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS11	03SS12	03SS12	03SS13	03SS14	03SS15	03SS16	03SS16-D	03TP12-0102-03
Sample Date:					4/8/1997	9/5/1991	4/8/1997	9/5/1991	9/5/1991	9/5/1991	9/5/1991	9/5/1991	5/4/2007
Duplicate:											03SS16-D	03SS16	
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	1 - 2
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP16-0102-01		03TP16-0102-01-D		03-SS-17		03-SS-18		03-SS-19		03-SS-20		03-SS-21	
Sample Date:					5/7/2007		5/7/2007		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008	
Duplicate:					03TP16-0102-01-D		03TP16-0102-01										03-SS-21-D	
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	1 - 2		1 - 2		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	24500		24000		15000		14600		16900		16900		17200	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	0.38	UL	0.37	UL	0.79	L	0.9	L	0.98	L	1.2	L	1.3	L
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	2.9		2.5		6.3		6.6		5.2		4.4		5.1	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	124		102		104		110		103		110		121	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	0.79		0.74		1.1	B	1.2	B	1.1	B	1	B	0.95	B
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	0.082	UR	0.081	UR	0.06	UR	0.05	UR	0.06	UR	0.05	UR	1.8	L
Calcium	NA	NA	NA	NA	433		434		978		1130		1370		1090		1770	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	6.4		6.8		21.8	J	19	J	21.7	J	20.5	J	26.8	J
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	9		7.8		7.6		6.9		7.9		8.6		8.8	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	35.3	K	36.8	K	17.8		13.7		27.4		33.9		69.9	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	0.11		0.2		0.15	U	0.23		0.14	U	0.15	U	0.19	
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	14500		13800		17300		16200		22000		22400		24100	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	3.2		3.5		23.6		23.9		30.2		34.1		76.9	
Magnesium	NA	NA	NA	NA	553		564		1790		1700		1930		1880		2020	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	941		819		662	L	665	L	563	L	591	L	528	L
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.038		0.039		0.11		0.14		0.13		0.18		0.34	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	11.1		10		11.1		11.1		12.2		13.1		18.7	
Potassium	NA	NA	NA	NA	245		261		795	J	756	J	909	J	1010	J	966	J
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	0.035	U	0.035	U	0.09	U	0.08	U	0.5	K	1.5	K	1.4	K
Sodium	NA	NA	NA	NA	18.4	UR	26.2	L	359	K	301	K	357	K	314	K	320	K
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.54	UR	0.53	UR	0.73	U	0.71	R	0.73	U	1.8	J	0.68	U
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	16.7		16.5		31.4		29.5		35.1		35.6		36.4	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	17.8		16.9		41.6		43.8		56.5		58.6		163	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		13	U	0.74	J	13	U	1.7	J	3.2	J
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	390	U	380	U	13	U	1	J	13	U	3.2	J	5.3	J
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	390	U	380	U	13	U	1.1	J	13	U	0.99	J	13	
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	390	U	380	U	3.2	J	3.2	J	2.2	J	2.3	J	5.8	J
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	390	U	380	U	3.9	J	5	J	3.1	J	3.9	J	39	
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	390	U	380	U	17		22		16		20		110	
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	390	U	380	U	19		26		18		25		100	
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	390	U	380	U	22		36		20		37		110	
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	390	U	380	U	13		18		12	J	19		56	
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	390	U	380	U	19		24		21		22		92	
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	390	U	380	U	350	U	330	U	370	U	310	U	320	U
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	390	U	380	U	260	U	240	U	270	U	230	U	240	U
Carbazole	NA	NA	**9.0E+05**	4.0E+06	390	U	380	U	210	J	240	U	270	U	230	U	240	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	390	U	380	U	22		29		21		31		120	
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	390	U	380	U	350	U	330	U	370	U	310	U	320	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	390	U	380	U	3.6	J	5.7	J	3.6	J	5.9	J	20	
Dibenzofuran	NA	NA	NA	NA	390	U	380	U	380	U	360	U	400	U	340	U	350	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	390	U	380	U	50		67		47		55		270	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	390	U	380	U	1.1	J	1.5	J	1.2	J	1.2	J	14	J
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	390	U	380	U	16		22		15		22		70	
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	390	U	380	U	0.87	B	1.1	B	1.1	B	2.1	B	5.2	J
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	390	U	380	U	20		28		22		22		200	J
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	390	U	380	U	39		52		37		44		210	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP16-0102-01		03TP16-0102-01-D		03-SS-17		03-SS-18		03-SS-19		03-SS-20		03-SS-21	
Sample Date:					5/7/2007		5/7/2007		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008	
Duplicate:					03TP16-0102-01-D		03TP16-0102-01										03-SS-21-D	
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	1 - 2		1 - 2		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	5.2	U	5.6	U	7.6	U	7.8	U	7.9	U	6.5	U	6.9	U
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	5.2	U	5.6	U	7.6	U	7.8	U	7.9	U	6.5	U	6.9	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	5.2	U	5.6	U	7.6	U	7.8	U	7.9	U	6.5	U	6.9	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	5.2	U	5.6	U	7.6	U	7.8	U	7.9	U	6.5	U	6.9	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	5.2	U	5.6	U	7.6	U	7.8	U	7.9	U	6.5	U	6.9	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	5.2	U	5.6	U	19	U	12	J	7.3	J	9	J	13	J
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	21	U	22	U	100		120		170		120		200	
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	5	U	6	U	8	U	8	U	8	U	7	U	6	J
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	3	B	4	B	2.1	B	1.7	B	2.5	B	1.7	B	1.5	B
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	5.2	U	5.6	U	7.6	U	15		2.8	J	3.1	J	4.2	J
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	2	U	2	U	5	UL	45		13	L	4.5	J	4.2	J
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	2	U	2	U	5	UL	24	U	2.5	J	47		100	
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	2	U	2	U	2.7	J	24	U	8.1	L	37		110	J
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	0.27	J	0.69	J	2.6	UL	12	U	2.7	UL	11	U	12	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	2	U	2	U	2.6	UL	12	U	2.7	UL	11	U	12	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2	U	2	U	2.1	B	2.9	J	0.96	B	11	U	12	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	20	U	19	U	26	UL	120	U	27	UL	110	U	120	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	20	U	19	U	26	UL	120	U	27	UL	110	U	120	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	2	U	2	U	1.3	UL	6.1	U	2.8	R	5.8	U	5.9	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	25	J	5.6	J	1.6	J	6.9	J	6	L	8	J	22	J
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	2	U	2	U	2.6	UL	7	J	2.7	UL	11	U	12	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	0.49	J	2	U	5	UL	24	U	5.2	UL	22	U	23	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	2	U	2	U	0.7	J	24	U	5.2	UL	22	U	23	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	2	U	2	U	5	UL	24	U	5.2	UL	22	U	23	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	2	U	2	U	2.6	UL	12	U	2.7	UL	11	U	12	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2	U	2	U	2.6	UL	2.2	B	1.3	B	11	U	12	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	2	U	2	U	2.6	UL	1.5	J	2.5	J	11	U	12	U
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg														
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03TP16-0102-01**	**03TP16-0102-01-D**	**03-SS-17**	**03-SS-18**	**03-SS-19**	**03-SS-20**	**03-SS-21**
Sample Date:					**5/7/2007**	**5/7/2007**	**12/17/2008**	**12/17/2008**	**12/17/2008**	**12/17/2008**	**12/17/2008**
Duplicate:	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**03TP16-0102-01-D**	**03TP16-0102-01**					**03-SS-21-D**
Depth Range (feet):					**1 - 2**	**1 - 2**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03-SS-21-D		03-SS-22		03-SS-23		03-SS-24		03-SS-24-D		03-SS-25		03-SS-26		03-SS-27	
Sample Date:					12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008	
Duplicate:					03-SS-21						03-SS-24-D		03-SS-24							
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	15100		19700		18100		17200		17400		24200		16000		17700	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	1.1	L	0.98	L	1.7	L	0.87	L	0.64	L	0.78	L	0.99	L	1.5	L
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	4.4		6.6		1.7		2.3		2.3		5.8		3.1		4	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	113		120		232		161		169		87.1		138		122	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	0.94	B	1.2	B	2	K	1	B	1.2	K	0.97	B	1.1	B	0.89	B
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	1.4	L	0.06	UR	0.91	L	0.51	J	0.22	J	0.05	UR	0.05	UR	0.05	UR
Calcium	NA	NA	NA	NA	1790		1870		1180		922		944		635		1340		1020	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	21.7	J	24.8	J	11.4	J	14.2	J	12.5	J	24.7	J	13.6	J	16.5	J
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	7.8		8.8		10.7		9		9.4		9.4		8.7		8.9	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	57.8		15.8		87.2		51.3		55.4		22.2		43.6		170	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	0.13	U	0.16	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.14	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	22000		26600		19500		15700		16700		28100		17100		18900	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	71		21.8		54.6		29.2		26.6		14.7		34.6		49.3	
Magnesium	NA	NA	NA	NA	1820		2670		966		814		1110		2100		1100		1230	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	501	L	674	L	1260	L	1140	L	1200	L	409	L	974	L	715	L
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.31		0.038		0.77		0.16		0.15		0.049		0.16		0.19	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	15.4		13.5		15.8		11.4		12.2		14.3		11.4		12.2	
Potassium	NA	NA	NA	NA	919	J	867	J	409	J	695	J	1060	J	845	J	565	J	646	J
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	1.3	K	0.1	U	0.46	K	0.08	U	0.36	K	0.08	U	0.08	U	1.1	
Sodium	NA	NA	NA	NA	306	K	403	K	412	K	319	K	313	K	269	K	319	K	326	K
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.66	U	1.8	R	0.83	R	0.81	R	0.65	U	1.8	R	1	R	1.8	J
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	33.1		43.3		18.4		21.8		21.4		45.7		23.8		29.1	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	144		45.9		466		45.6		45.5		31.4		55		74	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	2.3	J	13	U	1.5	J	11	U	0.8	J	11	U	1.6	J	3.5	J
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	3.2	J	13	U	2.8	J	1.1	J	1.6	J	11	U	2.8	J	8.3	J
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	4	J	13	U	1.6	J	11	U	11	U	11	U	11	U	1.4	J
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	3.5	J	1.4	J	1.3	J	1	J	0.97	J	1	J	2.5	J	3.9	J
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	13		1.7	J	6.1	J	1.2	J	1.3	J	1.1	J	4.1	J	6.2	J
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	67		8.8	J	22		5.6	J	6.3	J	4.2	J	21		26	
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	74		12	J	22		6.7	J	7.9	J	5.1	J	23		30	
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	87		15		31		10	J	10	J	7.2	J	31		46	
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	54		8.3	J	16		5.6	J	6.8	J	3.7	J	17		22	J
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	67		12	J	20		6.1	J	9	J	5.2	J	22		26	
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	270	J	370	U	300	U	310	U	120	J	300	U	320	U	540	
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U
Carbazole	NA	NA	**9.0E+05**	4.0E+06	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	86		13	J	27		8.4	J	9.7	J	6.6	J	28		41	
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	17		2.2	B	5.4	J	1.7	B	1.8	B	1.1	B	4.7	J	7	J
Dibenzofuran	NA	NA	NA	NA	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	200		26		52		15		17		15		52		68	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	4.4	J	13	U	2	J	11	U	11	U	11	U	1	J	1.5	J
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	62		9.8	J	18		6.4	J	7.5	J	4.4	J	20		25	
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	3.1	J	0.74	B	2.3	B	1.2	B	1.8	B	0.74	B	2.6	B	5.3	J
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	80	J	9.8	J	28		5.6	J	6.5	J	7.1	J	16		29	
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	160		21		39		12		14		11		41		54	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03-SS-21-D		03-SS-22		03-SS-23		03-SS-24		03-SS-24-D		03-SS-25		03-SS-26		03-SS-27	
Sample Date:					12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008		12/17/2008	
Duplicate:					03-SS-21						03-SS-24-D		03-SS-24							
Depth Range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5		0 - 0.5	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	6.6	J	9.9	J	9.2	J	17	U	14	U	4	J	14	J	15	J
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	180		170		120		190		190		89		270		170	
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	7	U	8	U	7	U	7	U	6	U	6	U	7	U	7	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	1.5	B	2.1	B	1.6	B	1.7	B	1.6	B	1.7	B	1.7	B	6.7	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	6.5	U	1.7	J	4.1	J	6.8	U	5.7	U	5.9	U	2.5	J	3.9	J
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	6.4	J	16	L	30	J	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	100		5.3	UL	17	J	4.4	UJ	4.3	U	4.3	UJ	0.57	J	3	J
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	230	J	5.3	UL	140		4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.3	J
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	22	U	2.7	UL	22	U	2.3	UJ	7.5	R	2.2	UJ	2.3	UL	2.4	UL
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	22	U	1.2	B	22	U	0.65	B	1.8	B	1.5	B	2.7	R	4.6	J
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	220	U	27	UL	220	U	12	J	14	J	22	UJ	36	L	24	UL
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	11	U	1.4	UL	11	U	0.98	J	4.5	R	1.1	UJ	0.8	J	12	R
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	20	J	5.3	J	43	U	2.9	J	3.6	J	24	J	2.8	J	22	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	0.25	J	0.58	J
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	0.8	J
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	2.3	J
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2.3	B	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	1.3	B	2.6	B
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	1.6	J	2.7	UL	22	U	2.3	UJ	0.55	J	2.2	UJ	2.3	UL	1.7	R
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg																
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03-SS-21-D**	**03-SS-22**	**03-SS-23**	**03-SS-24**	**03-SS-24-D**	**03-SS-25**	**03-SS-26**	**03-SS-27**
Sample Date:					**12/17/2008**	**12/17/2008**	**12/17/2008**	**12/17/2008**	**12/17/2008**	**12/17/2008**	**12/17/2008**	**12/17/2008**
Duplicate:					**03-SS-21**			**03-SS-24-D**	**03-SS-24**			
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03-SS-28**	
Sample Date:					**12/17/2008**	
Duplicate:						
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**0 - 0.5**	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	17500	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	0.9	L
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	6.9	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	102	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	1.2	B
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	0.06	UR
Calcium	NA	NA	NA	NA	1120	
Chromium	2.9E-01	5.6E+00	**9.4E+01**	4.2E+02	22.4	J
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	8	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.0E+05	18.5	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	5.6E+04	0.44	
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	22400	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	40.7	
Magnesium	NA	NA	NA	NA	2170	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	602	L
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.13	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	13.3	
Potassium	NA	NA	NA	NA	842	J
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	0.09	U
Sodium	NA	NA	NA	NA	316	K
Thallium	NA	NA	**1.5E+01**	2.0E+02	0.76	R
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	40.4	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	55.8	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	2.9	J
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	4.5	J
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	2.2	J
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	6.4	J
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	9.1	J
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	41	
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	51	
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	79	
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	39	
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	49	
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	350	U
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	260	U
Carbazole	NA	NA	**9.0E+05**	4.0E+06	260	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	63	
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	350	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	11	J
Dibenzofuran	NA	NA	NA	NA	380	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	170	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	3	J
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	44	
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	3.8	B
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	61	
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	130	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03-SS-28**	
Sample Date:					**12/17/2008**	
Duplicate:						
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**0 - 0.5**	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
1,1,1-Trichloroethane	**8.7E+06**	3.8E+07	1.0E+07	1.0E+07	7.8	U
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.3E+04	7.8	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	7.8	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	7.8	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	3.3E+06	7.8	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	14	J
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	160	
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	8	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	3.5E+06	1.9	B
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	7.8	U
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	49	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	49	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	49	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	25	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	25	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	25	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	4.4E+04	250	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.3E+05	250	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	4.4E+04	13	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	280	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	25	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	49	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	49	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	49	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	6.1E+04	25	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	25	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	25	U
DIOXINS/FURANS	**ng/kg**	**ng/kg**	**ng/kg**	**ng/kg**		
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA	
OCDD	NA	NA	NA	NA	NA	
OCDF	NA	NA	NA	NA	NA	
Teq Halfnd	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	5.3E+02	NA	
Total HpCDD	NA	NA	NA	NA	NA	
Total HpCDF	NA	NA	NA	NA	NA	
Total HxCDD	NA	NA	NA	NA	NA	

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03-SS-28**
Sample Date:					**12/17/2008**
Duplicate:					
Depth Range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**0 - 0.5**
Total HxCDF	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS31		03SS32		03SS33		03SS34		03SS35		03SS35-D		03SS36		03SS37	
Sample Date:	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	08/25/09		08/25/09		08/25/09		08/25/09		08/25/09		08/25/09		08/25/09		08/26/09	
Dup Of:															03SS35					
Depth Range (feet)					0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	15700		16400		19600		18000		19700		20800		17600		22500	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	1	L	1.6	L	0.2	UL	0.26	L	1	L	0.87	L	0.22	UL	1.4	L
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	5.1	L	5.8	L	4.7	L	4.4	L	6.2	L	5.7	L	4.2	L	5	L
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	117		142		88.9		128		135		125		124		246	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	0.94	K	0.96	K	0.83	K	0.91	K	0.76	R	0.78	K	1	K	0.78	K
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	1.8	L	7.4		0.03	UR	0.11	B	5.3	L	3.8	L	0.03	UR	3.9	L
Calcium	NA	NA	NA	NA	5340	J	3770	J	868	J	1060	J	2710	J	2600	J	885	J	12300	J
Chromium	**2.9E-01**	5.6E+00	9.4E+01	4.2E+02	27.9		26.1		28.5		20.7		35.8		30.7		20		28.8	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	6.9	J	7.5	J	7.7	J	8.1	J	10.4	J	9.2	J	6.5	J	9.6	J
Copper	**3.1E+03**	4.1E+04	**8.2E+03**	1.0E+05	67.4	K	120	K	19.7	K	51.7	K	151	K	163	K	11.4	K	182	K
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	20400	J	22700	J	24400	J	22900	J	70900	J	40200	J	18600	J	26700	J
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	74.9	J	111	J	20.7	J	57.7	J	379	J	228	J	12.8	J	128	J
Magnesium	NA	NA	NA	NA	3020	J	2570	J	1890	J	1700	J	2110	J	2060	J	1700	J	2120	J
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	534		631		394		525		574		484		786		956	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.22	K	0.14	K	0.053	K	0.15	K	0.14	K	0.18	K	0.021	J	0.65	K
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	14	J	27.2	J	12.7	J	14.2	J	26.9	J	27.8	J	11.8	J	30.2	J
Potassium	NA	NA	NA	NA	955		979		982		1080		1120		1060		644		1400	
Selenium	3.9E+02	5.1E+03			0.34	UR	0.36	L	0.33	UR	0.33	UR	0.33	UR	0.35	UR	0.35	UR	0.33	UR
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	1.1		2.8		0.49		1.8		26.3	J	1.6	J	0.04	U	1.7	
Sodium	NA	NA	NA	NA	170	B	224	K	156	B	168	R	189	R	192	R	158	B	167	R
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	32		31.7		40.9		34		43.4		40.9		31.3		22.7	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	120		297		42		59		282		231		33.4		239	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	29	J	220	U	210	U	210	U	210	U	210	U	210	U	210	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	170	J	220	U	210	U	210	U	210	U	210	U	690		120	J
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	260	U	4.3	J	10	U	8.2	J	200	U	1.3	J	0.93	J	1.3	J
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	29	J	7.9	J	1.2	J	7	J	15	J	1.8	J	0.8	J	0.86	J
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	30	J	5.4	J	3.1	J	5.4	J	200	U	10	J	1.2	J	0.86	J
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	61	J	43		4.3	J	23		28	J	19		1.4	J	1.3	J
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	260		110		19		78	J	270		180		11		9.6	J
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	260		110		23		16		280		200		14		13	
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	260		100	J	27		100	J	310		250		18		16	
Benzo(g,h,i)perylene	**NA**	NA	1.3E+07	1.7E+08	170	J	57	J	17		67		180	J	160		11		13	
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	250	J	110		26		89	J	290		230		13		18	
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	280		110		26		110		280		200		15		15	
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	46	J	31		4.5	J	26		51	J	43		2.5	J	2.8	J
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	560		190		64		220		370		200		30		24	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	34	J	13		2.6	J	11		16	J	2	J	0.91	J	0.73	J
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	190	J	75	J	21		61	J	210		190		12		15	
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	260	U	9.4	B	1.6	B	8.4	B	200	U	2.3	B	1.4	B	2.1	B
Phenanthrene	NA	NA	6.6E+07	1.9E+08	310		160		36		140		140	J	51		14		10	J
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	560		160		49		170		380		220		29		22	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
2-Butanone	**2.8E+07**	2.0E+08	1.0E+07	1.0E+07	6.2	B	8	B	4.6	B	5.8	B	7.6	B	8.2	B	15		12	J
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	77	B	130	J	68	B	70	B	110	J	120	J	160	J	110	J
Benzene	**1.1E+03**	5.4E+03	4.1E+01	2.1E+02	5.8	U	1.4	J	5.5	U	5.5	U	5.4	U	5.5	U	5.9	U	5.6	U
Chloromethane	**1.2E+05**	5.0E+05	1.8E+02	9.2E+02	2.1	J	3.6	J	5.5	U	5.5	U	5.4	U	2.4	J	5.9	U	5.6	U

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA
PAGE 26 OF 29

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SS31**		**03SS32**		**03SS33**		**03SS34**		**03SS35**		**03SS35-D**		**03SS36**		**03SS37**	
Sample Date:	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**08/25/09**		**08/25/09**		**08/25/09**		**08/25/09**		**08/25/09**		**08/25/09**		**08/25/09**		**08/26/09**	
Dup Of:															**03SS35**					
Depth Range (feet)					**0-2**		**0-2**		**0-2**		**0-2**		**0-2**		**0-2**		**0-2**		**0-2**	
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	5.8	U	6.4	U	5.5	U	5.5	U	5.4	U	5.5	U	5.9	U	2.2	J
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	2.2	J	30		4	U	14	J	6.3	J	5.4	J	1.9	J	29	J
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	14		11	J	2.2	J	130		210		140		4	UJ	12	J
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	30	J	22		2.2	J	110	J	450		300		4	UJ	130	J
Total DDT	NA	NA	NA	NA	46.2		63		4.4		254		666.3		445.4		1.9		171	
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	2.1	U	2.2	U	2.1	U	1.6	J	0.57	J	0.68	J	2.1	UJ	2.1	UJ
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	0.98	J	2.2	U	2.1	U	0.86	J	2.1	U	2.1	U	2.1	UJ	2.1	UJ
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	11	J	5.1	J	0.53	J	1.2	J	1.7	J	2.2	J	2.5	R	2.1	UJ
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	34		25		8.2		32		85	J	79	J	3.1	J	3.3	J
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	2.1	U	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	UJ	2.1	UJ
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	21	U	1.6	J	4	U	4	U	7.4	J	16	J	4	UJ	4	UJ
Endosulfan Sulfate	**3.7E+02**	3.7E+03	1.3E+03	1.7E+04	4.1	U	4.2	U	4	U	3.2	J	4.1	U	4	U	4	UJ	4	UJ
Endrin	**1.8E+01**	1.8E+02	6.6E+01	8.4E+02	4.1	U	31	R	4	U	20	U	5.6	J	16	J	4	UJ	4	UJ
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	7.1	J	8	J	1	J	6.3	J	4.1	U	4	U	0.61	J	2.2	J
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	4.6	J	0.93	J	4	U	4.4	J	4.1	U	4	U	4	UJ	4	UJ
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	15		6.6	J	2.1	U	1.3	J	17	J	33	J	2.1	UJ	2.1	UJ
Heptachlor	**1.1E+02**	3.8E-01	4.0E+00	1.8E+01	3.9		2.2	U	2.1	U	0.71	J	2.1	U	2.1	U	2.1	UJ	2.1	UJ
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	13		4.1	J	2.1	U	1.9	J	9.8	J	20	J	2.1	UJ	21	U
Methoxychlor	**3.1E+02**	3.1E+03	1.1E+03	1.4E+04	21	U	5	J	21	U	21	U	21	U	21	U	21	UJ	21	UJ
Aroclor-1260	**2.2E+02**	7.4E-01	3.0E+01	1.3E+02	21	U	22	U	21	U	21	U	62	J	150	J	21	UJ	21	UJ
Total PCBs	NA	NA	NA	NA	21	U	22	U	21	U	21	U	62	J	150	J	21	UJ	21	UJ

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SS38		03SS39		03SS40		03SS41		03SS41-D		03SS42	
Sample Date:	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	08/26/09		08/25/09		08/25/09		08/25/09		08/25/09		08/25/09	
Dup Of:													03SS41			
Depth Range (feet)					0-2		0-2		0-2		0-2		0-2		0-2	
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	15200		24000		20200		24600		23900		18500	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.1E+03	0.31	L	0.21	UL	0.23	L	0.21	UL	0.22	L	0.22	UL
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	5.3E+01	3.8	L	4.2	L	3.4	L	4.2	L	3.8	L	4.6	L
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	113		77.7		137		99.4		103		79	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	5.6E+03	0.85	K	0.77	K	0.99	K	0.82	K	0.79	K	0.7	K
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	2.1E+02	0.19	B	0.03	UR	0.03	U	0.03	UR	0.03	UR	0.03	UR
Calcium	NA	NA	NA	NA	1240	J	518	J	1020	J	508	J	522	J	629	J
Chromium	**2.9E-01**	5.6E+00	9.4E+01	4.2E+02	19.6		19.4		18		20.1		20.4		24.2	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	5.6E+04	8	J	7.9	J	9.3	J	10	J	9.9	J	7.7	J
Copper	**3.1E+03**	4.1E+04	**8.2E+03**	1.0E+05	33	K	24.4	K	51	K	33.1	K	34.3	K	16.8	K
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	18200	J	19800	J	18200	J	21800	J	21200	J	24700	J
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.0E+03	43.8	J	13.1	J	40.3	J	18.5	J	19.2	J	14.7	J
Magnesium	NA	NA	NA	NA	1640	J	1360	J	1240	J	1390	J	1320	J	2130	J
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	724		360		830		554		602		334	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	8.4E+02	0.022	J	0.037	K	0.17	K	0.038	K	0.047	K	0.033	J
Nickel	**1.5E+03**	2.0E+04	4.4E+03	5.6E+04	12.2	J	12.8	J	13.3	J	13.7	J	13.7	J	12.5	J
Potassium	NA	NA	NA	NA	783		643		689		726		680		1100	
Selenium	3.9E+02	5.1E+03			0.36	UR	0.34	UR	0.35	UR	0.33	UR	0.33	UR	0.35	UR
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.4E+04	0.04	U	0.04	U	0.3	B	0.04	U	0.04	U	0.04	U
Sodium	NA	NA	NA	NA	157	B	145	B	180	K	146	B	155	B	158	B
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	2.0E+04	28.4		32.3		25.7		34.9		33.9		39.8	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	46.3		28.6		51		41.9		42.5		34.3	
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	210	U	200	U	77	J	210	U	200	U	210	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	300		96	J	140	J	210	U	200	U	210	U
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	2.5	J	9.9	U	2.8	J	1.4	J	2	J	1.1	J
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	3	J	9.9	U	1.2	J	1.2	J	0.88	J	10	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	2.1	J	1.2	J	1.6	J	1.3	J	1.9	J	1.2	J
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	14		0.86	J	1.6	J	1.2	J	2.1	J	0.99	J
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	130		7.5	J	11		10	J	13		7.6	J
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	130		9.7	J	16		14		14		10	J
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	130		11		22		16		21		11	
Benzo(g,h,i)perylene	**NA**	NA	1.3E+07	1.7E+08	67	J	7.9	J	14		9.9	J	10	J	8.1	J
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	120		10		16		15		12		11	
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	130		11		20		17		18		12	
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	35	J	1.7	J	2.9	J	2.2	J	2.2	J	1.7	J
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	240		24		28		36		44		23	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	4.6	J	0.75	J	1.3	J	1.6	J	1.6	J	0.88	J
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	88	J	8.2	J	15		11		15		9.1	J
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	5.6E+07	10	B	1	B	4	B	1.8	B	3.8	B	1.5	B
Phenanthrene	NA	NA	6.6E+07	1.9E+08	73		11		15		22		16		11	
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	210		23		27		34		27		22	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
2-Butanone	**2.8E+07**	2.0E+08	1.0E+07	1.0E+07	10	J	12	U	20		7.3	B	13	J	6.8	B
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	120	J	75	B	230	J	110	J	130	J	93	J
Benzene	**1.1E+03**	5.4E+03	4.1E+01	2.1E+02	5.8	U	4.8	U	6.3	U	5.3	U	5.5	U	5.3	U
Chloromethane	**1.2E+05**	5.0E+05	1.8E+02	9.2E+02	5.8	U	4.8	U	6.3	U	5.3	U	5.5	U	5.3	U

TABLE 4-6

COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA
PAGE 28 OF 29

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SS38**		**03SS39**		**03SS40**		**03SS41**		**03SS41-D**		**03SS42**	
Sample Date:	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**08/26/09**		**08/25/09**		**08/25/09**		**08/25/09**		**08/25/09**		**08/25/09**	
Dup Of:													**03SS41**			
Depth Range (feet)					**0-2**		**0-2**		**0-2**		**0-2**		**0-2**		**0-2**	
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	5.8	U	4.8	U	6.3	U	5.3	U	5.5	U	5.3	U
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	3.3E+05	4.1	U	3.9	U	1.2	J	4	U	4	U	4.1	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	2.3E+05	4.1	U	3.9	U	3.2	J	1.2	J	1.2	J	4.1	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	2.3E+05	5.1	R	3.9	U	8.9	J	1.4	J	1.4	J	4.1	U
Total DDT	NA	NA	NA	NA	4.1	U	3.9	U	13.3		2.6		2.6		4.1	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	4.7E+03	2.1	U	2	U	0.33	J	2.1	U	2	U	2.1	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.3E+04	5.6		2	U	2.2	U	2.1	U	2	U	2.1	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2.1	U	2	U	2.2	U	0.61	J	1.2	J	2.1	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	5.0E+03	4.3		81		11		110		110		14	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	0.58	J	2	U	2.2	U	2.1	U	2	U	2.1	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.7E+07	4.1	U	3.9	U	0.73	J	4	U	4	U	4.1	U
Endosulfan Sulfate	**3.7E+02**	3.7E+03	1.3E+03	1.7E+04	1.3	J	3.9	U	4.2	U	4	U	4	U	4.1	U
Endrin	**1.8E+01**	1.8E+02	6.6E+01	8.4E+02	4.1	U	3.9	U	0.61	J	4	U	4	U	4.1	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	1.6	J	3.9	U	3.7	J	0.94	J	4	U	4.1	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	8.4E+05	9.6	J	3.9	U	4.2	U	4	U	4	U	4.1	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	2.3E+05	2.1	U	2	U	0.58	J	2.1	U	2	U	2.1	U
Heptachlor	**1.1E+02**	3.8E-01	4.0E+00	1.8E+01	2.1	U	2	U	2.2	U	2.1	U	2	U	2.1	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	8.7E+03	0.57	J	2	U	2.2	U	2.1	U	2	U	2.1	U
Methoxychlor	**3.1E+02**	3.1E+03	1.1E+03	1.4E+04	21	U	20	U	22	U	21	U	20	U	21	U
Aroclor-1260	**2.2E+02**	7.4E-01	3.0E+01	1.3E+02	21	U	20	U	22	U	21	U	20	U	21	U
Total PCBs	NA	NA	NA	NA	21	U	20	U	22	U	21	U	20	U	21	U

TABLE 4-6
COMPARISON OF LANDFILL AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

Bolded criterion is the most stringent.
Shaded values exceed the most stringent criteria.

TABLE 4-7

COMPARISON OF HANGAR AREA SURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:** **Depth Range (feet):**	**CONCENTRATION BENCHMARKS**				**03SB18** **3/22/2006** **0 - 2**
	Region 3 Residential SL	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	62 J
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.7E+08	96 J
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	260 J
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	780
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	860
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	1100
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.7E+08	740
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.1E+06	410
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	5.7E+06	52 J
Butylbenzylphthalate	**2.6E+05**	9.1E+05	1.0E+07	1.0E+07	33 J
Carbazole	NA	NA	**9.0E+05**	4.0E+06	120 J
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.1E+07	960
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	400 U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.1E+04	180 J
Dibenzofuran	NA	NA	NA	NA	63 J
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	2100
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.1E+08	110 J
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.1E+05	680
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	1400
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	8.4E+07	1500

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the contract Required Detection Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

Bolded criterion is the most stringent.
Shaded values exceed the most stringent criteria.

TABLE 4-8

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN LANDFILL AREA SUBSURFACE SOIL SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data											
	Freq. of	Range of Positive Detection				Mean of	Sampling Round and	Freq. of	Range of Positive Detection					Mean of	Sampling Round and	Range of Detection Limits		
Substance	Detection	Min.		Max.		All Data	Location of Maximum	Detection	Min.		Max.			All Data	Location of Maximum	Min.		Max.
Total 2,3,7,8-TCDD Equiv.	0/0		-					3/3	145	-	340			230	03TP06-0809-03-20070501		-	
Aluminum	12/12	8570	-	15000		11300	BGSS06 04/07/97	47/47	10400	-	74700			22800	03TP19-0304-02		-	
Antimony	0/2		-					20/39	2 J	-	281	L		22.3	03TP27-0304-01-D	0.38	-	10.3
Arsenic	12/12	3.7 K	-	10.6		6.65	BGSS03 04/07/97	47/47	1.3	-	49.9	J		6.31	03TP27-0304-01		-	
Barium	12/12	77.8	-	111		95.7	BGSS04 04/07/97	47/47	45.2	-	859			247	03TP19-0304-02		-	
Beryllium	12/12	0.75	-	1.3		0.987	BGSS11 04/07/97	37/37	0.61	-	1.7			1.04	03TP10-0405-01-20070503		-	
Cadmium	0/12		-					26/41	1.3	-	300			33.1	03TP19-0607-01	0.082	-	0.98
Calcium	12/12	614	-	1600		1020	BGSS12 04/07/97	42/42	253	-	71900			7300	03TP27-0304-01-D		-	
Chromium	12/12	12.4	-	20.8		15.3	BGSS02 04/07/97	46/47	4.2 K	-	348	J		48.8	03TP30-0506-01	17	-	17
Cobalt	12/12	6.8	-	9.3		7.9	BGSS02 04/07/97	47/47	2.5	-	121	J		13.8	03TP27-0304-01-D		-	
Copper	12/12	8	-	13.4		10.7	BGSS09 04/07/97	47/47	7.1	-	9660			717	03TP25-0607-02-D		-	
Cyanide	2/12	0.7	-	3.8		0.649	BGSS09 04/07/97	23/47	0.13	-	4.6			0.782	03TP06-0809-03-20070501	0.09	-	2.5
Iron	12/12	11500	-	17600		14800	BGSS06 04/07/97	47/47	9570	-	236000	J		41000	03TP27-0304-01-D		-	
Lead	12/12	16.3	-	64.7		30.6	BGSS04 04/07/97	47/47	2.2	-	6480	J		733	03TP05-0910-02-20070430		-	
Magnesium	12/12	1210	-	1940		1500	BGSS06 04/07/97	47/47	408	-	8690			2430	03TP06-0607-04-20070501		-	
Manganese	12/12	429	-	1190		642	BGSS04 04/07/97	47/47	41.6	-	20000			1400	03TP10-0405-01-20070503		-	
Mercury	0/12		-					39/47	0.023 L	-	7.1			0.898	03TP20-0708-01	0.017	-	0.11
Nickel	12/12	7.4	-	11.2		9.79	BGSS04 04/07/97	47/47	5.8	-	296	K		51.1	03TP05-0506-01-20070430		-	
Potassium	7/12	436	-	771		434	BGSS05 04/07/97	42/43	168	-	3010			844	03TP01_19910909	522	-	522
Selenium	0/12		-					1/27	0.55 L	-	0.55	L		0.422	03TP08-0203-03-20070502	0.31	-	8
Silver	0/12		-					22/44	0.31	-	233			13.8	03TP06-0607-04-20070501	0.035	-	1.5
Sodium	2/12	112	-	120		63.7	BGSS09 04/07/97	17/29	19.1 L	-	1830			451	03TP27-0304-01	18.8	-	1090
Thallium	7/12	0.25	-	0.34		0.226	BGSS07 04/07/97	12/28	0.44	-	61.1	J		7.03	03TP27-0304-01-D	0.41	-	13.9
Vanadium	12/12	20.9	-	28.2		24.9	BGSS02 04/07/97	47/47	11.8	-	752	J		41	03TP27-0304-01		-	
Zinc	12/12	21.7	-	597		90.1	BGSS04 04/07/97	47/47	10.6	-	13700	J		1180	03TP27-0304-01		-	
4,4'-DDD	0/12		-					17/46	0.83 J	-	72000			1570	03TP06-0607-04-20070501	2	-	93
4,4'-DDE	0/12		-					13/39	0.39 J	-	8700			231	03TP06-0607-04-20070501	2	-	93
4,4'-DDT	2/12	6.2 J	-	8.3	J	3.01	BGSS10 04/07/97	20/47	0.39 J	-	270000			5760	03TP06-0607-04-20070501	2	-	93
Aldrin	0/12		-					12/46	0.53 J	-	9.7			31.1	03TP06-0809-03-20070501	2	-	2500
Alpha-BHC	0/12		-					4/46	0.7 J	-	16			30.7	03TP25-0607-02	2	-	2500
Alpha-Chlordane	0/12		-					14/45	0.26 J	-	330	J		52.8	03TP14-0203-01-20070504	2	-	2500
Aroclor-1242	0/12		-					2/47	37	-	110			41	03TP12-0405-01-20070504	20	-	490
Aroclor-1248	0/12		-					2/47	92	-	560			49.6	03TP26-0506-01	20	-	490
Aroclor-1254	0/12		-					6/47	50	-	4000			175	03TP24-0304-01	20	-	490
Aroclor-1260	0/12		-					8/47	20	-	600			83.1	03TP06-0809-03-20070501	20	-	490
Beta-BHC	0/12		-					2/45	1.8 J	-	14	J		30.7	03TP25-0607-02-D	1	-	2500
Delta-BHC	0/12		-					7/47	0.35 J	-	2.7			30	03TP12-0405-01-20070504	2	-	2500
Dieldrin	9/12	13	-	760		179	BGSS03 04/07/97	29/47	0.24 J	-	10000			265	03TP06-0607-04-20070501	2	-	93
Endosulfan I	0/12		-					8/47	0.69 J	-	580	J		15.6	03TP06-0607-04-20070501	2	-	48
Endosulfan II	0/12		-					4/46	0.63 J	-	16	J		33.7	03TP06-0809-03-20070501	2	-	2500
Endosulfan Sulfate	0/12		-					7/46	0.61 J	-	19			33.9	03TP06-0809-03-20070501	2	-	2500
Endrin	0/12		-					7/47	1.8 J	-	25			33.3	03TP02-1_19910910	2	-	2500
Endrin Aldehyde	0/12		-					10/35	0.52 J	-	25	J		40.3	03TP19-0607-01	2	-	2500
Endrin Ketone	0/12		-					8/46	0.32 J	-	24	J		33.7	03TP27-0304-01	2	-	2500
Gamma-BHC (Lindane)	0/12		-					10/47	0.69 J	-	6.9			30.2	03TP12-0304-02-20070504	2	-	2500
Gamma-Chlordane	4/12	3.2	-	48	J	8.67	BGSS10 04/07/97	20/44	0.36 J	-	620	J		37	03TP06-0607-04-20070501	2	-	190
Heptachlor	0/12		-					8/44	0.52 J	-	8	J		31.9	03TP06-0708-02-20070501	2	-	2500

TABLE 4-8

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN LANDFILL AREA SUBSURFACE SOIL SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Range of Detection Limits Min. - Max.
Heptachlor Epoxide	3/12	3.4 J	47	7.79	BGSS10 04/07/97	12/47	0.85 J	390 J	12.2	03TP06-0607-04-20070501	2 - 48
Methoxychlor	0/12	-				11/47	1 J	130 J	82.8	03TP19-0607-01	3.9 - 4800
1,2,4,5-Tetrachlorobenzene	0/0	-				1/37	36 J	36 J	249	03TP19-0607-01	190 - 2300
1,2-Dichlorobenzene	0/12	-				2/47	45 J	3600	211	03TP04-2_19910911	4.7 - 5700
1,4-Dichlorobenzene	0/12	-				1/47	880 J	880 J	157	03TP04-2_19910911	4.7 - 5700
1-Methylnaphthalene	0/0	-				6/9	0.84 J	560	838	03TP25-0607-02-D	9.8 - 14000
2-Methylnaphthalene	0/12	-				11/42	1.3 J	1100 J	308	03TP20-0708-01	9.9 - 2300
2-Methylphenol	0/12	-				2/47	190 J	290 J	311	03TP04-3_19910911	340 - 2300
Acenaphthene	3/12	55 J	64 J	178	BGSS10 04/07/97	7/43	3.7 J	6400 J	422	03TP20-0708-01	9.9 - 2300
Acenaphthylene	3/12	54 J	62 J	177	BGSS12 04/07/97	8/42	0.64 J	280 J	272	03TP04-3_19910911	9.9 - 2300
Anthracene	6/12	46 J	160 J	154	BGSS12 04/07/97	10/42	0.82 J	19000	820	03TP20-0708-01	9.9 - 2300
Benz(a)anthracene	9/12	33 J	940	306	BGSS12 04/07/97	17/43	4.3 J	15000	952	03TP20-0708-01	9.9 - 2300
Benzaldehyde	0/0	-				7/37	38 J	83 J	253	03TP27-0304-01	200 - 2300
Benzo(a)pyrene	8/12	110 J	1100	394	BGSS12 04/07/97	18/44	6.2 J	7900 J	731	03TP20-0708-01	9.9 - 2300
Benzo(b)fluoranthene	8/12	160 J	1500	507	BGSS12 04/07/97	18/45	7.4 J	9900 J	842	03TP20-0708-01	9.9 - 2300
Benzo(g,h,i)perylene	7/12	52 J	490	225	BGSS12 04/07/97	17/45	4.4 J	2900 J	397	03TP20-0708-01	9.9 - 2300
Benzo(k)fluoranthene	7/12	98 J	920	370	BGSS12 04/07/97	13/43	5 J	6600 J	676	03TP20-0708-01	9.9 - 2300
Bis(2-ethylhexyl) Phthalate	0/0	-				20/47	46 J	12000	663	03TP25-0506-01	270 - 2100
Carbazole	5/12	80 J	310 J	212	BGSS10 04/07/97	2/37	330	11000	555	03TP20-0708-01	200 - 2300
Chrysene	9/12	43 J	1200	420	BGSS12 04/07/97	19/45	8.2 J	23000	1080	03TP20-0708-01	9.9 - 2300
Di-n-butyl Phthalate	0/2	-				1/42	170 J	170 J	319	03TP25-0506-01	270 - 2300
Di-n-octyl Phthalate	0/12	-				1/47	220 J	220 J	284	03TP06-0809-03-20070501	260 - 2100
Dibenz(a,h)anthracene	5/12	52 J	160 J	161	BGSS12 04/07/97	9/42	1.3 J	1100 J	295	03TP20-0708-01	9.9 - 2300
Dibenzofuran	4/12	51 J	120 J	172	BGSS08 04/07/97	3/47	140 J	8200	465	03TP20-0708-01	290 - 2300
Fluoranthene	10/12	49 J	2600	902	BGSS12 04/07/97	20/45	12	56000	2180	03TP20-0708-01	9.9 - 2300
Fluorene	4/12	59 J	160 J	184	BGSS08 04/07/97	7/43	4.7 J	8200 J	470	03TP20-0708-01	9.9 - 2300
Indeno(1,2,3-cd)pyrene	8/12	49 J	640	251	BGSS12 04/07/97	17/45	4.9 J	3600 J	453	03TP20-0708-01	9.9 - 2300
Naphthalene	0/12	-				11/41	9.2 J	14000	834	03TP20-0708-01	380 - 2300
Phenanthrene	8/12	110 J	1700	667	BGSS12 04/07/97	18/43	5.8 J	62000	2180	03TP20-0708-01	9.9 - 2300
Pyrene	10/12	46 J	2100	723	BGSS12 04/07/97	21/45	12	38000	1710	03TP20-0708-01	9.9 - 2300
1,2,3-Trichlorobenzene	0/0	-				3/36	71 J	5700	170	03TP25-0506-01	4.7 - 320
1,2,4-Trichlorobenzene	0/12	-				2/47	250 J	310 J	155	03TP25-0607-02-D	4.7 - 5700
2-Butanone	0/0	-				4/50	5.5	24	161	03TP19-0607-01	4.9 - 14000
Acetone	0/0	-				16/43	6.1 J	540 J	42	03TP25-0607-02	12 - 33
Benzene	0/0	-				9/50	2.2 J	78 J	66	03TP25-0607-02	4.7 - 5700
Bromomethane	0/0	-				1/50	8.2	8.2	67.1	03TP19-0607-01	4.7 - 5700
Carbon Disulfide	0/0	-				1/50	2.9 J	2.9 J	66.1	03TP24-0304-01	4.7 - 5700
Chlorobenzene	0/0	-				1/50	2 J	2 J	66.1	03SB02_19910906	4.7 - 5700
Chloromethane	0/0	-				1/50	16	16	67.3	03TP26-0506-01	4.7 - 5700
Dichlorodifluoromethane	0/0	-				1/37	4.8 J	4.8 J	87.8	03TP24-0304-01	4.7 - 5700
Ethylbenzene	0/0	-				3/50	380	7000	170	03TP25-0506-01	4.7 - 30
M,p-xylene	0/0	-				3/37	960	18000	692	03TP25-0506-01	9.5 - 21
Methyl Acetate	0/0	-				1/37	450 J	450 J	91.8	03TP25-0607-02-D	4.7 - 5700
Methylcyclohexane	0/0	-				1/37	3500 J	3500 J	105	03TP25-0506-01	4.7 - 320
O-xylene	0/0	-				3/37	260 J	4000	179	03TP20-0708-01	4.7 - 10
Styrene	0/0	-				1/50	3300	3300	129	03TP20-0708-01	4.7 - 5700
Tetrachloroethene	0/0	-				4/50	4.8 J	210 J	67.1	03TP25-0607-02	4.7 - 5700

TABLE 4-8

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN LANDFILL AREA SUBSURFACE SOIL SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data						
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Range of Detection Limits Min.	Range of Detection Limits Max.
Toluene	0/0	-				5/43	2 J	150000	3590	03TP25-0506-01	4.7	30
Trichloroethene	0/0	-				2/50	2 J	2.7 J	66.1	03TP24-0304-01	4.7	5700
Xylenes (Total)	0/0	-				3/26	1200	20000	1220	03TP25-0506-01	4.7	30

Notes:

Units are mg/kg for inorganics, ug/kg for organics except dioxin, ng/kg for 2,3,7,8-TCDD Toxicity Equivalents.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-9

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN HANGAR AREA SUBSURFACE SOIL SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Background Data							Site-Related Data										
	Freq.	Range of Positive Detection					Mean of	Sampling Round and	Freq.	Range of Positive Detection					Mean of	Sampling Round and	Range of Detection Limits	
Substance	of Detection	Min.		Max.			All Data	Location of Maximum	of Detection	Min.		Max.			All Data	Location of Maximum	Min.	Max.
2-Methylnaphthalene	0/12		-						1/12	28	J	-	28	J	199	03SB19-0204	380 -	780
Acenaphthene	3/12	55	J	-	64	J	178	BGSS10 04/07/97	2/12	170	J	-	230	J	198	03SB19-0204	380 -	440
Acenaphthylene	3/12	54	J	-	62	J	177	BGSS12 04/07/97	2/12	110	J	-	120	J	183	03SB19-0408	380 -	440
Anthracene	6/12	46	J	-	160	J	154	BGSS12 04/07/97	2/12	740	J	-	1800		376	03SB19-0204	380 -	440
Benz(a)anthracene	9/12	33	J	-	940		306	BGSS12 04/07/97	3/12	36	J	-	4200		759	03SB19-0204	380 -	440
Benzo(a)pyrene	8/12	110	J	-	1100		394	BGSS12 04/07/97	3/12	40	J	-	3200		635	03SB19-0204	380 -	440
Benzo(b)fluoranthene	8/12	160	J	-	1500		507	BGSS12 04/07/97	3/12	68	J	-	4200		745	03SB19-0204	380 -	440
Benzo(g,h,i)perylene	7/12	52	J	-	490		225	BGSS12 04/07/97	3/12	33	J	-	2100		484	03SB19-0204	380 -	440
Benzo(k)fluoranthene	7/12	98	J	-	920		370	BGSS12 04/07/97	3/12	17	J	-	1400		374	03SB19-0204	380 -	440
Butyl Benzyl Phthalate	3/12	83	J	-	280	J	208	BGSS02 04/07/97	4/12	30	J	-	38	J	173	03SB17-0406	380 -	780
Carbazole	5/12	80	J	-	310	J	212	BGSS10 04/07/97	2/12	140	J	-	340	J	204	03SB19-0204	380 -	440
Chrysene	9/12	43	J	-	1200		420	BGSS12 04/07/97	3/12	53	J	-	3400		661	03SB19-0204	380 -	440
Dibenz(a,h)anthracene	5/12	52	J	-	160	J	161	BGSS12 04/07/97	2/12	500	J	-	580	J	254	03SB19-0204	380 -	440
Dibenzofuran	4/12	51	J	-	120	J	172	BGSS08 04/07/97	2/12	75	J	-	150	J	183	03SB19-0204	380 -	440
Fluoranthene	10/12	49	J	-	2600		902	BGSS12 04/07/97	3/12	91	J	-	6900	E	1160	03SB19-0204	380 -	440
Fluorene	4/12	59	J	-	160	J	184	BGSS08 04/07/97	2/12	180	J	-	260	J	201	03SB19-0204	380 -	440
Indeno(1,2,3-cd)pyrene	8/12	49	J	-	640		251	BGSS12 04/07/97	3/12	28	J	-	2000		459	03SB19-0204	380 -	440
Phenanthrene	8/12	110	J	-	1700		667	BGSS12 04/07/97	3/12	40	J	-	4100		693	03SB19-0204	380 -	440
Pyrene	10/12	46	J	-	2100		723	BGSS12 04/07/97	3/12	84	J	-	6600		1170	03SB19-0204	380 -	440

Notes:

Units are mg/kg for inorganics, ug/kg for organics except dioxin, ng/kg for 2,3,7,8-TCDD Toxicity Equivalents.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-10
STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 LANDFILL AREA SUBSURFACE SOIL TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		Site 3 sb Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are Site 3 sb?				Ranks of Site 3 sb > bkg.?				Site 3 sb Mean > bkg. Mean ?					Site 3 sb Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:		#ND & Pos.>=5 or use Fisher				Data fit normal or gamma distrib., or nonparametric					# Site 3 sb (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 sb & bkg. both normally distributed						
Test Criterion:		P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
		bkg.	Site 3 sb	P	YN	Back.	Std.Dev.	t	N, Q, or	Back.	r	k	P	YN	P	Test	Used	YN	bkg.	Site 3 sb	t	t	YN	bkg.	Site 3 sb	Std.Dev.	Std.Dev.	F	F	YN
Concentration > background?	Y/N	Freq.	Freq.	Value		Mean	Back	Value	Other***	UTL			Value		Value				Mean	Mean	Value	Table		Distrib.	Distrib.	bkg.	Site 3 sb	Value	Table	
Total 2,3,7,8-TCDD Equiv.	NA	0/0	3/3		NA									NA				NA		230			NA							NA
Aluminum	**Y**	12/12	47/47		NA	11300	1720	2.7360	N	16000	37	37	<.0001	**Y**	<.0001	Gehan	Test	**Y**	11300	22800			NA	lognor.	lognor.					NA
Antimony	NA*	0/2	20/39		NA						16	16	0.3659	N				NA		22.3			NA							NA
Arsenic	N	12/12	47/47		NA	6.65	1.83	2.7360	N	11.7	12	11	0.2334	N	0.9513	Gehan	Test	N	6.65	6.31			NA	lognor.	lognor.					NA
Barium	**Y**	12/12	47/47		NA	95.7	12.3	2.7360	N	129	32	32	<.0001	**Y**	0.0084	Gehan	Test	**Y**	95.7	247			NA	lognor.	nonpar.					NA
Beryllium	N	12/12	37/37		NA	0.987	0.192	2.7360	N	1.51	5	5	0.2286	N	0.3250	Gehan	Test	N	0.987	1.04			NA	lognor.	lognor.					NA
Cadmium	**Y**	0/12	26/41		NA						25	25	0.0001	**Y**				NA		33.1			NA							NA
Calcium	**Y**	12/12	42/42		NA	1020	352	2.7360	N	1980	21	21	0.0010	**Y**	0.0606	Gehan	Test	N	1020	7300			NA	lognor.	nonpar.					NA
Chromium	**Y**	12/12	46/47	1.0000	N	15.3	2.28	2.7360	N	21.6	35	34	0.0001	**Y**	0.0024	Gehan	Test	**Y**	15.3	48.8			NA	lognor.	lognor.					NA
Cobalt	**Y**	12/12	47/47		NA	7.9	0.788	2.7360	N	10.1	29	29	0.0001	**Y**	0.0040	Gehan	Test	**Y**	7.9	13.8			NA	normal	nonpar.					NA
Copper	**Y**	12/12	47/47		NA	10.7	1.54	2.7360	N	14.9	41	41	<.0001	**Y**	<.0001	Gehan	Test	**Y**	10.7	717			NA	normal	nonpar.					NA
Cyanide	NA*	2/12	23/47		NA	0.649					1	1	0.7966	N	0.3838	Gehan	Test	N	0.649	0.782			NA	nonpar.	lognor.					NA
Iron	**Y**	12/12	47/47		NA	14800	1760	2.7360	N	19600	37	37	<.0001	**Y**	<.0001	Gehan	Test	**Y**	14800	41000			NA	lognor.	nonpar.					NA
Lead	**Y**	12/12	47/47		NA	30.6	15.2		gamma***	60.8	20	20	0.0035	**Y**	0.3532	Gehan	Test	N	30.6	733			NA	lognor.	nonpar.					NA
Magnesium	**Y**	12/12	47/47		NA	1500	172	2.7360	N	1970	22	22	0.0017	**Y**	0.1333	Gehan	Test	N	1500	2430			NA	lognor.	lognor.					NA
Manganese	**Y**	12/12	47/47		NA	642	206		gamma***	1030	32	30	0.0041	**Y**	0.0460	Gehan	Test	**Y**	642	1400			NA	lognor.	nonpar.					NA
Mercury	**Y**	0/12	39/47		NA						20	20	0.0035	**Y**				NA		0.898			NA							NA
Nickel	**Y**	12/12	47/47		NA	9.79	0.954	2.7360	N	12.4	35	35	<.0001	**Y**	0.0001	Gehan	Test	**Y**	9.79	51.1			NA	normal	nonpar.					NA
Potassium	**Y**	7/12	42/43	0.0012	**Y**	599	132		KM UPL***	1090	23	23	0.0005	**Y**	0.0080	Gehan	Test	**Y**	434	844			NA	normal	lognor.					NA
Selenium	NA*	0/12	1/27		NA									NA				NA		0.422			NA							NA
Silver	**Y**	0/12	22/44		NA						20	20	0.0022	**Y**				NA		13.8			NA							NA
Sodium	**Y**	2/12	17/29		NA	116					2	2	0.4951	N	0.0106	Gehan	Test	**Y**	63.7	451			NA	nonpar.	nonpar.					NA
Thallium	**Y**	7/12	12/28		NA	0.291	0.027		KM UPL***	0.4	3	3	0.3316	N	0.0033	Gehan	Test	**Y**	0.226	7.03			NA	nonpar.	nonpar.					NA
Vanadium	**Y**	12/12	47/47		NA	24.9	2.13	2.7360	N	30.7	25	25	0.0005	**Y**	0.0433	Gehan	Test	**Y**	24.9	41			NA	normal	nonpar.					NA
Zinc	**Y**	12/12	47/47		NA	90.1	160		Q***	597	25	24	0.0069	**Y**	0.2519	Gehan	Test	N	90.1	1180			NA	nonpar.	nonpar.					NA
4,4'-DDD	NA*	0/12	17/46		NA						2	2	0.6261	N				NA		1570			NA							NA
4,4'-DDE	NA*	0/12	13/39		NA						1	1	0.7647	N				NA		231			NA							NA
4,4'-DDT	NA*	2/12	20/47		NA	3.01					4	4	0.3919	N	0.0588	Gehan	Test	N	3.01	5760			NA	nonpar.	nonpar.					NA
Aldrin	NA*	0/12	12/46		NA									NA				NA		31.1			NA							NA
Alpha-BHC	NA*	0/12	4/46		NA									NA				NA		30.7			NA							NA
Alpha-Chlordane	NA*	0/12	14/45		NA									NA				NA		52.8			NA							NA
Aroclor-1242	NA*	0/12	2/47		NA									NA				NA		41			NA							NA
Aroclor-1248	NA*	0/12	2/47		NA						1	1	0.7966	N				NA		49.6			NA							NA
Aroclor-1254	NA*	0/12	6/47		NA						5	5	0.3064	N				NA		175			NA							NA
Aroclor-1260	NA*	0/12	8/47		NA						3	3	0.4988	N				NA		83.1			NA							NA
Beta-BHC	NA*	0/12	2/45		NA									NA				NA		30.7			NA							NA
Delta-BHC	NA*	0/12	7/47		NA									NA				NA		30			NA							NA
Dieldrin	NA*	9/12	29/47		NA	179					1	1	0.7966	N	0.9319	Gehan	Test	N	179	265			NA	lognor.	lognor.					NA
Endosulfan I	NA*	0/12	8/47		NA						1	1	0.7966	N				NA		15.6			NA							NA
Endosulfan II	NA*	0/12	4/46		NA									NA				NA		33.7			NA							NA
Endosulfan Sulfate	NA*	0/12	7/46		NA									NA				NA		33.9			NA							NA
Endrin	NA*	0/12	7/47		NA									NA				NA		33.3			NA							NA
Endrin Aldehyde	NA*	0/12	10/35		NA									NA				NA		40.3			NA							NA
Endrin Ketone	NA*	0/12	8/46		NA									NA				NA		33.7			NA							NA
Gamma-BHC (Lindane)	NA*	0/12	10/47		NA									NA				NA		30.2			NA							NA
Gamma-Chlordane	NA*	4/12	20/44		NA	8.67					2	2	0.6143	N	0.2355	Gehan	Test	N	8.67	37			NA	nonpar.	nonpar.					NA
Heptachlor	NA*	0/12	8/44		NA									NA				NA		31.9			NA							NA
Heptachlor Epoxide	NA*	3/12	12/47		NA	7.79					1	1	0.7966	N	0.5486	Gehan	Test	N	7.79	12.2			NA	nonpar.	nonpar.					NA
Methoxychlor	NA*	0/12	11/47		NA									NA				NA		82.8			NA							NA
1,2,4,5-Tetrachlorobenzene	NA*	0/0	1/37		NA									NA				NA		249			NA							NA
1,2,4-Trichlorobenzene	NA*	0/12	2/47		NA									NA				NA		155			NA							NA
1,2-Dichlorobenzene	NA*	0/12	2/47		NA						1	1	0.7966	N				NA		211			NA							NA
1,4-Dichlorobenzene	NA*	0/12	1/47		NA									NA				NA		157			NA							NA
1-Methylnaphthalene	NA*	0/0	6/9		NA									NA				NA		838			NA							NA
2-Methylnaphthalene	NA*	0/12	11/42		NA						2	2	0.6017	N				NA		308			NA							NA

TABLE 4-10
STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 LANDFILL AREA SUBSURFACE SOIL TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		Site 3 sb Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are Site 3 sb?				Ranks of Site 3 sb > bkg.?				Site 3 sb Mean > bkg. Mean ?					Site 3 sb Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:		#ND & Pos.>=5 or use Fisher				Data fit normal or gamma distrib., or nonparametric					# Site 3 sb (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 sb & bkg. both normally distributed						
Test Criterion:		P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
		bkg.	Site 3 sb	P	YN	Back.	Std.Dev.	t	N, Q, or	Back.	r	k	P	YN	P	Test	Used	YN	bkg.	Site 3 sb	t	t	YN	bkg.	Site 3 sb	Std.Dev.	Std.Dev.	F	F	YN
Concentration > background?	Y/N	Freq.	Freq.	Value		Mean	Back	Value	Other***	UTL			Value		Value				Mean	Mean	Value	Table		Distrib.	Distrib.	bkg.	Site 3 sb	Value	Table	
2-Methylphenol	NA*	0/12	2/47		NA									NA				NA		311			NA							NA
Acenaphthene	NA*	3/12	7/43		NA	178					2	2	0.6081	N	0.4965	Gehan	Test	N	178	422			NA	nonpar.	nonpar.					NA
Acenaphthylene	NA*	3/12	8/42		NA	177								NA	0.7287	Gehan	Test	N	177	272			NA	nonpar.	nonpar.					NA
Anthracene	N	6/12	10/42		NA	154					3	3	0.4628	N	0.2409	Gehan	Test	N	154	820			NA	nonpar.	nonpar.					NA
Benz(a)anthracene	N	9/12	17/43		NA	306					4	4	0.3618	N	0.9587	Gehan	Test	N	306	952			NA	lognor.	nonpar.					NA
Benzaldehyde	NA	0/0	7/37		NA									NA				NA		253			NA							NA
Benzo(a)pyrene	N	8/12	18/44		NA	394					4	4	0.3696	N	0.9788	Gehan	Test	N	394	731			NA	lognor.	nonpar.					NA
Benzo(b)fluoranthene	N	8/12	18/45		NA	507					4	4	0.3772	N	0.9952	Gehan	Test	N	507	842			NA	lognor.	nonpar.					NA
Benzo(g,h,i)perylene	N	7/12	17/45		NA	225					4	4	0.3772	N	0.9613	Gehan	Test	N	225	397			NA	normal	nonpar.					NA
Benzo(k)fluoranthene	N	7/12	13/43		NA	370					4	4	0.3618	N	0.9682	Gehan	Test	N	370	676			NA	lognor.	nonpar.					NA
Bis(2-ethylhexyl) Phthalate	NA	0/0	20/47		NA									NA				NA		663			NA							NA
Carbazole	NA*	5/12	2/37		NA	212					1	1	0.7551	N	0.9539	Gehan	Test	N	212	555			NA	normal	nonpar.					NA
Chrysene	N	9/12	19/45		NA	420					4	4	0.3772	N	0.9791	Gehan	Test	N	420	1080			NA	lognor.	nonpar.					NA
Di-n-butyl Phthalate	NA*	0/2	1/42		NA									NA				NA		319			NA							NA
Di-n-octyl Phthalate	NA*	0/12	1/47		NA									NA				NA		284			NA							NA
Dibenz(a,h)anthracene	N	5/12	9/42		NA	161					1	1	0.7778	N	0.2502	Gehan	Test	N	161	295			NA	nonpar.	nonpar.					NA
Dibenzofuran	NA*	4/12	3/47		NA	172					2	2	0.6318	N	0.4288	Gehan	Test	N	172	465			NA	nonpar.	nonpar.					NA
Fluoranthene	N	10/12	20/45		NA	902					4	4	0.3772	N	0.9968	Gehan	Test	N	902	2180			NA	lognor.	nonpar.					NA
Fluorene	NA*	4/12	7/43		NA	184					2	2	0.6081	N	0.6840	Gehan	Test	N	184	470			NA	nonpar.	nonpar.					NA
Indeno(1,2,3-cd)pyrene	N	8/12	17/45		NA	251					4	4	0.3772	N	0.9700	Gehan	Test	N	251	453			NA	lognor.	nonpar.					NA
Naphthalene	NA*	0/12	11/41		NA						3	3	0.4550	N				NA		834			NA							NA
Phenanthrene	N	8/12	18/43		NA	667					3	3	0.4704	N	0.9902	Gehan	Test	N	667	2180			NA	lognor.	nonpar.					NA
Pyrene	N	10/12	21/45		NA	723					4	4	0.3772	N	0.9943	Gehan	Test	N	723	1710			NA	lognor.	nonpar.					NA
1,2,3-Trichlorobenzene	NA	0/0	3/36		NA									NA				NA		170			NA							NA
2-Butanone	NA	0/0	4/50		NA									NA				NA		161			NA							NA
Acetone	NA	0/0	16/43		NA									NA				NA		42			NA							NA
Benzene	NA	0/0	9/50		NA									NA				NA		66			NA							NA
Bromomethane	NA	0/0	1/50		NA									NA				NA		67.1			NA							NA
Carbon Disulfide	NA	0/0	1/50		NA									NA				NA		66.1			NA							NA
Chlorobenzene	NA	0/0	1/50		NA									NA				NA		66.1			NA							NA
Chloromethane	NA	0/0	1/50		NA									NA				NA		67.3			NA							NA
Dichlorodifluoromethane	NA	0/0	1/37		NA									NA				NA		87.8			NA							NA
Ethylbenzene	NA	0/0	3/50		NA									NA				NA		170			NA							NA
M,p-xylene	NA	0/0	3/37		NA									NA				NA		692			NA							NA
Methyl Acetate	NA	0/0	1/37		NA									NA				NA		91.8			NA							NA
Methylcyclohexane	NA	0/0	1/37		NA									NA				NA		105			NA							NA
O-xylene	NA	0/0	3/37		NA									NA				NA		179			NA							NA
Styrene	NA	0/0	1/50		NA									NA				NA		129			NA							NA
Tetrachloroethene	NA	0/0	4/50		NA									NA				NA		67.1			NA							NA
Toluene	NA	0/0	5/43		NA									NA				NA		3590			NA							NA
Trichloroethene	NA	0/0	2/50		NA									NA				NA		66.1			NA							NA
Xylenes (Total)	NA	0/0	3/26		NA									NA				NA		1220			NA							NA

**** Site 3 concentrations in subsurface soil (sb) are compared to background soil.**

Interpretation of Z-Test or Fisher's Exact Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data's detection frequency is greater than the background data detection frequency.
Interpretation of Quantile Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more upper rank values relative to the background data set.
Since "k" samples from the top "r" ranks of the combined data set belonged to the site soil subgroup, this would be unlikely if the site and background data sets came from the same population.
Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more values ranked greater than the ranks of background data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians.
Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site data set belongs to a population having a greater mean relative to the mean of the background population.
Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

TABLE 4-10
STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 LANDFILL AREA SUBSURFACE SOIL TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:	Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:	Site 3 sb Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are Site 3 sb?				Ranks of Site 3 sb > bkg.?				Site 3 sb Mean > bkg. Mean ?					Site 3 sb Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:	#ND & Pos.>=5 or use Fisher				Data fit normal or gamma distrib., or nonparametric					# Site 3 sb (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 sb & bkg. both normally distributed						
Test Criterion:	P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
	bkg.	Site 3 sb	P	YN	Back.	Std.Dev.	t	N, Q, or	Back.	r	k	P	YN	P	Test	Used	YN	bkg.	Site 3 sb	t	t	YN	bkg.	Site 3 sb	Std.Dev.	Std.Dev.	F	F	YN
Concentration > background? Y/N	Freq.	Freq.	Value		Mean	Back	Value	Other***	UTL			Value		Value				Mean	Mean	Value	Table		Distrib.	Distrib.	bkg.	Site 3 sb	Value	Table	

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 sb to bkg. soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 sb > bkg.) for each chemical appears at the left and is based on four criteria:
(1) Overall decision is YES if any one of the Mann-Whitney/Gehan, Quantile Test, or T-Test is YES, regardless of other test results.
(2) Overall decision is NO if at least one of Mann-Whitney/Gehan, Quantile Test, or T-Test is NO, and none of the aforementioned tests are YES.
(3) Overall decision is YES/NO if Z/Fisher Test is YES/NO, respectively, and other tests are NA. Z-test is treated as lowest priority since it relies on detection frequency, not magnitude of results.
(4) Overall decision is NA if all tests are NA. (Might occur if too few detections to be capable of detecting a statistically significant difference even if one exists.)
NOTE: This decision scheme does not utilize the UTL test because random false positive exceedances of the background UTL are probable if there are many site samples, even if site distribution matches background.

* Low power because either N is small or very low frequency of detected values with detections close to the detection limits, which interferes with the power of statistical tests to detect a significant difference between groups.

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 sb (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 sb results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 sb > bkg. with 95 % confidence.
N, Q, or other UTL***	UTL is based on a 95 % upper limit (using t-value) when data are normal (N). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.
KM	Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.
r,k	The Quantile test calculates the probability that k or more samples from the top r ranks of the combined Site 3 sb and bkg. data set are comprised of Site 3 sb data if both populations are in fact equal.

TABLE 4-11

TEST FORM II COMPARISON OF METALS IN SITE 3 LANDFILL AREA SUBSURFACE SOIL TO BACKGROUND SOIL
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		Ranks of Site 3 sb < bkg.+2σ?				Site 3 sb Mean < bkg. Mean + 2σ ?					Site 3 sb Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:						#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 sb & bkg. both normally distributed						
Test Criterion:		P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
		P	Test	Used	YN	Site 3 sb	bkg.+ 2σ	t	t	YN	Site 3 sb	bkg.	Std.Dev.	Std.Dev.	F	F	YN
Site Conc.< background + 2σ?	Y/N	Value				Mean@	Mean@	Value	Table		Distrib.	Distrib.	Site 3 sb@	bkg. sb@	Value	Table	
Aluminum	N	0.9995	Gehan	Test	N	22800	14700			NA	lognor.	normal					NA
Arsenic	**Y**	<.0001	Gehan	Test	**Y**	6.31	10.3			NA	lognor.	normal					NA
Chromium	N	0.8412	Gehan	Test	N	48.8	19.9			NA	lognor.	normal					NA
Copper	N	1.0000	Gehan	Test	N	717	13.8			NA	nonpar.	normal					NA
Iron	N	0.9989	Gehan	Test	N	41000	18300			NA	nonpar.	normal					NA
Manganese	N	0.0861	Gehan	Test	N	1400	1050			NA	nonpar.	lognor.					NA

**** Site 3 Landfill Area metals concentrations in subsurface soil are compared to background soil.**

Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the background data plus 2σ has a distribution with more values ranked greater than the ranl site data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians.

Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the background d belongs to a population having a greater mean relative to the mean of the site population.

Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 sb to bkg. Soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 sb < bkg. + 2σ) for each chemical appears at the left and is based on the criteria: Overall decision is YES if either one of the Mann-Whitney/Gehan or T-Test is YES.
NOTE: The Test Form 2 results do not utilize the UTL test or quantile test because the minimum detectable difference (MDD) is applied to the entire data set for a comparison of arithemetic mean or rank su

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 sb (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 sb results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 sb < bkg. + 2σ with 95 % confidence.
@	For the t-test, the arithmetic mean and standard deviation of un-transformed data are shown in every case, since the t-test cannot be run if site and background do not both match a normal distribution.

TABLE 4-12

STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 HANGAR AREA SUBSURFACE SOIL TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		hangr.sb Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are hangr.sb?								hangr.sb Mean > bkg. Mean ?					hangr.sb Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:		#ND & Pos.>=5 or use Fisher				Data fit normal or gamma distrib., or nonparametric					# hangr.sb (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, hangr.sb & bkg. both normally distributed						
Test Criterion:		P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
		bkg.	hangr.sb	P	YN	Back.	Std.Dev.	t	N, Q, or	Back.	r	k	P	YN	P	Test	Used	YN	bkg.	hangr.sb	t	t	YN	bkg.	hangr.sb	Std.Dev.	Std.Dev.	F	F	YN
Concentration > background?	Y/N	Freq.	Freq.	Value		Mean	Back	Value	Other***	UTL			Value		Value				Mean	Mean	Value	Table		Distrib.	Distrib.	bkg.	hangr.sb	Value	Table	
2-Methylnaphthalene	NA*	0/12	1/12	0.5000	N									NA				NA		199			NA							NA
Acenaphthene	NA*	3/12	2/12	0.8416	N	178					2	2	0.2391	N	0.0839	Gehan	Test	N	178	198			NA	nonpar.	normal					NA
Acenaphthylene	NA*	3/12	2/12	0.8416	N	177								NA	0.0609	Gehan	Test	N	177	183			NA	nonpar.	nonpar.					NA
Anthracene	N	6/12	2/12	0.9864	N	154					2	2	0.2391	N	0.3121	Gehan	Test	N	154	376			NA	nonpar.	nonpar.					NA
Benz(a)anthracene	N	9/12	3/12	0.9983	N	306					2	2	0.2391	N	0.9037	Gehan	Test	N	306	759			NA	lognor.	nonpar.					NA
Benzo(a)pyrene	N	8/12	3/12	0.9939	N	394					2	2	0.2391	N	0.9099	Gehan	Test	N	394	635			NA	lognor.	nonpar.					NA
Benzo(b)fluoranthene	N	8/12	3/12	0.9939	N	507					2	2	0.2391	N	0.9669	Gehan	Test	N	507	745			NA	lognor.	nonpar.					NA
Benzo(g,h,i)perylene	N	7/12	3/12	0.9820	N	225					2	2	0.2391	N	0.8511	Gehan	Test	N	225	484			NA	normal	nonpar.					NA
Benzo(k)fluoranthene	N	7/12	3/12	0.9820	N	370					2	2	0.2391	N	0.9044	Gehan	Test	N	370	374			NA	lognor.	nonpar.					NA
Butyl Benzyl Phthalate	NA*	3/12	4/12	0.5000	N	208								NA	0.9518	Gehan	Test	N	208	173			NA	nonpar.	nonpar.					NA
Carbazole	N	5/12	2/12	0.9657	N	212					1	1	0.5000	N	0.9295	Gehan	Test	N	212	204			NA	normal	nonpar.					NA
Chrysene	N	9/12	3/12	0.9983	N	420					2	2	0.2391	N	0.9162	Gehan	Test	N	420	661			NA	lognor.	nonpar.					NA
Dibenz(a,h)anthracene	N	5/12	2/12	0.9657	N	161					2	2	0.2391	N	0.2581	Gehan	Test	N	161	254			NA	nonpar.	nonpar.					NA
Dibenzofuran	NA*	4/12	2/12	0.9225	N	172					1	1	0.5000	N	0.5449	Gehan	Test	N	172	183			NA	nonpar.	nonpar.					NA
Fluoranthene	N	10/12	3/12	0.9997	N	902					2	2	0.2391	N	0.9617	Gehan	Test	N	902	1160			NA	lognor.	nonpar.					NA
Fluorene	NA*	4/12	2/12	0.9225	N	184					2	2	0.2391	N	0.4470	Gehan	Test	N	184	201			NA	nonpar.	nonpar.					NA
Indeno(1,2,3-cd)pyrene	N	8/12	3/12	0.9939	N	251					2	2	0.2391	N	0.9107	Gehan	Test	N	251	459			NA	lognor.	nonpar.					NA
Phenanthrene	N	8/12	3/12	0.9939	N	667					2	2	0.2391	N	0.9099	Gehan	Test	N	667	693			NA	lognor.	nonpar.					NA
Pyrene	N	10/12	3/12	0.9997	N	723					2	2	0.2391	N	0.9617	Gehan	Test	N	723	1170			NA	lognor.	nonpar.					NA

**** Site 3 Hangar Area concentrations in subsurface soil are compared to background soil (sb).**

Interpretation of Z-Test or Fisher's Exact Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data's detection frequency is greater than the background data detection frequency.
Interpretation of Quantile Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more upper rank values relative to the background data set.
Since "k" samples from the top "r" ranks of the combined data set belonged to the site soil subgroup, this would be unlikely if the site and background data sets came from the same population.
Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more values ranked greater than the ranks of background data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians.
Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site data set belongs to a population having a greater mean relative to the mean of the background population.
Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 Hangar Area sb to bkg. soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 Hangar Area sb > bkg.) for each chemical appears at the left and is based on four criteria:
(1) Overall decision is YES if any one of the Mann-Whitney/Gehan, Quantile Test, or T-Test is YES, regardless of other test results.
(2) Overall decision is NO if at least one of Mann-Whitney/Gehan, Quantile Test, or T-Test is NO, and none of the aforementioned tests are YES.
(3) Overall decision is YES/NO if Z/Fisher Test is YES/NO, respectively, and other tests are NA. Z-test is treated as lowest priority since it relies on detection frequency, not magnitude of results.
(4) Overall decision is NA if all tests are NA. (Might occur if too few detections to be capable of detecting a statistically significant difference even if one exists.)
NOTE: This decision scheme does not utilize the UTL test because random false positive exceedances of the background UTL are probable if there are many site samples, even if site distribution matches background.

* Low power because either N is small or very low frequency of detected values with detections close to the detection limits, which interferes with the power of statistical tests to detect a significant difference between groups.

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 Hangar Area sb (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 Hangar Area sb results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 Hangar Area sb > bkg. with 95 % confidence.
N, Q, or other UTL***	UTL is based on a 95 % upper limit (using t-value) when data are normal (N). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.
KM	Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.
r,k	The Quantile test calculates the probability that k or more samples from the top r ranks of the combined hangr.sb and bkg. data set are comprised of hangr.sb data if both populations are in fact equal.

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB01-0204	03SB01-0608	03SB01-1416	03SB02	03SB04	03TP01	03TP02-1
Sample Date:					5/27/1997	5/27/1997	5/27/1997	9/6/1991	9/6/1991	9/9/1991	9/10/1991
Duplicate:											
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	2 - 4	6 - 8	14 - 16	1.5 - 2.5	1.5 - 2.5	5 - 5.5	9 - 9.5
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**				**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	NA	NA	NA	16200	14600	14200	20900
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	NA	NA	NA	9.7 U	12 B	10.3 U	12.3 B
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	NA	NA	NA	4	4.5	1.3	4.8
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	NA	NA	NA	77.6	80.2	166	121
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	NA	NA	NA	1.3	1.4	0.92 B	1.2
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	NA	NA	NA	3.2	3.8	1.8	3.9
Calcium	NA	NA	NA	NA	NA	NA	NA	1760	4200	646 B	1950
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	NA	NA	NA	24.9	23.7	24.5	32
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	NA	NA	NA	8.4	10.6	10.8	9.4
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	NA	NA	NA	19.5	19	7.1	204
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	NA	NA	NA	1.6 U	1.1 U	2.3 U	2.3 U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	NA	NA	NA	25200	25500	30200	28500
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	NA	NA	NA	18	39.7	13.1	106
Magnesium	NA	NA	NA	NA	NA	NA	NA	2410	3520	3260	2320
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	NA	NA	NA	482	496	431	617
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	NA	NA	NA	0.1 U	0.09 U	0.09 U	0.62
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	NA	NA	NA	13.2	13.8	16.3	16
Potassium	NA	NA	NA	NA	NA	NA	NA	1030	1010	3010	1140
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	NA	NA	NA	0.87 U	0.85 U	0.81 U	0.97 U
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	NA	NA	NA	1.3 U	1.4 U	1.4 U	3.9
Sodium	NA	NA	NA	NA	NA	NA	NA	964 U	1000 U	1020 U	1080 U
Thallium	NA	NA	**1.5E+01**	1.9E+05	NA	NA	NA	0.44	0.51	0.41 U	0.48 U
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	NA	NA	NA	36.2	36.8	27.3	41.4
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	NA	NA	NA	44	52.4	47.9	173
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**				**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	NA	NA	NA	390 U	460 J	1100 U	410 U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	NA	NA	NA	390 U	1900 U	1100 U	410 U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	NA	NA	NA	390 U	1400 J	1100 U	410 U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	NA	NA	NA	390 U	1900 U	1100 U	410 U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	NA	NA	NA	390 U	4100	1100 U	410 U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	NA	NA	NA	40 J	8200	1100 U	91 J
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	NA	NA	NA	44 J	7000	1100 U	87 J
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	NA	NA	NA	390 U	7500	1100 U	88 J
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	NA	NA	NA	390 U	2200	1100 U	410 U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	NA	NA	NA	51 J	6200	1100 U	86 J
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	NA	NA	NA	120 J	1900 U	1100 U	51 J
Carbazole	NA	NA	**9.0E+05**	1.9E+08	NA	NA	NA	NA	NA	NA	NA
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	NA	NA	NA	47 J	7700	1100 U	97 J
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	NA	NA	NA	73 B	1900 U	1100 U	43 B
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	390 U	1900 U	1100 U	410 U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	NA	NA	NA	390 U	320 J	1100 U	410 U
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	390 U	1100 J	1100 U	410 U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	NA	NA	NA	89 J	18000	1100 U	180 J
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	NA	NA	NA	390 U	1600 J	1100 U	410 U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	NA	NA	NA	390 U	2900	1100 U	44 J
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	NA	NA	NA	390 U	690 J	1100 U	410 U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	NA	NA	NA	65 J	17000	1100 U	100 J
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	NA	NA	NA	84 J	15000	1100 U	170 J

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB01-0204		03SB01-0608		03SB01-1416		03SB02		03SB04		03TP01		03TP02-1	
Sample Date:					5/27/1997		5/27/1997		5/27/1997		9/6/1991		9/6/1991		9/9/1991		9/10/1991	
Duplicate:																		
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	2 - 4		6 - 8		14 - 16		1.5 - 2.5		1.5 - 2.5		5 - 5.5		9 - 9.5	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	12	U	12	U	12	U	3	B	6	U	6	U	6	U
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	NA		NA		NA		390	U	1900	U	1100	U	410	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	NA		NA		NA		45	J	1900	U	1100	U	410	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	NA		NA		NA		390	U	1900	U	1100	U	410	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	12	U	14	J	12	U	11	U	12	U	12	U	13	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	12	UJ	71	J	12	UJ	6	B	6	B	12	U	13	U
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	12	U	12	U	12	U	3	J	6	U	6	U	6	U
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	12	U	12	U	12	U	11	U	12	U	12	U	13	U
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	12	U	12	U	12	U	6	U	6	U	6	U	6	U
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	12	U	12	U	12	U	2	J	6	U	6	U	6	U
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	12	U	12	U	12	U	11	U	12	U	12	U	13	U
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	12	U	12	U	12	U	6	U	6	U	6	U	6	U
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	24	B	25	B	24	B	6	U	4	B	6	U	6	U
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	NA		NA		NA		NA		NA		NA		NA	
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	12	U	12	U	12	U	6	U	6	U	6	U	6	U
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	12	U	12	U	12	U	6	U	6	U	6	U	6	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	12	U	12	U	12	U	2	J	6	U	6	U	6	U
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	12	U	12	U	12	U	2	J	6	U	6	U	6	U
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	12	U	12	U	12	U	6	U	6	U	6	U	6	U
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**							**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	NA		NA		NA		19	U	19	U	18	U	20	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	NA		NA		NA		19	U	19	U	18	U	20	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	NA		NA		NA		19	U	19	U	18	U	20	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	NA		NA		NA		93	U	93	U	91	U	100	U
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	NA		NA		NA		93	U	93	U	91	U	100	U
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	NA		NA		NA		93	U	93	U	91	U	100	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	NA		NA		NA		190	U	190	U	180	U	490	
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	NA		NA		NA		190	U	190	U	180	U	200	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	NA		NA		NA		63		230		18	U	79	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	NA		NA		NA		19	U	19	U	18	U	20	U
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	NA		NA		NA		19	U	19	U	18	U	20	U
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	NA		NA		NA		19	U	19	U	18	U	25	
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	NA		NA		NA		19	U	19	U	18	U	20	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	NA		NA		NA		93	U	93	U	91	U	100	U
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	NA		NA		NA		93	U	93	U	91	U	100	U
DIOXINS/FURANS	**ng/kg**	**ng/kg**	**ng/kg**	**ng/kg**														
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB01-0204	03SB01-0608	03SB01-1416	03SB02	03SB04	03TP01	03TP02-1
Sample Date:					5/27/1997	5/27/1997	5/27/1997	9/6/1991	9/6/1991	9/9/1991	9/10/1991
Duplicate:											
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	2 - 4	6 - 8	14 - 16	1.5 - 2.5	1.5 - 2.5	5 - 5.5	9 - 9.5
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA	NA	NA	NA	NA	NA	NA
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP02-2		03TP03		03TP04-1		03TP04-2		03TP04-3		03TP04-4		03TP05-0506-01		03TP05-0910-02		03TP05-0910-02-D	
Sample Date:					9/10/1991		9/11/1991		9/11/1991		9/11/1991		9/11/1991		9/11/1991		4/30/2007		4/30/2007		4/30/2007	
Duplicate:																			03TP05-0910-02-D		03TP05-0910-02	
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	5.5 - 6		7 - 7.5		5 - 6		7.5 - 8		2 - 2.5		8.5 - 9		5 - 6		9 - 10		9 - 10	
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	18200		17400		23200		28100		13500		29100		27200		26100		16000	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	14.7		10.1	U	10	U	14.8		9.3	U	12.7	B	7.2	L	6.9	J	2.6	J
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	5.2		3.4		5.8		1.9		17.9		3.7		7.4		6.3	J	3.4	J
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	132		171		87.5		115		96		330		302	J	377	J	186	J
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	1.1		1.1		1.1		1.1		1		1.2		0.79		0.77		0.94	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	3.8		0.9	U	1.3		0.9	U	2.1		0.98	U	57.7	K	14.2	K	17.8	K
Calcium	NA	NA	NA	NA	2370		314	B	554	B	450	B	9260		277	B	8730		4120	J	2370	J
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	30.5		18.4		17	U	18.8		20.6		13.7		73.5	K	78.2	J	30	J
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	9.4		12.1		6		8.5		7.2		21.5		23.8		10.7		8	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	141		36.6		21		22.2		25.7		77.3		1210	K	363	K	392	K
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	2.5	U	2.2	U	2.5	U	2.2	U	2.3	U	2.3	U	0.41	J	0.49	J	0.8	J
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	26600		20000		27900		25600		23200		17000		44400		40100		27900	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	118		6.1		10.4		11.1		29.9		3.7		1090	J	1100	J	6480	J
Magnesium	NA	NA	NA	NA	2420		1430		704		914		6130		841		2610		2400		1760	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	458		1110		508		478		449		3030		975		816		959	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	0.44		0.09	U	0.11	U	0.1	U	0.14		0.1	U	0.46	L	1.6	L	1.6	L
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	17.7		11.4		9.6		9.9		13		11.7		296	K	47.1	K	58.9	K
Potassium	NA	NA	NA	NA	903		498		482		509		1020		522	U	1120		887		1090	
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.92	U	0.88	U	0.93	U	0.9	U	0.82	U	0.96	U	0.34	UR	0.32	UR	0.33	UR
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	4.9		1.3	U	1.3	U	1.3	U	1.2	U	1.5	U	18.9		3.2		3.6	
Sodium	NA	NA	NA	NA	950	U	999	U	993	U	996	U	917	U	1090	U	578	L	77.7	L	19.5	UR
Thallium	NA	NA	**1.5E+01**	1.9E+05	0.46	U	0.44	U	0.46	U	0.45	U	0.41	U	0.48	U	0.59	UR	0.57	UR	0.57	UR
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	41.4		28.3		29.5		27.5		33.6		21.2		22.3		20.7		21.8	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	441		30.1		40		32.5		74.2		20.7		2600	K	892	K	814	K
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	NA		NA		NA		NA		NA		NA		860	U	820	U	820	U
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	55	J	380	U	330	J	980	J	1100	U	400	U	860	U	820	U	820	U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	390	U	380	U	410	U	1200	U	290	J	400	U	860	U	820	U	820	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	380	U	410	U	1200	U	130	J	400	U	860	U	820	U	820	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	380	U	410	U	1200	U	280	J	400	U	860	U	820	U	820	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	200	J	380	U	410	U	1200	U	850	J	400	U	860	U	820	U	820	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	850		380	U	410	U	1200	U	5600		400	U	860	U	820	U	820	U
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	NA		NA		NA		NA		NA		NA		860	U	820	U	820	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	670		380	U	410	U	1200	U	5100		400	U	860	U	820	U	820	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	890		380	U	410	U	1200	U	7100		400	U	860	U	820	U	820	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	230	J	380	U	410	U	1200	U	1300		400	U	860	U	820	U	820	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	530		380	U	410	U	1200	U	3600		400	U	860	U	820	U	820	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	860		380	U	46	J	130	J	1100	U	400	U	860	U	820	U	820	U
Carbazole	NA	NA	**9.0E+05**	1.9E+08	NA		NA		NA		NA		NA		NA		860	U	820	U	820	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	960		380	U	410	U	1200	U	5000		400	U	860	U	820	U	820	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	62	B	380	U	60	B	1200	U	1000	U	45	B	860	U	820	U	820	U
Di-n-octylphthalate	NA	NA	NA	NA	390	U	380	U	410	U	1200	U	1100	U	400	U	860	U	820	U	820	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	390	U	380	U	410	U	1200	U	180	J	400	U	860	U	820	U	820	U
Dibenzofuran	NA	NA	NA	NA	390	U	380	U	410	U	1200	U	140	J	400	U	860	U	820	U	820	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	1600		380	U	42	J	1200	U	8200		400	U	860	U	820	U	820	U
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	390	U	380	U	410	U	1200	U	200	J	400	U	860	U	820	U	820	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	310	J	380	U	410	U	1200	U	1800		400	U	860	U	820	U	820	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	390	U	380	U	2000		7400		210	J	400	U	860	U	820	U	820	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	820		380	U	410	U	1200	U	3100		400	U	860	U	820	U	820	U
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	1500		380	U	410	U	1200	U	9300		400	U	860	U	820	U	820	U

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP02-2		03TP03		03TP04-1		03TP04-2		03TP04-3		03TP04-4		03TP05-0506-01		03TP05-0910-02		03TP05-0910-02-D	
Sample Date:					9/10/1991		9/11/1991		9/11/1991		9/11/1991		9/11/1991		9/11/1991		4/30/2007		4/30/2007		4/30/2007	
Duplicate:																			03TP05-0910-02-D		03TP05-0910-02	
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	5.5 - 6		7 - 7.5		5 - 6		7.5 - 8		2 - 2.5		8.5 - 9		5 - 6		9 - 10		9 - 10	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	NA		NA		NA		NA		NA		NA		7.1	U	5	U	5	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	390	U	380	U	410	U	1200	U	1100	U	400	U	7	U	5	U	5	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	390	U	380	U	410	U	3600		1100	U	400	U	7	U	5	U	5	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	390	U	380	U	410	U	880	J	1100	U	400	U	7	U	5	U	5	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	12	U	12	U	13	U	60	U	11	U	12	U	7.1	U	5.3	U	5.3	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	12	U	12	U	23	B	140	B	7	B	12	U	28	U	9.5	J	21	U
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	12	U	12	U	13	U	60	U	11	U	12	U	7.1	U	5.3	U	5.3	U
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	12	U	12	U	13	U	60	U	11	U	12	U	7.1	U	5.3	U	5.3	U
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	NA		NA		NA		NA		NA		NA		7.1	U	5.3	U	5.3	U
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	NA		NA		NA		NA		NA		NA		14	U	11	U	11	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	NA		NA		NA		NA		NA		NA		7	U	5	U	5	U
Methylcyclohexane	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		7	U	5	U	5	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	6	U	6	U	6	U	6	B	6	U	2	B	5.9	B	2.4	B	1.6	B
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	NA		NA		NA		NA		NA		NA		7	U	5	U	5	U
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	6	U	6	U	6	U	30	U	6	U	6	U	7.1	U	5.3	U	5.3	U
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	6	U	6	U	6	U	30	U	6	U	6	U	NA		NA		NA	
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	38	U	19	U	20	U	20	U	36	U	19	U	9.9	J	5.8	J	1.7	J
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	38	U	19	U	20	U	20	U	36	U	19	U	2	J	1.6	J	2.5	J
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	38	U	19	U	20	U	20	U	36	U	19	U	6.2	J	2.1	U	5.8	J
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	19	U	9.3	U	9.9	U	9.8	U	18	U	9.6	U	1.7	J	3	J	5.6	J
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	19	U	9.3	U	9.9	U	9.8	U	18	U	9.6	U	2.2	U	2.1	U	2.1	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	190	U	93	U	99	U	98	U	180	U	96	U	2.2	U	2.1	U	2.1	U
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	190	U	93	U	99	U	98	U	180	U	96	U	22	U	21	U	21	U
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	190	U	93	U	99	U	98	U	180	U	96	U	22	U	21	U	21	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	810		190	U	200	U	200	U	360	U	190	U	22	U	50		81	J
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	380	U	190	U	200	U	200	U	360	U	190	U	22	U	55		40	
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	19	U	9.3	U	9.9	U	9.8	U	18	U	9.6	U	2.2	U	2.1	U	2.1	U
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	19	U	9.3	U	9.9	U	9.8	U	18	U	9.6	U	0.35	J	0.43	J	2.1	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	38	U	19	U	20	U	20	U	36	U	19	U	200		76		83	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	19	U	9.3	U	9.9	U	9.8	U	18	U	9.6	U	2.2	U	2.1	U	2.1	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	38	U	19	U	20	U	20	U	36	U	19	U	2.2	U	2.1	U	2.1	U
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	38	U	19	U	20	U	20	U	36	U	19	U	2.2	U	2.3	J	0.91	J
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	38	U	19	U	20	U	20	U	36	U	19	U	2.2	U	2.1	U	2.1	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	NA		NA		NA		NA		NA		NA		1	J	2	U	2	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	38	U	19	U	20	U	20	U	36	U	19	U	0.39	J	0.55	J	0.32	J
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	19	U	9.3	U	9.9	U	9.8	U	18	U	9.6	U	0.9	J	1.3	J	1.8	J
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	190	U	93	U	99	U	98	U	180	U	96	U	1.7	J	3.2	J	5.5	J
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	19	U	9.3	U	9	U	9	U	18	U	9.6	U	2.2	U	1.8	J	2.1	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	19	U	9.3	U	9.9	U	9.8	U	18	U	9.6	U	2.2	U	2.1	U	2.1	U
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	190	U	93	U	99	U	98	U	180	U	96	U	3	J	4.6	J	2.8	J
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg													ng/kg					
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		320		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		560		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		60		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		21		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03TP02-2**	**03TP03**	**03TP04-1**	**03TP04-2**	**03TP04-3**	**03TP04-4**	**03TP05-0506-01**		**03TP05-0910-02**	**03TP05-0910-02-D**
Sample Date:					**9/10/1991**	**9/11/1991**	**9/11/1991**	**9/11/1991**	**9/11/1991**	**9/11/1991**	**4/30/2007**		**4/30/2007**	**4/30/2007**
Duplicate:	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**									**03TP05-0910-02-D**	**03TP05-0910-02**
Depth range (feet):					**5.5 - 6**	**7 - 7.5**	**5 - 6**	**7.5 - 8**	**2 - 2.5**	**8.5 - 9**	**5 - 6**		**9 - 10**	**9 - 10**
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	230		NA	NA
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	45		NA	NA
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150	EMPC	NA	NA
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	58		NA	NA
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17		NA	NA
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	28	EMPC	NA	NA
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	240	EMPC	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	170		NA	NA
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	210	EMPC	NA	NA
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA	NA	NA	NA	NA	NA	9.6		NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	230	EMPC	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2100		NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	190		NA	NA
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**		**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**	
Sample Date:					**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/2/2007**		**5/2/2007**	
Duplicate:	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**							**03TP06-0809-03-D**		**03TP06-0809-03**					
Depth range (feet):					**3 - 4**		**6 - 7**		**7 - 8**		**8 - 9**		**8 - 9**		**2 - 3**		**3 - 4**	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**				**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	15200		25400		21600		25600		NA		24700		21700	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	0.58	B	28.8	L	12.9	L	113	L	NA		0.39	UL	0.39	UL
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	2.6	L	10.7	L	4.1	L	8.6	L	NA		2.8		4.1	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	167	J	628	J	267	J	656	J	NA		128		69.5	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	1.1		1		0.78		0.61		NA		0.97		0.74	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	1.4	K	99.4	K	25.1	K	155	K	NA		0.085	U	0.084	U
Calcium	NA	NA	NA	NA	984		26200		5550		14700		NA		253		624	
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	9.4	K	108	K	53.4	K	83.7	K	NA		7.7	K	16.4	K
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	13.2		30.1		12.1		20.2		NA		10		10.5	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	67.4	K	1280	K	475	K	1500	K	NA		44.9		28.6	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	0.25		1		0.63		4.6		NA		0.18		0.6	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	24100		113000		106000		91600		NA		15400		21000	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	63.2	J	2170	J	1370	J	1990	J	NA		4.3		7.4	
Magnesium	NA	NA	NA	NA	665		8690		1720		3690		NA		660		1370	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	1290		2030		1590		3070		NA		936		606	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	0.58	L	4.8	L	3.9	L	6.7	L	NA		0.057		0.057	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	13.8	K	145	K	40.9	K	81.3	K	NA		11.5		12.2	
Potassium	NA	NA	NA	NA	351		1590		553		790		NA		272		503	
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.32	UR	3.8	UR	1.7	UR	3.7	UR	NA		0.32	UL	0.32	UL
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.64		233		6		45.7		NA		0.036	U	0.052	B
Sodium	NA	NA	NA	NA	19.2	UR	987	L	100	UR	158	L	NA		19.1	UR	18.9	UR
Thallium	NA	NA	**1.5E+01**	1.9E+05	0.56	UR	1.3	UR	2.9	UR	1.3	UR	NA		0.56	UL	0.55	UL
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	16.7		32.9		18		26.2		NA		17.7		30.4	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	103	K	7390	K	1230	K	4990	K	NA		18		25.8	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**				**ug/kg**		**ug/kg**	
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	410	U	480	U	230	J	2300	U	NA		400	U	400	U
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	410	U	480	U	390	J	2300	U	NA		400	U	400	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	410	U	480	U	290	J	2300	U	NA		400	U	400	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	410	U	63	J	2100	U	2300	U	NA		400	U	400	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	130	J	290	J	2100	U	3300		NA		400	U	400	U
Carbazole	NA	NA	**9.0E+05**	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	410	U	480	U	250	J	2300	U	NA		400	U	400	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Di-n-octylphthalate	NA	NA	NA	NA	410	U	480	U	2100	U	220	J	NA		400	U	400	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Dibenzofuran	NA	NA	NA	NA	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	410	U	480	U	2100	U	2300	U	NA		400	U	400	U
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	410	U	480	U	580	J	2300	U	NA		400	U	400	U

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP06-0304-01		03TP06-0607-04		03TP06-0708-02		03TP06-0809-03		03TP06-0809-03-D		03TP07-0203-02		03TP07-0304-01	
Sample Date:					5/1/2007		5/1/2007		5/1/2007		5/1/2007		5/1/2007		5/2/2007		5/2/2007	
Duplicate:											03TP06-0809-03-D		03TP06-0809-03					
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		6 - 7		7 - 8		8 - 9		8 - 9		2 - 3		3 - 4	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg				ug/kg		ug/kg	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	5	U	8	U	6	U	8	U	NA		5.1	U	5.1	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	5	U	8	U	6	U	8	U	NA		5.1	U	5.1	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	5	U	8	U	6	U	8	U	NA		5.1	U	5.1	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	5	U	8	U	6	U	8	U	NA		5.1	U	5.1	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	20	U	33	U	24	U	30	U	NA		20	U	20	U
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	10	U	16	U	12	U	15	U	NA		10	U	10	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	5	U	8	U	6	U	8	U	NA		5.1	U	5.1	U
Methylcyclohexane	NA	NA	NA	NA	5	U	8	U	6	U	8	U	NA		5.1	U	5.1	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	3.5	B	4.5	B	3.3	B	3.9	B	NA		1.9	B	1.9	B
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	5	U	8	U	6	U	8	U	NA		5.1	U	5.1	U
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	5.1	U	8.1	U	6	U	7.5	U	NA		5.1	U	5.1	U
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	NA		NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg				ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	0.47	B	72000		24	J	57	J	NA		2.1	U	2.1	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	2.4		8700		13	J	11	J	NA		2.1	U	2.1	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	2.2	J	270000		2.2	U	69	J	NA		2.1	U	2.1	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	2.1	U	2500	U	9.4	J	9.7		NA		2.1	U	2.1	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	2.1	U	2500	U	2.2	U	2.4	U	NA		2.1	U	2.1	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	2.1	U	2500	U	2.2	U	2.4	U	NA		2.1	U	2.1	U
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	20	U	490	U	21	U	24	U	NA		20	U	20	U
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	20	U	490	U	21	U	24	U	NA		20	U	20	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	20	U	490	U	450		620		NA		20	U	20	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	20	U	490	U	550		600		NA		20	U	20	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	2.1	U	2500	U	2.2	U	2.4	U	NA		2.1	U	2.1	U
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	0.96	J	2500	U	2.2	U	0.94	J	NA		2.1	U	2.1	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	10		10000		30		68		NA		2.1	U	2.1	U
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2.1	U	580	J	2.2	U	1.4	J	NA		2.1	U	2.1	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2.1	U	2500	U	2.2	U	16	J	NA		2.1	U	0.71	J
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2.1	U	2500	U	5.9	J	19		NA		2.1	U	2.1	U
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2.1	U	2500	U	2.2	U	17	J	NA		2.1	U	2.1	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	1	J	2500	U	2	U	2	U	NA		2	U	2	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2.1	U	2500	U	5.2	J	2.4	U	NA		2.1	U	2.1	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	0.69	J	2500	U	3	J	3.4	J	NA		2.1	U	2.1	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	1.2	J	620	J	16	J	18	J	NA		2.1	U	2.1	U
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	2.1	U	2500	U	8	J	2.4	U	NA		2.1	U	2.1	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	1.5	J	390	J	2.2	U	1.8	J	NA		2.1	U	2.1	U
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	1	J	4800	U	18		24	J	NA		4	U	4	U
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg							ng/kg		ng/kg					
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		380	J	650	J	NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		490	J	1100	J	NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		36	J	88	J	NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		16	J	39	J	NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP06-0304-01		03TP06-0607-04		03TP06-0708-02		03TP06-0809-03		03TP06-0809-03-D		03TP07-0203-02		03TP07-0304-01	
Sample Date:					5/1/2007		5/1/2007		5/1/2007		5/1/2007		5/1/2007		5/2/2007		5/2/2007	
Duplicate:											03TP06-0809-03-D		03TP06-0809-03					
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		6 - 7		7 - 8		8 - 9		8 - 9		2 - 3		3 - 4	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		270	J	690	EMPC	NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		40	J	94	J	NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		89	EMPC	230	EMPC	NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		49	J	120	J	NA		NA	
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA		NA		NA		3.2	J	14		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		16	EMPC	43	EMPC	NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		52	EMPC	130	J	NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		150	J	350	EMPC	NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		110	J	300	EMPC	NA		NA	
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA		NA		NA		17		17	J	NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		59	EMPC	130	EMPC	NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		1700		2200		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		190	J	420	J	NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP08-0203-03		03TP08-0304-02		03TP08-0405-01		03TP09-0506-01		03TP09-0506-02		03TP10-0304-02		03TP10-0405-01	
Sample Date:					5/2/2007		5/2/2007		5/2/2007		5/3/2007		5/3/2007		5/3/2007		5/3/2007	
Duplicate:																		
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	2 - 3		3 - 4		4 - 5		5 - 6		5 - 6		3 - 4		4 - 5	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	18000		18700		29600		20700		17800		14300		20800	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	29.7	L	0.38	UL	41.9	L	0.4	UL	0.4	UL	0.39	UL	0.39	UL
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	6.3		2.2		9.9		2.5		2.8	L	2	L	7	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	518		149		735		61.3		46.1		129		287	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	0.86		1		0.84		0.67		0.92		1.3		1.7	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	24.2		0.084	U	51.5		0.087	U	0.088	U	0.084	U	0.085	U
Calcium	NA	NA	NA	NA	17900		365		6740		485		402		379		704	
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	49.5	K	4.2	K	133	K	18	K	6.3	K	5.7	K	22.5	K
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	18.3		6.1		11.2		2.5		3.8		11.4		82.8	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	734		93.1		932		25.1		60.8		148		43	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	0.18		0.2		2.2		0.63	U	0.63	U	0.6	U	0.14	
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	27200		10600		60400		9660		19900		17500		23000	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	2010		2.2		4640		7.6		4.5		4.2		35.7	
Magnesium	NA	NA	NA	NA	8650		408		2340		798		1020		451		868	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	712		879		1520		41.6		52		1140		20000	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	0.73		0.067		0.35		0.023	L	0.027	L	0.024	L	0.074	L
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	150		7.8		84.6		9		5.8		12.7		15.6	
Potassium	NA	NA	NA	NA	1000		191		1070		388		240		168		286	
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.55	L	0.31	UL	0.36	UR	0.33	UL	0.33	UL	0.32	UL	8	U
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	8		0.036	U	34		0.037	U	0.038	U	0.036	U	3.6	
Sodium	NA	NA	NA	NA	529		18.8	UL	1200		19.6	UL	28.1	L	38.7	L	19.1	UR
Thallium	NA	NA	**1.5E+01**	1.9E+05	0.64	UR	0.55	UL	0.62	UR	0.57	UL	0.57	UR	0.55	UR	13.9	U
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	28.2		11.8		21.7		32.5		19.2		15.4		34.9	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	2260		10.6		2560		12.1		30		20.4		28.3	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	930	U	400	U	450	U	410	U	420	U	400	U	400	U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	930	U	400	U	93	J	410	U	420	U	400	U	400	U
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	930	U	400	U	62	J	410	U	420	U	400	U	400	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	930	U	400	U	61	J	410	U	420	U	400	U	400	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	930	U	400	U	59	J	410	U	420	U	400	U	400	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	390	J	400	U	450	U	410	U	420	U	400	U	400	U
Carbazole	NA	NA	**9.0E+05**	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	930	U	400	U	100	J	410	U	420	U	400	U	400	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Di-n-octylphthalate	NA	NA	NA	NA	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Dibenzofuran	NA	NA	NA	NA	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	930	U	400	U	160	J	410	U	420	U	400	U	400	U
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	930	U	400	U	62	J	410	U	420	U	400	U	400	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	930	U	400	U	450	U	410	U	420	U	400	U	400	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	930	U	400	U	180	J	410	U	420	U	400	U	400	U
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	930	U	400	U	160	J	410	U	420	U	400	U	400	U

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP08-0203-03		03TP08-0304-02		03TP08-0405-01		03TP09-0506-01		03TP09-0506-02		03TP10-0304-02		03TP10-0405-01	
Sample Date:					5/2/2007		5/2/2007		5/2/2007		5/3/2007		5/3/2007		5/3/2007		5/3/2007	
Duplicate:																		
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	2 - 3		3 - 4		4 - 5		5 - 6		5 - 6		3 - 4		4 - 5	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	30	U	21	U	25	U	23	U	24	U	25	U	22	U
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	15	U	11	U	12	U	11	U	12	U	13	U	11	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Methylcyclohexane	NA	NA	NA	NA	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	2.6	B	2.8	B	2.7	B	3.4	B	6.1	B	3.4	B	2.4	B
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3	U	5.6	U
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	NA		NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	1.4	J	2	U	1.4	J	2.1	U	2.1	U	2.1	U	2.1	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	6.6		2	U	3.8		2.1	U	2.1	U	2.1	U	2.1	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	15		2	U	8.6		2.1	U	2.1	U	2.1	U	2.1	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	2.3	J	2	U	0.61	J	2.1	U	2.1	U	2.1	U	2.1	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1	U	2.1	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	3.1		2	U	1.3	J	2.1	U	2.1	U	0.39	J	0.26	J
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	24	U	20	U	23	U	21	U	21	U	20	U	20	U
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	24	U	20	U	23	U	21	U	21	U	20	U	20	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	24	U	20	U	23	U	21	U	21	U	20	U	20	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	46		20	U	23	U	21	U	21	U	20	U	20	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1	U	2.1	U
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	0.55	J	2	U	2.3	U	2.1	U	2.1	U	2.1	U	2.1	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	330		2	U	120		2.1	U	2.1	U	2.1	U	2.1	U
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1	U	2.1	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	0.63	J	2	U	2.3	U	2.1	U	2.1	U	2.1	U	2.1	U
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2.2	J	2	U	0.61	J	2.1	U	2.1	U	2.1	U	2.1	U
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	4.5	J	2	U	1.8	J	2.1	U	2.1	U	2.1	U	2.1	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2	J	2	U	1	J	2	U	2	U	2	U	2	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2.7	J	2	U	0.94	J	2.1	U	2.1	U	2.1	U	2.1	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	0.99	J	2	U	0.81	J	2.1	U	2.1	U	2.1	U	2.1	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	4.2	J	2	U	2.3	J	2.1	U	2.1	U	2.1	U	2.1	U
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	0.52	J	2	U	2.3	U	2.1	U	2.1	U	2.1	U	2.1	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1	U	2.1	U
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	2.2	J	4	U	2.5	J	4.1	U	4.2	U	4	U	4	U
DIOXINS/FURANS	**ng/kg**	**ng/kg**	**ng/kg**	**ng/kg**														
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP08-0203-03	03TP08-0304-02	03TP08-0405-01	03TP09-0506-01	03TP09-0506-02	03TP10-0304-02	03TP10-0405-01
Sample Date:	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	5/2/2007	5/2/2007	5/2/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007
Duplicate:											
Depth range (feet):					2 - 3	3 - 4	4 - 5	5 - 6	5 - 6	3 - 4	4 - 5
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA	NA	NA	NA	NA	NA	NA
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP11-0304-01		03TP11-0405-02		03TP12-0304-02		03TP12-0405-01		03TP13-0203-01		03TP14-0203-01		03TP15-0405-01	
Sample Date:					5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/7/2007	
Duplicate:																		
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		4 - 5		3 - 4		4 - 5		2 - 3		2- 3		4- 5	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	12800		12400		10400		12000		13900		11100		19200	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	0.38	UL	0.38	UL	0.4	UL	1	B	0.38	UL	0.4	UL	0.39	UL
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	4.6		4.1		4.6		5.3		2.3		6.7		2.8	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	58		48.4		117		83.9		77.1		90.9		176	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	0.77		0.78		1.1		0.94		0.67		1.2		0.98	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	0.083	U	0.083	U	0.086	U	2.7		0.082	U	0.088	U	0.085	UR
Calcium	NA	NA	NA	NA	1310		641		1230		1220		396		1420		329	
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	18.6	K	18.7	K	14.2	K	21.5	K	6.9	K	18.1	K	8.1	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	7.1		8.1		6.6		8.4		4.1		5.7		9.6	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	12.9		16.3		11.3		34.6		21.9		9.3		34.1	K
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	0.6	U	0.6	U	0.62	U	0.17		0.59	U	0.13		0.61	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	21200		19800		13800		21600		9570		13200		14100	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	11.6		7.6		30.2		104		3.3		23.4		4.9	
Magnesium	NA	NA	NA	NA	2420		1840		1540		1620		809		1470		979	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	412		541		947		774		221		321		910	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	0.036	L	0.027	L	0.06	L	0.18	L	0.034	L	0.09	L	0.029	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	10.4		10		9.2		10.8		7.4		9.3		15.4	
Potassium	NA	NA	NA	NA	605		527		356	B	365	B	350	B	336	B	469	
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.31	UL	0.31	UL	0.32	UL	0.32	UL	0.31	UL	0.33	UL	0.32	U
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.075	B	0.036	U	0.17	B	0.31		0.035	U	0.038	U	0.036	U
Sodium	NA	NA	NA	NA	26.4	L	19.1	L	19.4	UR	18.9	UR	32.8	L	19.7	UR	19.1	UR
Thallium	NA	NA	**1.5E+01**	1.9E+05	0.54	UR	0.55	UR	0.56	UL	0.55	UR	0.54	UL	0.57	UL	0.56	UR
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	32.6		30.5		22.3		28.1		13.2		25.4		17.6	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	29.1		22.9		37.3		141		14.7		37.9		26.9	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	390	U	390	U	820	U	190	J	390	U	420	U	400	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	390	U	390	U	110	J	800	U	390	U	71	J	400	U
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	390	U	390	U	100	J	800	U	390	U	70	J	400	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	390	U	390	U	110	J	800	U	390	U	84	J	400	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	390	U	390	U	100	J	800	U	390	U	73	J	400	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	390	U	390	U	820	U	140	J	390	U	420	U	400	U
Carbazole	NA	NA	**9.0E+05**	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	390	U	390	U	180	J	800	U	390	U	150	J	400	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Di-n-octylphthalate	NA	NA	NA	NA	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dibenzofuran	NA	NA	NA	NA	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	390	U	390	U	280	J	89	J	390	U	240	J	400	U
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	390	U	390	U	110	J	800	U	390	U	69	J	400	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	42	J	390	U	260	J	80	J	390	U	250	J	400	U
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	390	U	390	U	280	J	92	J	390	U	240	J	400	U

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP11-0304-01		03TP11-0405-02		03TP12-0304-02		03TP12-0405-01		03TP13-0203-01		03TP14-0203-01		03TP15-0405-01	
Sample Date:					5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/7/2007	
Duplicate:																		
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		4 - 5		3 - 4		4 - 5		2 - 3		2- 3		4- 5	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	5	U	5.3	U	5.6	U	5.5		4.9	U	6.2	UJ	5.2	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	20	U	21	U	16	J	33		6.1	J	25	UJ	21	U
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	10	U	11	U	11	U	11	U	9.9	U	12	UJ	10	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methylcyclohexane	NA	NA	NA	NA	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	5.1	B	7.2	B	3.3	B	3.5	B	5.5	B	4	B	6.8	B
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	NA		NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	2	U	2	U	4.1		5.5	J	2	U	11	U	2.1	U
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	2	U	2	U	15		18		0.72	J	11	U	2.1	U
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	2	U	2	U	1.5	J	2.1	U	0.39	J	20		2.1	U
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	2	U	2	U	1.9	J	6.5	J	2	U	11	U	2.1	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	1.4	J	2	U	24		91		2	U	330	J	2.1	U
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	20	U	20	U	37		110		20	U	21	U	20	U
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	20	U	20	U	21	U	53		20	U	21	U	20	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	2	U	2	U	1.4	J	2.7		2	U	11	U	2.1	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	0.58	J	2	U	15		140		0.24	J	400		0.28	J
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2	U	2	U	2.1	U	2.1	U	2	U	11	U	1.1	J
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2	U	2	U	2.1	U	2.1	U	2	U	11	U	0.7	J
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2	U	2	U	2.1	U	0.62	J	2	U	11	U	2.1	U
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2	U	2	U	2	U	2	J	2	U	11	U	2	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	2	U	2	U	6.9		2.8		2	U	4.5	J	2.1	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	1.1	J	2	U	20	J	57	J	2	U	230		2.1	U
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	2	U	2	U	0.53	J	2.8	J	2	U	11	U	2.1	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	2	U	2	U	3.7	J	5.4	J	2	U	12	J	2.1	U
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	3.9	U	3.9	U	4.1	U	2.1	J	3.9	U	21	U	4	U
DIOXINS/FURANS	**ng/kg**	**ng/kg**	**ng/kg**	**ng/kg**														
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP11-0304-01		03TP11-0405-02		03TP12-0304-02		03TP12-0405-01		03TP13-0203-01		03TP14-0203-01		03TP15-0405-01	
Sample Date:					5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/4/2007		5/7/2007	
Duplicate:																		
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		4 - 5		3 - 4		4 - 5		2 - 3		2- 3		4- 5	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
OCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
OCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP17-0304-01		03TP18-0203-01		03TP18-0203-01-D		03TP19-0304-02		03TP19-0607-01		03TP20-0708-01		03TP23-0304-01	
Sample Date:					5/7/2007		5/8/2007		5/8/2007		1/12/2009		1/12/2009		1/12/2009		1/13/2009	
Duplicate:	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC			03TP18-0203-01-D		03TP18-0203-01									
Depth range (feet):					3 - 4		2 - 3		2 - 3		3 - 4		6 - 7		7 - 8		3 - 4	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	23100		25200		28300		74700		23800		24700		20000	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	0.39	UL	0.39	UJ	4	J	70.6	L	31	L	10.7	J	1.3	B
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	3.9		3.8		2	L	17.1		8.4		6.5		5.7	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	88.9		162		155		859		475		346		115	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	0.94		0.98	L	0.67	L	0.71	B	0.81	B	1.4	K	0.8	B
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	0.084	UR	2.7	J	13.7	J	237		300		48.7		0.08	UR
Calcium	NA	NA	NA	NA	519		777	J	1300	J	27300		16500		12200		953	
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	10.8		14.7	J	25.2	J	148	J	71.4	J	56.3	J	21.9	J
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	9.7		9.1		8.4		20		13.7		10.3		7	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	21.5	K	90.5	J	421	J	6340		1380		567		23.2	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	0.6	U	0.61	U	0.62	U	1.2		0.64		0.45		0.1	U
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	16000		21500	J	87100	J	193000		40200		40700		26000	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	8.7		688		450		2570	J	2380	J	1210	J	10.8	J
Magnesium	NA	NA	NA	NA	973		877		767		5560	J	3190	J	2830	J	2120	J
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	701		738		926		2610		1680		817		388	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	0.049		0.078	J	0.19	J	1.8		0.081		7.1		0.054	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	11.1		20.1	J	33.8	J	161	J	144	J	85.4	J	15.5	J
Potassium	NA	NA	NA	NA	337		368		249		1740		1700		1230		825	
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.32	U	0.32	UL	0.65	UR	0.35	UR	0.26	UR	0.24	UR	0.26	UR
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.036	U	1.1	J	3.7	J	23.5		33.3		60.2		0.07	U
Sodium	NA	NA	NA	NA	18.9	UR	26.2	L	39	UR	734	K	1020	K	411	R	148	R
Thallium	NA	NA	**1.5E+01**	1.9E+05	0.55	UR	0.55	UR	1.1	UR	48.5	K	9.7	K	9.2	K	4.9	R
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	22.4		19.5		17.9		43.4		31.7		37.7		38.7	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	22.3		151	J	954	J	4610		2350		1710		127	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	400	U	400	U	410	U	290	U	36	J	190	U	200	U
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	NA		NA		NA		6	J	8.1	J	14000	U	0.84	J
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	400	U	400	U	410	U	15		16		1100	J	1.3	J
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	400	U	400	U	410	U	490	U	350	U	1600	U	350	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	400	U	400	U	410	U	10	J	3.7	J	6400	J	10	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	400	U	400	U	410	U	4.2	J	1.9	J	27	J	0.64	J
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	400	U	400	U	410	U	83		12		19000		1.2	J
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	400	U	400	U	410	UJ	790		47		15000		6.5	J
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	400	U	400	U	410	U	63	J	48	J	940	U	200	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	400	U	400	U	410	U	760		33		7900	J	6.4	J
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	400	U	400	U	410	U	1000		76		9900	J	8.8	J
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	400	U	400	U	410	U	510		44		2900	J	4.4	J
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	400	U	400	U	410	U	630		51		6600	J	5	J
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	400	U	400	U	410	UJ	400		280	U	570	J	790	
Carbazole	NA	NA	**9.0E+05**	1.9E+08	400	U	400	U	410	U	330		200	U	11000		200	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	400	U	400	U	410	UJ	780		74		23000		8.2	J
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	400	U	400	U	410	U	390	U	280	U	1300	U	280	U
Di-n-octylphthalate	NA	NA	NA	NA	400	U	400	U	410	U	370	U	270	U	1200	U	270	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	400	U	400	U	410	U	170	J	12		1100	J	1.3	J
Dibenzofuran	NA	NA	NA	NA	400	U	400	U	410	U	420	U	300	U	8200		300	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	400	U	400	U	410	U	1300		58		56000		14	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	400	U	400	U	410	U	10	J	4.7	J	8200	J	10	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	400	U	400	U	410	U	650		42		3600	J	4.9	J
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	400	U	400	U	410	U	50		27		14000		1.1	B
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	400	U	400	U	410	U	320	D	54		62000		5.8	J
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	50	J	400	U	410	UJ	1000		67		38000		12	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP17-0304-01		03TP18-0203-01		03TP18-0203-01-D		03TP19-0304-02		03TP19-0607-01		03TP20-0708-01		03TP23-0304-01	
Sample Date:					5/7/2007		5/8/2007		5/8/2007		1/12/2009		1/12/2009		1/12/2009		1/13/2009	
Duplicate:	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC			03TP18-0203-01-D		03TP18-0203-01									
Depth range (feet):					3 - 4		2 - 3		2 - 3		3 - 4		6 - 7		7 - 8		3 - 4	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	71	J	7.1	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	250	J	7.1	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	5.4	U	5.5	U	5.5	UJ	26	U	24		680	U	22	
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	22	U	22	U	22	UJ	49	J	120	J	680	UR	160	J
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	5.4	U	5.5	U	5.5	UJ	4.2	J	15		270	U	7.1	U
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	5.4	U	5.5	U	5.5	UJ	10	U	8.2		270	U	7.1	U
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	880		7.1	U
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	11	U	11	U	11	UJ	21	U	11	U	6100		14	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
Methylcyclohexane	NA	NA	NA	NA	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	3.4	B	2.4	B	2.1	B	10	U	5.3	U	270	U	7.1	U
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	4000		7.1	U
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	3300		7.1	U
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	5.4	U	5.5	U	5.5	UJ	9.2	J	4.8	J	270	U	7.1	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	5.4	U	5.5	U	5.5	UJ	3.8	B	5.6	B	590		1.4	B
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	NA		NA		NA		10	U	5.3	U	10000		7.1	U
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	2	U	0.85	J	2.1	U	29	J	20	U	8.6	J	0.83	J
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	2	U	0.39	J	0.47	J	49	B	20	U	29	B	1.5	B
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	2	U	2.1	U	2.1	U	110		20	U	25	J	1.9	J
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	2	U	2.1	U	2.1	U	14	U	19	R	19	U	2	U
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	2	U	2.1	U	0.7	J	7	J	10	U	19	U	2	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	2	U	1.5	J	2.1		8.6	J	10	U	19	U	1.1	J
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	20	U	20	U	21	U	140	U	100	U	190	U	20	U
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	20	U	20	U	21	U	140	U	100	U	190	U	20	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	20	U	20	U	21	U	140	U	100	U	190	U	20	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	20	U	20		21		140	U	100	U	340		20	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	2	U	2.1	U	2.1	U	51	R	5.1	U	9.5	U	1	U
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	2	U	2.1	U	2.1	U	14	U	10	U	19	U	2	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	4		41		35		35		20	U	86		12	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2	U	2.1	U	2.1	U	14	U	9.9	J	4.7	J	2	U
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2	U	2.1	U	2.1	U	28	U	20	U	37	U	4	U
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2	U	0.76	J	0.67	J	28	U	20	U	37	U	4	U
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2	U	2.1	U	2.1	U	4.6	J	20	U	37	U	4	U
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2	U	2	U	1	J	17	R	25	J	37	U	4	U
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2	U	2.1	U	0.56	J	30	R	20	U	37	U	4	U
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	2	U	2.1	U	2.1	U	14	U	10	U	19	U	2	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	2	U	1.6	J	2	J	8.6	J	69	R	12	J	1.2	J
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	2	U	2.1	U	2.1	U	7.1	R	6.2	J	5.9	J	2	U
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	2	U	2.1	U	2.1	U	5.4	J	10	U	15	J	0.85	J
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	4	U	4	U	4.1	U	140	U	130	J	190	U	20	U
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg														
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03TP17-0304-01**	**03TP18-0203-01**	**03TP18-0203-01-D**	**03TP19-0304-02**	**03TP19-0607-01**	**03TP20-0708-01**	**03TP23-0304-01**
Sample Date:					**5/7/2007**	**5/8/2007**	**5/8/2007**	**1/12/2009**	**1/12/2009**	**1/12/2009**	**1/13/2009**
Duplicate:						**03TP18-0203-01-D**	**03TP18-0203-01**				
Depth range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**3 - 4**	**2 - 3**	**2 - 3**	**3 - 4**	**6 - 7**	**7 - 8**	**3 - 4**
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA	NA	NA	NA	NA	NA	NA
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP24-0304-01		03TP25-0506-01		03TP25-0607-02		03TP25-0607-02-D		03TP26-0506-01		03TP27-0304-01		03TP27-0304-01-D	
Sample Date:					1/13/2009		1/13/2009		1/13/2009		1/13/2009		1/14/2009		1/15/2009		1/15/2009	
Duplicate:									03TP25-0607-02-D		03TP25-0607-02				03TP27-0304-01-D		03TP27-0304-01	
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		5 - 6		6 - 7		6 - 7		5 - 6		3 - 4		3 - 4	
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	33900		32100		25000		23900		31300		38700		33800	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	19.2	J	2	J	11.9	L	12.3	J	19.4	J	220	L	281	L
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	8.7		3.6		5.7		5.9		9.4		49.9	J	14.9	J
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	347		232		385		476		350		539		492	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	0.89	B	1.7	K	0.77	B	0.83	B	1.7	K	1.1	B	0.92	B
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	24.3	L	0.08	UR	4.7	L	5.6	L	31.3	L	133		150	
Calcium	NA	NA	NA	NA	6240		909		6020		7890		4510		55600		71900	
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	84.9	J	16.2	J	24.3	J	33.5	J	68.5	J	295	J	215	J
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	8.3		11.1		7.9		8.6		11.1		28.5	J	121	J
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	415		63.2		8800		9660		872		4730	J	2820	J
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	2.4		0.69		0.39		0.25		0.98		2.3	J	3.9	J
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	49300		22300		26600		33800		63500		129000	J	236000	J
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	555	J	38.2	J	1530	J	1510	J	625	J	2780	J	4410	J
Magnesium	NA	NA	NA	NA	2390	J	899	J	3010	J	3720	J	1910	J	3740	J	3990	J
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	765		1340		1380	J	718	J	1180		1410		1650	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	0.4		0.028		0.14		0.14		3.1		0.77		0.87	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	67.8	J	20.2	J	19.6	J	51.8	J	83.1	J	183	J	295	J
Potassium	NA	NA	NA	NA	840		507		741		1060		940		2250		1860	
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.3	UR	0.26	UR	0.26	UR	0.28	UR	0.28	UR	0.39	UR	0.37	UR
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	29.8		0.07	U	2.3		3.6		19.6		16.2		12.4	
Sodium	NA	NA	NA	NA	292	R	319	K	277	R	373	R	491	R	1830		1390	K
Thallium	NA	NA	**1.5E+01**	1.9E+05	9.8	R	4.5	K	5.5	K	7	K	13.1	K	29.8	J	61.1	J
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	44.3		26.7		33.7		37.8		87.4		752	J	366	J
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	1750		336		1050	J	1770	J	1580		13700	J	6570	J
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	240	U	210	U	220	U	220	U	220	U	310	U	310	U
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	5	J	8.6	J	450		560		3	B	3.8	B	4.2	B
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	6.1	J	23		170		320		5.8	B	9.3	B	8.8	B
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	410	U	360	U	370	U	1500	U	380	U	540	U	540	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	22		10	U	17		24		3.6	B	15	U	15	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	12		0.67	J	10	J	16		3.3	B	1.3	B	1.8	B
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	230	J	0.82	J	4.1	J	5.7	J	5.3	B	1.8	B	2.9	B
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	2100		4.3	J	19		23		40		12	B	11	B
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	38	J	210	U	220	U	870	U	58	J	83	J	82	J
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	2200		6.2	J	15		11	U	41		8.3	B	7.5	B
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	2800		7.4	J	18		11	U	52		18	B	14	B
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	1400		15		23		28		38		17	B	17	B
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	1700		5	J	17		11	U	41		16	B	9.9	B
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	270	J	12000		1400	J	3000	J	150	J	680		660	
Carbazole	NA	NA	**9.0E+05**	1.9E+08	240	U	210	U	220	U	870	U	220	U	310	U	310	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	2300		13		28		32		50		55		22	B
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	320	U	170	J	290	U	1200	U	300	U	430	U	430	U
Di-n-octylphthalate	NA	NA	NA	NA	310	U	280	U	280	U	1100	U	290	U	410	U	410	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	450	J	1.8	J	4.2	J	11	U	9.2	B	3.8	B	3.2	B
Dibenzofuran	NA	NA	NA	NA	350	U	310	U	320	U	1300	U	330	U	460	U	460	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	3500		12		37		48		120		13	B	16	B
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	26	J	10	U	20	J	32		1.7	B	15	U	15	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	1800		6.3	J	16		18		40		8.9	B	8.5	B
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	9.2	J	86		320		450		5	B	7.3	B	8.8	B
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	1100		7.5	J	34		48		23	B	19	B	18	B
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	3000		19		59		100	J	90		20	B	17	B

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP24-0304-01		03TP25-0506-01		03TP25-0607-02		03TP25-0607-02-D		03TP26-0506-01		03TP27-0304-01		03TP27-0304-01-D	
Sample Date:					1/13/2009		1/13/2009		1/13/2009		1/13/2009		1/14/2009		1/15/2009		1/15/2009	
Duplicate:	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC					03TP25-0607-02-D		03TP25-0607-02				03TP27-0304-01-D		03TP27-0304-01	
Depth range (feet):					3 - 4		5 - 6		6 - 7		6 - 7		5 - 6		3 - 4		3 - 4	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	8.7	U	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	8.7	U	5700		320	U	310	J	6	U	9.7	U	9.7	U
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	8.7	U	5700	U	320	U	310	J	6	U	9.7	U	9.7	U
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	8.7	U	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	8.7	U	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	22	U	14000	U	810	U	760	U	15	U	24	U	24	U
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	140	J	14000	UR	540	J	760	UR	37	J	100	J	110	J
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	46		5700	U	78	J	76	J	22		12		7.3	J
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	8.7	U	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	2.9	J	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	8.7	U	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	8.7	U	5700	U	320	U	310	U	16		9.7	U	9.7	U
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	4.8	J	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	8.7	U	7000		550		380		6	U	9.7	U	9.7	U
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	17	U	18000		1600		960		12	U	19	U	19	U
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	8.7	U	5700	U	320	U	450	J	6	U	9.7	U	9.7	U
Methylcyclohexane	NA	NA	NA	NA	8.7	U	3500	J	320	U	310	U	6	U	9.7	U	9.7	U
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	8.7	U	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	8.7	U	2200	J	350		260	J	6	U	9.7	U	9.7	U
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	8.7	U	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	32		5700	U	210	J	130	J	6	U	9.7	U	9.7	U
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	17		150000		4300		2700		8.9	B	10	B	4.4	B
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	2.7	J	5700	U	320	U	310	U	6	U	9.7	U	9.7	U
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	8.7	U	20000		2000		1200		6	U	9.7	U	9.7	U
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	93	U	4.1	U	21	U	21	U	7.2	J	12	J	13	J
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	93	U	1.5	B	4.4	B	21	U	13	B	15	J	11	B
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	93	U	1.3	J	7.7	J	21	U	220		21		23	J
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	48	U	0.53	J	1.5	J	11	U	22	U	3.1	J	3.7	J
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	48	U	0.8	J	16		5.9	J	22	U	3.1	U	3.1	U
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	48	U	0.61	J	11	U	11	U	22	U	12	J	13	J
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	480	U	21	U	110	U	110	U	220	U	31	U	31	U
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	480	U	21	U	110	U	110	U	560		31	U	31	U
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	4000		21	U	110	U	110	U	220	U	31	U	31	U
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	480	U	21	U	110	U	110	U	220	U	31	U	31	U
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	24	U	1.8	J	21	R	14	J	11	U	12	R	1.6	U
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	48	U	2.1	U	9.1	R	11	U	22	U	3.1	U	3.1	U
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	93	U	10		59		46		120		31	J	36	J
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	48	U	2.1	U	11	U	11	U	22	U	3.1	U	1.5	J
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	93	U	4.1	U	21	U	21	U	43	U	6.1	U	6.1	U
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	93	U	4.1	U	21	U	21	U	43	U	12	R	6.1	U
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	93	U	4.1	U	21	U	21	U	43	U	6.1	U	6.2	J
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	93	U	4	U	21	U	4	J	7	J	17	R	9	J
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	93	U	4.1	U	21	U	21	U	43	U	24	J	14	R
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	48	U	2.1	U	11	U	11	U	22	U	3.1	U	3.1	U
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	48	U	0.36	J	11	U	3.8	J	22	U	23	R	25	R
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	48	U	2.1	U	6	J	2.3	J	22	U	12	R	7.1	R
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	48	U	2.1	U	11	U	11	U	22	U	4.2	J	6.1	J
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	480	U	21	U	110	U	110	U	220	U	15	J	31	U
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg														
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		NA		NA		NA		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03TP24-0304-01**	**03TP25-0506-01**	**03TP25-0607-02**	**03TP25-0607-02-D**	**03TP26-0506-01**	**03TP27-0304-01**	**03TP27-0304-01-D**
Sample Date:					**1/13/2009**	**1/13/2009**	**1/13/2009**	**1/13/2009**	**1/14/2009**	**1/15/2009**	**1/15/2009**
Duplicate:							**03TP25-0607-02-D**	**03TP25-0607-02**		**03TP27-0304-01-D**	**03TP27-0304-01**
Depth range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**3 - 4**	**5 - 6**	**6 - 7**	**6 - 7**	**5 - 6**	**3 - 4**	**3 - 4**
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA	NA	NA	NA	NA	NA	NA
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP27-0304-02		03TP28-0203-01		03TP29-0304-01		03TP30-0506-01		03TP30-0506-01-D	
Sample Date:					1/15/2009		1/15/2009		1/14/2009		1/14/2009		1/14/2009	
Duplicate:											03TP30-0506-01-D		03TP30-0506-01	
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		2 - 3		3 - 4		5 - 6		5 - 6	
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg			
Aluminum	**7.7E+04**	9.9E+05	1.9E+05	1.9E+05	45600		23800		17100		23600		NA	
Antimony	**3.1E+01**	4.1E+02	8.8E+01	1.9E+05	121	L	1.2	B	1.4	B	36.3	L	NA	
Arsenic	**3.9E-01**	1.6E+00	1.2E+01	1.9E+05	11.7		5.2		4.7		9.6		NA	
Barium	**1.5E+04**	1.9E+05	1.5E+04	1.9E+05	624		88.7		45.2		503		NA	
Beryllium	**1.6E+02**	2.0E+03	4.4E+02	1.9E+05	0.9	B	0.96	K	0.76	B	0.78	B	NA	
Cadmium	7.0E+01	8.0E+02	**4.7E+01**	1.9E+05	66.5		0.08	UR	0.08	UR	41.3		NA	
Calcium	NA	NA	NA	NA	19200		962		632		31700		NA	
Chromium	**2.9E-01**	5.6E+00	9.4E+01	1.9E+05	137	J	41.9	J	19	J	348	J	NA	
Cobalt	**2.3E+01**	3.0E+02	4.4E+03	1.9E+05	12.6		7.9		15.8		11.9		NA	
Copper	**3.1E+03**	4.1E+04	8.2E+03	1.9E+05	2170		29.2		24.9		785		NA	
Cyanide	**1.6E+03**	2.0E+04	4.4E+03	1.9E+05	1		0.09	U	0.1	U	1.1		NA	
Iron	**5.5E+04**	7.2E+05	6.6E+04	1.9E+05	127000		24400		21700		57100		NA	
Lead	**4.0E+02**	8.0E+02	5.0E+02	1.9E+05	2120	J	13.4	J	11.9	J	1500	J	NA	
Magnesium	NA	NA	NA	NA	7840	J	1400	J	1770	J	4470	J	NA	
Manganese	**1.8E+03**	2.3E+04	3.1E+04	1.9E+05	2130		646		1030		1170		NA	
Mercury	**7.8E+00**	1.0E+02	6.6E+01	1.9E+05	6.7		0.069		0.017	U	0.27		NA	
Nickel	**1.5E+03**	2.0E+04	4.4E+03	1.9E+05	281	J	13.4	J	12.4	J	60.5	J	NA	
Potassium	NA	NA	NA	NA	1020		654		897		1360		NA	
Selenium	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	0.33	UR	0.26	UR	0.26	UR	0.29	UR	NA	
Silver	**3.9E+02**	5.1E+03	1.1E+03	1.9E+05	34.7		0.07	U	0.07	U	16.5		NA	
Sodium	NA	NA	NA	NA	679	K	165	R	158	R	522	R	NA	
Thallium	NA	NA	**1.5E+01**	1.9E+05	30.3	K	4.9	K	4.2	R	13.3	K	NA	
Vanadium	**5.5E+00**	7.2E+01	1.5E+03	1.9E+05	33.7		34.7		33.9		34.9		NA	
Zinc	**2.3E+04**	3.1E+05	6.6E+04	1.9E+05	5450		37		28.4		2140		NA	
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg			
1,2,4,5-Tetrachlorobenzene	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	260	U	200	U	200	U	240	U	NA	
1-Methylnaphthalene	**2.2E+04**	9.9E+04	NA	NA	3.4	B	9.8	U	9.9	U	5.7	B	NA	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	6.7	B	0.74	B	9.9	U	13	B	NA	
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	440	U	340	U	350	U	400	U	NA	
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	0.99	B	1.1	B	9.9	U	1.2	B	NA	
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	1.8	B	1.8	B	9.9	U	3.7	B	NA	
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	2.7	B	3.9	B	9.9	U	6.4	B	NA	
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	13	B	9.1	B	9.9	U	25	B	NA	
Benzaldehyde	**7.8E+06**	1.0E+08	NA	NA	75	J	200	U	200	U	43	J	NA	
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	14	B	16	B	9.9	U	24		NA	
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	26	B	21		9.9	U	36		NA	
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	15	B	22		9.9	U	23		NA	
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	13	B	15	B	9.9	U	21	B	NA	
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	210	J	270	U	270	U	250	J	NA	
Carbazole	NA	NA	**9.0E+05**	1.9E+08	260	U	200	U	200	U	240	U	NA	
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	23	B	17	B	9.9	U	37		NA	
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	350	U	270	U	270	U	320	U	NA	
Di-n-octylphthalate	NA	NA	NA	NA	330	U	260	U	260	U	310	U	NA	
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	4.5	B	4.2	B	9.9	U	7.7	B	NA	
Dibenzofuran	NA	NA	NA	NA	380	U	290	U	300	U	350	U	NA	
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	33	B	46		9.9	U	53		NA	
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	1.5	B	1.9	B	9.9	U	1.2	B	NA	
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	16	B	20		9.9	U	25		NA	
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	8.3	B	0.72	B	0.34	B	15		NA	
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	26	B	15	B	9.9	U	33		NA	
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	25	B	32		9.9	U	42		NA	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03TP27-0304-02		03TP28-0203-01		03TP29-0304-01		03TP30-0506-01		03TP30-0506-01-D	
Sample Date:					1/15/2009		1/15/2009		1/14/2009		1/14/2009		1/14/2009	
Duplicate:											03TP30-0506-01-D		03TP30-0506-01	
Depth range (feet):	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	3 - 4		2 - 3		3 - 4		5 - 6		5 - 6	
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg			
1,1-Dichloroethene	2.4E+05	1.1E+06	**6.4E+03**	3.8E+04	8.3	U	4.7	U	4.9	U	6.7	U	NA	
1,2,3-Trichlorobenzene	**4.9E+04**	4.9E+05	NA	NA	8.3	U	4.7	U	4.9	U	5.5	B	NA	
1,2,4-Trichlorobenzene	**2.2E+04**	9.9E+04	2.2E+06	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
1,2-Dichlorobenzene	**1.9E+06**	9.8E+06	3.8E+06	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
1,4-Dichlorobenzene	**2.4E+03**	1.2E+04	7.5E+05	1.9E+08	8.3	U	4.7	U	4.9	U	6.7	U	NA	
2-Butanone	2.8E+07	2.0E+08	**1.0E+07**	1.0E+07	21	U	12	U	12	U	17	U	NA	
Acetone	6.1E+07	6.3E+08	**1.0E+07**	1.0E+07	130	J	55	J	24	J	28	J	NA	
Benzene	**1.1E+03**	5.4E+03	4.1E+04	2.4E+05	2.2	J	4.7	U	4.9	U	2.3	J	NA	
Bromomethane	**7.3E+03**	3.2E+04	9.5E+04	3.0E+05	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Carbon Disulfide	**8.2E+05**	3.7E+06	1.0E+07	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Chlorobenzene	**2.9E+05**	1.4E+06	4.4E+06	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Chloromethane	**1.2E+05**	5.0E+05	NA	NA	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Dichlorodifluoromethane	**1.8E+05**	7.8E+05	3.8E+06	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Ethylbenzene	**5.4E+03**	2.7E+04	1.0E+07	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
M,p-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	17	U	9.5	U	9.7	U	13	U	NA	
Methyl Acetate	7.8E+07	1.0E+09	**1.0E+07**	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Methylcyclohexane	NA	NA	NA	NA	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Methylene Chloride	**1.1E+04**	5.4E+04	6.8E+05	4.0E+06	8.3	U	4.7	U	4.9	U	6.7	U	NA	
O-xylene	**3.4E+06**	1.7E+07	8.0E+06	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Styrene	**6.3E+06**	3.6E+07	1.0E+07	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Tetrachloroethene	**5.5E+02**	2.6E+03	3.4E+05	3.3E+06	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Toluene	**5.0E+06**	4.5E+07	7.6E+06	1.0E+07	2.7	B	4.7	U	4.9	U	2.3	B	NA	
Trichloroethene	**2.8E+03**	1.4E+04	1.9E+05	1.1E+06	8.3	U	4.7	U	4.9	U	6.7	U	NA	
Xylene (Total)	**6.3E+05**	2.7E+06	8.0E+06	1.0E+07	8.3	U	4.7	U	4.9	U	6.7	U	NA	
PESTICIDES/PCBS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg		ug/kg		ug/kg		ug/kg			
4,4'-DDD	**2.0E+03**	7.2E+03	7.5E+04	1.9E+08	16	J	3.9	U	3.9	U	4.8	J	NA	
4,4'-DDE	**1.4E+03**	5.1E+03	5.3E+04	1.9E+08	8	B	1.1	B	3.9	U	10	B	NA	
4,4'-DDT	**1.7E+03**	7.0E+03	5.3E+04	1.9E+08	21	J	4.9		3.9	U	12	J	NA	
Aldrin	**2.9E+01**	1.0E+02	1.1E+03	1.9E+08	1.4	J	2	U	2	U	12	U	NA	
Alpha-BHC	**7.7E+01**	2.7E+02	2.8E+03	1.9E+08	6.4	R	2	U	2	U	12	U	NA	
Alpha-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	12	R	2	U	2.9	R	11	J	NA	
Aroclor-1242	**2.2E+02**	7.4E+02	3.6E+04	1.0E+07	26	U	20	U	20	U	120	U	NA	
Aroclor-1248	**2.2E+02**	7.4E+02	9.9E+03	1.0E+07	26	U	92		20	U	120	U	NA	
Aroclor-1254	**2.2E+02**	7.4E+02	4.4E+03	1.0E+07	26	U	20	U	20	U	120	U	NA	
Aroclor-1260	**2.2E+02**	7.4E+02	3.0E+04	1.9E+08	26	U	20	U	20	U	96	J	NA	
Beta-BHC	**2.7E+02**	9.6E+02	9.9E+03	1.9E+08	8.2	R	1	U	1	U	5.9	U	NA	
Delta-BHC	NA	NA	**1.3E+05**	1.9E+08	2.6	U	2	U	2	U	12	U	NA	
Dieldrin	**3.0E+01**	1.1E+02	1.1E+03	1.0E+07	21	J	18	J	3.9	U	100		NA	
Endosulfan I	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	0.69	J	2	U	2	U	1.2	J	NA	
Endosulfan II	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	2.3	R	3.9	U	3.9	U	23	U	NA	
Endosulfan Sulfate	**3.7E+05**	3.7E+06	1.3E+06	1.9E+08	7.8	R	3.9	U	3.9	U	23	U	NA	
Endrin	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	2.3	J	3.9	U	3.9	U	23	U	NA	
Endrin Aldehyde	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	12	R	4	U	4	U	23	U	NA	
Endrin Ketone	**1.8E+04**	1.8E+05	6.6E+04	1.9E+08	5.6	J	3.9	U	3.9	U	23	U	NA	
Gamma-BHC (Lindane)	**5.2E+02**	2.1E+03	1.4E+04	1.9E+08	2.6	U	2	U	2	U	12	U	NA	
Gamma-Chlordane	**1.6E+03**	6.5E+03	5.1E+04	1.9E+08	20	R	2	U	1.7	J	9.4	J	NA	
Heptachlor	**1.1E+02**	3.8E+02	4.0E+03	1.9E+08	4.2	R	2	U	2	U	12	U	NA	
Heptachlor Epoxide	**5.3E+01**	1.9E+02	2.0E+03	1.9E+08	4.5	J	2	U	2	U	3	J	NA	
Methoxychlor	**3.1E+05**	3.1E+06	1.1E+06	1.9E+08	15	J	20	U	20	U	120	U	NA	
DIOXINS/FURANS	ng/kg	ng/kg	ng/kg	ng/kg							ng/kg		ng/kg	
1,2,3,4,6,7,8-HpCDD	NA	NA	NA	NA	NA		NA		NA		651		424	
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	NA	NA		NA		NA		840		674	
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	NA	NA		NA		NA		60.8		63.7	
1,2,3,4,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		38.2		24.9	

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03TP27-0304-02**		**03TP28-0203-01**		**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:					**1/15/2009**		**1/15/2009**		**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:											**03TP30-0506-01-D**		**03TP30-0506-01**	
Depth range (feet):	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**3 - 4**		**2 - 3**		**3 - 4**		**5 - 6**		**5 - 6**	
1,2,3,4,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		246	IEMP	216	IEMP
1,2,3,6,7,8-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		67.8		46.3	
1,2,3,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		214	IEMP	156	IEMP
1,2,3,7,8,9-HxCDD	**9.4E+01**	3.9E+02	NA	NA	NA		NA		NA		55.3		39.2	
1,2,3,7,8,9-HxCDF	NA	NA	NA	NA	NA		NA		NA		53.6		37.7	
1,2,3,7,8-PeCDD	NA	NA	NA	NA	NA		NA		NA		42.8		34.8	
1,2,3,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		139	IEMP	98.2	IEMP
2,3,4,6,7,8-HxCDF	NA	NA	NA	NA	NA		NA		NA		293		193	
2,3,4,7,8-PeCDF	NA	NA	NA	NA	NA		NA		NA		256		188	
2,3,7,8-TCDD	NA	NA	**1.2E+02**	1.9E+11	NA		NA		NA		17.5		15.2	
2,3,7,8-TCDF	NA	NA	NA	NA	NA		NA		NA		146		104	
OCDD	NA	NA	NA	NA	NA		NA		NA		5490	J	4130	
OCDF	NA	NA	NA	NA	NA		NA		NA		393	J	1660	J
Total 2,3,7,8-TCDD Equiv.	**4.5E+00**	1.8E+01	1.2E+02	1.9E+11	NA		NA		NA		270		204	
Total HpCDD	NA	NA	NA	NA	NA		NA		NA		1350		871	
Total HpCDF	NA	NA	NA	NA	NA		NA		NA		1210		967	
Total HxCDD	NA	NA	NA	NA	NA		NA		NA		1310		804	
Total HxCDF	NA	NA	NA	NA	NA		NA		NA		2320	IEMP	1570	IEMP
Total PeCDD	NA	NA	NA	NA	NA		NA		NA		1000	J	665	J
Total PeCDF	NA	NA	NA	NA	NA		NA		NA		2990	IEMP	2020	IEMP
Total TCDD	NA	NA	NA	NA	NA		NA		NA		838		612	
Total TCDF	NA	NA	NA	NA	NA		NA		NA		4250	IEMP	2790	J

TABLE 4-13

COMPARISON OF LANDFILL AREA SUBSURFACE SOIL ANALYTICAL RESULTS TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
D -- Result is reported from a diluted result.
EMPC -- Estimated Maximum Positive Concentration.
IEMPC -- Interference Estimated Maximum Positive Concentration.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

Bolded criterion is the most stringent.
Shaded values exceed the most stringent criteria.

TABLE 4-14

COMPARISON OF HANGAR AREA SUBSURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB17-0406		03SB17-0608		03SB18-1012		03SB19-0204		03SB19-0408		03SB20-0608	
Duplicate:																
Top Depth:					4.00		6.00		10.00		2.00		4.00		6.00	
Bottom Depth:					6.00		8.00		12.00		4.00		8.00		8.00	
Sample Date	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	03/22/06		03/22/06		03/22/06		03/22/06		03/22/06		03/22/06	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	390	U	380	U	380	U	28	J	780	U	380	U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	390	U	380	U	380	U	780	U	780	U	380	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	380	U	380	U	230	J	170	J	380	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	380	U	380	U	110	J	120	J	380	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	390	U	380	U	380	U	1800		740	J	380	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	36	J	380	U	380	U	4200		3100		380	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	40	J	380	U	380	U	3200		2600		380	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	68	J	380	U	380	U	4200		2900		380	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	33	J	380	U	380	U	2100		1900		380	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	17	J	380	U	380	U	1400		1300		380	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	390	U	380	U	380	U	780	U	780	U	380	U
Butylbenzylphthalate	**2.60E+05**	9.10E+05	1.00E+07	1.00E+07	38	J	380	U	380	U	780	U	780	U	380	U
Carbazole	NA	NA	**9.0E+05**	1.9E+08	390	U	380	U	380	U	340	J	140	J	380	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	53	J	380	U	380	U	3400		2700		380	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	390	U	380	U	380	U	780	U	780	U	380	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	390	U	380	U	380	U	580	J	500	J	380	U
Dibenzofuran	NA	NA	NA	NA	390	U	380	U	380	U	150	J	75	J	380	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	91	J	380	U	380	U	6900	E	5200		380	U
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	390	U	380	U	380	U	260	J	180	J	380	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	28	J	380	U	380	U	2000		1700		380	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	390	U	380	U	380	U	780	U	780	U	380	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	40	J	380	U	380	U	4100		2400		380	U
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	84	J	380	U	380	U	6600		5600		380	U

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.
Bolded criterion is the most stringent.
Shaded values exceed the most stringent criteria.
Footnotes to Subsurface Soil Screening Criteria:
\- - No standard is available for this chemical in this classification.
MSC - Medium Specific Concentration

TABLE 4-14

COMPARISON OF HANGAR AREA SUBSURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS				03SB20-1012		03SB21-1012		03SB21-1012-D		03SB21-1415		03SB22-0406		03SB22-0608	
Duplicate:							03SB21-1012-D		03SB21-1012							
Top Depth:					10.00		10.00		10.00		14.00		4.00		6.00	
Bottom Depth:					12.00		12.00		12.00		15.00		6.00		8.00	
Sample Date	Region 3 Residential SL	Region 3 Non-Residential SL	PADEP Residential MSC	PADEP Non-Residential MSC	03/22/06		03/22/06		03/22/06		03/22/06		03/23/06		03/23/06	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	380	U	390	U	390	U	380	U	390	U	400	U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	380	U	390	U	390	U	380	U	390	U	400	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	380	U	32	J	21	J	380	U	390	U	400	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	380	U	34	J	21	J	380	U	390	U	400	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	380	U	44	J	390	U	380	U	390	U	400	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	380	U	26	J	390	U	380	U	390	U	400	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	380	U	19	J	390	U	380	U	390	U	400	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	380	U	390	U	390	U	380	U	390	U	400	U
Butylbenzylphthalate	**2.60E+05**	9.10E+05	1.00E+07	1.00E+07	380	U	390	U	390	U	380	U	390	U	30	J
Carbazole	NA	NA	**9.0E+05**	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	380	U	35	J	23	J	380	U	390	U	400	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	380	U	390	U	390	U	380	U	390	U	400	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Dibenzofuran	NA	NA	NA	NA	380	U	390	U	390	U	380	U	390	U	400	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	380	U	52	J	32	J	380	U	390	U	400	U
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	380	U	390	U	390	U	380	U	390	U	400	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	380	U	29	J	21	J	380	U	390	U	400	U
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	380	U	59	J	36	J	380	U	390	U	400	U

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered pre
J -- Value is estimated due to exceedance of technical quality control criteria or because result is less than
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.
Bolded criterion is the most stringent.
Shaded values exceed the most stringent criteria.
Footnotes to Subsurface Soil Screening Criteria:
- - No standard is available for this chemical in this classification.
MSC - Medium Specific Concentration

TABLE 4-14

COMPARISON OF HANGAR AREA SUBSURFACE SOIL ANALYTICAL DATA TO BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**				**03SB23-0406**		**03SB23-1012**		**03SB24-0406**		**03SB24-1011.2**		**03SB24-1011.2-D**	
Duplicate:											**03SB24-1011.2-D**		**03SB24-1011.2**	
Top Depth:					**4.00**		**10.00**		**4.00**		**10.00**		**10.00**	
Bottom Depth:	**Region 3 Residential SL**	**Region 3 Non-Residential SL**	**PADEP Residential MSC**	**PADEP Non-Residential MSC**	**6.00**		**12.00**		**6.00**		**11.20**		**11.20**	
Sample Date					**03/23/06**		**03/23/06**		**03/23/06**		**03/23/06**		**03/23/06**	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
2-Methylnaphthalene	**3.1E+05**	4.1E+06	4.4E+06	1.0E+07	390	U	390	U	400	U	420	U	420	U
2-Methylphenol	**3.1E+06**	3.1E+07	1.0E+07	1.0E+07	390	U	390	U	400	U	420	U	420	U
Acenaphthene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	390	U	400	U	420	U	420	U
Acenaphthylene	**3.4E+06**	3.3E+07	1.3E+07	1.9E+08	390	U	390	U	400	U	420	U	420	U
Anthracene	**1.7E+07**	1.7E+08	6.6E+07	1.9E+08	390	U	390	U	400	U	420	U	420	U
Benz(a)anthracene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	390	U	390	U	400	U	420	U	420	U
Benzo(a)pyrene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	390	U	390	U	400	U	420	U	420	U
Benzo(b)fluoranthene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	390	U	390	U	400	U	420	U	420	U
Benzo(g,h,i)perylene	NA	NA	**1.3E+07**	1.9E+08	390	U	390	U	400	U	420	U	420	U
Benzo(k)fluoranthene	**1.5E+03**	2.1E+04	2.5E+05	1.9E+08	390	U	390	U	400	U	420	U	420	U
Bis(2-ethylhexyl)phthalate	**3.5E+04**	1.2E+05	1.3E+06	1.0E+07	390	U	390	U	400	U	420	U	420	U
Butylbenzylphthalate	**2.60E+05**	9.10E+05	1.00E+07	1.00E+07	30	J	25	J	400	U	420	U	420	U
Carbazole	NA	NA	**9.0E+05**	1.9E+08	390	U	390	U	400	U	420	U	420	U
Chrysene	**1.5E+04**	2.1E+05	2.5E+06	1.9E+08	390	U	390	U	400	U	420	U	420	U
Di-n-butylphthalate	**6.1E+06**	6.2E+07	1.0E+07	1.0E+07	390	U	390	U	400	U	420	U	420	U
Dibenz(a,h)anthracene	**1.5E+01**	2.1E+02	2.5E+03	1.9E+08	390	U	390	U	400	U	420	U	420	U
Dibenzofuran	NA	NA	NA	NA	390	U	390	U	400	U	420	U	420	U
Fluoranthene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	390	U	390	U	400	U	420	U	420	U
Fluorene	**2.3E+06**	2.2E+07	8.8E+06	1.9E+08	390	U	390	U	400	U	420	U	420	U
Indeno(1,2,3-cd)pyrene	**1.5E+02**	2.1E+03	2.5E+04	1.9E+08	390	U	390	U	400	U	420	U	420	U
Naphthalene	**3.6E+03**	1.8E+04	4.4E+06	1.9E+08	390	U	390	U	400	U	420	U	420	U
Phenanthrene	NA	NA	**6.6E+07**	1.9E+08	390	U	390	U	400	U	420	U	420	U
Pyrene	**1.7E+06**	1.7E+07	6.6E+06	1.9E+08	390	U	390	U	400	U	420	U	420	U

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered pre
J -- Value is estimated due to exceedance of technical quality control criteria or because result is less than
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.
Bolded criterion is the most stringent.
Shaded values exceed the most stringent criteria.
Footnotes to Subsurface Soil Screening Criteria:
- - No standard is available for this chemical in this classification.
MSC - Medium Specific Concentration

TABLE 4-15

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN SURFACE WATER SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data										
	Freq.	Range of Positive Detection					Freq.	Range of Positive Detection							Range of Detection Limits		
Substance	of Detection	Min.		Max.	Mean of All Data	Sampling Round and Location of Maximum	of Detection	Min.		Max.		Mean of All Data	Sampling Round and Location of Maximum	Min.		Max.
Aluminum	1/8	561	-	561	145	BGSW03-DUP 03/13/97	7/8	120 K	-	317	K	160	03-SW-17	80	-	80
Barium	8/8	87.3	-	112	101	BGSW05 03/13/97	8/8	32.5	-	113		57.8	03SW11-20080319		-	
Calcium	8/8	15800	-	34900	24600	BGSW01 03/13/97	8/8	13200	-	22300		15100	03SW11-20080319		-	
Chromium	0/8		-				4/6	1.1	-	1.3		0.856	03-SW-14	0.87	-	0.87
Cobalt	0/8		-				1/8	0.2 J	-	0.2	J	0.633	03SW11-20080319	0.62	-	6
Iron	8/8	85.3	-	751	321	BGSW03-DUP 03/13/97	8/8	185	-	1060		352	03SW11-20080319		-	
Lead	1/8	1.1	-	1.1	0.538	BGSW03-DUP 03/13/97	8/8	0.07 J	-	2.7		1.85	03-SW-16	2	-	2
Magnesium	8/8	6250	-	12100	8910	BGSW01 03/13/97	8/8	3750	-	7470		4570	03SW11-20080319		-	
Manganese	8/8	26.7	-	122	67.1	BGSW03-DUP 03/13/97	8/8	30.9	-	197		67	03SW11-20080319		-	
Nickel	1/8	31.4	-	31.4	11.3	BGSW03-DUP 03/13/97	2/8	1.2 J	-	2	J	0.768	03SW11-20080319	0.98	-	0.98
Potassium	6/8	1750	-	2860	1830	BGSW01 03/13/97	8/8	1430 L	-	1880		1610	03SW11-20080319		-	
Sodium	8/8	10700	-	36200	20100	BGSW02 03/13/97	5/5	6240	-	18800		9110	03SW11-20080319		-	
Vanadium	0/8		-				1/1	1.4	-	1.4		1.4	03SW11-20080319		-	
Zinc	3/8	6.8	-	18.9	5.28	BGSW03-DUP 03/13/97	3/3	3.6 J	-	16		10.5	03SW11-20080319		-	
Dieldrin	0/8		-				6/6	0.008 J	-	0.011	J	0.00983	03-SW-14		-	
Acenaphthylene	0/8		-				1/6	0.016 J	-	0.016	J	0.0885	03-SW-14	0.2	-	0.22
Benz(a)anthracene	0/8		-				1/6	0.027 J	-	0.027	J	0.0903	03-SW-14	0.2	-	0.22
Benzo(a)pyrene	0/8		-				3/6	0.013 J	-	0.047	J	0.0638	03-SW-14	0.2	-	0.22
Benzo(b)fluoranthene	0/8		-				5/6	0.014 J	-	0.097	J	0.0436	03-SW-14	0.2	-	0.2
Benzo(g,h,i)perylene	0/8		-				2/6	0.018 J	-	0.036	J	0.0765	03-SW-14	0.2	-	0.22
Benzo(k)fluoranthene	0/8		-				4/6	0.013 J	-	0.085	J	0.0543	03-SW-14	0.2	-	0.22
Chrysene	0/8		-				1/6	0.053 J	-	0.053	J	0.0947	03-SW-14	0.2	-	0.22
Dibenz(a,h)anthracene	0/8		-				1/6	0.012 J	-	0.012	J	0.087	03-SW-15-D	0.2	-	0.22
Fluoranthene	0/8		-				3/6	0.012 J	-	0.12	J	0.0755	03-SW-14	0.2	-	0.22
Fluorene	0/8		-				6/6	0.59	-	0.69		0.643	03-SW-14		-	
Indeno(1,2,3-cd)pyrene	0/8		-				6/6	0.01 J	-	0.042	J	0.017	03-SW-14	0.22	-	0.22
Phenanthrene	0/8		-				1/6	0.096 J	-	0.096	J	0.102	03-SW-14	0.2	-	0.22
Pyrene	0/8		-				6/6	0.012 J	-	0.099	J	0.0293	03-SW-14		-	
Acetone	0/8		-				3/8	1.3 J	-	3.8		2.7	03-SW-17	2.5	-	10
Toluene	0/8		-				1/12	0.21 J	-	0.21	J	0.351	03SW10-20080319	0.5	-	1

Notes:

Units are in µg/L.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-16

STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 SURFACE WATER TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		Site 3 sw Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are Site 3 sw?				Ranks of Site 3 sw > bkg.?				Site 3 sw Mean > bkg. Mean ?					Site 3 sw Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:		#ND & Pos.>=5 or use Fisher				Data fit normal or gamma distrib., or nonparametric					# Site 3 sw (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 sw & bkg. both normally distributed						
Test Criterion:		P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
Concentration > background?	Y/N	bkg. Freq.	Site 3 sw Freq.	P Value	YN	Back. Mean	Std.Dev. Back	t Value	N, Q, or Other***	Back. UTL	r	k	P Value	YN	P Value	Test	Used	YN	bkg. Mean	Site 3 sw Mean	t Value	t Table	YN	bkg. Distrib.	Site 3 sw Distrib.	Std.Dev. bkg.	Std.Dev. Site 3 sw	F Value	F Table	YN
Aluminum	N	1/8	7/8		NA	145					2	1	0.7667	N	0.4733	Gehan	Test	N	145	160			NA	lognor.	normal					NA
Barium	N	8/8	8/8		NA	101	9.19	3.1880	N	130	1	1	0.5000	N	0.9965	Gehan	Test	N	101	57.8	-4.1649	1.8595	N	normal	normal	9.19	27.8	6.8330	3.8563	N
Calcium	N	8/8	8/8		NA	24600	7720	3.1880	N	49300	8	2	0.9949	N	0.9990	Gehan	Test	N	24600	15100			NA	normal	nonpar.					NA
Chromium	NA	0/8	4/6		NA									NA				NA		0.856			NA							NA
Cobalt	NA	0/8	1/8		NA									NA				NA		0.633			NA							NA
Iron	N	8/8	8/8		NA	321	156	3.1880	N	817	1	1	0.5000	N	0.7875	Gehan	Test	N	321	352			NA	normal	nonpar.					NA
Lead	**Y**	1/8	8/8	0.0007	**Y**	0.538					6	6	0.0035	**Y**	0.0029	Gehan	Test	**Y**	0.538	1.85			NA	nonpar.	normal					NA
Magnesium	N	8/8	8/8		NA	8910	2350	3.1880	N	16400	6	1	0.9965	N	0.9997	Gehan	Test	N	8910	4570			NA	normal	nonpar.					NA
Manganese	N	8/8	8/8		NA	67.1	26.2	3.1880	N	150	1	1	0.5000	N	0.8359	Gehan	Test	N	67.1	67			NA	normal	lognor.					NA
Nickel	N	1/8	2/8		NA	11.3								NA	0.7434	Gehan	Test	N	11.3	0.768			NA	nonpar.	nonpar.					NA
Potassium	N	6/8	8/8	0.2333	N	1830					12	6	0.7154	N	0.9576	Gehan	Test	N	1830	1610			NA	normal	normal					NA
Sodium	N	8/8	5/5		NA	20100	10300	3.1880	N	52900	5	1	0.9565	N	0.9946	Gehan	Test	N	20100	9110			NA	lognor.	nonpar.					NA
Vanadium	NA	0/8	1/1	0.1111	N									NA				NA		1.4			NA							NA
Zinc	N	3/8	3/3	0.1212	N	5.28					3	2	0.1515	N	0.1333	Gehan	Test	N	5.28	10.5			NA	nonpar.	normal					NA
Dieldrin	NA	0/8	6/6	0.0003	**Y**									NA				NA		0.00983			NA							NA
Acenaphthylene	NA	0/8	1/6		NA									NA				NA		0.0885			NA							NA
Benz(a)anthracene	NA	0/8	1/6		NA									NA				NA		0.0903			NA							NA
Benzo(a)pyrene	NA	0/8	3/6		NA									NA				NA		0.0638			NA							NA
Benzo(b)fluoranthene	NA	0/8	5/6		NA									NA				NA		0.0436			NA							NA
Benzo(g,h,i)perylene	NA	0/8	2/6		NA									NA				NA		0.0765			NA							NA
Benzo(k)fluoranthene	NA	0/8	4/6		NA									NA				NA		0.0543			NA							NA
Chrysene	NA	0/8	1/6		NA									NA				NA		0.0947			NA							NA
Dibenz(a,h)anthracene	NA	0/8	1/6		NA									NA				NA		0.087			NA							NA
Fluoranthene	NA	0/8	3/6		NA									NA				NA		0.0755			NA							NA
Fluorene	NA	0/8	6/6		NA									NA				NA		0.643			NA							NA
Indeno(1,2,3-cd)pyrene	NA	0/8	6/6		NA									NA				NA		0.017			NA							NA
Phenanthrene	NA	0/8	1/6		NA									NA				NA		0.102			NA							NA
Pyrene	NA	0/8	6/6		NA									NA				NA		0.0293			NA							NA
Acetone	N	0/8	3/8		NA						1	1	0.5000	N				NA		2.7			NA							NA
Toluene	NA	0/8	1/12		NA									NA				NA		0.351			NA							NA

**** Site 3 concentrations in surface water are compared to background surface water (sw).**

Interpretation of Z-Test or Fisher's Exact Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data's detection frequency is greater than the background data detection frequency.
Interpretation of Quantile Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more upper rank values relative to the background data set.
Since "k" samples from the top "r" ranks of the combined data set belonged to the site soil subgroup, this would be unlikely if the site and background data sets came from the same population.
Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more values ranked greater than the ranks of background data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians.
Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site data set belongs to a population having a greater mean relative to the mean of the background population.
Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 sw to bkg. soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 sw > bkg.) for each chemical appears at the left and is based on four criteria:
(1) Overall decision is YES if any one of the Mann-Whitney/Gehan, Quantile Test, or T-Test is YES, regardless of other test results.
(2) Overall decision is NO if at least one of Mann-Whitney/Gehan, Quantile Test, or T-Test is NO, and none of the aforementioned tests are YES.
(3) Overall decision is YES/NO if Z/Fisher Test is YES/NO, respectively, and other tests are NA. Z-test is treated as lowest priority since it relies on detection frequency, not magnitude of results.
(4) Overall decision is NA if all tests are NA. (Might occur if too few detections to be capable of detecting a statistically significant difference even if one exists.)
NOTE: This decision scheme does not utilize the UTL test because random false positive exceedances of the background UTL are probable if there are many site samples, even if site distribution matches background.

* Low power because either N is small or very low frequency of detected values with detections close to the detection limits, which interferes with the power of statistical tests to detect a significant difference between groups.

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 sw (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 sw results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 sw > bkg. with 95 % confidence.
N, Q, or other UTL***	UTL is based on a 95 % upper limit (using t-value) when data are normal (N). Otherwise, a gamma distribution 95% UPL or a nonparametric 95 % quantile (Q) is used if there are sufficient data points. UTL documentation is provided in the ProUCL statistical results in Appendix K.
KM	Kaplan-Meier UPL is estimated for cases involving a percentage of nondetected results.
r,k	The Quantile test calculates the probability that k or more samples from the top r ranks of the combined Site 3 sw and bkg. data set are comprised of Site 3 sw data if both populations are in fact equal.

TABLE 4-17

COMPARISON OF SURFACE WATER ANALYTICAL RESULTS WITH CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS					03-SW-12		03-SW-13		03-SW-14		03-SW-15		03-SW-15-AVG		03-SW-15-D		03-SW-16	
Sample Date:						12/15/08		12/16/08		12/16/08		12/16/08		12/16/08		12/16/08		12/16/08	
Duplicate of:																03-SW-15			
	AWQC CCC	AWQC Ingestion of Water and Organism	AWQC Ingestion of Organism Only	PADEP WQC CCC	PADEP Human Health Criteria														
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Aluminum	NA	NA	NA	NA	NA	159	K	146	K	154	K	185	K	168	K	151	K	120	K
Barium	NA	7	NA	4100	2400	57.9		46.2		55.1		33.8		33.85		33.9		32.5	
Calcium	NA	NA	NA	NA	NA	13600		13700		13200		13900		13950		14000		14100	
Chromium	11	NA	NA	**10**	NA	0.87	U	1.1		1.3		1.1		0.7675		0.87	U	1.1	
Cobalt	NA	NA	NA	**19**	NA	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U
Iron	NA	NA	NA	NA	NA	228		185		222		232		228.5		225		216	
Lead	2.5	NA	NA	2.5	NA	2.2		2.5		2.5		2.3		1.65		2	U	2.7	
Magnesium	NA	NA	NA	NA	NA	4050		3940		3970		3750		3755		3760		3770	
Manganese	NA	NA	NA	NA	NA	46.2		41.6		39		52.7		52.85		53		33	
Nickel	52	610	4600	52	610	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Potassium	NA	NA	NA	NA	NA	1430	L	1520	L	1440	L	1610	L	1605	L	1600	L	1610	L
Sodium	NA	NA	NA	NA	NA	6350		6240		6500		5510	B	5545	B	5580	B	5730	B
Vanadium	NA	NA	NA	100	NA	1.1	B	1.1	B	1.1	B	0.96	B	1.03	B	1.1	B	1.4	B
Zinc	120	7400	26000	120	NA	5.1	B	4.8	B	6	B	5.5	B	5.95	B	6.4	B	5.7	B
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Acenaphthylene	NA	NA	NA	NA	NA	0.21	U	0.2	U	0.016	J	0.22	U	0.22	U	0.22	U	0.2	U
Benz(a)anthracene	NA	NA	NA	0.1	**0.0038**	0.21	U	0.2	U	0.027	J	0.22	U	0.22	U	0.22	U	0.2	U
Benzo(a)pyrene	NA	NA	NA	NA	**0.0038**	0.21	U	0.2	U	0.047	J	0.22	U	0.018	J	0.018	J	0.2	U
Benzo(b)fluoranthene	NA	NA	NA	NA	**0.0038**	0.016	J	0.015	J	0.097	J	0.014	J	0.0175	J	0.021	J	0.2	U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	0.21	U	0.2	U	0.036	J	0.22	U	0.018	J	0.018	J	0.2	U
Benzo(k)fluoranthene	NA	NA	NA	NA	**0.0038**	0.014	J	0.013	J	0.085	J	0.22	U	0.014	J	0.014	J	0.2	U
Chrysene	NA	NA	NA	NA	**0.0038**	0.21	U	0.2	U	0.053	J	0.22	U	0.22	U	0.22	U	0.2	U
Dibenz(a,h)anthracene	NA	NA	NA	NA	**0.0038**	0.21	U	0.2	U	0.21	U	0.22	U	0.012	J	0.012	J	0.2	U
Fluoranthene	NA	NA	NA	40	130	0.21	U	0.2	U	0.12	J	0.22	U	0.016	J	0.016	J	0.2	U
Fluorene	NA	NA	NA	NA	1100	0.67		0.63		0.69		0.67		0.655		0.64		0.62	
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	**0.0038**	0.011	J	0.01	J	0.042	J	0.22	U	0.017	J	0.017	J	0.01	J
Phenanthrene	NA	NA	NA	1	NA	0.21	U	0.2	U	0.096	J	0.22	U	0.22	U	0.22	U	0.2	U
Pyrene	NA	NA	NA	NA	830	0.013	J	0.013	J	0.099	J	0.012	J	0.0165	J	0.021	J	0.014	J
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Acetone	NA	NA	NA	86000	3500	2.5	U	2.5	U	2.5	U	1.3	J	1.3	J	2.5	U	2.8	
Toluene	NA	1300	15000	330	1300	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
PESTICIDES/PCBS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Dieldrin	NA	NA	NA	0.056	62	0.0096	J	0.0096	J	0.011	J	0.008	J	0.0081	J	0.0082	J	0.0097	J

TABLE 4-17

COMPARISON OF SURFACE WATER ANALYTICAL RESULTS WITH CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	CONCENTRATION BENCHMARKS					03-SW-17		03SW10		03SW10		03SW10		03SW10-D		03SW11		03SW11	
Sample Date:						12/16/08		03/19/08		10/13/08		4/1/2009		4/1/2009		03/19/08		10/13/08	
Duplicate of:	AWQC CCC	AWQC Ingestion of Water and Organism	AWQC Ingestion of Organism Only	PADEP WQC CCC	PADEP Human Health Criteria							03SW10-D		03SW10					
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**								**ug/L**			
Aluminum	NA	NA	NA	NA	NA	317	K	80	U	NA		NA		NA		174		NA	
Barium	NA	7	NA	4100	2400	40		84.1		NA		NA		NA		113		NA	
Calcium	NA	NA	NA	NA	NA	13400		16400		NA		NA		NA		22300		NA	
Chromium	11	NA	NA	**10**	NA	0.87	U	1.5	B	NA		NA		NA		1.7	B	NA	
Cobalt	NA	NA	NA	**19**	NA	0.62	U	6	U	NA		NA		NA		0.2	J	NA	
Iron	NA	NA	NA	NA	NA	245		430		NA		NA		NA		1060		NA	
Lead	2.5	NA	NA	2.5	NA	2.3		0.07	J	NA		NA		NA		0.9	J	NA	
Magnesium	NA	NA	NA	NA	NA	3780		5800		NA		NA		NA		7470		NA	
Manganese	NA	NA	NA	NA	NA	30.9		95.6		NA		NA		NA		197		NA	
Nickel	52	610	4600	52	610	0.98	U	1.2	J	NA		NA		NA		2	J	NA	
Potassium	NA	NA	NA	NA	NA	1650	L	1730		NA		NA		NA		1880		NA	
Sodium	NA	NA	NA	NA	NA	5790	B	7670		NA		NA		NA		18800		NA	
Vanadium	NA	NA	NA	100	NA	1.1	B	0.8	B	NA		NA		NA		1.4		NA	
Zinc	120	7400	26000	120	NA	11.9	L	3.6	J	NA		NA		NA		16		NA	
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**								**ug/L**			
Acenaphthylene	NA	NA	NA	NA	NA	0.2	U	NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA	NA	NA	0.1	**0.0038**	0.2	U	NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA	NA	NA	NA	**0.0038**	0.013	J	NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	NA	NA	NA	NA	**0.0038**	0.016	J	NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	0.2	U	NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	NA	NA	NA	NA	**0.0038**	0.2	U	NA		NA		NA		NA		NA		NA	
Chrysene	NA	NA	NA	NA	**0.0038**	0.2	U	NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA	NA	NA	NA	**0.0038**	0.2	U	NA		NA		NA		NA		NA		NA	
Fluoranthene	NA	NA	NA	40	130	0.012	J	NA		NA		NA		NA		NA		NA	
Fluorene	NA	NA	NA	NA	1100	0.59		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	**0.0038**	0.012	J	NA		NA		NA		NA		NA		NA	
Phenanthrene	NA	NA	NA	1	NA	0.2	U	NA		NA		NA		NA		NA		NA	
Pyrene	NA	NA	NA	NA	830	0.02	J	NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Acetone	NA	NA	NA	86000	3500	3.8		10	UR	10	U	10	UR	10	UR	10	UR	10	U
Toluene	NA	1300	15000	330	1300	0.5	U	0.21	J	1	U	1	U	1	U	1	U	1	U
PESTICIDES/PCBS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**													
Dieldrin	NA	NA	NA	0.056	62	0.011	J	NA		NA		NA		NA		NA		NA	

TABLE 4-17

COMPARISON OF SURFACE WATER ANALYTICAL RESULTS WITH CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**CONCENTRATION BENCHMARKS**					**03SW11**	
Sample Date:						**4/1/2009**	
Duplicate of:	**AWQC CCC**	**AWQC Ingestion of Water and Organism**	**AWQC Ingestion of Organism Only**	**PADEP WQC CCC**	**PADEP Human Health Criteria**		
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		
Aluminum	NA	NA	NA	NA	NA	NA	
Barium	NA	7	NA	4100	2400	NA	
Calcium	NA	NA	NA	NA	NA	NA	
Chromium	11	NA	NA	**10**	NA	NA	
Cobalt	NA	NA	NA	**19**	NA	NA	
Iron	NA	NA	NA	NA	NA	NA	
Lead	2.5	NA	NA	2.5	NA	NA	
Magnesium	NA	NA	NA	NA	NA	NA	
Manganese	NA	NA	NA	NA	NA	NA	
Nickel	52	610	4600	52	610	NA	
Potassium	NA	NA	NA	NA	NA	NA	
Sodium	NA	NA	NA	NA	NA	NA	
Vanadium	NA	NA	NA	100	NA	NA	
Zinc	120	7400	26000	120	NA	NA	
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		
Acenaphthylene	NA	NA	NA	NA	NA	NA	
Benz(a)anthracene	NA	NA	NA	0.1	**0.0038**	NA	
Benzo(a)pyrene	NA	NA	NA	NA	**0.0038**	NA	
Benzo(b)fluoranthene	NA	NA	NA	NA	**0.0038**	NA	
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	
Benzo(k)fluoranthene	NA	NA	NA	NA	**0.0038**	NA	
Chrysene	NA	NA	NA	NA	**0.0038**	NA	
Dibenz(a,h)anthracene	NA	NA	NA	NA	**0.0038**	NA	
Fluoranthene	NA	NA	NA	40	130	NA	
Fluorene	NA	NA	NA	NA	1100	NA	
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	**0.0038**	NA	
Phenanthrene	NA	NA	NA	1	NA	NA	
Pyrene	NA	NA	NA	NA	830	NA	
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	
Acetone	NA	NA	NA	86000	3500	10	UR
Toluene	NA	1300	15000	330	1300	1	U
PESTICIDES/PCBS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		
Dieldrin	NA	NA	NA	0.056	62	NA	

TABLE 4-17

COMPARISON OF SURFACE WATER ANALYTICAL RESULTS TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA
PAGE 4 OF 4

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

Bolded criteria are the most stringent.
Shaded values exceed the most stringent criteria.

TABLE 4-18

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN SITE 3 SEDIMENT SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data						
Substance	Freq. of Detection	Range of Positive Detection Min.		Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.		Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Range of Detection Limits Min.		Range of Detection Limits Max.
Aluminum	8/8	3610	-	10900	6620	BGSD03-DUP 03/13/97	6/6	5110	-	16400	9440	03-SD-17		-	
Arsenic	8/8	3.2	-	7.2	4.55	BGSD01 03/13/97	3/3	3.1	-	11.1	6.4	03-SD-17		-	
Barium	8/8	54.6	-	179	98.2	BGSD03-DUP 03/13/97	6/6	49.6	-	127	86.2	03-SD-15-D		-	
Beryllium	8/8	0.52	-	1.3	0.878	BGSD03-DUP 03/13/97	5/5	0.72 K	-	1.9 K	1.01	03-SD-17		-	
Cadmium	0/8		-				3/4	0.29 L	-	0.48 L	0.294	03-SD-12	0.06	-	0.06
Calcium	8/8	744	-	18200	4980	BGSD06 03/13/97	6/6	889	-	2290	1360	03-SD-17		-	
Chromium	8/8	6.8	-	34.5	15.7	BGSD01 03/13/97	6/6	8.9	-	34.8	16.3	03-SD-17		-	
Cobalt	8/8	4.5	-	12.4	7.21	BGSD01 03/13/97	6/6	2.5	-	11.3	4.8	03-SD-17		-	
Copper	8/8	5.8	-	27.8	13.4	BGSD01 03/13/97	6/6	8.4	-	30.5	16.7	03-SD-17		-	
Iron	8/8	9540	-	35400	16500	BGSD01 03/13/97	6/6	6470	-	37600	14900	03-SD-17		-	
Lead	8/8	6.4	-	28.4	15.3	BGSD03-DUP 03/13/97	6/6	12 J	-	95.6 J	35.1	03-SD-17		-	
Magnesium	8/8	999	-	10600	3440	BGSD06 03/13/97	6/6	676	-	2990	1470	03-SD-17		-	
Manganese	8/8	376	-	759	514	BGSD01 03/13/97	6/6	52.7 J	-	631 J	255	03-SD-17		-	
Mercury	0/8		-				5/6	0.038	-	0.062	0.0448	03-SD-15	0.026	-	0.026
Nickel	8/8	6.8 K	-	22.7	12.5	BGSD01 03/13/97	6/6	5	-	18.5	9.32	03-SD-17		-	
Potassium	7/8	514	-	2330	1050	BGSD01 03/13/97	6/6	305 J	-	1500 J	634	03-SD-17		-	
Selenium	2/8	0.36 J	-	0.51 J	0.198	BGSD03-DUP 03/13/97	3/6	0.92 K	-	1.2 K	0.733	03-SD-15	0.58	-	1.2
Sodium	2/8	240	-	560	143	BGSD01 03/13/97	6/6	366 K	-	719 K	483	03-SD-17		-	
Vanadium	8/8	7.9	-	52.6	22.6	BGSD01 03/13/97	6/6	11.9	-	62.1	25.8	03-SD-17		-	
Zinc	8/8	25.4	-	97.6	51.2	BGSD01 03/13/97	6/6	25.6	-	134	56.1	03-SD-17		-	
4,4'-DDD	0/8		-				1/6	2.2 J	-	2.2 J	6.42	03-SD-12	4.2	-	28
4,4'-DDE	0/8		-				3/5	3.3 J	-	29 J	11	03-SD-14	4.2	-	28
4,4'-DDT	0/8		-				4/6	2.4 J	-	11 J	7.23	03-SD-14	4.2	-	28
Aldrin	0/8		-				5/6	0.85 J	-	8.1 J	3.21	03-SD-15	4.6	-	4.6
Alpha-Chlordane	0/8		-				2/2	4.6 J	-	8.4 J	6.5	03-SD-12		-	
Delta-BHC	0/8		-				1/6	0.38 J	-	0.38 J	3.16	03-SD-12	2.2	-	15
Dieldrin	1/8	3.1 J	-	3.1 J	2.26	BGSD03 03/13/97	6/6	4.4	-	47	28.5	03-SD-15-D		-	
Endosulfan II	0/8		-				1/6	15 J	-	15 J	6.6	03-SD-15-D	4.2	-	28
Endrin Aldehyde	0/8		-				3/4	0.94 J	-	8.9 J	6.84	03-SD-12	28	-	28
Endrin Ketone	0/8		-				3/6	2.8 J	-	6.4 J	6.98	03-SD-17	4.2	-	28
Gamma-Chlordane	0/8		-				4/4	1.3 J	-	5.7 J	2.94	03-SD-15-D		-	
Heptachlor	0/8		-				2/6	0.81 J	-	0.98 J	3.02	03-SD-17	2.2	-	15
Heptachlor Epoxide	0/8		-				1/4	2.9 J	-	2.9 J	4.51	03-SD-17	2.8	-	15
Methoxychlor	0/8		-				1/6	11 J	-	11 J	32.8	03-SD-12	22	-	150
1-Methylnaphthalene	0/0		-				2/2	39	-	75	57	03-SD-14		-	
2-Methylnaphthalene	0/8		-				2/2	37	-	65	51	03-SD-14		-	
Acenaphthene	0/8		-				2/2	97	-	200 J	149	03-SD-14		-	
Acenaphthylene	0/8		-				5/5	33	-	280 J	131	03-SD-14		-	
Anthracene	0/8		-				6/6	30	-	700 J	247	03-SD-14		-	
Benz(a)anthracene	1/8	580	-	580	275	BGSD01 03/13/97	6/6	61	-	1200 J	456	03-SD-14		-	
Benzo(a)pyrene	1/8	530 J	-	530 J	268	BGSD01 03/13/97	6/6	75	-	1400 J	543	03-SD-14		-	
Benzo(b)fluoranthene	1/8	670 J	-	670 J	286	BGSD01 03/13/97	6/6	80	-	2500	918	03-SD-12		-	
Benzo(g,h,i)perylene	0/8		-				6/6	52	-	970 J	362	03-SD-14		-	
Benzo(k)fluoranthene	1/8	300 J	-	300 J	240	BGSD01 03/13/97	6/6	89 J	-	1400 J	512	03-SD-14		-	
Carbazole	0/8		-				3/6	79 J	-	240 J	172	03-SD-14	220	-	460
Chrysene	3/8	90 J	-	640	238	BGSD01 03/13/97	6/6	89 J	-	2300	836	03-SD-12		-	
Dibenz(a,h)anthracene	0/8		-				5/5	50	-	380 J	166	03-SD-14		-	

TABLE 4-18

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN SITE 3 SEDIMENT SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Background Data					Site-Related Data						
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Range of Detection Limits Min.	Range of Detection Limits Max.
Fluoranthene	4/8	100 J	510	221	BGSD01 03/13/97	6/6	210	9600	2970	03-SD-14	-	
Fluorene	0/8	-				3/3	29	290 J	163	03-SD-14	-	
Indeno(1,2,3-cd)pyrene	0/8	-				6/6	64	1300 J	474	03-SD-14	-	
Naphthalene	0/8	-				2/2	47	89	68	03-SD-14	-	
Phenanthrene	1/8	260 J	260 J	235	BGSD01 03/13/97	6/6	130 J	7200	2080	03-SD-14	-	
Pyrene	4/8	100 J	1300	315	BGSD01 03/13/97	6/6	150	6800	2160	03-SD-14	-	
2-Butanone	0/8	-				4/6	13 J	31	15.2	03-SD-15	14	30
Acetone	0/8	-				6/6	26	180	100	03-SD-17	-	
Carbon Disulfide	0/0	-				3/6	2 J	6.2 J	4.5	03-SD-13	9.1	12

Notes:

Units are in mg/Kg for inorganics and µg/Kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-19

STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 SEDIMENT TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Name of Test:		Detection Freq: Z or Fisher				95 % Upper Tolerance Limit (UTL)					Quantile Test				Mann-Whitney/Gehan				Student's or Satterthwaite T-test					Bartlett's Test for Equal Standard Deviations						
Question Posed:		Site 3 sd Freq. > bkg. Freq.?				Site Max > UTL on Background ?##					Majority are Site 3 sd?				Ranks of Site 3 sd > bkg.?				Site 3 sd Mean > bkg. Mean ?					Site 3 sd Standard Deviation =bkg. Std.Dev.?						
Assumptions Valid:		#ND & Pos.>=5 or use Fisher				Bkg. log. or norm. If not, #b>18 for Quantile Test					# Site 3 sd (s) in Top r								#s>2,#b>2,>=85% Pos; both normal					#s>2,#b>2, Site 3 sd & bkg. both normally distributed						
Test Criterion:		P value <= 0.05 ?				Max >95% UTL (parametric). Or, Max >95% Quantile					P<=0.05 that #s>=k				P value <=0.05 ?				t-Value > t-Table					F-Value<=F-Table (Students T). If not, Satterthwaite						
Concentration > background?	Y/N	bkg. Freq.	Site 3 sd Freq.	P Value	YN	Back. Mean@	Std.Dev. Back.@	t Value	L,N,Q, Other***	Back. UTL	r	k	P Value	YN	P Value	Test	Used	YN	bkg. Mean@	Site 3 sd Mean@	t Value	t Table	YN	bkg. Distrib.	Site 3 sd Distrib.	Std.Dev. bkg.	Std.Dev. Site 3 sd	F Value	F Table	YN
Aluminum	**Y**	8/8	6/6		NA	6620	1950	3.1880	N	12800	3	3	0.0549	N	0.0709	Gehan	Test	N	6620	9440	1.8124	1.7823	**Y**	normal	normal	1950	3810	2.4127	3.8639	**Y**
Arsenic	N	8/8	3/3		NA	4.55	1.26	3.1880	N	8.56	1	1	0.2727	N	0.3758	Gehan	Test	N	4.55	6.4	0.7540	2.9200	N	normal	normal	1.26	4.18	5.1201	3.9200	N
Barium	N	8/8	6/6		NA	98.2	32.5	3.1880	N	202	8	4	0.4709	N	0.6227	Gehan	Test	N	98.2	86.2	-0.7307	1.7823	N	normal	normal	32.5	27.4	0.1499	3.8639	**Y**
Beryllium	N	8/8	5/5		NA	0.878	0.28	3.1880	N	1.77	10	5	0.1958	N	0.4305	Gehan	Test	N	0.878	1.01			NA	normal	nonpar.					NA
Cadmium	NA*	0/8	3/4		NA									NA				NA		0.294			NA							NA
Calcium	N	8/8	6/6		NA	4980					12	6	0.3077	N	0.5871	Gehan	Test	N	4980	1360			NA	nonpar.	normal					NA
Chromium	N	8/8	6/6		NA	2.59	0.585	3.1880	L	86.1	9	5	0.2378	N	0.3310	Gehan	Test	N	15.7	16.3			NA	lognor.	lognor.					NA
Cobalt	N	8/8	6/6		NA	7.21	2.64	3.1880	N	15.6	2	1	0.6923	N	0.9900	Gehan	Test	N	7.21	4.8			NA	lognor.	lognor.					NA
Copper	N	8/8	6/6		NA	13.4	7.64	3.1880	N	37.7	8	5	0.1212	N	0.1412	Gehan	Test	N	13.4	16.7	0.8233	1.7823	N	normal	normal	7.64	7.54	0.0010	3.8639	**Y**
Iron	N	8/8	6/6		NA	9.6	0.473	3.1880	L	66600	1	1	0.4286	N	0.7546	Gehan	Test	N	16500	14900			NA	lognor.	lognor.					NA
Lead	**Y**	8/8	6/6		NA	15.3	7.34	3.1880	N	38.7	5	4	0.0629	N	0.0406	Gehan	Test	**Y**	15.3	35.1			NA	lognor.	lognor.					NA
Magnesium	N	8/8	6/6		NA	3440					4	2	0.5944	N	0.7546	Gehan	Test	N	3440	1470			NA	nonpar.	normal					NA
Manganese	N	8/8	6/6		NA	514	135	3.1880	N	944	2	1	0.6923	N	0.9704	Gehan	Test	N	514	255	-2.7201	1.7823	N	normal	normal	135	222	1.3577	3.8639	**Y**
Mercury	NA*	0/8	5/6		NA									NA				NA		0.0448			NA							NA
Nickel	N	8/8	6/6		NA	12.5	5.74	3.1880	N	30.7	12	5	0.8352	N	0.9154	Gehan	Test	N	12.5	9.32	-1.0843	1.7823	N	normal	normal	5.74	4.75	0.1849	3.8639	**Y**
Potassium	N	7/8	6/6	0.5714	N	6.7	0.771	3.1880	L	9460	5	2	0.7622	N	0.9154	Gehan	Test	N	1050	634			NA	lognor.	lognor.					NA
Selenium	**Y**	2/8	3/6		NA	0.198								NA	0.0230	Gehan	Test	**Y**	0.198	0.733			NA	nonpar.	normal					NA
Sodium	**Y**	2/8	6/6	0.0093	**Y**	143					7	6	0.0023	**Y**	0.0040	Gehan	Test	**Y**	143	483			NA	nonpar.	normal					NA
Vanadium	N	8/8	6/6		NA	2.91	0.669	3.1880	L	155	9	5	0.2378	N	0.2438	Gehan	Test	N	22.6	25.8			NA	lognor.	lognor.					NA
Zinc	N	8/8	6/6		NA	51.2	25.6	3.1880	N	133	5	3	0.3427	N	0.4749	Gehan	Test	N	51.2	56.1			NA	lognor.	lognor.					NA
4,4'-DDD	NA*	0/8	1/6		NA									NA				NA		6.42			NA							NA
4,4'-DDE	NA*	0/8	3/5		NA						1	1	0.3846	N				NA		11			NA							NA
4,4'-DDT	NA*	0/8	4/6		NA						1	1	0.4286	N				NA		7.23			NA							NA
Aldrin	**Y**	0/8	5/6	0.0030	**Y**						4	4	0.0150	**Y**				NA		3.21			NA							NA
Alpha-Chlordane	**Y**	0/8	2/2	0.0222	**Y**						2	2	0.0222	**Y**				NA		6.5			NA							NA
Delta-BHC	NA*	0/8	1/6		NA									NA				NA		3.16			NA							NA
Dieldrin	**Y**	1/8	6/6	0.0023	**Y**	2.26					6	6	0.0003	**Y**	0.0003	Gehan	Test	**Y**	2.26	28.5			NA	lognor.	normal					NA
Endosulfan II	NA*	0/8	1/6		NA						1	1	0.4286	N				NA		6.6			NA							NA
Endrin Aldehyde	NA*	0/8	3/4		NA									NA				NA		6.84			NA							NA
Endrin Ketone	NA*	0/8	3/6		NA									NA				NA		6.98			NA							NA
Gamma-Chlordane	**Y**	0/8	4/4	0.0020	**Y**						4	4	0.0020	**Y**				NA		2.94			NA							NA
Heptachlor	NA*	0/8	2/6		NA									NA				NA		3.02			NA							NA
Heptachlor Epoxide	NA*	0/8	1/4		NA									NA				NA		4.51			NA							NA
Methoxychlor	NA*	0/8	1/6		NA									NA				NA		32.8			NA							NA
1-Methylnaphthalene	NA	0/0	2/2		NA									NA				NA		57			NA							NA
2-Methylnaphthalene	NA*	0/8	2/2	0.0222	**Y**									NA				NA		51			NA							NA
Acenaphthene	NA*	0/8	2/2	0.0222	**Y**									NA				NA		149			NA							NA
Acenaphthylene	NA*	0/8	5/5	0.0008	**Y**						1	1	0.3846	N				NA		131			NA							NA
Anthracene	NA*	0/8	6/6	0.0003	**Y**						2	2	0.1648	N				NA		247			NA							NA
Benz(a)anthracene	**Y**	1/8	6/6	0.0023	**Y**	275					2	2	0.1648	N	0.0137	Gehan	Test	**Y**	275	456			NA	nonpar.	lognor.					NA
Benzo(a)pyrene	**Y**	1/8	6/6	0.0023	**Y**	268					6	5	0.0163	**Y**	0.0110	Gehan	Test	**Y**	268	543			NA	nonpar.	normal					NA
Benzo(b)fluoranthene	**Y**	1/8	6/6	0.0023	**Y**	286					6	5	0.0163	**Y**	0.0110	Gehan	Test	**Y**	286	918			NA	nonpar.	lognor.					NA
Benzo(g,h,i)perylene	NA*	0/8	6/6	0.0003	**Y**						3	3	0.0549	N				NA		362			NA							NA
Benzo(k)fluoranthene	**Y**	1/8	6/6	0.0023	**Y**	240					6	5	0.0163	**Y**	0.0083	Gehan	Test	**Y**	240	512			NA	lognor.	normal					NA
Carbazole	NA*	0/8	3/6	0.0549	N						2	2	0.1648	N				NA		172			NA							NA
Chrysene	**Y**	3/8	6/6	0.0280	**Y**	238					6	5	0.0163	**Y**	0.0133	Gehan	Test	**Y**	238	836			NA	lognor.	lognor.					NA
Dibenz(a,h)anthracene	NA*	0/8	5/5	0.0008	**Y**						2	2	0.1282	N				NA		166			NA							NA
Fluoranthene	**Y**	4/8	6/6	0.0699	N	221					7	6	0.0023	**Y**	0.0013	Gehan	Test	**Y**	221	2970			NA	lognor.	lognor.					NA
Fluorene	N	0/8	3/3	0.0061	**Y**						1	1	0.2727	N				NA		163			NA							NA
Indeno(1,2,3-cd)pyrene	**Y**	0/8	6/6	0.0003	**Y**						4	4	0.0150	**Y**				NA		474			NA							NA
Naphthalene	NA*	0/8	2/2	0.0222	**Y**									NA				NA		68			NA							NA
Phenanthrene	**Y**	1/8	6/6	0.0023	**Y**	235					4	4	0.0150	**Y**	0.0033	Gehan	Test	**Y**	235	2080			NA	lognor.	lognor.					NA
Pyrene	**Y**	4/8	6/6	0.0699	N	315					6	5	0.0163	**Y**	0.0097	Gehan	Test	**Y**	315	2160			NA	nonpar.	lognor.					NA
2-Butanone	**Y**	0/8	4/6	0.0150	**Y**						4	4	0.0150	**Y**				NA		15.2			NA							NA
Acetone	**Y**	0/8	6/6		NA						5	5	0.0030	**Y**				NA		100			NA							NA
Carbon Disulfide	NA	0/0	3/6		NA									NA				NA		4.5			NA							NA

TABLE 4-19

STATISTICAL COMPARISON OF CONCENTRATIONS IN SITE 3 SEDIMENT TO BACKGROUND
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

**** Site 3 concentrations in sediment are compared to background sediment (sd).**

Interpretation of Z-Test or Fisher's Exact Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data's detection frequency is greater than the background data detection frequency.
Interpretation of Quantile Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more upper rank values relative to the background data set.
Since "k" samples from the top "r" ranks of the combined data set belonged to the site soil subgroup, this would be unlikely if the site and background data sets came from the same population.
Interpretation of Mann Whitney / Gehan Test: If the "P-Value" is less than 0.05, then it can be concluded that the site data set has a distribution with more values ranked greater than the ranks of background data, based on combining the data together and comparing the rank sums belonging to each group. This indicates the data belong to two populations having different medians.
Interpretation of Student's t- / Satterthwaite's t-Test: If the "t-Value" exceeds the lookup "t-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site data set belongs to a population having a greater mean relative to the mean of the background population.
Interpretation of Bartlett's Test: If the "F-Value" exceeds the lookup "F-Table" and both soil type distributions match a "normal" shape, then it can be concluded that the site and background data sets belong to two populations having different standard deviations. In this case, the Satterthwaite t-Test must be used rather than the Student's t-Test.

A statistical significance level (P value) of 0.05 is used for all tests that directly compare Site 3 sd to bkg. soil. A two-sided significance level of 0.1 is used for Bartlett's test for equal variance.
For each test, a YES or NO decision is presented only if all assumptions are met. The overall decision (is Site 3 sd > bkg.) for each chemical appears at the left and is based on four criteria:
(1) Overall decision is YES if any one of the Mann-Whitney/Gehan, Quantile Test, or T-Test is YES, regardless of other test results.
(2) Overall decision is NO if at least one of Mann-Whitney/Gehan, Quantile Test, or T-Test is NO, and none of the aforementioned tests are YES.
(3) Overall decision is YES/NO if Z/Fisher Test is YES/NO, respectively, and other tests are NA. Z-test is treated as lowest priority since it relies on detection frequency, not magnitude of results.
(4) Overall decision is NA if all tests are NA. (Might occur if too few detections to be capable of detecting a statistically significant difference even if one exists.)
NOTE: This decision scheme does not utilize the UTL test because random false positive exceedances of the background UTL are probable if there are many site samples, even if site distribution matches background.

* Low power because either N is small or very low frequency of detected values with detections close to the detection limits, which interferes with the power of statistical tests to detect a significant difference between groups.

# NDs or # Pos.	Number of non-detected (ND) or positive (Pos.) results in data set, not including rejected data or blank-qualified data.
# s or # b	Number of Site 3 sd (s) or bkg. (b) samples, not including rejected data or blank-qualified data.
s = b	Standard deviation of Site 3 sd results must not be different from the standard deviation of bkg. results.
P value	Probability or significance level is defined as the chance of a false positive. If P <= 0.05 then test determines Site 3 sd > bkg. with 95 % confidence.
L, N, or Q	UTL is based on 95 % upper limit (using t-value) when data are lognormal (L) or normal (N). Otherwise, an upper 95 % quantile (Q) is used if there are > 18 back. points.
@	For the t-test, the arithmetic mean and standard deviation of un-transformed data are shown in every case, while for the UTL, the mean of log-data is shown if data match this distribution. do not both match a normal distribution. For the UTL test, an (L) code indicates mean and standard deviations represent log-transformed data.
r,k	The Quantile test calculates the probability that k or more samples from the top r ranks of the combined Site 3 sd and bkg. data set are comprised of Site 3 sd data if both populations are in fact equal.

TABLE 4-20

COMPARISON OF SEDIMENT ANALYTICAL RESULTS TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	EPA Region 3 BTAG Freshwater Sediment Screening Benchmark	03-SD-12		03-SD-13		03-SD-14		03-SD-15		03-SD-15-AVG		03-SD-15-D		03-SD-16		03-SD-17	
Sample Date:		**12/15/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**	
Duplicate:												**03-SD-15**					
INORGANICS		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	---	7810		5110		10200		7440		9070		10700		8040		16400	
Arsenic	9.8	5		0.9	B	3.1		1.2	B	1.5	B	1.8	B	1.9	B	11.1	
Barium	---	88		49.6		91		89.1		108.05		127		59.6		121	
Beryllium	---	0.77	K	0.5	B	0.84	K	0.6	B	0.555		0.81		0.72	K	1.9	K
Cadmium	0.99	0.48	L	0.06	U	0.29	L	0.41		0.375		0.34		0.05	UR	0.1	UR
Calcium	---	1820		1080		1100		889		919.5		950		946		2290	
Chromium	43.4	12.5		8.9		16.2		10.7		13.15		15.6		12		34.8	
Cobalt	50	3		2.5		4.1		2.8		3.6		4.4		4.3		11.3	
Copper	31.6	17.2		8.4		15.5		14.9		16.95		19		11.9		30.5	
Iron	20000	14700		7090		12400		6470		7465		8460		10000		37600	
Lead	35.8	27.4	J	12	J	37.7	J	21.3	J	25.45	J	29.6	J	12.4	J	95.6	J
Magnesium	---	1030		676		1360		838		1019		1200		1730		2990	
Manganese	460	183	J	411	J	152	J	52.7	J	62.3	J	71.9	J	87.7	J	631	J
Mercury	0.18	0.048		0.026	U	0.061		0.062		0.057		0.052		0.038		0.052	
Nickel	22.7	7.1		5		9.8		6.6		7.8		9		7.7		18.5	
Potassium	---	337	J	305	J	469	J	347	J	380.5	J	414	J	810	J	1500	J
Selenium	2	1.1	K	1	K	0.69	U	1.2	K	1.06	K	0.92	K	0.58	U	1.2	U
Sodium	---	484	K	459	K	416	K	455	K	455	K	455	K	366	K	719	K
Vanadium	---	19.6		11.9		23.8		15.5		18.45		21.4		19		62.1	
Zinc	121	64.3		29		52.8		25.7		30.65		35.6		25.6		134	
SEMIVOLATILES		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Carbazole	---	230	J	79	J	240	J	280	U	285	U	290	U	220	U	460	U
1-Methylnaphthalene	---	39		9.9	B	75		3.8	B	4.15	B	4.5	B	2.6	B	9.7	B
2-Methylnaphthalene	20.2	37		10	B	65		4.1	B	4.35	B	4.6	B	3.7	B	18	B
Acenaphthene	6.7	97		16	B	200	J	12	B	10.85	B	9.7	B	8.4	B	10	B
Acenaphthylene	5.9	190	J	52		280	J	33		23.75		29	B	16	B	100	
Anthracene	57.2	490	J	79		700	J	70		60.5		51		30		120	
Benz(a)anthracene	108	910	J	170	J	1200	J	250	J	195	J	140	J	61		200	J
Benzo(a)pyrene	150	990	J	250	J	1400	J	270	J	230	J	190	J	75		310	J
Benzo(b)fluoranthene	---	2500		320	J	2000	J	340	J	285	J	230	J	80		320	
Benzo(g,h,i)perylene	170	570	J	180	J	970	J	170	J	150	J	130	J	52		250	J
Benzo(k)fluoranthene	240	800	J	230	J	1400	J	250	J	220	J	190	J	89	J	330	J
Chrysene	166	2300		280	J	1800	J	310	J	255	J	200	J	89	J	290	J
Dibenz(a,h)anthracene	33	260	J	63		380	J	50		33.75		35	B	14	B	76	
Fluoranthene	423	6400		630		9600		640		585		530		210		420	
Fluorene	77.4	170	J	29		290	J	20	B	18.5	B	17	B	13	B	11	B
Indeno(1,2,3-cd)pyrene	17	780	J	220	J	1300	J	220	J	190	J	160	J	64		290	J
Naphthalene	176	47		13	B	89		4.7	B	5.15	B	5.6	B	3	B	12	B
Phenanthrene	204	4300		400		7200		320	J	290	J	260	J	130	J	180	
Pyrene	195	4700		470		6800		480		435		390		150		420	
Total PAHs	1610	25580		3373		35749		3403		2953		2471		1030		3306	
VOLATILES		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
2-Butanone	---	30	U	15	J	13	J	31		21		22	U	14	U	20	J
Acetone	---	120		140		60		110	J	73	J	36	J	26		180	
Carbon Disulfide	0.851	12	U	6.2	J	9.4	U	9.1	U	2.6	J	2.6	J	2	J	11	U
PESTICIDES/PCBS		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4.88	2.2	J	5.5	UJ	26	U	28	U	28	U	28	U	4.2	U	8.9	UJ

TABLE 4-20

COMPARISON OF SEDIMENT ANALYTICAL RESULTS TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**EPA Region 3 BTAG Freshwater Sediment Screening Benchmark**	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-AVG**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:		**12/15/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**		**12/16/08**	
Duplicate:												**03-SD-15**					
4,4'-DDE	3.16	15	R		J	29	J	28	U	28	U	28	U	4.2	U	6.8	J
4,4'-DDT	4.16	6.5		2.4	J	11	J	28	U	28	U	28	U	4.2	U	7.4	J
Total DDT	5.28	8.7		5.7		40		28	U	28	U	28	U	4.2	U	14.2	
Aldrin	2	2.1	J	2.1	J	3.8	J	8.1	J	8.1	J	8.1	J	0.85	J	4.6	UJ
Alpha-Chlordane	3.24	8.4	J	3.8	B	7.2	B	4.6	B	5.35	B	6.1	B	4.6	J	6.6	B
Delta-BHC	6400	0.38	J	2.8	UJ	13	U	14	U	14.5	U	15	U	2.2	U	4.6	UJ
Dieldrin	1.9	36		17	J	43		46		46.5		47		4.4		24	J
Endosulfan II	14	5.6	U	5.5	UJ	26	U	28	U	15	J	15	J	4.2	U	8.9	UJ
Endrin Aldehyde	2.22	8.9	J	5.1	R	26	R	28	U	28	U	28	U	0.94	J	3.5	J
Endrin Ketone	2.22	3.6	J	2.8	J	26	U	28	U	28	U	28	U	4.2	U	6.4	J
Gamma-Chlordane	3.24	5.9	R	1.3	J	3.6	J	5.2	J	5.45	J	5.7	J	1.4	J	8.3	R
Heptachlor	68	2.9	U	0.81	J	13	U	14	U	14.5	U	15	U	2.2	U	0.98	J
Heptachlor Epoxide	2.47	6.1	R	2.8	UJ	13	U	14	U	14.5	U	15	U	1.4	R	2.9	J
Methoxychlor	18.7	11	J	28	UJ	130	U	140	U	145	U	150	U	22	U	46	UJ

TABLE 4-20

COMPARISON OF SEDIMENT ANALYTICAL RESULTS TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

Shaded values exceed the screening criterion.

TABLE 4-21

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN GROUNDWATER SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Site-Related Data								
	Freq. of	Range of Positive Detection				Mean of	Sampling Round and	Range of Detection Limits	
Substance	Detection	Min.		Max.		All Data	Location of Maximum	Min.	Max.
Aluminum	5/20	89	-	2030		206	03MW06I-20080314	80 -	80
Antimony	13/20	0.08 J	-	1.2	J	0.792	03MW01I-20080311	2 -	2
Arsenic	11/20	0.4 J	-	9.1		2.4	03MW06I-20080314	6 -	6
Barium	20/20	37	-	625		256	03MW07S-20080319	-	
Beryllium	3/20	0.09 J	-	0.6	J	0.465	03MW08S-20080312	1 -	1
Cadmium	2/20	0.1 J	-	1.1		0.51	03MW01SI-20080320	1 -	1
Calcium	20/20	7220	-	62900		22300	03MW07S-20080319	-	
Chromium	12/12	0.9 J	-	12		4.18	03MW06I-20080314	-	
Cobalt	8/20	0.2 J	-	4	J	2.35	03MW05I-20080311	6 -	6
Copper	10/14	0.08 J	-	2.4	J	1.59	03MW06I-20080314	6 -	6
Iron	14/20	20 J	-	2400	K	244	03MW06I-20080314	70 -	70
Lead	3/20	0.04 J	-	1.4	J	0.943	03MW06I-20080314	2 -	2
Magnesium	20/20	1880	-	16200		7780	03MW07S-20080319	-	
Manganese	16/20	0.4 J	-	103		10.9	03MW06I-20080314	6 -	6
Mercury	1/20	0.03 J	-	0.03	J	0.239	03MW03SI-20080317	0.5 -	0.5
Nickel	20/20	0.7 J	-	9.6		3.23	03MW06I-20080314	-	
Potassium	19/20	600	-	3080		1000	03MW06I-20080314	560 -	560
Selenium	16/20	1 J	-	5	J	2.3	03MW06S-20080313	6 -	6
Silver	1/11	0.06 J	-	0.06	J	0.46	03MW05I-20080311	1 -	1
Sodium	20/20	7020	-	22400		11400	03MW07S-20080319	-	
Vanadium	7/15	0.09 J	-	6.4		1.25	03MW06I-20080314	1 -	1
Zinc	13/20	1.9 J	-	10.6		3.82	03MW06I-20080314	6 -	6
Bis(2-ethylhexyl) Phthalate	2/19	6 J	-	11		5.39	03MW06SI_19970618	10 -	11
1,1,1-Trichloroethane	3/66	2.6	-	4.1		0.624	03MW08D-20081015	1 -	1
1,1,2-Trichloro-1,2,2-trifluoroethane	2/66	0.34 J	-	0.37	J	0.496	03MW07S	1 -	1
1,1-Dichloroethane	3/66	5.9	-	8.2		0.786	03MW08D-20081015	1 -	1
1,1-Dichloroethene	4/66	0.2 J	-	5.1		0.635	03MW08D-20081015	1 -	1
1,2-Dichloroethene (cis)	3/66	0.9 J	-	1.5		0.532	03MW08D-20081015	1 -	1
Acetone	1/39	3.4 J	-	3.4	J	3.81	03MW02I	5 -	10
Bromodichloromethane	1/66	1.1	-	1.1		0.509	03MW04S-20080314	1 -	1
Bromoform	1/66	0.87 J	-	0.87	J	0.506	03MW04S-20080314	1 -	1
Carbon Tetrachloride	4/66	0.27 J	-	0.38	J	0.489	03MW02I-20080318	1 -	1

TABLE 4-21

OCCURRENCE AND DISTRIBUTION OF COMPOUNDS IN GROUNDWATER SAMPLES
SITE 3 - NINTH STREET LANDFILL
NAS JRB WILLOW GROVE, PENNSYLVANIA

	Site-Related Data								
	Freq. of	Range of Positive Detection				Mean of	Sampling Round and	Range of Detection Limits	
Substance	Detection	Min.		Max.		All Data	Location of Maximum	Min.	Max.
Chloroform	8/66	0.17	J	- 1.6		0.539	03MW04S-20081016	1 -	1
Dibromochloromethane	1/66	1.5		- 1.5		0.515	03MW04S-20080314	1 -	1
Methyl tert-Butyl Ether (MTBE)	3/66	0.26	J	- 0.63	J	0.496	03MW03S-20090401	1 -	1
Tetrachloroethene	50/66	0.23	J	- 14		3.22	03MW03S	1 -	1
Toluene	3/64	0.19	J	- 0.22	J	0.486	03MW06I	1 -	1
Trichloroethene	3/63	1.5		- 3.1		0.579	03MW08D-20081015	1 -	1

Notes:

Units are in µg/L.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**SCREENING BENCHMARKS**				**03IW01**	**03IW01-D**	**03IW01**	**03IW01-D**	**03IW01**	**03MW01I**	**03MW01I**	**03MW01I**	**03MW01I**
Sample Date:		**Health**	**PADEP**	**Region 3**	**3/19/2008**	**3/19/2008**	**10/13/2008**	**10/13/2008**	**4/1/2009**	**3/11/2008**	**10/17/2008**	**9/23/1991**	**6/25/1997**
Duplicate:	**MCL**	**Advisory DWEL**	**Residential MSC**	**Tap Water SL**	**03IW01-D**	**03IW01**	**03IW01-D**	**03IW01**					
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**								**ug/L**	**ug/L**
2-Chlorophenol	NA	200	**40**	180	NA	NA	NA	NA	NA	NA	NA	10 U	10 U
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	NA	NA	NA	NA	NA	NA	4 J	10 U
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	NA	NA	NA	NA	NA	NA	10 U	10 U
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 J	10 U
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	0.68 J	0.46 J	0.48 J	1 U	1 U	NA	NA
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
Bromodichloromethane	NA	100	100	**0.12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Bromoform	NA	1000	100	**8.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	0.98 B	1 B	1 U	1 U	1 U	5 U	10 U
Dibromochloromethane	NA	700	100	**0.15**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 B	14 B
Tetrachloroethene	5	500	5	**0.11**	6	6.3	5.6	6	4.4	1 U	1 U	5 U	10 U
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	1 U	1 U	1 U	1 U	6	10 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW01S	03MW01S-D	03MW01S	03MW01SI	03MW01SI	03MW01SI-L	03MW01SI-L-D	03MW01SI
Sample Date:		Health	PADEP	Region 3	3/11/2008	3/11/2008	10/16/2008	3/20/2008	10/17/2008	10/17/2008	10/17/2008	9/20/1991
Duplicate:		Advisory	Residential	Tap Water	03MW01S-D	03MW01S				03MW01SI-L-D	03MW01SI-L	
	MCL	DWEL	MSC	SL								
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**								**ug/L**
2-Chlorophenol	NA	200	**40**	180	NA	NA	NA	NA	NA	NA	NA	10 U
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	NA	NA	NA	NA	NA	NA	10 U
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	NA	NA	NA	NA	NA	NA	10 U
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA
Bromodichloromethane	NA	100	100	**0.12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Bromoform	NA	1000	100	**8.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Dibromochloromethane	NA	700	100	**0.15**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Tetrachloroethene	5	500	5	**0.11**	1.9	1.9	2.6	8.8 J	9.7	7.7	7.4	29
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW01S	03MW01S-D	03MW01S	03MW02I	03MW02I	03MW02I-L	03MW02I-L-D	03MW02I
Sample Date:		Health	PADEP	Region 3	9/18/1991	9/18/1991	6/25/1997	3/18/2008	10/20/2008	10/20/2008	10/20/2008	7/7/1997
Duplicate:	MCL	Advisory DWEL	Residential MSC	Tap Water SL	03MW01S-D	03MW01S				03MW02I-L-D	03MW02I-L	
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**					**ug/L**
2-Chlorophenol	NA	200	**40**	180	33 U	1 J	10 U	NA	NA	NA	NA	10 U
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	33 U	10 U	10 U	NA	NA	NA	NA	10 U
Di-n-butylphthalate	NA	4000	**3700**	3700	33 U	10 U	10 U	NA	NA	NA	NA	10 U
Di-n-octylphthalate	NA	NA	NA	NA	33 U	10 U	10 U	NA	NA	NA	NA	10 U
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	NA	NA	NA	1 U	1 U	1 U	1 U	NA
1,1-Dichloroethane	NA	NA	27	**2.4**	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
1,1-Dichloroethene	7	2000	**7**	340	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
1,2-Dichloroethene (cis)	70	350	**70**	370	NA	NA	NA	1 U	1 U	1 U	1 U	NA
Bromodichloromethane	NA	100	100	**0.12**	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
Bromoform	NA	1000	100	**8.5**	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
Carbon Tetrachloride	5	30	5	**0.2**	5 U	5 U	10 U	0.38 J	1 U	1 U	1 U	10 U
Chloroform	NA	350	100	**0.19**	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
Dibromochloromethane	NA	700	100	**0.15**	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	NA	NA	NA	1 U	1 U	1 U	1 U	NA
Methylene Chloride	5	2000	5	**4.8**	4 B	3 B	14 B	1 U	1 U	1 U	1 U	21 B
Tetrachloroethene	5	500	5	**0.11**	15	15	6 J	7.8	9.1	7.3	7.6	8 J
Toluene	1000	3000	**1000**	2300	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U
Trichloroethene	5	200	5	**1.7**	5 U	5 U	10 U	1 U	1 U	1 U	1 U	10 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW02S	03MW02S	03MW02SI	03MW02SI	03MW02SI	03MW02S	03MW02S	03MW03I	03MW03I
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	3/18/2008	10/16/2008	3/18/2008	10/17/2008	7/7/1997	9/18/1991	6/26/1997	3/17/2008	10/21/2008
Duplicate:	MCL	DWEL	MSC	SL									
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**					**ug/L**	**ug/L**	**ug/L**		
2-Chlorophenol	NA	200	**40**	180	NA	NA	NA	NA	10 U	10 U	10 U	NA	NA
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	NA	NA	NA	10 U	10 U	10 U	NA	NA
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	NA	NA	NA	10 U	10 U	10 U	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	NA	NA
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U
Bromodichloromethane	NA	100	100	**0.12**	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
Bromoform	NA	1000	100	**8.5**	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
Dibromochloromethane	NA	700	100	**0.15**	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	1 U	5 B	5 U	12 B	1 U	1 U
Tetrachloroethene	5	500	5	**0.11**	1 U	1 U	3.3	3.3	6 J	5 U	10 U	6.9	10.4
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	1 U	10 U	5 U	10 U	1 U	1 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW03I1	03MW03I	03MW03I-D	03MW03I	03MW03I-D	03MW03S	03MW03S	03MW03S
Sample Date:		Health	PADEP	Region 3	4/11/2009	9/23/1991	9/23/1991	6/30/1997	6/30/1997	3/17/2008	10/20/2008	4/1/2009
Duplicate:	MCL	Advisory DWEL	Residential MSC	Tap Water SL		03MW03I-D	03MW03I	03MW03I-D	03MW03I			03MW03S-D
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**	**ug/L**	**ug/L**			
2-Chlorophenol	NA	200	**40**	180	NA	10 U	10 U	10 U	10 U	NA	NA	NA
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	10 U	10 U	10 U	10 U	NA	NA	NA
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	10 U	10 U	10 U	10 U	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	NA	NA	NA
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	NA	NA	NA	NA	1 U	1 U	1 U
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	NA	NA	NA	NA	1 U	1 U	1 U
Bromodichloromethane	NA	100	100	**0.12**	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
Bromoform	NA	1000	100	**8.5**	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
Chloroform	NA	350	100	**0.19**	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
Dibromochloromethane	NA	700	100	**0.15**	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	NA	NA	NA	NA	1 U	1 U	0.63 J
Methylene Chloride	5	2000	5	**4.8**	1 U	5 U	5 U	4 B	10 UJ	1 U	1 U	1 U
Tetrachloroethene	5	500	5	**0.11**	4.3	5	5	6 J	6 J	2.5	2.6	3
Toluene	1000	3000	**1000**	2300	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U
Trichloroethene	5	200	5	**1.7**	1 U	5 U	5 U	10 U	10 U	1 U	1 U	1 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW03S-D	03MW03S-L	03MW03SI	03MW03SI-D	03MW03SI	03MW03SI	03MW03SI	03MW03SI
Sample Date:		Health	PADEP	Region 3	4/1/2009	10/20/2008	3/17/2008	3/17/2008	10/21/2008	4/1/2009	9/20/1991	6/25/1997
Duplicate:	MCL	Advisory DWEL	Residential MSC	Tap Water SL	03MW03S		03MW03SI-D	03MW03SI				
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**							**ug/L**	**ug/L**
2-Chlorophenol	NA	200	**40**	180	NA	NA	NA	NA	NA	NA	10 U	10 U
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	NA	NA	NA	NA	NA	1 J	10 U
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	NA	NA	NA	NA	NA	10 U	10 U
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 J	10 U
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
Bromodichloromethane	NA	100	100	**0.12**	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Bromoform	NA	1000	100	**8.5**	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	1 U	1 U	0.57 J	1 U	5 U	10 U
Dibromochloromethane	NA	700	100	**0.15**	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	0.42 J	1 U	1 U	1 U	1 U	1 U	NA	NA
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	1 U	1 U	1 U	5 U	13 B
Tetrachloroethene	5	500	5	**0.11**	3.2	2.1	12	11.7	12.4	10.8	35	18
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	1 U	1 U	1 U	5 U	10 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW03S	03MW03S	03MW04I	03MW04I	03MW04I	03MW04I	03MW04I	03MW04S	03MW04S
Sample Date:		Health	PADEP	Region 3	9/18/1991	6/25/1997	3/14/2008	10/14/2008	4/2/2009	9/20/1991	6/30/1997	3/14/2008	10/16/2008
Duplicate:	MCL	Advisory DWEL	Residential MSC	Tap Water SL									
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**				**ug/L**	**ug/L**		
2-Chlorophenol	NA	200	**40**	180	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	10 U	10 U	NA	NA	NA	1 J	10 U	NA	NA
Di-n-butylphthalate	NA	4000	**3700**	3700	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	2 J	10 U	NA	NA
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	NA	NA	1 U	1 U	1 U	NA	NA	1 U	1 U
1,1-Dichloroethane	NA	NA	27	**2.4**	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U
1,1-Dichloroethene	7	2000	**7**	340	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U
1,2-Dichloroethene (cis)	70	350	**70**	370	NA	NA	1 U	1 U	1 U	NA	NA	1 U	1 U
Bromodichloromethane	NA	100	100	**0.12**	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1.1	1 U
Bromoform	NA	1000	100	**8.5**	5 U	10 U	1 U	1 U	1 U	5 U	10 U	0.87 J	1 U
Carbon Tetrachloride	5	30	5	**0.2**	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U
Chloroform	NA	350	100	**0.19**	5 U	10 U	1 U	1 U	1 U	5 U	10 U	0.4 J	1.6
Dibromochloromethane	NA	700	100	**0.15**	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1.5	1 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	NA	NA	1 U	1 U	1 U	NA	NA	1 U	1 U
Methylene Chloride	5	2000	5	**4.8**	3 B	15 B	1 U	1 U	1 U	5 U	10 UJ	1 U	1 U
Tetrachloroethene	5	500	5	**0.11**	8	5 J	0.45 J	1 U	0.41 J	5 U	10 U	4.5	2.7
Toluene	1000	3000	**1000**	2300	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U
Trichloroethene	5	200	5	**1.7**	5 U	10 U	1 U	1 U	1 U	5 U	10 U	1 U	1 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW04S	03MW04SI	03MW04SI	03MW04SI	03MW04SI-L	03MW04SI	03MW04SI	03MW04SI-D
Sample Date:		Health	PADEP	Region 3	4/2/2009	3/14/2008	10/14/2008	4/2/2009	10/14/2008	9/20/1991	6/25/1997	6/25/1997
Duplicate:	MCL	Advisory DWEL	Residential MSC	Tap Water SL							03MW04SI-D	03MW04SI
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**						**ug/L**	**ug/L**	**ug/L**
2-Chlorophenol	NA	200	**40**	180	NA	NA	NA	NA	NA	10 U	10 U	10 U
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	NA	NA	NA	NA	1 J	10 U	10 U
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	NA	NA	NA	NA	10 U	10 U	10 U
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 J	10 U	10 U
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Bromodichloromethane	NA	100	100	**0.12**	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
Bromoform	NA	1000	100	**8.5**	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
Chloroform	NA	350	100	**0.19**	1 U	0.22 J	1.6	1 U	1.5	5 U	10 U	10 U
Dibromochloromethane	NA	700	100	**0.15**	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	0.26 J	1 U	1 U	1 U	NA	NA	NA
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	1 U	1 U	5 U	12 B	16 B
Tetrachloroethene	5	500	5	**0.11**	3.1	4.6	3.9	5.7	4	56	20	22
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	1 U	1 U	5 U	10 U	10 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW04S	03MW04S	03MW05I	03MW05I	03MW05I	03MW05S	03MW05S	03MW05S	03MW05S
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	9/18/1991	6/25/1997	3/11/2008	10/16/2008	6/18/1997	3/12/2008	10/16/2008	9/20/1991	6/18/1997
Duplicate:	MCL	DWEL	MSC	SL									
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**			**ug/L**			**ug/L**	**ug/L**
2-Chlorophenol	NA	200	**40**	180	10 U	10 U	NA	NA	10 U	NA	NA	10 U	10 U
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	10 U	10 U	NA	NA	6 J	NA	NA	1 J	10 U
Di-n-butylphthalate	NA	4000	**3700**	3700	10 U	10 U	NA	NA	10 U	NA	NA	10 U	10 U
Di-n-octylphthalate	NA	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA	NA	1 J	10 U
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	NA	NA	1 U	1 U	NA	1 U	1 U	NA	NA
1,1-Dichloroethane	NA	NA	27	**2.4**	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
1,1-Dichloroethene	7	2000	**7**	340	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
1,2-Dichloroethene (cis)	70	350	**70**	370	NA	NA	1 U	1 U	NA	1 U	1 U	NA	NA
Bromodichloromethane	NA	100	100	**0.12**	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
Bromoform	NA	1000	100	**8.5**	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
Carbon Tetrachloride	5	30	5	**0.2**	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
Chloroform	NA	350	100	**0.19**	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
Dibromochloromethane	NA	700	100	**0.15**	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	NA	NA	1 U	1 U	NA	1 U	1 U	NA	NA
Methylene Chloride	5	2000	5	**4.8**	5 U	18 B	1 U	1 U	8 B	1 U	1 U	5 U	7 B
Tetrachloroethene	5	500	5	**0.11**	61	21	0.46 J	1 U	10 U	1 U	0.49 J	7	2 J
Toluene	1000	3000	**1000**	2300	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U
Trichloroethene	5	200	5	**1.7**	5 U	10 U	1 U	1 U	10 U	1 U	1 U	5 U	10 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW06I	03MW06I	03MW06I-L	03MW06I	03MW06S	03MW06S	03MW06SI	03MW06SI	03MW06SI
Sample Date:		Health	PADEP	Region 3	3/14/2008	10/15/2008	10/15/2008	6/25/1997	3/13/2008	10/15/2008	3/13/2008	10/15/2008	6/18/1997
Duplicate:	MCL	Advisory DWEL	Residential MSC	Tap Water SL									
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**				**ug/L**					**ug/L**
2-Chlorophenol	NA	200	**40**	180	NA	NA	NA	11 U	NA	NA	NA	NA	10 U
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	NA	NA	11 U	NA	NA	NA	NA	11
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	NA	NA	11 U	NA	NA	NA	NA	10 U
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	11 U	NA	NA	NA	NA	10 U
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	NA
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
1,1-Dichloroethene	7	2000	**7**	340	0.2 J	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	NA
Bromodichloromethane	NA	100	100	**0.12**	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
Bromoform	NA	1000	100	**8.5**	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
Dibromochloromethane	NA	700	100	**0.15**	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	NA
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	15 B	1 U	1 U	1 U	1 U	8 B
Tetrachloroethene	5	500	5	**0.11**	1 U	1 U	1 U	39	0.76 J	1.8	1 U	1 U	10 U
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	10 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW06S	03MW07S	03MW07S	03MW07S	03MW07S	03MW08D	03MW08D	03MW08S	03MW08S
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	6/30/1997	3/19/2008	10/21/2008	4/2/2009	7/7/1997	3/12/2008	10/15/2008	3/12/2008	10/15/2008
Duplicate:	MCL	DWEL	MSC	SL									
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**				**ug/L**				
2-Chlorophenol	NA	200	**40**	180	10 U	NA	NA	NA	10 U	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	10 U	NA	NA	NA	10 U	NA	NA	NA	NA
Di-n-butylphthalate	NA	4000	**3700**	3700	10 U	NA	NA	NA	1 B	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	10 U	1 U	1 U	1 U	10 U	2.6	4.1	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	NA	1 U	1 U	0.34 J	NA	1 U	1 U	1 U	1 U
1,1-Dichloroethane	NA	NA	27	**2.4**	10 U	1 U	1 U	1 U	10 U	6.3	8.2	1 U	1 U
1,1-Dichloroethene	7	2000	**7**	340	10 U	1 U	1 U	1 U	10 U	3.1	5.1	1 U	1 U
1,2-Dichloroethene (cis)	70	350	**70**	370	NA	1 U	1 U	1 U	NA	1.2	1.5	1 U	1 U
Bromodichloromethane	NA	100	100	**0.12**	10 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U
Bromoform	NA	1000	100	**8.5**	10 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	30	5	**0.2**	10 U	1 U	1 U	1 U	10 U	0.28 J	1 U	1 U	1 U
Chloroform	NA	350	100	**0.19**	10 U	1 U	1.6	1 U	10 U	1 U	1 U	1 U	1 U
Dibromochloromethane	NA	700	100	**0.15**	10 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	NA	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
Methylene Chloride	5	2000	5	**4.8**	10 UJ	1 U	1 U	1 U	5 B	1 U	1 U	1 U	1 U
Tetrachloroethene	5	500	5	**0.11**	29	1.1	0.41 J	0.74 J	10 U	1	1.3	1 U	1 U
Toluene	1000	3000	**1000**	2300	10 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U
Trichloroethene	5	200	5	**1.7**	10 U	1 U	1 U	1 U	10 U	1.9	3.1	1 U	1 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW09S	03MW09O
Sample Date:		Health	PADEP	Region 3	2/17/2010	2/17/2010
Duplicate:	MCL	Advisory DWEL	Residential MSC	Tap Water SL		
SEMIVOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**		
2-Chlorophenol	NA	200	**40**	180	NA	NA
Bis(2-ethylhexyl)phthalate	6	700	6	**4.8**	NA	NA
Di-n-butylphthalate	NA	4000	**3700**	3700	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	0.5 U	0.5 U
1,1-Dichloroethane	NA	NA	27	**2.4**	0.5 U	0.5 U
1,1-Dichloroethene	7	2000	**7**	340	0.5 U	0.5 U
1,2-Dichloroethene (cis)	70	350	**70**	370	0.5 U	0.5 U
Bromodichloromethane	NA	100	100	**0.12**	0.5 U	0.5 U
Bromoform	NA	1000	100	**8.5**	0.5 U	0.5 U
Carbon Tetrachloride	5	30	5	**0.2**	0.5 U	0.5 U
Chloroform	NA	350	100	**0.19**	0.42 J	0.5 U
Dibromochloromethane	NA	700	100	**0.15**	NA	NA
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	0.5 U	0.5 U
Methylene Chloride	5	2000	5	**4.8**	0.13 B	0.12 B
Tetrachloroethene	5	500	5	**0.11**	6.8	0.35 J
Toluene	1000	3000	**1000**	2300	0.5 U	0.16 J
Trichloroethene	5	200	5	**1.7**	0.11 J	0.5 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: Sample Date: Duplicate:	MCL	Health Advisory DWEL	PADEP Residential MSC	Region 3 Tap Water SL	03MW01I 02/06/06 03MW01I-DUP	03MW01I-DUP 02/06/06 03MW01I	03MW01S 02/03/06	03MW01SI 02/03/06	03MW02I 02/01/06	03MW02S 02/06/06	03MW02SI 02/01/06	03MW03S 02/08/06
SEMIVOLATILES												
Naphthalene	NA	700	100	**0.14**	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	**1100**	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	NA	NA	**3700**	22000	5 U	5 U	5 U	5 U	3.4 J	5 U	5 U	5 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	0.27 J	1 U	0.32 J	1 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	1 U	1.7 B	1 U	1.9 B	1 U
Tetrachloroethene	5	500	5	**0.11**	0.23 J	1 U	0.9 J	4.9	2.4	1 U	1.9	14
Toluene	1000	3000	**1000**	2300	0.2 J	1 U	1 U	1 U	0.5 B	1 U	0.2 B	1 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	1 U	0.36 B	1 U	0.59 B	1 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: **Sample Date:** **Duplicate:**	**MCL**	**Health Advisory DWEL**	**PADEP Residential MSC**	**Region 3 Tap Water SL**	**03MW03SI 02/08/06**	**03MW04I 02/10/06**	**03MW04S 02/10/06 03MW04S-DUP**	**03MW04S-DUP 02/10/06 03MW04S**	**03MW04SI 02/10/06**	**03MW05I 02/03/06**	**03MW05S 02/03/06**	**03MW06I 02/06/06**
SEMIVOLATILES												
Naphthalene	NA	700	100	**0.14**	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	**1100**	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	NA	NA	**3700**	22000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	0.4 J	0.17 J	0.32 J	1 U	1 U	1 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	1 U	1 U	1 U	0.45 J	1 U	1 U	1 U
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	500	5	**0.11**	12	0.52 J	8.8	9.1	10	0.7 J	0.67 J	0.79 J
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.22 J
Trichloroethene	5	200	5	**1.7**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Sample ID: Sample Date: Duplicate:	MCL	Health Advisory DWEL	PADEP Residential MSC	Region 3 Tap Water SL	03MW06S 02/06/06	03MW06SI 02/07/06	03MW07S 01/31/06	03MW08D 01/30/06	03MW08S 01/30/06 03MW08S-DUP	03MW08S-DUP 01/30/06 03MW08S
SEMIVOLATILES								**ug/L**	**ug/L**	**ug/L**
Naphthalene	NA	700	100	**0.14**	NA	NA	NA	0.21 U	0.057 B	0.2 U
Phenanthrene	NA	NA	**1100**	NA	NA	NA	NA	0.11 B	0.098 B	0.15 B
VOLATILES	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,1,1-Trichloroethane	200	1000	**200**	9100	1 U	1 U	1 U	3	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	83000	**59000**	1 U	1 U	0.37 J	1 U	1 U	1 U
1,1-Dichloroethane	NA	NA	27	**2.4**	1 U	1 U	1 U	5.9	1 U	1 U
1,1-Dichloroethene	7	2000	**7**	340	1 U	1 U	1 U	2.5	1 U	1 U
1,2-Dichloroethene (cis)	70	350	**70**	370	1 U	1 U	1 U	0.9 J	1 U	1 U
Acetone	NA	NA	**3700**	22000	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5	30	5	**0.2**	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	NA	350	100	**0.19**	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Tert-butyl Ether (mtbe)	NA	NA	20	**12**	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	2000	5	**4.8**	1 U	1 U	1.1 B	1 U	1 U	1 U
Tetrachloroethene	5	500	5	**0.11**	1.3	1 U	1.4	0.78 J	1 U	1 U
Toluene	1000	3000	**1000**	2300	1 U	1 U	1 U	0.19 J	1 U	1 U
Trichloroethene	5	200	5	**1.7**	1 U	1 U	0.37 B	1.5	1 U	1 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03IW01	03IW01-D	03MW01I	03MW01I	03MW01I	03MW01S	03MW01S-D	03MW01SI	03MW01SI
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	3/19/2008	3/19/2008	3/11/2008	9/23/1991	6/25/1997	3/11/2008	3/11/2008	3/20/2008	9/20/1991
Duplicate:	MCL	DWEL	MSC	SL	03IW01-D	03IW01				03MW01S-D	03MW01S		
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	80 U	80 U	1160	2480 J	73.9 B	80 U	80 U	80 U	363 B
Antimony	6	10	**6**	15	2 U	2 U	1.2 J	45 U	20 U	1.2 J	0.7 J	2 U	45 U
Arsenic	10	10	50	**0.045**	6 U	6 U	6	7.4 J	8.6 J	6 U	6 U	6 U	2 UJ
Barium	2000	7000	**2000**	7300	590	589	215	379	199	111	111	107	263
Beryllium	4	70	**4**	73	1 U	1 U	1 U	3 B	1 U	0.1 J	0.09 J	1 U	3 B
Cadmium	5	20	**5**	18	1 U	1 U	0.1 J	4 U	5 U	1 U	1 U	1.1	4 U
Calcium	NA	NA	NA	NA	48600	47700	25000	57000	13900	7220	7250	17000	12700
Chromium	100	100	**100**	730	1.3 B	1.4 B	4.3	7 U	5 U	5	4.7	1.5 J	13 B
Cobalt	NA	NA	730	**11**	6 U	6 U	0.8 J	10 U	5 U	0.2 J	0.2 J	6 U	10 U
Copper	1300	NA	**1000**	47000	6 U	0.6 B	0.6 J	5 B	10 U	0.3 J	0.3 J	0.4 J	9 B
Iron	300	NA	**300**	26000	70 U	70 U	1200 K	1660	103	110 K	140 K	70 U	508
Lead	15	NA	**5**	NA	2 U	2 U	0.4 J	7.6	1 U	0.06 J	0.04 J	2 U	1.6
Magnesium	NA	NA	NA	NA	18500	18100	10600	9790	8990	1880	1880	2670	2380
Manganese	50	1600	**50**	880	6 U	6 U	16.3	103	38.1	3 J	2.8 J	0.4 J	37
Mercury	2	10	**2**	3.7	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U
Nickel	NA	700	**100**	730	1.9 J	1.9 J	3.9 J	12 U	20 U	3.8 J	3.9 J	1.7 J	14 B
Potassium	NA	NA	NA	NA	1050	1020	1480	62600	14100	670	600	560 U	2140 U
Selenium	50	200	**50**	180	2 J	2 J	2 J	20 UJ	5 U	3 J	3 J	2 J	4 UJ
Silver	100	200	**100**	180	0.6 B	0.6 B	1 U	6 U	5 U	1 U	1 U	0.6 B	6 U
Sodium	NA	NA	NA	NA	15000	14800	12700	30700	16900	12300	12300	9570	9560
Vanadium	NA	NA	**260**	260	1.4	1.5	0.5 J	4 U	5 U	1 U	1 U	0.4 B	4 U
Zinc	5000	10000	**2000**	11000	6 U	6 U	3 J	14 B	6.9 B	2.8 J	2.8 J	6 U	5 B
DISSOLVED INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	80 U	80 U	36 J	72 U	NA	7 J	5 J	80 U	73 B
Antimony	6	10	**6**	15	0.4 B	0.4 B	2 U	45 U	NA	1.4 J	2 U	2 U	45 U
Arsenic	10	10	50	**0.045**	0.5 J	0.2 J	6.4	5.2 J	NA	3 U	3 U	3 U	2 UJ
Barium	2000	7000	**2000**	7300	520	473	199	49	NA	104	102	106	255
Beryllium	4	70	**4**	73	1 U	1 U	1 U	4 B	NA	0.2 J	1 U	1 U	4 B
Cadmium	5	20	**5**	18	1 U	1 U	1 U	4 U	NA	1 U	1 U	1.2	4 U
Calcium	NA	NA	NA	NA	53700	50100	24900	5020	NA	7690	7840	19000	12600
Chromium	100	100	**100**	730	3.1	2.7	3.5	8	NA	6.1	6.3	1.3 J	7 U
Cobalt	NA	NA	730	**11**	5 U	0.2 J	5 U	10 U	NA	0.2 J	0.2 J	5 U	10 U
Copper	1300	NA	**1000**	47000	5 U	5 U	5 U	7 B	NA	5 U	5 U	5 U	7 B
Iron	300	NA	**300**	26000	60 U	60 U	20 J	40 B	NA	60 U	9 J	60 U	45 B
Lead	15	NA	**5**	NA	2 U	2 U	2 U	1 U	NA	2 U	2 U	2 U	1.6
Magnesium	NA	NA	NA	NA	19200	17800	10400 L	3760	NA	1900 L	1930 L	2960	2370
Manganese	50	1600	**50**	880	4 U	0.7 J	3.6 J	1 B	NA	1.8 J	2 J	1.2 J	5 B
Mercury	2	10	**2**	3.7	0.5 U	0.5 U	0.09 J	0.2 U	NA	0.09 J	0.09 J	0.5 U	0.2 U
Nickel	NA	700	**100**	730	0.8 J	0.9 J	1.8 J	12 U	NA	4.8 J	5.4	1.3 J	12 U
Potassium	NA	NA	NA	NA	1070	960	1560	45900	NA	790	780	580	2140 U
Selenium	50	200	**50**	180	2 J	1 J	5 U	4 UJ	NA	3 J	3 J	3 J	4 UJ
Silver	100	200	**100**	180	1 UF	1 UF	1 U	R	NA	1 U	1 U	1 U	R
Sodium	NA	NA	NA	NA	16800	15600	13200	23700	NA	12700	12800	11400	8410
Vanadium	NA	NA	**260**	260	1.5	1.3	1	4 U	NA	1 U	1 U	0.8 B	4 U
Zinc	5000	10000	**2000**	11000	5 U	5 U	0.4 J	5	NA	1.8 J	1.5 J	0.6 J	11

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW01S	03MW01S-D	03MW01S	03MW02I	03MW02I	03MW02S	03MW02SI	03MW02SI	03MW02S
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	9/18/1991	9/18/1991	6/25/1997	3/18/2008	7/7/1997	3/18/2008	3/18/2008	7/7/1997	9/18/1991
Duplicate:	MCL	DWEL	MSC	SL	03MW01S-D	03MW01S							
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	4000	6530	126 B	80 U	50 U	80 U	80 U	50 U	214 B
Antimony	6	10	**6**	15	45 U	45 U	20 U	2 U	20 U	2 U	2 U	20 U	45 U
Arsenic	10	10	50	**0.045**	2 U	2 U	1 UL	1 J	1 U	6 U	0.4 J	1 U	2 U
Barium	2000	7000	**2000**	7300	269	303	154	268	226	123	347	325	99
Beryllium	4	70	**4**	73	3 B	3 B	1 U	1 U	1 U	1 U	1 U	1 U	3 B
Cadmium	5	20	**5**	18	4 U	4 U	5 U	1 U	5 U	1 U	1 U	5 U	4 U
Calcium	NA	NA	NA	NA	8420	8120	8540	21400	21600	9590	23700	24200	6820
Chromium	100	100	**100**	730	11 B	13 B	23.3	2 B	5 U	1.9 B	2.1 B	5 U	7 U
Cobalt	NA	NA	730	**11**	10 U	10 U	5 U	6 U	5 U	6 U	0.2 J	10.3	10 U
Copper	1300	NA	**1000**	47000	2 U	2 U	10 U	0.7 B	10 U	0.3 B	0.3 B	10 U	6 B
Iron	300	NA	**300**	26000	5680	8880	285	70 U	228 J	70 U	30 J	108 J	328
Lead	15	NA	**5**	NA	4.8	4.8	1.3 B	2 U	1 U	2 U	2 U	1 U	1.4
Magnesium	NA	NA	NA	NA	2480	2880	1670	9550	9440	4060	9150	9150	2940
Manganese	50	1600	**50**	880	136	160	8.8 K	1.8 J	14.6	2.5 J	1.6 J	5.4	15
Mercury	2	10	**2**	3.7	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U
Nickel	NA	700	**100**	730	12 U	12 U	22.1	1.4 J	20 U	1.6 J	1.3 J	20 U	12 U
Potassium	NA	NA	NA	NA	2140 U	2790	1500 U	660	1500 U	930	640	1500 U	2140 U
Selenium	50	200	**50**	180	20 U	4 U	5 U	6 U	1 UL	6 U	6 U	5 U	4 U
Silver	100	200	**100**	180	6 U	6 U	5 U	0.6 B	5 U	0.6 B	0.6 B	5 U	6 U
Sodium	NA	NA	NA	NA	11700	11800	12400	7020	7240	7580	7600	8140	6680
Vanadium	NA	NA	**260**	260	8 B	12	5 U	1.8	5 U	0.3 B	2.6	5 U	4 U
Zinc	5000	10000	**2000**	11000	17 B	21 B	11.9 B	6 U	5 U	2.7 J	2 J	5	8 B
DISSOLVED INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**	**ug/L**		**ug/L**
Aluminum	200	NA	**200**	37000	141 B	141 B	NA	80 U	NA	80 U	80 U	NA	137 B
Antimony	6	10	**6**	15	47	45 U	NA	0.4 B	NA	0.5 B	0.4 B	NA	45 U
Arsenic	10	10	50	**0.045**	2 U	2 U	NA	1.1 J	NA	5 U	0.4 J	NA	2 U
Barium	2000	7000	**2000**	7300	135	143	NA	245	NA	113	313	NA	103
Beryllium	4	70	**4**	73	3 B	3 B	NA	1 U	NA	1 U	1 U	NA	3 B
Cadmium	5	20	**5**	18	4 U	4 U	NA	1 U	NA	1 U	1 U	NA	4 U
Calcium	NA	NA	NA	NA	7730	8050	NA	24100	NA	10800	26700	NA	7340
Chromium	100	100	**100**	730	7 U	7 B	NA	2.3	NA	2.8	2.4	NA	7 U
Cobalt	NA	NA	730	**11**	10 U	10 U	NA	5 U	NA	0.8 J	5 U	NA	10 U
Copper	1300	NA	**1000**	47000	7 B	7 B	NA	0.3 J	NA	0.4 J	5 U	NA	6 B
Iron	300	NA	**300**	26000	54	43	NA	60 U	NA	60 U	60 U	NA	223
Lead	15	NA	**5**	NA	1 U	1 U	NA	2 U	NA	2 U	2 U	NA	1 U
Magnesium	NA	NA	NA	NA	1730	1760	NA	9740	NA	4450	9360	NA	3140
Manganese	50	1600	**50**	880	18	19	NA	0.08 B	NA	4.5	4 U	NA	3 B
Mercury	2	10	**2**	3.7	0.2 U	0.2 U	NA	0.5 U	NA	0.5 U	0.5 U	NA	0.2 U
Nickel	NA	700	**100**	730	12 U	12 U	NA	0.8 J	NA	1.3 J	0.7 J	NA	12 U
Potassium	NA	NA	NA	NA	2140 U	2140 U	NA	840	NA	1070	660	NA	2140 U
Selenium	50	200	**50**	180	4 U	4 U	NA	1 J	NA	0.6 J	1 J	NA	4 U
Silver	100	200	**100**	180	6 U	6 U	NA	1 UF	NA	1 UF	1 UF	NA	6 U
Sodium	NA	NA	NA	NA	12400	12000	NA	8170	NA	8740	9130	NA	6840
Vanadium	NA	NA	**260**	260	4 U	4 U	NA	1.7	NA	0.3 J	2.3	NA	4 U
Zinc	5000	10000	**2000**	11000	10 B	27	NA	6.5	NA	5 U	5 U	NA	19 B

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW02S	03MW03I	03MW03I	03MW03I-D	03MW03I	03MW03I-D	03MW03S	03MW03SI
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	6/26/1997	3/17/2008	9/23/1991	9/23/1991	6/30/1997	6/30/1997	3/17/2008	3/17/2008
Duplicate:	MCL	DWEL	MSC	SL			03MW03I-D	03MW03I	03MW03I-D	03MW03I		03MW03SI-D
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	50 U	80 U	87 B	87 B	50 U	50 U	80 U	80 U
Antimony	6	10	**6**	15	20 U	2 U	45 U	45 U	20 U	20 U	2 U	2 U
Arsenic	10	10	50	**0.045**	1 U	1.4 J	2.4 J	2.4 J	2.4	2.5 B	6 U	6 U
Barium	2000	7000	**2000**	7300	111	209	175	177	197	194 B	157	353
Beryllium	4	70	**4**	73	1 U	1 U	3 B	3 B	1 U	1 U	1 U	1 U
Cadmium	5	20	**5**	18	5 U	1 U	4 U	4 U	5 U	5 U	1 U	1 U
Calcium	NA	NA	NA	NA	9190	23700	16900	177	21000	20900	13800	25900
Chromium	100	100	**100**	730	5 U	1.2 B	14 B	7 U	5 U	5 U	2.4 B	1.8 B
Cobalt	NA	NA	730	**11**	5 U	6 U	10 U	10 U	5 U	5 U	6 U	6 U
Copper	1300	NA	**1000**	47000	10 U	6 U	6 B	6 B	10 U	10 U	1 B	6 U
Iron	300	NA	**300**	26000	50 U	70 U	80 B	43 B	50 U	50 U	40 J	70 U
Lead	15	NA	**5**	NA	1 U	2 U	1 U	1 U	1 U	1 U	2 U	2 U
Magnesium	NA	NA	NA	NA	3710	11400	10200	10500	11400	11200	5580	9960
Manganese	50	1600	**50**	880	5 U	6 U	2	1	5 U	5 U	3.3 J	6 U
Mercury	2	10	**2**	3.7	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.03 J
Nickel	NA	700	**100**	730	20 U	0.7 J	15 B	12 U	20 U	20 U	2.7 J	0.9 J
Potassium	NA	NA	NA	NA	1500 U	1200	2140 U	2140 U	1500 U	1500 U	1180	670
Selenium	50	200	**50**	180	5 U	1 J	4 UL	4 UL	5 UL	5 UL	2 J	2 J
Silver	100	200	**100**	180	5 U	0.6 B	6 U	6 U	5 U	5 U	0.6 B	0.6 B
Sodium	NA	NA	NA	NA	7540	8180	5930	6120	6840	6700	11300	9300
Vanadium	NA	NA	**260**	260	5 U	1.8	4 U	4 U	5 U	5 U	0.3 B	1.5
Zinc	5000	10000	**2000**	11000	5 U	6 U	3 B	7 B	5 U	5 U	4.3 J	6 U
DISSOLVED INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**	**ug/L**			**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	NA	80 U	72 U	72 U	NA	NA	80 U	80 U
Antimony	6	10	**6**	15	NA	0.6 B	45 U	45 U	NA	NA	0.6 B	1.6 B
Arsenic	10	10	50	**0.045**	NA	1.5 J	3.8 J	2.8 J	NA	NA	5 U	0.5 J
Barium	2000	7000	**2000**	7300	NA	197	184	175	NA	NA	141	344
Beryllium	4	70	**4**	73	NA	1 U	4 B	4 B	NA	NA	1 U	1 U
Cadmium	5	20	**5**	18	NA	1 U	4 B	4 U	NA	NA	1 U	1 U
Calcium	NA	NA	NA	NA	NA	26600	18400	17600	NA	NA	15500	28300
Chromium	100	100	**100**	730	NA	2.2	7 U	7 U	NA	NA	3.7	2.7
Cobalt	NA	NA	730	**11**	NA	5 U	10 U	10 U	NA	NA	5 U	5 U
Copper	1300	NA	**1000**	47000	NA	5 U	6 B	7 B	NA	NA	1.1 J	5 U
Iron	300	NA	**300**	26000	NA	60 U	41 B	39 B	NA	NA	60 U	60 U
Lead	15	NA	**5**	NA	NA	2 U	1 U	1.6	NA	NA	2 U	2 U
Magnesium	NA	NA	NA	NA	NA	11600	11400	10600	NA	NA	5870	10200
Manganese	50	1600	**50**	880	NA	4 U	2 B	1 B	NA	NA	3.3 J	4 U
Mercury	2	10	**2**	3.7	NA	0.5 U	0.2 U	0.2 U	NA	NA	0.5 U	0.5 U
Nickel	NA	700	**100**	730	NA	0.3 J	12 U	12 U	NA	NA	2.2 J	0.7 J
Potassium	NA	NA	NA	NA	NA	1360	2140 U	2140 U	NA	NA	1390	770
Selenium	50	200	**50**	180	NA	2 J	4 UJ	4 UJ	NA	NA	3 J	2 J
Silver	100	200	**100**	180	NA	1 UR	R	R	NA	NA	1 UR	1 UR
Sodium	NA	NA	NA	NA	NA	8080	5560	5460	NA	NA	11600	9770
Vanadium	NA	NA	**260**	260	NA	1.9	4 U	4 U	NA	NA	0.5 J	1.7
Zinc	5000	10000	**2000**	11000	NA	5 U	10	5	NA	NA	1.1 J	5 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW03SI-D	03MW03SI	03MW03SI	03MW03S	03MW03S	03MW04I	03MW04I	03MW04I	03MW04S
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	3/17/2008	9/20/1991	6/25/1997	9/18/1991	6/25/1997	3/14/2008	9/20/1991	6/30/1997	3/14/2008
Duplicate:	MCL	DWEL	MSC	SL	03MW03SI								
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	80 U	72 UJ	75.4 B	214 B	50.4 B	80 U	87 B	50 U	80 U
Antimony	6	10	**6**	15	0.08 J	45 U	20 U	45 U	20 U	0.7 J	45 U	20 U	0.2 J
Arsenic	10	10	50	**0.045**	0.5 J	2 UJ	1 U	2 U	1 U	0.6 J	2 UJ	1 U	6 U
Barium	2000	7000	**2000**	7300	362	250	294	154	147	455	405	395	434
Beryllium	4	70	**4**	73	1 U	3 B	1 U	3 B	1 U	1 U	3 B	1 U	1 U
Cadmium	5	20	**5**	18	1 U	4	5 U	4 U	5 U	1 U	4 U	5 U	1 U
Calcium	NA	NA	NA	NA	25600	19500	22600	15100	14700	31900	24000	25600	36500
Chromium	100	100	**100**	730	1.4 B	7 U	5 U	8 B	5 U	1 J	7 U	5 U	5.4 B
Cobalt	NA	NA	730	**11**	6 U	10 U	5 U	10 U	5 U	6 U	10 U	5 U	6 U
Copper	1300	NA	**1000**	47000	6 U	9 B	10 U	7 B	10 U	0.08 J	6 B	10 U	1.3 B
Iron	300	NA	**300**	26000	70 U	43 B	50 U	243	50 U	40 J	35 B	50 U	70 U
Lead	15	NA	**5**	NA	2 U	1 U	13 B	1 U	14.4 B	2 U	1 U	1 U	2 U
Magnesium	NA	NA	NA	NA	9860	7710	8370	4570	4950	8260	6440	6220	13200
Manganese	50	1600	**50**	880	6 U	1	5 U	10 B	5 U	6 U	1	5 U	1 J
Mercury	2	10	**2**	3.7	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U
Nickel	NA	700	**100**	730	0.8 J	12 U	20 U	12 U	20 U	1.8 J	12 U	20 U	4.2 J
Potassium	NA	NA	NA	NA	670	2140 U	1500 U	2140 U	1500 U	680	2140 U	1500 U	840
Selenium	50	200	**50**	180	2 J	20 UJ	5 UL	4 U	5 U	3 J	20 UJ	5 UL	1 J
Silver	100	200	**100**	180	0.7 B	6 U	5 U	6 U	5 U	1 U	6 U	5 U	0.7 B
Sodium	NA	NA	NA	NA	9470	6420	7840	7700	7320	13300	8900	11100	12100
Vanadium	NA	NA	**260**	260	1.5	4 U	5 U	4 U	5 U	1 U	4 U	5 U	0.8 B
Zinc	5000	10000	**2000**	11000	6 U	5 B	5 U	8 B	12 B	6.2	3 B	5 U	6 U
DISSOLVED INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**	**ug/L**		**ug/L**
Aluminum	200	NA	**200**	37000	80 U	72 B	NA	128 B	NA	80 UL	72 U	NA	80 U
Antimony	6	10	**6**	15	0.8 B	45 U	NA	45 U	NA	2 U	45 U	NA	0.4 B
Arsenic	10	10	50	**0.045**	0.4 J	2 UJ	NA	2 U	NA	3 U	2 U	NA	0.3 J
Barium	2000	7000	**2000**	7300	351	263	NA	145	NA	461	431	NA	411
Beryllium	4	70	**4**	73	1 U	4 B	NA	3 B	NA	1 U	4 B	NA	1 U
Cadmium	5	20	**5**	18	1 U	4 U	NA	4 U	NA	1 U	4 U	NA	1 U
Calcium	NA	NA	NA	NA	29000	20000	NA	14400	NA	35700	25200	NA	39900
Chromium	100	100	**100**	730	2.6	7 U	NA	7 U	NA	1.5 J	7 U	NA	3.6
Cobalt	NA	NA	730	**11**	5 U	10 U	NA	10 U	NA	0.1 J	10 U	NA	5 U
Copper	1300	NA	**1000**	47000	5 U	6 B	NA	7 B	NA	5 U	7 B	NA	5 U
Iron	300	NA	**300**	26000	60 U	48 B	NA	42 B	NA	60 U	50 B	NA	60 U
Lead	15	NA	**5**	NA	2 U	1.1 U	NA	1 U	NA	2 U	1 U	NA	2 U
Magnesium	NA	NA	NA	NA	10100	7800	NA	4340	NA	8570 L	6630	NA	13600
Manganese	50	1600	**50**	880	4 U	1 B	NA	2 B	NA	4 U	2 B	NA	4 U
Mercury	2	10	**2**	3.7	0.5 U	0.2 U	NA	0.2 U	NA	0.09 J	0.2 U	NA	0.5 U
Nickel	NA	700	**100**	730	0.5 J	12 U	NA	12 U	NA	5 U	12 U	NA	1.2 J
Potassium	NA	NA	NA	NA	760	2140 U	NA	2140 U	NA	870	2140 U	NA	960
Selenium	50	200	**50**	180	2 J	4 UJ	NA	4 U	NA	2 J	4 UJ	NA	2 J
Silver	100	200	**100**	180	1 UR	R	NA	6 U	NA	1 U	R	NA	1 UR
Sodium	NA	NA	NA	NA	9900	6090	NA	7270	NA	13600	8170	NA	13000
Vanadium	NA	NA	**260**	260	1.7	4 U	NA	4 U	NA	1.2	4 U	NA	1.1
Zinc	5000	10000	**2000**	11000	5 U	14	NA	11 B	NA	5 U	6	NA	5 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW04SI	03MW04SI	03MW04SI	03MW04SI-D	03MW04S	03MW04S	03MW05I	03MW05I	03MW05S
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	3/14/2008	9/20/1991	6/25/1997	6/25/1997	9/18/1991	6/25/1997	3/11/2008	6/18/1997	3/12/2008
Duplicate:	MCL	DWEL	MSC	SL			03MW04SI-D	03MW04SI					
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	80 U	379 B	91.9 B	50 U	551 B	67.1 B	80 U	1040	80 U
Antimony	6	10	**6**	15	0.6 J	45 U	20 U	20 U	45 U	20 U	0.8 J	20 UL	0.7 J
Arsenic	10	10	50	**0.045**	0.6 J	2 UJ	1 U	1 U	2 U	1 U	0.5 J	1 UL	6 U
Barium	2000	7000	**2000**	7300	487	326	369	364	306	322	209	480	55
Beryllium	4	70	**4**	73	1 U	3 B	1 U	1 U	3 B	1 U	1 U	1 U	1 U
Cadmium	5	20	**5**	18	1 U	4 U	5 U	5 U	4 U	5 U	1 U	5 U	1 U
Calcium	NA	NA	NA	NA	37200	18800	24400	23900	22900	26300	12000	12000	9690
Chromium	100	100	**100**	730	0.9 J	12 B	5 U	5 U	7 U	5 U	7.6	53.3	2.7
Cobalt	NA	NA	730	**11**	6 U	10 U	5 U	5 U	10 U	5 U	4 J	5 U	6 U
Copper	1300	NA	**1000**	47000	0.1 J	9 B	10 U	10 U	7 B	10 U	1 J	10 U	6 U
Iron	300	NA	**300**	26000	20 J	757	50 U	50 U	562	59.6	130 K	1860	40 J
Lead	15	NA	**5**	NA	2 U	1.7	4.2 B	1 U	1 U	1 U	2 U	4.7 B	2 U
Magnesium	NA	NA	NA	NA	9650	5330	6150	6020	8460	9040	3160	3430	3240
Manganese	50	1600	**50**	880	6 U	226	5 U	5 U	50	5.1 K	2.8 J	138	1.7 J
Mercury	2	10	**2**	3.7	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.5 U
Nickel	NA	700	**100**	730	2.6 J	15 B	20 U	20 U	12 U	20 U	5.7 J	44.4	1.8 J
Potassium	NA	NA	NA	NA	880	2140 U	1500 U	1500 U	2140 U	1500 U	790	1500 U	800
Selenium	50	200	**50**	180	3 J	20 UJ	5 UL	5 U	20 U	5 UL	2 J	5 U	3 J
Silver	100	200	**100**	180	1 U	6 U	5 U	5 U	6 U	5 U	0.06 J	5 U	1 U
Sodium	NA	NA	NA	NA	17600	9880	12100	11900	7780	9230	9320	9760	11500
Vanadium	NA	NA	**260**	260	1 U	4 U	5 U	5 U	5 B	5 U	1 U	5 U	1 U
Zinc	5000	10000	**2000**	11000	1.9 J	9 B	5 U	5 U	8 B	5 U	6 U	37.1	2.8 J
DISSOLVED INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**			**ug/L**		**ug/L**		**ug/L**
Aluminum	200	NA	**200**	37000	80 UL	72 B	NA	NA	105 B	NA	80 U	NA	5 J
Antimony	6	10	**6**	15	2 U	45 U	NA	NA	45 U	NA	2 U	NA	2 U
Arsenic	10	10	50	**0.045**	3 U	2 UJ	NA	NA	2 U	NA	3 U	NA	3 U
Barium	2000	7000	**2000**	7300	496	358	NA	NA	334	NA	201	NA	54.8
Beryllium	4	70	**4**	73	1 U	4 B	NA	NA	3 B	NA	1 U	NA	1 U
Cadmium	5	20	**5**	18	1 U	4 U	NA	NA	4 U	NA	1 U	NA	1 U
Calcium	NA	NA	NA	NA	42400	22000	NA	NA	26100	NA	12800	NA	11100
Chromium	100	100	**100**	730	2.5	7 U	NA	NA	7 U	NA	3.9	NA	4.9
Cobalt	NA	NA	730	**11**	0.2 J	10 U	NA	NA	10 U	NA	2.5 J	NA	0.5 J
Copper	1300	NA	**1000**	47000	5 U	6 B	NA	NA	6 B	NA	5 U	NA	5 U
Iron	300	NA	**300**	26000	60 U	54 B	NA	NA	38 B	NA	60 U	NA	9 J
Lead	15	NA	**5**	NA	2 U	1 U	NA	NA	1 U	NA	2 U	NA	2 U
Magnesium	NA	NA	NA	NA	10100	6080	NA	NA	9620	NA	3240 L	NA	3720 L
Manganese	50	1600	**50**	880	0.06 J	2 B	NA	NA	1 B	NA	4 U	NA	2.4 J
Mercury	2	10	**2**	3.7	0.09 J	0.2 U	NA	NA	0.2 U	NA	0.1 J	NA	0.09 J
Nickel	NA	700	**100**	730	0.9 J	12 U	NA	NA	12 U	NA	3.6 J	NA	2.2 J
Potassium	NA	NA	NA	NA	1020	2140 U	NA	NA	2140 U	NA	860	NA	1140
Selenium	50	200	**50**	180	2 J	4 UJ	NA	NA	20 U	NA	5 U	NA	3 J
Silver	100	200	**100**	180	1 U	R	NA	NA	6 U	NA	1 U	NA	1 U
Sodium	NA	NA	NA	NA	18500	9840	NA	NA	8680	NA	9470	NA	12600
Vanadium	NA	NA	**260**	260	1.3	4 U	NA	NA	4 B	NA	1 U	NA	1 U
Zinc	5000	10000	**2000**	11000	5 U	13	NA	NA	6 B	NA	0.3 J	NA	1.4 J

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW05S	03MW05S	03MW06I	03MW06I	03MW06S	03MW06SI	03MW06SI	03MW06S	03MW07S
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	9/20/1991	6/18/1997	3/14/2008	6/25/1997	3/13/2008	3/13/2008	6/18/1997	6/30/1997	3/19/2008
Duplicate:	MCL	DWEL	MSC	SL									
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	185 J	50 U	2030	6970	89	144	466	206	96
Antimony	6	10	**6**	15	45 U	20 UL	0.7 J	20 U	0.7 J	0.7 J	20 UL	20 U	2 U
Arsenic	10	10	50	**0.045**	2.1 J	1 U	9.1	4.9 J	0.4 J	6 U	1 UL	1 UL	6 U
Barium	2000	7000	**2000**	7300	172	62.7	413	591	37	111	162	102	625
Beryllium	4	70	**4**	73	4 B	1 U	1 U	1 U	0.1 J	1 U	1 U	1 U	1 U
Cadmium	5	20	**5**	18	4 U	5 U	1 U	5 U	1 U	1 U	5 U	5 U	1 U
Calcium	NA	NA	NA	NA	5020	10100	25900	36300	12000	7310	7770	16100	62900
Chromium	100	100	**100**	730	17 B	7.7	12	90.9	4.9	5.1	36.9	10.7 K	2.2 B
Cobalt	NA	NA	730	**11**	10 U	5 U	3 J	11.7	6 U	6 U	6.6	5 U	0.2 J
Copper	1300	NA	**1000**	47000	32 B	10 U	2.4 J	12.7 K	1.7 J	1.7 J	10 U	10 U	0.1 B
Iron	300	NA	**300**	26000	14300	118	2400 K	8170	90 K	230 K	962	340 B	90
Lead	15	NA	**5**	NA	2.6	2.2 B	1.4 J	9.5 B	2 U	2 U	1.7 B	2.5 B	2 U
Magnesium	NA	NA	NA	NA	2200	2670	11100	14300	6420	2260	2350	6240	16200
Manganese	50	1600	**50**	880	316	7 K	103	457	8.2	10.2	90.2	93.2	12.9
Mercury	2	10	**2**	3.7	1.7	0.2 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.5 U
Nickel	NA	700	**100**	730	18 B	20 U	9.6	84	5 J	4.3 J	30	20 U	4.8 J
Potassium	NA	NA	NA	NA	2140 U	1500 U	3080	6750	1370	980	1500 U	1500 U	1060
Selenium	50	200	**50**	180	20 UJ	5 U	2 J	5 UL	5 J	1 J	5 U	5 UL	6 U
Silver	100	200	**100**	180	6 U	5 U	1 U	5 U	1 U	1 U	5 U	5 U	0.6 B
Sodium	NA	NA	NA	NA	6600	12000	9550	20100	13500	8680	9310	14200	22400
Vanadium	NA	NA	**260**	260	16	5 U	6.4	14	1 U	1 U	5 U	5 U	0.6 B
Zinc	5000	10000	**2000**	11000	39	12.2	10.6	49.8	8.4	5.2 J	17	20.8 B	2.4 J
DISSOLVED INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**		**ug/L**	**ug/L**			**ug/L**
Aluminum	200	NA	**200**	37000	77 B	NA	4 J	NA	10 J	3 J	NA	NA	80 U
Antimony	6	10	**6**	15	45 U	NA	2 U	NA	2 U	2 U	NA	NA	0.4 B
Arsenic	10	10	50	**0.045**	2 UJ	NA	10.1	NA	3 U	3 U	NA	NA	5 U
Barium	2000	7000	**2000**	7300	61	NA	299	NA	34.8	104	NA	NA	544
Beryllium	4	70	**4**	73	4 B	NA	1 U	NA	0.4 J	1 U	NA	NA	1 U
Cadmium	5	20	**5**	18	4 U	NA	1 U	NA	1 U	1 U	NA	NA	1 U
Calcium	NA	NA	NA	NA	11500	NA	24900	NA	14000	8310	NA	NA	71100
Chromium	100	100	**100**	730	7 U	NA	1.4 J	NA	4.7	3.6	NA	NA	3.4
Cobalt	NA	NA	730	**11**	10 U	NA	0.1 J	NA	5 U	5 U	NA	NA	5 U
Copper	1300	NA	**1000**	47000	7	NA	5 U	NA	1.4 J	5 U	NA	NA	5 U
Iron	300	NA	**300**	26000	37 B	NA	60 U	NA	10 J	10 J	NA	NA	60 U
Lead	15	NA	**5**	NA	1.6 B	NA	2 U	NA	2 U	2 U	NA	NA	2 U
Magnesium	NA	NA	NA	NA	2840	NA	10200 L	NA	6760 L	2490 L	NA	NA	17100
Manganese	50	1600	**50**	880	16	NA	0.4 J	NA	5.8	0.6 J	NA	NA	0.1 B
Mercury	2	10	**2**	3.7	0.2 U	NA	0.09 J	NA	0.09 J	0.08 J	NA	NA	0.5 U
Nickel	NA	700	**100**	730	12 U	NA	0.5 J	NA	4.4 J	2.6 J	NA	NA	2.9 J
Potassium	NA	NA	NA	NA	2140 U	NA	2090	NA	1670	1100	NA	NA	1180
Selenium	50	200	**50**	180	4 U	NA	2 J	NA	5 J	5 U	NA	NA	1 J
Silver	100	200	**100**	180	R	NA	1 U	NA	1 U	1 U	NA	NA	1 UF
Sodium	NA	NA	NA	NA	11800	NA	9310	NA	14400	9110	NA	NA	26000
Vanadium	NA	NA	**260**	260	4 U	NA	4.9	NA	1 U	1 U	NA	NA	0.7 J
Zinc	5000	10000	**2000**	11000	18	NA	5 U	NA	6	0.7 J	NA	NA	5 U

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA

Sample ID:	SCREENING BENCHMARKS				03MW07S	03MW08D	03MW08S
Sample Date:		Health Advisory	PADEP Residential	Region 3 Tap Water	7/7/1997	3/12/2008	3/12/2008
Duplicate:	MCL	DWEL	MSC	SL			
INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	263	80 U	80 U
Antimony	6	10	**6**	15	20 U	0.7 J	0.8 J
Arsenic	10	10	50	**0.045**	1 U	0.5 J	6 U
Barium	2000	7000	**2000**	7300	339	340	50.1
Beryllium	4	70	**4**	73	1 U	1 U	0.6 J
Cadmium	5	20	**5**	18	5 U	1 U	1 U
Calcium	NA	NA	NA	NA	25700	31900	11500
Chromium	100	100	**100**	730	5 U	2.5	2.8
Cobalt	NA	NA	730	**11**	5 U	2.4 J	0.2 J
Copper	1300	NA	**1000**	47000	10 U	6 U	2 J
Iron	300	NA	**300**	26000	318 J	170 K	70 K
Lead	15	NA	**5**	NA	2.7 B	2 U	2 U
Magnesium	NA	NA	NA	NA	6200	13800	3470
Manganese	50	1600	**50**	880	12.2	1.9 J	35.3
Mercury	2	10	**2**	3.7	0.2 U	0.5 U	0.5 U
Nickel	NA	700	**100**	730	20 U	2.8 J	4 J
Potassium	NA	NA	NA	NA	1500 U	770	1140
Selenium	50	200	**50**	180	5 U	1 J	1 J
Silver	100	200	**100**	180	5 U	1 U	1 U
Sodium	NA	NA	NA	NA	25300	10800	14600
Vanadium	NA	NA	**260**	260	5 U	0.09 J	1 U
Zinc	5000	10000	**2000**	11000	8.3 B	6 U	3.1 J
DISSOLVED INORGANICS	**ug/L**	**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**
Aluminum	200	NA	**200**	37000	NA	17 J	5 J
Antimony	6	10	**6**	15	NA	2 U	2 U
Arsenic	10	10	50	**0.045**	NA	3 U	3 U
Barium	2000	7000	**2000**	7300	NA	324	46.9
Beryllium	4	70	**4**	73	NA	1 U	0.6 J
Cadmium	5	20	**5**	18	NA	1 U	1 U
Calcium	NA	NA	NA	NA	NA	35500	12600
Chromium	100	100	**100**	730	NA	3.7	3.9
Cobalt	NA	NA	730	**11**	NA	1.9 J	5 U
Copper	1300	NA	**1000**	47000	NA	5 U	1.6 J
Iron	300	NA	**300**	26000	NA	60 U	60 U
Lead	15	NA	**5**	NA	NA	2 U	2 U
Magnesium	NA	NA	NA	NA	NA	15300 L	3780 L
Manganese	50	1600	**50**	880	NA	0.05 J	34.6
Mercury	2	10	**2**	3.7	NA	0.1 J	0.09 J
Nickel	NA	700	**100**	730	NA	1.7 J	3.8 J
Potassium	NA	NA	NA	NA	NA	970	1430
Selenium	50	200	**50**	180	NA	9	5 U
Silver	100	200	**100**	180	NA	1 U	1 U
Sodium	NA	NA	NA	NA	NA	11300	15300
Vanadium	NA	NA	**260**	260	NA	1 J	1 U
Zinc	5000	10000	**2000**	11000	NA	0.7 J	3.4 J

TABLE 4-22

COMPARISON OF GROUNDWATER ANALYTICAL DATA TO CONCENTRATION BENCHMARKS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

Bolded criteria are the most stringent.
Shaded values exceed the most stringent criteria.

TABLE 4-23

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

WELL	SEPTEMBER 1991	JUNE 1997	FEBRUARY 2006	MARCH 2008	OCTOBER 2008	APRIL 2009
SHALLOW WELLS						
03MW01S	15	6J	0.9	1.9	2.6	NS
03MW02S	ND	ND	ND	ND	ND	NS
03MW03S	8	5J	14	2.5	2.6	3.1
03MW04S	61	21	9.1	4.5	2.7	3.1
03MW05S	7	2J	0.67J	ND	0.49J	NS
03MW06S	NA	29	1.3	0.76J	1.8	NS
03MW07S	NA	ND	1.4	1.1	0.41J	0.74J
SHALLOW-INTERMEDIATE DEPTH WELLS						
03MW01SI	29	---	4.9	8.8	9.7	NS
03MW02SI	NA	6J	1.9	3.3	3.3	NS
03MW03SI	35	18	12	12	12.4	10.8
03MW04SI	56	20	10	4.6	3.9	5.7
03MW05I	NA	ND	0.70J	0.46J	ND	NS
03MW06SI	NA	ND	ND	ND	ND	NS
03MW08S	NA	NA	ND	ND	ND	NS
INTERMEDIATE DEPTH WELLS						
03MW01I	ND	ND	0.23J	ND	ND	NS
03MW02I	NA	8J	2.4	7.8	7.5	NS
03MW03I	5	6J	NS	6.9	10.4	4.3
03MW04I	ND	ND	0.52J	0.45J	ND	0.41J
03MW06I	NA	39	0.79J	ND	ND	NS
03MW08D	NA	NA	0.78J	1	1.3	NS
OFF-BASE LOT 1 IRRIGATION WELL						
03IW01	25	15*	---	6.3	5.6	4.4

ND – The sample result was non-detect.
NA – Well was not yet installed.
NS – Well was not sampled.
* Sampled March 1998.

TABLE 6-1
SUMMARY OF HUMAN HEALTH RISKS FOR SITE 3
NAS JRB, WILLOW GROVE, PENNSYLVANIA

MEDIA OF CONCERN Receptors --\/	Cumulative Cancer Risk	Maximum Target Organ HI	Population % Lead >10ug/dl	Contributors to unacceptable risk listed if cancer risk > 1E-6, noncancer HQ > 0.2, or blood lead > 10 ug/dL for > 5% of population Lifetime receptor-- only cancer risk COCs; child or adult-- only noncancer COCs; "BG"-- not a site-related COC (similar to backgrounc
GROUNDWATER				
Lifetime Resident	1.3E-04	--	NA	Arsenic (BG), Bis(2-ethylhexyl) Phthalate (BG), Bromodichloromethane (BG), Dibromochloromethane (BG), Tetrachloroethene, 1,1-Dichloroethane
Child Resident	(see lifetime)	1.3	NA	Arsenic (BG)
Adult Resident	(see lifetime)	<1	NA	
Contruction Worker	<1.0E-06	<1	NA	
HANGAR AREA - SURFACE SOIL				
Lifetime Resident	8.8E-05	--	NA	
Child Resident	(see lifetime)	NA	NA	
Adult Resident	(see lifetime)	NA	NA	
Industrial Worker	6.1E-06	NA	NA	
Lifetime Recreational	2.6E-05	--	NA	
Recreational Child	(see lifetime)	NA	NA	
Recreational Adult	(see lifetime)	NA	NA	
HANGAR AREA - TOTAL SOIL (COMBINED SURFACE AND SUBSURFACE)				
Lifetime Resident	3.3E-04	--	NA	Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene
Child Resident	(see lifetime)	NA	NA	
Adult Resident	(see lifetime)	NA	NA	
Industrial Worker	2.3E-05	NA	NA	
Contruction Worker	1.1E-06	NA	NA	
Lifetime Recreational	9.7E-05	--	NA	
Recreational Child	(see lifetime)	NA	NA	
Recreational Adult	(see lifetime)	NA	NA	
LANDFILL AREA - SURFACE SOIL				
Lifetime Resident	5.7E-04	--	NA	Total 2,3,7,8-TCDD Equivalents, Arsenic (BG), Chromium, Dieldrin (BG), Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene
Child Resident	(see lifetime)	1.0	NA	
Adult Resident	(see lifetime)	<1	NA	
Industrial Worker	4.6E-05	<1	NA	
Lifetime Recreational	1.3E-04	--	NA	Arsenic (BG), Chromium, Dieldrin (BG), Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene
Recreational Child	(see lifetime)	<1	NA	
Recreational Adult	(see lifetime)	<1	NA	
LANDFILL AREA - TOTAL SOIL (COMBINED SURFACE AND SUBSURFACE)				
Lifetime Resident	6.8E-04	--	NA	Total 2,3,7,8-TCDD Equiv., Arsenic (BG), Chromium, DDD, DDT, Aroclor-1248, Dieldrin (BG), Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Naphthalene, Ethylbenzene
Child Resident	(see lifetime)	5.0	<10 ug/dL	Total 2,3,7,8-TCDD Equivalents, Aluminum, Antimony, Chromium, Copper, Iron, Manganese, DDT, Dieldri
Adult Resident	(see lifetime)	<1	NA	
Industrial Worker	7.4E-05	<1	<10 ug/dL	
Contruction Worker	3.4E-06	<1	6.1 %	Lead
Lifetime Recreational	2.0E-04	--	NA	Total 2,3,7,8-TCDD Equivalents, Arsenic (BG), Chromium, DDT, Dieldrin (BG), Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene
Recreational Child	(see lifetime)	1.5	<10 ug/dL	Total 2,3,7,8-TCDD Equivalents, Manganese
Recreational Adult	(see lifetime)	<1	NA	
SURFACE WATER				
Lifetime Recreational	2.0E-05	--	NA	
Recreational Child	(see lifetime)	<1	NA	
Recreational Adult	(see lifetime)	<1	NA	
Contruction Worker	<1.0E-06	<1	NA	
SEDIMENT				
Lifetime Recreational	4.1E-05	--	NA	
Recreational Child	(see lifetime)	<1	NA	
Recreational Adult	(see lifetime)	<1	NA	
Contruction Worker	1.3E-06	<1	NA	

In this table, risk drivers are listed for any receptor only if the cumulative cancer risk for all substances exceeds 1×10^{-4} or if the HI for any target organ exceeds 1. When these thresholds are exceeded, then all contributing chemicals are listed with individual cancer risks greater than 1×10^{-6} or an HQ that is a signficant contributor to the target organ HI exceeding 1.

TABLE 7-1
WILDLIFE TOXICITY REFERENCE VALUES
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

PARAMETER	Mammal		Bird	
	NOAEL	LOAEL	NOAEL	LOAEL
SEMIVOLATILES (mg/kg/day)				
1,2,4-Trichlorobenzene	1.48	14.8	NA	NA
1,2-Dichlorobenzene	30	300	NA	NA
1,4-Dichlorobenzene	30	300	NA	NA
Acenaphthene	65.6	356	2	20
Acenaphthylene	65.6	356	2	20
Anthracene	65.6	356	2	20
Benzo(a)anthracene	0.615	38.4	2	20
Benzo(a)pyrene	0.615	38.4	2	20
Benzo(b)fluoranthene	0.615	38.4	2	20
Benzo(g,h,i)perylene	0.615	38.4	2	20
Benzo(k)fluoranthene	0.615	38.4	2	20
Butyl Benzyl Phthalate	15.9	47	NA	NA
Chrysene	0.615	38.4	2	20
Dibenzo(a,h)anthracene	0.615	38.4	2	20
Di-n-butyl Phthalate	550	1833	NA	NA
Fluoranthene	65.6	356	2	20
Fluorene	65.6	356	2	20
Indeno(1,2,3-cd)pyrene	0.615	38.4	2	20
Naphthalene	65.6	356	2	20
Phenanthrene	65.6	356	2	20
Pyrene	0.615	38.4	2	20
PESTICIDES/PCBs (mg/kg/day)				
4,4'-DDD	0.147	5.56	0.227	2.7
4,4'-DDE	0.147	5.56	0.227	2.7
4,4'-DDT	0.147	5.56	0.227	2.7
Total DDT	0.147	5.56	0.227	2.7
Aldrin	0.2	1	NA	NA
Alpha-Chlordane	4.58	9.16	2.14	10.7
Aroclor-1254	0.068	0.68	0.18	1.8
Aroclor-1260	0.068	0.68	0.18	1.8
alpha-BHC	0.014	0.14	0.56	2.25
beta-BHC	0.4	2	0.56	2.25
delta-BHC	0.014	0.14	0.56	2.25
Dieldrin	0.015	1.27	0.0709	0.8
Endosulfan I	0.15	1.5	10	100
Endosulfan II	0.15	1.5	10	100
Endosulfan sulfate	0.15	1.5	10	100
Endrin	0.092	0.92	0.01	0.1
Endrin Aldehyde	0.092	0.92	0.01	0.1
Endrin Ketone	0.092	0.92	0.01	0.1
Gamma-BHC (Lindane)	8	80	2	20
Gamma-Chlordane	4.58	9.16	2.14	10.7
Heptachlor	0.1	1	NA	NA
Heptachlor Epoxide	0.1	1	NA	NA
Methoxychlor	4	8	NA	NA
DIOXINS and FURANS (mg/kg/day)				
TCDD TEQ	0.000001	0.00001	0.000014	0.00014
INORGANICS (mg/kg/day)				
Antimony	0.059	2.76	NA	NA
Arsenic	1.04	4.55	2.24	4.51
Cadmium	0.8	6.9	1.5	6.3
Chromium	2.40	58.17	2.66	15.63
Copper	5.6	82.7	4.05	34.76
Cyanide	68.7	687	NA	NA
Lead	4.7	186.4	1.63	44.63
Mercury	0.032	0.16	0.0064	0.064
Nickel	1.70	14.77	6.71	18.57
Selenium	0.143	0.66	0.29	0.82
Silver	6.02	118.6	2.02	60.5
Thallium	0.0074	0.074	NA	NA
Vanadium	4.16	9.44	0.34	1.69
Zinc	75.4	298	66.1	171

Notes:
NA - NOAEL and LOAEL not available
See Table I-1 of Appendix I for the sources of the above values. The NOAELs and LOAELs in Table I-1 of Appendix I were divided by 10 if the values were derived from a subchronic study. If only a NOAEL was available, the value was multiplied by 10 to estimate the LOAEL. If only a LOAEL was available, the value was divided by 10 to estimate the NOAEL.

TABLE 7-2
A SUMMARY OF PRE-2009 SURFACE SOIL DATA COMPARED TO SOIL DATA COLLECTED IN AUGUST 2009
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Samples Collected Prior to August 2009					Samples Collected in August 2009				
	Frequency of Detection	Range of Detected Concentrations[1]			Mean[2]	Frequency of Detection	Range of Detected Concentrations[1]			Mean[2]
		Minimum		Maximum			Minimum		Maximum	
Inorganics (mg/kg)										
Aluminum	56/56	8200		24500	14900	12/12	15200		24600	19400
Antimony	13/39	0.64	L	10.4	5.33	8/12	0.22	L	1.6 L	0.562
Arsenic	49/49	0.37	J	13	5	12/12	3.4	L	6.2 L	4.6
Barium	56/56	47.6		232	101	12/12	77.7		246	124
Beryllium	30/30	0.62		2 K	1.07	12/12	0.7	K	1 K	0.86
Cadmium	19/44	0.22	J	18.4	1.91	4/5	1.8	L	7.4	3.54
Calcium	56/56	372		86400	3230	12/12	508	J	12300 J	2570
Chromium	56/56	6.4		26.8 J	19.7	12/12	18		35.8	23.9
Cobalt	56/56	5.2		12.2	8.55	12/12	6.5	J	10.4 J	8.25
Copper	56/56	9.9		170	23.7	12/12	11.4	K	182 K	64
Cyanide	6/58	0.1275		2.3	0.743	0/12				
Iron	56/56	13800		29700	19800	12/12	18200	J	70900 J	24500
Lead	56/56	3.2		90.5	31	12/12	12.8	J	379 J	69.9
Magnesium	56/56	553		50200	2660	12/12	1240	J	3020 J	1900
Manganese	56/56	318		1780	640	12/12	334		956	598
Mercury	17/56	0.038		0.77	0.127	12/12	0.021	J	0.65 K	0.142
Nickel	56/56	6.3		39	12.2	12/12	11.8	J	30.2 J	16.8
Potassium	54/56	245		2130	705	12/12	643		1400	921
Selenium	0/32					1/1	0.36	L	0.36 L	0.36
Silver	6/55	0.36	K	1.5 K	1.11	6/11	0.49		26.3 J	2
Sodium	35/56	26.2	L	884	449	2/2	180	K	224 K	202
Thallium	24/49	0.26	L	1.8 J	0.34	0/12				
Vanadium	56/56	16.5		45.7	29.8	12/12	22.7		43.4	32.9
Zinc	56/56	16.9		466	57.5	12/12	28.6		297	104
Pesticides and PCBs (µg/kg)										
4,4'-DDD	6/56	4.2	J	45	21.8	7/12	1.2	J	30	8.69
4,4'-DDE	9/56	0.57	J	100	23.3	8/12	1.2	J	210	30.4
4,4'-DDT	9/56	1.1	J	230 J	26.7	8/11	1.4	J	450	62.9
Aldrin	2/56	0.27	J	0.69 J	11.1	3/12	0.33	J	1.6 J	1.78
Alpha-BHC	0/56					3/12	0.86	J	5.6	2.2
Alpha-Chlordane	3/50	2.9	J	23 J	101	6/11	0.53	J	11 J	2.84
Aroclor-1254	3/56	13	J	84 J	103	0/12				
Aroclor-1260	2/56	12	J	36 L	204	1/12	62	J	150 J	28.1
beta-BHC	2/54	0.8	J	0.98 J	5.3	0/12				
Dieldrin	47/55	1.6	J	620 J	85.6	12/12	3.1	J	110	34
Endosulfan I	5/56	0.25	J	30	11.6	1/12	0.58	J	0.58 J	1.98
Endosulfan II	2/56	0.49	J	0.8 J	22.1	3/12	0.73	J	16 J	5.59
Endosulfan Sulfate	0/56					2/12	1.3	J	3.2 J	3.75
Endrin	0/56					2/11	0.61	J	16 J	5.78
Endrin Aldehyde	2/26	0.7	J	2.3 J	9.71	9/12	0.61	J	8 J	3.63
Endrin Ketone	1/56	0.29	J	0.29 J	22.1	4/12	0.93	J	9.6 J	4.32
Gamma-Chlordane	1/52	16	J	16 J	97.2	5/12	0.58	J	33 J	5.25
Gamma-BHC (Lindane)	1/56	1.1	J	1.1 J	5.58	0/12				
Heptachlor	0/56					2/12	0.71	J	3.9	2.14
Heptachlor Epoxide	7/55	0.55	J	15	11	5/12	0.57	J	20 J	5.67
Methoxychlor	0/56					1/12	5	J	5 J	19.6

TABLE 7-2
A SUMMARY OF PRE-2009 SURFACE SOIL DATA COMPARED TO SOIL DATA COLLECTED IN AUGUST 2009
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Samples Collected Prior to August 2009					Samples Collected in August 2009				
	Frequency of Detection	Range of Detected Concentrations[1]			Mean[2]	Frequency of Detection	Range of Detected Concentrations[1]			Mean[2]
		Minimum		Maximum			Minimum		Maximum	
Semivolatile Organic Compounds (µg/kg)										
1,2,4-Trichlorobenzene	1/56	150	J	150	J	289	0/12			
1,2-Dichlorobenzene	7/56	39	J	330	J	280	0/12			
1,4-Dichlorobenzene	12/56	39	J	160	J	266	0/12			
1-Methylnaphthalene	8/12	0.74	J	3.5	J	3.37	NA[3]			
2-Methylnaphthalene	10/56	1	J	9500	J	794	9/12	0.93	J	8.2 J	25.3
Acenaphthene	13/56	0.99	J	33000		783	10/12	0.8	J	29 J	6.69
Acenaphthylene	14/56	0.97	J	160	J	939	12/12	0.86	J	30 J	5.31
Anthracene	22/56	1.1	J	66000		1450	12/12	0.86	J	61 J	14.7
Benz(a)anthracene	43/56	4.2	J	65000		1500	12/12	7.5	J	270	73.4
Benzaldehyde	0/14						2/12	29	J	77 J	183
Benzo(a)pyrene	43/56	5.1	J	48000		1160	12/12	9.7	J	280	71.3
Benzo(b)fluoranthene	47/56	7.2	J	58000		1250	12/12	11		310	82.8
Benzo(g,h,i)perylene	33/56	3.7	J	13000	J	552	12/12	7.9	J	180 J	51
Benzo(k)fluoranthene	41/56	5.2	J	31000		872	12/12	10		290	78
Bis(2-ethylhexyl) Phthalate	16/44	38	J	540		1090	6/12	96	J	690	232
Butyl Benzyl Phthalate	1/56	330	J	330	J	502	0/12				
Carbazole	3/26	79	J	3200	J	282	0/12				
Chrysene	50/56	6.6	J	52000		1280	12/12	11		280	82.2
Di-n-butyl Phthalate	2/47	60	J	370	J	572	0/12				
Dibenz(a,h)anthracene	14/53	3.6	J	4800	J	741	12/12	1.7	J	51 J	16.9
Dibenzofuran	4/56	73	J	29000		744	0/12				
Fluoranthene	53/56	15		150000		3260	12/12	23		560	144
Fluorene	15/56	1	J	41000		929	12/12	0.73	J	34 J	6.7
Indeno(1,2,3-cd)pyrene	33/56	4.4	J	19000		665	12/12	8.2	J	210	58.9
Naphthalene	4/46	3.1	J	13000	J	614	0/12				
Phenanthrene	52/56	5.6	J	210000		4200	12/12	10	J	310	74.5
Pyrene	53/56	11		140000		3030	12/12	22		560	134
Volatile Organic Compounds (µg/kg)										
2-Butanone	10/44	4	J	15	J	11	5/6	10	J	20	13.7
Acetone	12/29	89		270		71.6	8/8	93	J	230 J	135
Benzene	0/44						1/12	1.4	J	1.4 J	5.23
Chloromethane	0/44						3/12	2.1	J	3.6 J	4.85
Methyl Acetate	1/14	5.5	J	5.5	J	3.48	0/12				
Toluene	8/44	1.7	J	15		5.69	1/12	2.2	J	2.2 J	5.36
Dioxins/Furans (ng/kg)										
TCDD TEQ[4]	2/2	4.5		12.6		8.55	NA[3]			

Notes:
(1) Excludes rejected and blank-qualified data.
(2) Mean of all data using one-half the detection limit for non-detected data; not calculated unless detected in at least one sample.
(3) Not analyzed.
(4) 2,3,7,8-TCDD toxic equivalents for mammals; see Table 7-6 for bird and fish TEQ values.
J Estimated value due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K Positive result is considered biased high due to exceedance of technical quality control criteria.
L Positive result is considered biased low due to exceedance of technical quality control criteria.

TABLE 7-3
SOIL BIOACCUMULATION FACTORS (BAFs) AND BIOTA-SEDIMENT ACCUMULATION FACTORS (BSAFs)
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Plant BAFs[1]		Earthworm BAFs[2]		Fish/Invertebrate BSAFs[3]	
Chemicals	**Conservative**	**Average**	**Conservative**	**Average**	**Conservative**	**Average**
Semivolatile Organics						
1,2,4-Trichlorobenzene	0.18	0.18	1	1	1	1
1,2-Dichlorobenzene	0.405	0.405	1	1	1	1
1,4-Dichlorobenzene	0.405	0.405	1	1	1	1
Acenaphthene	Eco-SSL	Eco-SSL	1.47	1.47	0.29	0.29
Acenaphthylene	Eco-SSL	Eco-SSL	22.9	22.9	0.29	0.29
Anthracene	Eco-SSL	Eco-SSL	2.42	2.42	0.29	0.29
Benzo(a)anthracene	Eco-SSL	Eco-SSL	1.59	1.59	0.29	0.29
Benzo(a)pyrene	Eco-SSL	Eco-SSL	1.33	1.33	0.29	0.29
Benzo(b)fluoranthene	Eco-SSL	Eco-SSL	2.6	2.6	0.29	0.29
Benzo(g,h,i)perylene	Eco-SSL	Eco-SSL	2.94	2.94	0.29	0.29
Benzo(k)fluoranthene	Eco-SSL	Eco-SSL	2.6	2.6	0.29	0.29
Butyl Benzyl Phthalate	0.055	0.055	1	1	1	1
Chrysene	Eco-SSL	Eco-SSL	2.29	2.29	0.29	0.29
Dibenzo(a,h)anthracene	Eco-SSL	Eco-SSL	2.31	2.31	0.29	0.29
Di-n-butyl Phthalate	0.055	0.055	1	1	1	1
Fluoranthene	Eco-SSL	Eco-SSL	3.04	3.04	0.29	0.29
Fluorene	0.11	0.11	9.57	9.57	0.29	0.29
Indeno(1,2,3-cd)pyrene	Eco-SSL	Eco-SSL	2.86	2.86	0.29	0.29
Naphthalene	0.46	0.46	4.4	4.4	0.29	0.29
Phenanthrene	Eco-SSL	Eco-SSL	1.72	1.72	0.29	0.29
Pyrene	Eco-SSL	Eco-SSL	1.75	1.75	0.29	0.29
Pesticides/ PCBs						
4,4'-DDD	NV[4]	NV[4]	Eco-SSL	Eco-SSL	0.28	0.28
4,4'-DDE	NV[4]	NV[4]	Eco-SSL	Eco-SSL	7.7	7.7
4,4'-DDT	NV[4]	NV[4]	Eco-SSL	Eco-SSL	1.67	1.67
Total DDT	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	7.7	7.7
Aldrin	0.691	0.691	3.3	3.3	1.8	1.8
Alpha-Chlordane	0.0245	0.0245	5	5	4.77	4.77
Aroclor-1254	0.0126	0.0126	15.909	6.667	1.85	1.85
Aroclor-1260	0.0029	0.0029	15.909	6.667	1.85	1.85
alpha-BHC	0.21	0.21	5	5	1.8	1.8
beta-BHC	0.182	0.182	5	5	1.8	1.8
delta-BHC	0.9	0.9	5	5	1.8	1.8
Dieldrin	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	1.8	1.8
Endosulfan I	0.332	0.332	1	1	1.8	1.8
Endosulfan II	0.332	0.332	1	1	1.8	1.8
Endosulfan sulfate	0.332	0.332	1	1	1.8	1.8
Endrin	0.0816	0.0816	3.6	3.6	1.8	1.8
Endrin Aldehyde	0.0816	0.0816	3.6	3.6	1.8	1.8
Endrin Ketone	0.0816	0.0816	3.6	3.6	1.8	1.8
Gamma-BHC (Lindane)	0.272	0.272	5	5	1.8	1.8
Gamma-Chlordane	0.0245	0.0245	5	5	2.22	2.22
Heptachlor	0.122	0.122	10	10	1.8	1.8
Heptachlor Epoxide	0.028	0.028	10	10	1.8	1.8
Methoxychlor	0.107	0.107	1	1	1.8	1.8
Dioxins						
2,3,7,8-TCDD (TEQ)	0.0043	0.0043	22.229[5]	11.011[5]	0.025	0.025

TABLE 7-3
SOIL BIOACCUMULATION FACTORS (BAFs) AND BIOTA-SEDIMENT ACCUMULATION FACTORS (BSAFs)
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Plant BAFs(1)		Earthworm BAFs(2)		Fish/Invertebrate BSAFs(3)	
Chemicals	**Conservative**	**Average**	**Conservative**	**Average**	**Conservative**	**Average**
Inorganics						
Antimony	Eco-SSL	Eco-SSL	1	1	1	1
Arsenic	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	0.69	0.143
Cadmium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	7.99	0.6
Chromium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	0.468	0.1
Copper	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	5.25	1.556
Cyanide	8.75	8.75	1	1	1	1
Lead	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	0.607	0.071
Mercury	5	0.652	Sample et al (1998) regression	Sample et al (1998) regression	2.868	1.136
Nickel	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	2.32	0.486
Selenium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	1	1
Silver	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	1	1
Thallium	0.004	0.004	1	1	1	1
Vanadium	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	1	1
Zinc	Eco-SSL	Eco-SSL	Eco-SSL	Eco-SSL	7.527	1.936

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
Conservative and average refers to the exposure scenarios for which the uptake factors are used (see Section 7.3)
(1) "Eco-SSL" indicates that equations from Tables 4a and 4b of Attachment 4-1 of USEPA (2005) were used to estimate tissue concentrations. Other values are from ORNL (2009).
(2) See Appendix I for sources of soil-to-earthworm BAFs for semivolatile organics and pesticides.
(3) BSAFs for organic compounds are from USEPA (2004); only one value is available for conservative and average scenarios. BSAFs for inorganics are from ORNL (1998). Conservative value is 90th percentile, average value is median from source document.
(4) USEPA (2005) provided a soil-to-plant BAF for total DDT but not for individual DDT isomers. Because the soil-to-plant uptake of DDT and its isomers is extremely low, assigning a default BAF of 1 would be unrealistically high, as evidenced by USEPA's (2005) soil-to-plant BAF for total DDT of ln(plant conc.) = 0.7524 × ln(soil conc.) - 2.5119; this equation results in a predicted total DDT concentration in vegetation of 0.0597 mg/kg when using the maximum Site 3 soil concentration of 0.666 mg/kg total DDT. Thus, estimated vegetation concentrations of individual DDT isomers were not calculated, and instead, DDT isomers were evaluated primarily by using total DDT concentrations.
(5) Sample et al (1998).
Default value of 1 is assigned to parameters without uptake factors., except as noted in footnote #4.

TABLE 7-4
FOOD CHAIN EXPOSURE PARAMETERS FOR TERRESTRIAL WILDLIFE
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Species/Exposure Inputs	Conservative Scenario[1]		Average Scenario[2]	
	Values	Units	Values	Units
American Robin				
Body Weight	0.0773	kg	0.0804	kg
Food Ingestion Rate[3]	0.01247	kg/day	0.01188	kg/day
Water Ingestion Rate	0.01207	L/day	0.01134	L/day
Soil Ingestion Rate	0.00205	kg/day	0.00076	kg/day
Short-Tailed Shrew				
Body Weight	0.0150	kg	0.0161	kg
Food Ingestion Rate[3]	0.00160	kg/day	0.00143	kg/day
Water Ingestion Rate	0.00428	L/day	0.00360	L/day
Soil Ingestion Rate	0.00005	kg/day	0.00001	kg/day
Bobwhite Quail				
Body Weight	0.154	kg	0.175	kg
Food Ingestion Rate[3]	0.01628	kg/day	0.01366	kg/day
Water Ingestion Rate	0.02276	L/day	0.01926	L/day
Soil Ingestion Rate	0.00226	kg/day	0.00083	kg/day
Meadow Vole				
Body Weight	0.017	kg	0.0358	kg
Food Ingestion Rate[3]	0.00376	kg/day	0.00349	kg/day
Water Ingestion Rate	0.00751	L/day	0.00626	L/day
Soil Ingestion Rate	0.00012	kg/day	0.00004	kg/day
Green Heron				
Body Weight	0.2000	kg	0.2120	kg
Food Ingestion Rate[3]	0.03100	kg/day	0.03000	kg/day
Water Ingestion Rate	0.02200	L/day	0.02100	L/day
Sediment Ingestion Rate	0.00160	kg/day	0.00150	kg/day
Mink				
Body Weight	0.5500	kg	1.10313	kg
Food Ingestion Rate[3]	0.06067	kg/day	0.04504	kg/day
Water Ingestion Rate	0.12134	L/day	0.07308	L/day
Sediment Ingestion Rate	0.00570	kg/day	0.00423	kg/day
Woodchuck [4]				
Body Weight	4.6	kg	4.6	kg
Food Ingestion Rate[3]	0.15	kg/day	0.129	kg/day
Soil Ingestion Rate	0.003	kg/day	0.0026	kg/day

(1) Values used in screening level ecological risk assessment (see Sections 7.3). The derivation of values in this table is presented in Section 7-3 and Table 7-5.

(2) Values used in Step 3A (see Section 7.5).

(3) Food ingestion rates are dry-weight values.

(4) Water ingestion was not included in dose calculations for the woodchuck; see Section 7.3 of text.

TABLE 7-5

DERIVATION OF BODY WEIGHT, FOOD INTAKE, AND WATER INTAKE FACTORS FOR REPRESENTATIVE WILDLIFE RECEPTORS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Species/Factor	Age/Sex/ Season[a]	Value	Study Average	Derivation of Factors Used in Food Chain Modeling			
American Robin[b]							
Body Weight (g)	A B	77.3	77.3	Minimum Value	0.0773	kg	
				Maximum Value	0.0862	kg	
	A M nonbreeding	86.2		Overall Average	0.0804	kg	
	A F nonbreeding	83.6	84.9				
	A M breeding	77.4					
	A F breeding	80.6	79				
Food Ingestion Rate (g/g/day)	B B free-living	0.89		Based on Metabolic Scaling (Nagy et al., 1999)			
				Conservative value:	0.01247	kg/day	Used maximum body weight in below equation
	- B free-living	1.52					
				Average value	0.01188	kg/day	Used average body weight in below equation
				Dry weight food ingestion (FI) rates were calculated from Nagy et al.(1999) for insectivorous birds as follows:			
	Overall Average		1.21				$FI = (9.7 \times BW(g)^{0.705})/18kJ/g/1000$
Water Ingestion Rate (g/g/day)	A B	0.14		Conservative value:	0.0121	L/day	Ingestion rate × Maximum Body weight
				Average value	0.0113	L/day	Ingestion rate × Average Body weight
Short-Tailed Shrew[b]							
Body Weight (g)	A B	15	15	Minimum Value	0.0150	kg	
				Maximum Value	0.01921	kg	
	M summer	19.21	17.27	Overall Study Average	0.01613	kg	
	F summer	17.4					
	M fall	16.87					
	M fall	15.58					
Food Ingestion Rate (g/g/day)	A B	0.49		Conservative value:	0.0016	kg/day	Maximum ingestion rate × Average Body weight × 0.16[c]
	A B	0.62		Average value	0.00143	kg/day	Average ingestion rate × Average Body weight × 0.16[c]
	Overall Average		0.555				
Water Ingestion Rate (g/g/day)	A B	0.223		Conservative value:	0.00428	L/day	Ingestion rate × Maximum Body weight
				Average value	0.00360	L/day	Ingestion rate × Average Body weight

TABLE 7-5

DERIVATION OF BODY WEIGHT, FOOD INTAKE, AND WATER INTAKE FACTORS FOR REPRESENTATIVE WILDLIFE RECEPTORS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Species/Factor	Age/Sex/ Season[a]	Value	Study Average	Derivation of Factors Used in Food Chain Modeling			
Mink[b]							
Body Weight (g)	A M spring	1734	1354	Minimum Value	0.550	kg	
	A F spring	974		Maximum Value	1.734	kg	
				Overall Study Average	1.1031	kg	
	A M summer	1040	852				
	A M fall	1233					
	A F summer	550					
	A F fall	586					
Food Ingestion Rate (g/g/day)	A M summer	0.13	0.13	Conservative value:	0.0607	kg/day	Maximum ingestion rate × Average Body weight × 0.25[d]
	A M winter	0.12	0.14	Average value	0.04504	kg/day	Average ingestion rate × Average Body weight × 0.25[d]
	A F winter	0.16					
	A M yr-round	0.22	0.22				
	Overall Average		0.163				
Water Ingestion Rate (g/g/day)	A F	0.11	0.105	Conservative value:	0.1213	kg/day	Maximum ingestion rate × Average Body weight
	A M	0.099					
				Average value	0.07308	kg/day	Average ingestion rate × Average Body weight
	A F	0.028	0.028				
	Overall Average		0.0663				
Meadow Vole[b]							
Body Weight (g)	A M summer	40	36.7	Minimum Value	0.017	kg	
	A F summer	33.4		Maximum Value	0.052	kg	
				Overall Study Average	0.0358	kg	
	A M spring	52.4	48.0				
	A F spring	43.5					
	A B spring	26	21.2				
	A B summer	24.3					
	A B fall	17					
	A B winter	17.5					
	A M	35.5	37.3				
	A F	39					
Food Ingestion Rate (g/g/day)		0.3	0.325	Conservative value:	0.003756	kg/day	Maximum ingestion rate × Average Body weight × 0.3 [e]
		0.35					
				Average value	0.003488	kg/day	Average ingestion rate × Average Body weight × 0.3[e]
Water Ingestion Rate	A B	0.21	0.18	Conservative value:	0.007513	L/day	Maximum ingestion rate × Average Body weight
	A B	0.14		Average value	0.006261	L/day	Average ingestion rate × Average Body weight

TABLE 7-5

DERIVATION OF BODY WEIGHT, FOOD INTAKE, AND WATER INTAKE FACTORS FOR REPRESENTATIVE WILDLIFE RECEPTORS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Species/Factor	Age/Sex/ Season[(a)]	Value	Study Average	Derivation of Factors Used in Food Chain Modeling			
Northern Bobwhite Quail[(b)]							
Body Weight (g)	A B fall	189.9	191	Minimum Value	0.154	kg	
	A B winter	193.9		Maximum Value	0.194	kg	
	A B spring	190		Overall Average	0.1751	kg	
	A M winter	181	177				
	A M summer	163					
	A F winter	183					
	A F summer	180					
	A M winter	161	157				
	A M summer	154					
	A F winter	157					
	A F summer	157					
Food Ingestion Rate (g/g/ay)	A B winter	0.093	0.078	Conservative value:	0.01628	kg/day	Maximum ingestion rate × Average Body weight
	A B spring	0.067					
	A B summer	0.079		Average value	0.01366	kg/day	Average ingestion rate × Average Body weight
	A B fall	0.072					
Water Ingestion Rate (g/g/day)	A M summer	0.1	0.11	Conservative value:	0.022763	L/day	Maximum ingestion rate × Average Body weight
	A F summer	0.13					
	A M summer	0.11		Average value	0.019261	L/day	Average ingestion rate × Average Body weight
	A F summer	0.1					
Green Heron[(f)]							
Body Weight (g)	AB	212	212	Mean of 34 adults from Florida = 212 g, standard deviation = 5.92 g (Dunning, 1993)			
				Conservative value:	0.200	kg	Mean minus 2 standard deviations (Dunning, 1993)
				Average value	0.212	kg	Mean (Dunning, 1993)
Food Ingestion Rate (g/g/day)				Conservative value:	0.031	kg/day	Using allometric equation from Nagy (2001) for 0.224 kg marine bird (0.224 kg = mean plus 2 standard deviations from Dunning (1993) green heron data)
				Average value	0.030	kg/day	Using allometric equation from Nagy (2001) for 0.212 kg marine bird
Water Ingestion Rate (L/day)				Conservative value:	0.022	L/day	Using equation 3-15 from USEPA (1993) for 0.224 kg bird
				Average value	0.021	L/day	Using equation 3-15 from USEPA (1993) for 0.212 kg bird
Woodchuck[(f)]							
Body Weight (kg)	A M	4.6		Mean of males trapped in New York (Boyd et al, 1985); only one value available, so used for conservative and average scenarios.			
Food Ingestion Rate (kg/day)	A M	0.15		Conservative value:	0.15	kg/day	Maximum value during 12 weeks in captivity (Boyd et al, 1985).
	A M	0.129		Average value:	0.129	kg/day	Measured value prior to hibernation (Boyd et al, 1985).

Notes:
(a) A=adult, M=male, F=female, B=both sexes
(b) Data are from Wildlife Exposure Factors Handbook (USEPA, 1993b) unless noted otherwise.
(c) Food ingestion was multiplied by 0.16 (based on 84 percent moisture content in earthworms) to convert to dry weight ingestion rate.
(d) Food ingestion was multiplied by 0.25 (based on 75 percent moisture content in fish) to convert to dry weight ingestion rate.
(e) Food ingestion was multiplied by 0.30 (based on 70 percent moisture content in plant food) to convert to dry weight ingestion rate.
(f) This species not included in USEPA (1993b). Values obtained from other sources as shown.

TABLE 7-6
SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Frequency of Detection	Range of Detected Concentrations[1]		Location of Maximum Concentration	Ecological Screening Value[2]			Maximum Hazard Quotient[4]	COPC (Yes/No)	Rationale for COPC Selection[5]
		Minimum	Maximum		Invertebrates	Plants	Wildlife[3]			
INORGANICS (mg/kg)										
Aluminum	68/68	8200	24600	03SS41	NA	50	NA	492	Yes	ASV, NSV
Antimony	21/51	0.22	10.4	03SB01_19910906	78	5	0.27	38.5	Yes	ASV
Arsenic	61/61	0.37	13	03SB10_19910906	60	18	43	0.7	Yes	BIO
Barium	68/68	47.6	246	03SS37	330	500	2000	0.7	No	BSV
Beryllium	42/42	0.62	2	03-SS-23	40	10	21	0.2	No	BSV
Cadmium	23/49	0.22	18.4	03SS09_19970408	140	32	0.36	51.1	Yes	ASV, BIO
Calcium	68/68	372	86400	03SB06_19910906	NA	NA	NA	NA	No	Nutrient
Chromium	68/68	6.4	35.8	03SS35	400	1000	26	1.4	Yes	ASV, BIO
Cobalt	68/68	5.2	12.2	03SB15_19910906	1000[6]	13	120	0.9	No	BSV
Copper	68/68	9.9	182	03SS37	80	70	28	6.5	Yes	ASV, BIO
Cyanide	6/68	0.11	2.3	03SS09_19970408	NA	NA	1.33	1.7	Yes	ASV, NSV
Iron	68/68	13800	70900	03SS35	200[6]	NA	NA	354.5	Yes	ASV, NSV
Lead	68/68	3.2	379	03SS35	1700	120	11	34.5	Yes	ASV, BIO
Magnesium	68/68	553	50200	03SB06_19910906	NA	NA	NA	NA	No	Nutrient
Manganese	68/68	318	1780	03SS11_19910905	450	220	4000	8.1	Yes	ASV
Mercury	29/68	0.021	0.77	03-SS-23	0.1	0.3	NA	7.7	Yes	ASV, BIO
Nickel	68/68	6.3	39	03SB06_19910906-D	280	38	130	1.03	Yes	ASV, BIO
Potassium	66/68	245	2130	03SS11_19970408	NA	NA	NA	NA	No	Nutrient
Selenium	1/33	0.36	0.36	03SS32	4.1	0.52	0.63	0.7	Yes	BIO
Silver	12/66	0.36	26.3	03SS35	NA	560	4.2	6.3	Yes	ASV, NSV, BIO
Sodium	37/58	26.2	884	03SB12_19910906	NA	NA	NA	NA	No	Nutrient
Thallium	24/61	0.26	1.8	03-SS-20	NA	1	0.0569	31.6	Yes	ASV, NSV
Vanadium	68/68	16.5	45.7	03-SS-25	NA	2	7.8	22.9	Yes	ASV, NSV
Zinc	68/68	16.9	466	03-SS-23	120	160	46	10.1	Yes	ASV, BIO
PESTICIDES and PCBs (µg/kg)										
4,4'-DDD	13/68	1.2	45	03-SS-18	NA	NA	21	2.1	Yes	ASV, NSV, BIO
4,4'-DDE	17/68	0.57	210	03SS35	NA	NA	21	10.0	Yes	ASV, NSV, BIO
4,4'-DDT	17/67	1.1	450	03SS35	NA	NA	21	21.4	Yes	ASV, NSV, BIO
Total DDT	17/68	0.57	666	03SS35	NA	NA	21	31.7	Yes	ASV, NSV, BIO
Aldrin	5/68	0.27	1.6	03SS34	NA	3.32	NA	0.5	Yes	NSV, BIO
Alpha-BHC	3/68	0.86	5.6	03SS38	NA	NA	99.4	0.1	Yes	NSV, BIO
Alpha-Chlordane	9/61	0.53	23	03TP12-0102-03-20070504	NA	224	NA	0.1	Yes	NSV, BIO
Aroclor-1254	3/68	13	84	03SS09_19970408	NA	40000	0.332	253.0	Yes	ASV, NSV, BIO
Aroclor-1260	3/68	12	150	03SS35-D	NA	40000	0.332	451.8	Yes	ASV, NSV, BIO

TABLE 7-6
SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Frequency of Detection	Range of Detected Concentrations[1]		Location of Maximum Concentration	Ecological Screening Value[2]			Maximum Hazard Quotient[4]	COPC (Yes/No)	Rationale for COPC Selection[5]
		Minimum	Maximum		Invertebrates	Plants	Wildlife[3]			
Beta-BHC	2/66	0.8	0.98	03-SS-24	NA	3.98	NA	0.2	Yes	NSV, BIO
Dieldrin	59/67	1.6	620	03SS12_19970408	NA	NA	4.9	126.5	Yes	ASV, NSV, BIO
Endosulfan I	6/68	0.25	30	03SB13_19910906	NA	NA	119	0.3	Yes	NSV, BIO
Endosulfan II	5/68	0.49	16	03SS35-D	NA	NA	119	0.1	Yes	NSV, BIO
Endosulfan Sulfate	2/68	1.3	3.2	03SS34	NA	NA	35.8	0.1	Yes	NSV, BIO
Endrin	2/67	0.61	16	03SS35-D	NA	NA	10.1	1.6	Yes	ASV, NSV, BIO
Endrin Aldehyde	11/38	0.61	8	03SS32	NA	NA	10.5	0.8	Yes	NSV, BIO
Endrin Ketone	5/68	0.29	9.6	03SS38	NA	NA	NA	NA	Yes	NSV, BIO
Gamma-BHC (Lindane)	1/68	1.1	1.1	03TP12-0102-03-20070504	NA	5	NA	0.2	Yes	NSV, BIO
Gamma-Chlordane	6/64	0.58	33	03SS35-D	NA	224	NA	0.1	Yes	NSV, BIO
Heptachlor	2/68	0.71	3.9	03SS31	NA	NA	5.98	0.7	Yes	NSV, BIO
Heptachlor Epoxide	12/67	0.55	20	03SS35-D	NA	NA	152	0.1	Yes	NSV, BIO
Methoxychlor	1/68	5	5	03SS32	NA	NA	19.9	0.3	Yes	NSV, BIO
SEMIVOLATILES (µg/kg)										
1,2,4-Trichlorobenzene	1/68	150	150	03SB07_19910906	20000	NA	11100	0.01	Yes	NSV, BIO
1,2-Dichlorobenzene	7/68	39	330	03SB07_19910906	NA	NA	2960	0.1	Yes	NSV, BIO
1,4-Dichlorobenzene	12/68	39	160	03SB01_19910906	20000	NA	546	0.3	Yes	NSV, BIO
1-Methylnaphthalene	8/12	0.74	3.5	03-SS-27	29000	NA	100000	0.0001	Yes	NSV
2-Methylnaphthalene	19/68	0.93	9500	03SB06_19910906	29000	NA	100000	0.3	Yes	NSV
Acenaphthene	23/68	0.8	33000	03SB06_19910906	29000	20000	100000	1.7	Yes	ASV, BIO
Acenaphthylene	26/68	0.86	160	03SB01_19910906	29000	NA	100000	0.01	Yes	NSV, BIO
Anthracene	34/68	0.86	66000	03SB06_19910906	29000	NA	100000	2.3	Yes	ASV, NSV, BIO
Benz(a)anthracene	55/68	4.2	65000	03SB06_19910906	18000	NA	1100	59.1	Yes	ASV, NSV, BIO
Benzaldehyde	2/26	29	77	03SS40	NA	NA	NA	NA	Yes	NSV
Benzo(a)pyrene	55/68	5.1	48000	03SB06_19910906	18000	NA	1100	43.6	Yes	ASV, NSV, BIO
Benzo(b)fluoranthene	59/68	7.2	58000	03SB06_19910906	18000	NA	1100	52.7	Yes	ASV, NSV, BIO
Benzo(g,h,i)perylene	45/68	3.7	13000	03SB06_19910906	18000	NA	1100	11.8	Yes	ASV, NSV, BIO
Benzo(k)fluoranthene	53/68	5.2	31000	03SB06_19910906	18000	NA	1100	28.2	Yes	ASV, NSV, BIO
Bis(2-ethylhexyl) Phthalate	22/56	38	690	03SS36	NA	NA	925	0.7	Yes	NSV
Butyl Benzyl Phthalate	1/68	330	330	03SS09_19970408	NA	NA	239	1.4	Yes	ASV, NSV
Carbazole	3/38	79	3200	03TP12-0102-03-20070504	NA	NA	NA	NA	Yes	NSV
Chrysene	62/68	6.6	52000	03SB06_19910906	18000	NA	1100	47.3	Yes	ASV, NSV, BIO
Di-n-butyl Phthalate	2/59	60	370	03SS07_19910905	NA	200000	150	2.5	Yes	ASV, NSV
Dibenz(a,h)anthracene	26/65	1.7	4800	03SB06_19910906	18000	NA	1100	4.4	Yes	ASV, NSV, BIO
Dibenzofuran	4/68	73	29000	03SB06_19910906	NA	NA	NA	NA	Yes	NSV

TABLE 7-6
SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Frequency of Detection	Range of Detected Concentrations(1)		Location of Maximum Concentration	Ecological Screening Value(2)			Maximum Hazard Quotient(4)	COPC (Yes/No)	Rationale for COPC Selection(5)
		Minimum	Maximum		Invertebrates	Plants	Wildlife(3)			
Fluoranthene	65/68	15	150000	03SB06_19910906	29000	NA	100000	5.2	Yes	ASV, NSV, BIO
Fluorene	27/68	0.73	41000	03SB06_19910906	29000	NA	100000	1.4	Yes	ASV, NSV, BIO
Indeno(1,2,3-cd)pyrene	45/68	4.4	19000	03SB06_19910906	18000	NA	1100	17.3	Yes	ASV, NSV, BIO
Naphthalene	4/48	3.1	13000	03SB06_19910906	29000	NA	100000	0.4	Yes	NSV
Phenanthrene	64/68	5.6	210000	03SB06_19910906	29000	NA	100000	7.2	Yes	ASV, NSV, BIO
Pyrene	65/68	11	140000	03SB06_19910906	18000	NA	1100	127	Yes	ASV, NSV, BIO
Total PAHs	65/68	71.6	953,300	03SB06_19910906	NA	NA	NA	NA	Yes	NSV, BIO
VOLATILES (µg/kg)										
2-Butanone	15/50	4	20	03SS40	NA	NA	NA	NA	Yes	NSV
Acetone	20/37	89	270	03-SS-26	NA	NA	2500	0.1	Yes	NSV
Benzene	1/56	1.4	1.4	03SS32	NA	NA	255	0.01	Yes	NSV
Chloromethane	3/56	2.1	3.6	03SS32	NA	NA	10400	0.0003	Yes	NSV
Methyl Acetate	1/26	5.5	5.5	03-SS-21	NA	NA	NA	NA	Yes	NSV
Toluene	9/56	1.7	15	03-SS-18	NA	200000	5450	0.003	Yes	NSV
DIOXINX/FURANS (ng/kg)										
TCDD TEQ (mammal)(7)	2/2	4.51	12.55	03SS04_19970408	NA	NA	0.199	63.1	Yes	ASV, BIO
TCDD TEQ (bird)(7)	2/2	1.66	31.08	03SS04_19970408	NA	NA	0.199	156.2	Yes	ASV, BIO
TCDD TEQ (fish)(7)	2/2	0.59	7.21	03SS04_19970408	NA	NA	0.199	36.2	Yes	ASV, BIO

Footnotes:
(1) The duplicate pair was treated as one result with the exception of the minimum and maximum concentrations.
(2) Ecological screening values are preferentially USEPA's Ecological Soil Screening Levels (Eco-SSLs). NOAA's Screening Quick Reference Tables (Buchman 2008) were used for chemicals that do not have an Eco-SSL. Shading indicates that the ecological screening value was exceeded in one or more Site 3 surface soil samples.
(3) For analytes with a USEPA Eco-SSL, the value is the lowest of avian and mammal Eco-SSLs. Otherwise, the "mammal" value from NOAA's Screening Quick Reference Tables was used.
(4) Maximum hazard quotient = maximum detected concentration ÷ lowest ecological screening value.
(5) Rationale codes: ASV=maximum concentration is greater than ecological screening value for one or more assessment endpoints (invertebrates, plants, wildlife).
BIO=chemical identified by USEPA (2000) as bioaccumulative.
BSV=maximum concentration is equal to or less than all three ecological screening values.
NSV=ecological screening value not available for one or more assessment endpoints (invertebrates, plants, wildlife).
Nutrient=essential nutrient
(6) Ecological screening value for invertebrates not available; value shown is the ecological screening value for soil microbes and microbial processes.
(7) 2,3,7,8-TCDD toxic equivalents; concentrations were calculated by assigning a value of one-half the detection limit for non-detected congeners.
NA: Ecological screening value not available.

TABLE 7-7

SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN BY ASSESSMENT ENDPOINT
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Assessment Endpoint[1]		
	Invertebrates[2]	Plants[2]	Wildlife[3]
INORGANICS (mg/kg)			
Aluminum	X	X	
Antimony		X	X
Arsenic			X
Cadmium			X
Chromium			X
Copper	X	X	X
Cyanide	X	X	X
Iron	X	X	
Lead			X
Manganese	X	X	
Mercury	X	X	X
Nickel		X	X
Selenium			X
Silver	X		X
Thallium	X	X	X
Vanadium	X	X	X
Zinc	X	X	X
PESTICIDES/PCBs (µg/kg)			
4,4'-DDD	X	X	X
4,4'-DDE	X	X	X
4,4'-DDT	X	X	X
Total DDT	X	X	X
Aldrin	X		X
Alpha-BHC	X	X	X
Alpha-Chlordane	X		X
Aroclor-1254	X		X
Aroclor-1260	X		X
Beta-BHC	X		X
Dieldrin	X	X	X
Endosulfan I	X	X	X
Endosulfan II	X	X	X
Endosulfan Sulfate	X	X	X
Endrin	X	X	X
Endrin Aldehyde	X	X	X
Endrin Ketone	X	X	X
Gamma-BHC (Lindane)	X		X
Gamma-Chlordane	X		X
Heptachlor	X	X	X
Heptachlor Epoxide	X	X	X
Methoxychlor	X	X	X
SEMIVOLATILES (µg/kg)			
1,2,4-Trichlorobenzene		X	X
1,2-Dichlorobenzene	X	X	X
1,4-Dichlorobenzene		X	X
1-Methylnaphthalene		X	

TABLE 7-7

SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN BY ASSESSMENT ENDPOINT
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Assessment Endpoint(1)		
	Invertebrates(2)	Plants(2)	Wildlife(3)
2-Methylnaphthalene		X	
Acenaphthene	X	X	X
Acenaphthylene		X	X
Anthracene	X	X	X
Benzaldehyde	X	X	
Benz(a)anthracene	X	X	X
Benzo(a)pyrene	X	X	X
Benzo(b)fluoranthene	X	X	X
Benzo(g,h,i)perylene		X	X
Benzo(k)fluoranthene	X	X	X
Bis(2-ethylhexyl) Phthalate	X	X	
Butyl Benzyl Phthalate	X	X	X
Carbazole	X	X	
Chrysene	X	X	X
Di-n-butyl Phthalate	X		X
Dibenz(a,h)anthracene		X	X
Dibenzofuran	X	X	
Fluoranthene	X	X	X
Fluorene	X	X	X
Indeno(1,2,3-cd)pyrene	X	X	X
Naphthalene		X	
Phenanthrene	X	X	X
Pyrene	X	X	X
Total PAHs	X	X	X
VOLATILES (µg/kg)			
2-Butanone	X	X	
Acetone	X	X	
Benzene	X	X	
Chloromethane	X	X	
Methyl Acetate	X	X	
Toluene	X		
DIOXINX/FURANS (ng/kg)			
TEQ	X	X	X

Footnotes:

This table is derived from Table 7-6. An "X" indicates that the chemical was retained as an ecological chemical of potential concern for that particular assessment endpoint.

(1) See Section 7.1.5 of text for a complete description of assessment endpoints.

(2) Chemicals in surface soil were retained as ecological COPCs for invertebrates or plants if the maximum detected concentration exceeded the associated screening value, or if an ecological screening value was not available.

(3) Chemicals in surface soil were retained as ecological COPCs for wildlife if the chemical was identified by USEPA (2000) as bioaccumulative, or if the maximum detected concentration exceeded the "wildlife" ecological screening value in Table 7-6.

TABLE 7-8

DATA SUMMARY FOR SUBSURFACE SOIL[1]
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS[2]		MEAN OF ALL DATA	MEAN OF DETECTED DATA	LOCATION OF MAXIMUM CONCENTRATION	RANGE OF NONDETECTS[3]	ECOLOGICAL SCREENING VALUE[4]	MAXIMUM HAZARD QUOTIENT (HQ)	NUMBER OF DETECTS > SCREENING VALUE	NUMBER OF NONDETECTS > SCREENING VALUE
		MINIMUM	MAXIMUM								
INORGANICS (mg/kg)											
Aluminum	20/20	10400	74700	23800	23800	03TP19-0304-02		50	1494	20	
Antimony	6/16	2.0975	281	31.2	82.2	03TP27-0304-01-D	0.38-9.3	0.27	1041	6	10
Arsenic	20/20	2	49.9	7.42	7.42	03TP27-0304-01		18	2.8	1	
Barium	20/20	45.2	859	222	222	03TP19-0304-02		330	2.6	5	
Beryllium	14/14	0.67	1.3	0.96	0.96	03TP10-0304-02-20070503		10	0.13		
Cadmium	8/16	1.4	237	31.6	63.2	03TP19-0304-02	0.082-0.088	0.36	658	8	
Calcium	20/20	253	71900	7740	7740	03TP27-0304-01-D		---	---	---	---
Chromium	20/20	4.2	295	45.5	45.5	03TP27-0304-01		26	11.3	6	
Cobalt	20/20	4.1	121	13.3	13.3	03TP27-0304-01-D		13	9.3	5	
Copper	20/20	9.3	6340	713	713	03TP19-0304-02		28	226	12	
Cyanide	9/20	0.13	3.9	0.602	0.96	03TP27-0304-01-D	0.09-2.3	1.33	2.9	2	1
Iron	20/20	9570	193000	44500	44500	03TP19-0304-02		200	965	20	
Lead	20/20	2.2	4410	582	582	03TP27-0304-01-D		11	401	13	
Magnesium	20/20	408	8650	2570	2570	03TP08-0203-03-20070502		4400	2.0	4	
Manganese	20/20	221	2610	927	927	03TP19-0304-02		220	11.9	20	
Mercury	19/20	0.024	6.7	0.595	0.626	03TP27-0304-02	0.017	0.1	67	8	
Nickel	20/20	7.4	281	54.3	54.3	03TP27-0304-02		38	7.4	5	
Potassium	17/17	168	2250	752	752	03TP27-0304-01		---	---	---	---
Selenium	1/12	0.55	0.55	0.213	0.55	03TP08-0203-03-20070502	0.31-0.82	0.52	1.1	1	1
Silver	7/17	0.64	34.7	6.71	16.2	03TP27-0304-02	0.035-1.2	4.2	8.3	5	
Sodium	8/10	26.2	1830	414	460	03TP27-0304-01	18.8-917	---	---	---	---
Thallium	4/11	4.9	48.5	11.9	32.3	03TP19-0304-02	0.41-0.57	0.0569	852	4	7
Vanadium	20/20	11.8	752	53.8	53.8	03TP27-0304-01		2	376	20	
Zinc	20/20	10.6	13700	1270	1270	03TP27-0304-01		46	298	9	
PESTICIDES (µg/kg)											
4,4'-DDD	7/19	0.83	29	7.67	9.24	03TP19-0304-02	2-93	21	1.4	1	2
4,4'-DDE	6/16	0.43	15	7.09	5.9	03TP12-0304-02-20070504	2-93	21	0.7		2
4,4'-DDT	10/20	0.39	110	13.6	19.9	03TP19-0304-02	2-93	21	5.2	2	2
Total DDT	11/20	1.11	139	18.6	27.2	03TP19-0304-02	2-93	21	6.6	4	2
Aldrin	4/20	1.4	3.7	3.34	2.25	03TP27-0304-01-D	2-48	3.32	1.1	1	4
Alpha-BHC	2/19	0.7	7	3.22	3.85	03TP19-0304-02	2-48	99.4	0.07		
Alpha-Chlordane	9/18	0.39	330	28	42.5	03TP14-0203-01-20070504	2-180	224	1.5	1	
Aroclor-1242	1/20	37	37	30.4	37	03TP12-0304-02-20070504	20-480	---	---	---	---
Aroclor-1248	1/20	92	92	33.2	92	03TP28-0203-01	20-480	---	---	---	---
Aroclor-1254	1/20	4000	4000	222	4000	03TP24-0304-01	20-360	0.332	12048	---	---
Aroclor-1260	2/20	20.5	46	35.8	33.3	03TP08-0203-03-20070502	20-480	0.332	139	2	18
Delta-BHC	3/20	0.55	1.4	3.12	0.97	03TP12-0304-02-20070504	2-48	9940	0.0001		---
Dieldrin	13/20	0.24	400	49.4	70.6	03TP14-0203-01-20070504	2-93	4.9	81.6	10	2
Endosulfan I	2/20	0.69	1.5	3.11	1.1	03TP27-0304-01-D	2-48	119	0.01		
Endosulfan II	2/19	0.63	0.71	5.45	0.67	03TP07-0304-01-20070502	2-93	119	0.006		
Endosulfan Sulfate	2/19	0.715	2.2	5.53	1.46	03TP08-0203-03-20070502	2-93	35.8	0.06		2
Endrin	4/20	2.3	6.2	5.11	4.01	03TP27-0304-01-D	2-93	10.1	0.6		3

TABLE 7-8

DATA SUMMARY FOR SUBSURFACE SOIL[1]
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS[2]		MEAN OF ALL DATA	MEAN OF DETECTED DATA	LOCATION OF MAXIMUM CONCENTRATION	RANGE OF NONDETECTS[3]	ECOLOGICAL SCREENING VALUE[4]	MAXIMUM HAZARD QUOTIENT (HQ)	NUMBER OF DETECTS > SCREENING VALUE	NUMBER OF NONDETECTS > SCREENING VALUE
		MINIMUM	MAXIMUM								
Endrin Aldehyde	4/17	0.52	9.3	4.6	3.02	03TP27-0304-01-D	2-93	10.5	0.9		2
Endrin Ketone	4/19	0.56	24	6.21	8.22	03TP27-0304-01	2-93	---	---	---	---
Gamma-BHC (Lindane)	4/20	0.69	6.9	3.36	3.27	03TP12-0304-02-20070504	2-48	5	1.4	1	3
Gamma-Chlordane	9/18	1.1	230	21.7	30	03TP14-0203-01-20070504	2-180	224	1.0	1	
Heptachlor	2/17	0.52	0.53	3.05	0.525	03TP12-0304-02-20070504	2-48	5.98	0.09		3
Heptachlor Epoxide	7/20	0.85	12	3.88	4.73	03TP14-0203-01-20070504	2-48	152	0.08		
Methoxychlor	4/20	1	15	24.6	8.3	03TP27-0304-01	3.9-480	19.9	0.8		7
SEMIVOLATILES (µg/kg)											
1-Methylnaphthalene	3/5	0.84	6	4.34	3.95	03TP19-0304-02	9.8-9.9	29000	0.0002		
2-Methylnaphthalene	3/17	1.3	15	204	7.47	03TP19-0304-02	9.9-1100	29000	0.0005		
2-Methylphenol	1/20	290	290	232	290	03TP04-3_19910911	340-930	40400	0.007		
Acenaphthene	3/18	10	130	170	54	03TP04-3_19910911	9.9-930	20000	0.007		
Acenaphthylene	4/17	0.64	280	187	74.2	03TP04-3_19910911	9.9-930	29000	0.01		
Anthracene	4/17	1.2	850	238	291	03TP04-3_19910911	9.9-930	29000	0.03		
Benz(a)anthracene	6/17	6.5	5600	644	1450	03TP04-3_19910911	9.9-930	1100	5.1	2	
Benzaldehyde	4/19	38	83	181	64.6	03TP27-0304-01	200-930	---	---	---	---
Benzo(a)pyrene	6/17	6.4	5100	618	1370	03TP04-3_19910911	9.9-930	1100	4.6	2	
Benzo(b)fluoranthene	7/18	8.8	7100	744	1590	03TP04-3_19910911	9.9-930	1100	6.5	2	
Benzo(g,h,i)perylene	7/18	4.4	1400	315	487	03TP24-0304-01	9.9-930	1100	1.3	2	
Benzo(k)fluoranthene	4/17	5	3600	519	1480	03TP04-3_19910911	9.9-930	1100	3.3	2	
Bis(2-ethylhexyl) Phthalate	7/20	130	790	295	409	03TP23-0304-01	270-1100	925	0.9		1
Carbazole	1/19	330	330	206	330	03TP19-0304-02	200-930	---	---	---	---
Chrysene	7/18	8.2	5000	595	1210	03TP04-3_19910911	9.9-930	1100	4.5	2	
Dibenz(a,h)anthracene	4/17	1.3	450	217	200	03TP24-0304-01	9.9-930	1100	0.4		
Dibenzofuran	1/20	140	140	214	140	03TP04-3_19910911	290-930	---	---	---	---
Fluoranthene	7/18	14	8200	880	1940	03TP04-3_19910911	9.9-930	29000	0.3		
Fluorene	3/18	10	200	174	78.7	03TP04-3_19910911	9.9-930	29000	0.007		
Indeno(1,2,3-cd)pyrene	7/18	4.9	1800	373	636	03TP04-3_19910911	9.9-930	1100	1.6	2	
Naphthalene	3/15	9.2	210	210	89.7	03TP04-3_19910911	390-930	29000	0.007		
Phenanthrene	7/17	5.8	3100	421	725	03TP04-3_19910911	9.9-930	29000	0.1		
Pyrene	8/18	12	9300	888	1740	03TP04-3_19910911	9.9-930	1100	8.5	2	
Total PAHs	10/19	33	51950	4615	8582	03TP04-3_19910911	9.9-930	1000	52	5	
VOLATILES (µg/kg)											
2-Butanone	1/21	22	22	5.98	22	03TP23-0304-01	4.9-26	---	---	---	---
Acetone	9/20	6.1	160	40.2	76.1	03TP23-0304-01	12-30	2500	0.06		
Benzene	4/21	2.2	46	5.38	15.5	03TP24-0304-01	4.7-12	255	0.2		
Carbon Disulfide	1/21	2.9	2.9	3.23	2.9	03TP24-0304-01	4.7-12	94.1	0.03		
Dichlorodifluoromethane	1/19	4.8	4.8	3.19	4.8	03TP24-0304-01	4.7-10	39500	0.0001		
Tetrachloroethene	2/21	9.2	32	4.81	20.6	03TP24-0304-01	4.7-12	9920	0.003		
Toluene	1/17	17	17	3.79	17	03TP24-0304-01	4.7-12	5450	0.003		
Trichloroethene	1/21	2.7	2.7	3.22	2.7	03TP24-0304-01	4.7-12	12400	0.0002		

Footnotes:
(1) Samples collected at various depth intervals from 2 to 4 feet below ground surface.
(2) The duplicate pair was treated as one result with the exception of the minimum and maximum concentrations.
(3) Sample-specific quantitation limits.
(4) Lowest ecological screening value from Table 7-6.

TABLE 7-9

SEDIMENT ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Frequency of Detection	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects[1]	Ecological Screening Value[2]	Hazard Quotient[3]	COPC (Yes/No)	Rationale for COPC Selection[4]
		Minimum	Maximum						
INORGANICS (mg/kg)									
Aluminum	6/6	5110	16400	03-SD-17	-	25500	0.6	No	BSV
Arsenic	3/3	3.1	11.1	03-SD-17	-	9.8	1.1	Yes	ASV, BIO
Barium	6/6	49.6	121	03-SD-17	-	NA	NA	Yes	NSV
Beryllium	5/5	0.555	1.9	03-SD-17	-	NA	NA	Yes	NSV
Cadmium	3/4	0.29	0.48	03-SD-12	0.06	0.99	0.5	Yes	BIO
Calcium	6/6	919.5	2290	03-SD-17	-	NA	NA	No	Nutrient
Chromium	6/6	8.9	34.8	03-SD-17	-	43.4	0.8	Yes	BIO
Cobalt	6/6	2.5	11.3	03-SD-17	-	50	0.2	No	BSV
Copper	6/6	8.4	30.5	03-SD-17	-	31.6	0.97	Yes	BIO
Iron	6/6	7090	37600	03-SD-17	-	20000	1.9	Yes	ASV
Lead	6/6	12	95.6	03-SD-17	-	35.8	2.7	Yes	ASV, BIO
Magnesium	6/6	676	2990	03-SD-17	-	NA	NA	No	Nutrient
Manganese	6/6	62.3	631	03-SD-17	-	460	1.4	Yes	ASV
Mercury	5/6	0.038	0.061	03-SD-14	0.026	0.18	0.3	Yes	BIO
Nickel	6/6	5	18.5	03-SD-17	-	22.7	0.8	Yes	BIO
Potassium	6/6	305	1500	03-SD-17	-	NA	NA	No	Nutrient
Selenium	3/6	1	1.1	03-SD-12	0.58-1.2	2	0.6	Yes	BIO
Sodium	6/6	366	719	03-SD-17	-	NA	NA	No	Nutrient
Vanadium	6/6	11.9	62.1	03-SD-17	-	NA	NA	Yes	NSV
Zinc	6/6	25.6	134	03-SD-17	-	121	1.1	Yes	ASV, BIO
PESTICIDES (µg/kg)									
4,4'-DDD	1/6	2.2	2.2	03-SD-12	4.2-28	4.88	0.5	Yes	BIO
4,4'-DDE	3/5	3.3	29	03-SD-14	4.2-28	3.16	9.2	Yes	ASV, BIO
4,4'-DDT	4/6	2.4	11	03-SD-14	4.2-28	4.16	2.6	Yes	ASV, BIO
Total DDT	4/6	5.7	40	03-SD-14	4.2-28	5.28	7.6	Yes	ASV, BIO
Aldrin	5/6	0.85	8.1	03-SD-15	4.6	2	4.1	Yes	ASV, BIO
Alpha-Chlordane	2/2	4.6	8.4	03-SD-12	-	3.24	2.6	Yes	ASV, BIO
Delta-BHC	1/6	0.38	0.38	03-SD-12	2.2-14.5	6400	0.0001	Yes	BIO
Dieldrin	6/6	4.4	46.5	03-SD-15-DUP	-	1.9	24.5	Yes	ASV, BIO
Endosulfan II	1/6	15	15	03-SD-15-DUP	4.2-26	14	1.1	Yes	ASV, BIO
Endrin Aldehyde	3/4	0.94	8.9	03-SD-12	28	2.22	4.0	Yes	ASV, BIO
Endrin Ketone	3/6	2.8	6.4	03-SD-17	4.2-28	2.22	2.9	Yes	ASV, BIO
Gamma-Chlordane	4/4	1.3	5.45	03-SD-15-DUP	-	3.24	1.7	Yes	ASV, BIO
Heptachlor	2/6	0.81	0.98	03-SD-17	2.2-14.5	68	0.01	Yes	BIO
Heptachlor Epoxide	1/4	2.9	2.9	03-SD-17	2.8-14.5	2.47	1.2	Yes	ASV, BIO
Methoxychlor	1/6	11	11	03-SD-12	22-145	18.7	0.6	Yes	BIO

TABLE 7-9

SEDIMENT ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Frequency of Detection	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects(1)	Ecological Screening Value(2)	Hazard Quotient(3)	COPC (Yes/No)	Rationale for COPC Selection(4)
		Minimum	Maximum						
SEMIVOLATILES (µg/kg)									
1-Methylnaphthalene	2/2	39	75	03-SD-14	-	NA	NA	Yes	NSV
2-Methylnaphthalene	2/2	37	65	03-SD-14	-	20.2	3.2	Yes	ASV
Acenaphthene	2/2	97	200	03-SD-14	-	6.7	29.9	Yes	ASV, BIO
Acenaphthylene	5/5	23.75	280	03-SD-14	-	5.9	47.5	Yes	ASV, BIO
Anthracene	6/6	30	700	03-SD-14	-	57.2	12.2	Yes	ASV, BIO
Benz(a)anthracene	6/6	61	1200	03-SD-14	-	108	11.1	Yes	ASV, BIO
Benzo(a)pyrene	6/6	75	1400	03-SD-14	-	150	9.3	Yes	ASV, BIO
Benzo(b)fluoranthene	6/6	80	2500	03-SD-12	-	NA	NA	Yes	NSV, BIO
Benzo(g,h,i)perylene	6/6	52	970	03-SD-14	-	170	5.7	Yes	ASV, BIO
Benzo(k)fluoranthene	6/6	89	1400	03-SD-14	-	240	5.8	Yes	ASV, BIO
Carbazole	3/6	79	240	03-SD-14	220-460	NA	NA	Yes	NSV
Chrysene	6/6	89	2300	03-SD-12	-	166	13.9	Yes	ASV, BIO
Dibenz(a,h)anthracene	5/5	33.75	380	03-SD-14	-	33	11.5	Yes	ASV, BIO
Fluoranthene	6/6	210	9600	03-SD-14	-	423	22.7	Yes	ASV, BIO
Fluorene	3/3	29	290	03-SD-14	-	77.4	3.7	Yes	ASV, BIO
Indeno(1,2,3-cd)pyrene	6/6	64	1300	03-SD-14	-	17	76.5	Yes	ASV, BIO
Naphthalene	2/2	47	89	03-SD-14	-	176	0.5	Yes	BIO
Phenanthrene	6/6	130	7200	03-SD-14	-	204	35.3	Yes	ASV, BIO
Pyrene	6/6	150	6800	03-SD-14	-	195	34.9	Yes	ASV, BIO
Total PAHs	6/6	1030	35749	03-SD-14	-	1610	22.2	Yes	ASV, BIO
VOLATILES (µg/kg)									
2-Butanone	4/6	13	21	03-SD-15	14-30	NA	NA	Yes	NSV
Acetone	6/6	26	180	03-SD-17	-	NA	NA	Yes	NSV
Carbon Disulfide	3/6	2	6.2	03-SD-13	9.4-12	0.851	7.3	Yes	ASV

Footnotes:

(1) Values presented are sample-specific quantitation limits.

(2) Ecological screening values are USEPA Region III BTAG Freshwater Sediment Screening Benchmarks (USEPA, 2006a), except the aluminum screening value is from NOAA's Screening Quick Reference Tables (Buchman 2008), because an aluminum sediment screening value was not available in USEPA (2006a).

(3) Hazard quotient = maximum detected concentration ÷ ecological screening value

(4) Rationale codes: ASV=maximum concentration is greater than screening value
BIO=bioaccumulative chemical
BSV=maximum concentration is less than ecological screening value
NSV=ecological screening value not available
Nutrient=essential nutrient

NA: Ecological screening value not available from USEPA (2006a) nor Buchman (2008).

TABLE 7-10

SURFACE WATER ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Chemical	Frequency of Detection	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects[1]	Ecological Screening Value[2]	Hazard Quotient[3]	COPC (Yes/No)	Rationale for COPC Selection[4]
		Minimum	Maximum						
INORGANICS (µg/L)									
Aluminum	7/8	120	317	03-SW-17	80	87	3.6	Yes	ASV
Barium	8/8	32.5	113	03SW11-20080319	-	4	28.3	Yes	ASV
Calcium	8/8	13200	22300	03SW11-20080319	-	116000	0.2	No	BSV
Chromium	4/6	0.7675	1.3	03-SW-14	0.87	47[5]	0.03	Yes	BIO
Cobalt	1/8	0.2	0.2	03SW11-20080319	0.62-6	23	0.01	No	BSV
Iron	8/8	185	1060	03SW11-20080319	-	300	3.5	Yes	ASV
Lead	8/8	0.07	2.7	03-SW-16	-	1.4[5]	1.9	Yes	ASV, BIO
Magnesium	8/8	3755	7470	03SW11-20080319	-	82000	0.1	No	BSV
Manganese	8/8	30.9	197	03SW11-20080319	-	120	1.6	Yes	ASV
Nickel	2/8	1.2	2	03SW11-20080319	0.98	32[5]	0.06	Yes	BIO
Potassium	8/8	1430	1880	03SW11-20080319	-	53000	0.04	No	BSV
Sodium	5/5	6240	18800	03SW11-20080319	-	680000	0.03	No	BSV
Vanadium	1/1	1.4	1.4	03SW11-20080319	-	20	0.1	No	BSV
Zinc	3/3	3.6	16	03SW11-20080319	-	73[5]	0.2	Yes	BIO
PESTICIDES (µg/L)									
Dieldrin	6/6	0.0081	0.011	03-SW-14		0.056	0.2	Yes	BIO
SEMIVOLATILES (µg/L)									
Acenaphthylene	1/6	0.016	0.016	03-SW-14	0.2-0.22	4.84	0.003	Yes	BIO
Benzo(a)anthracene	1/6	0.027	0.027	03-SW-14	0.2-0.22	0.018	1.5	Yes	ASV, BIO
Benzo(a)pyrene	3/6	0.013	0.047	03-SW-14	0.2-0.21	0.015	3.1	Yes	ASV, BIO
Benzo(b)fluoranthene	5/6	0.015	0.097	03-SW-14	0.2	9.07	0.01	Yes	BIO
Benzo(g,h,i)perylene	2/6	0.018	0.036	03-SW-14	0.2-0.21	NA	NA	Yes	NSV, BIO
Benzo(k)fluoranthene	4/6	0.013	0.085	03-SW-14	0.2	NA	NA	Yes	NSV, BIO
Chrysene	1/6	0.053	0.053	03-SW-14	0.2-0.22	NA	NA	Yes	NSV, BIO
Dibenzo(a,h)anthracene	1/6	0.012	0.012	03-SW-15-D	0.2-0.21	NA	NA	Yes	NSV, BIO
Fluoranthene	3/6	0.012	0.12	03-SW-14	0.2-0.21	0.04	3.0	Yes	ASV, BIO
Fluorene	6/6	0.59	0.69	03-SW-14	-	3	0.2	Yes	BIO
Indeno(1,2,3-cd)pyrene	6/6	0.01	0.042	03-SW-14	-	4.31	0.01	Yes	BIO
Phenanthrene	1/6	0.096	0.096	03-SW-14	0.2-0.22	0.4	0.2	Yes	BIO
Pyrene	6/6	0.013	0.099	03-SW-14	-	0.025	4.0	Yes	ASV, BIO
Total PAHs	6/6	0.644	1.408	03-SW-14	-	NA	NA	Yes	NSV, BIO
VOLATILES (µg/L)									
Acetone	3/8	1.3	3.8	03-SW-17	2.5-10	1500	0.003	No	BSV
Toluene	1/10	0.21	0.21	03SW10-20080319	0.5-1	2	0.1	No	BSV

Footnotes:

(1) Values presented are sample-specific quantitation limits.

(2) Ecological screening values are USEPA Region III BTAG Freshwater Screening Benchmarks (USEPA, 2006b), except for acenaphthylene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene. Screening values for these PAHs were not available in USEPA (2006b) so their screening values are chronic fresh water screening values from NOAA's Screening Quick Reference Tables (Buchman 2008).

(3) Hazard quotient = maximum detected concentration ÷ ecological screening value

(4) Rationale codes: ASV=maximum concentration is greater than screening value
BIO=bioaccumulative chemical
BSV=maximum concentration is less than ecological screening value
NSV=ecological screening value not available

(5) Based on average site-specific hardness in of 57 mg/L.

NA: Ecological screening value not available from USEPA (2006b) nor Buchman (2008).

TABLE 7-11

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
CONSERVATIVE SCENARIO, INSECTIVOROUS AND HERBIVOROUS RECEPTORS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Herbivorous Receptors HQs						Insectivorous Receptors HQs			
	Bobwhite Quail		Meadow Vole		Woodchuck		Robin		Short-Tailed Shrew	
Chemical	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Semivolatile Organics										
1,2,4-Trichlorobenzene	NV	NV	4.7E-03	4.7E-04	5.9E-04	5.9E-05	NV	NV	3.2E-04	3.2E-05
1,2-Dichlorobenzene	NV	NV	1.1E-03	1.1E-04	1.5E-04	1.5E-05	NV	NV	1.2E-03	1.2E-04
1,4-Dichlorobenzene	NV	NV	5.1E-04	5.1E-05	7.0E-05	7.0E-06	NV	NV	5.9E-04	5.9E-05
Acenaphthene	2.4E-01	2.4E-02	3.6E-03	6.6E-04	1.4E-06	2.6E-07	4.4E+00	4.4E-01	8.1E-02	1.5E-02
Acenaphthylene	5.1E-03	5.1E-04	2.7E-04	5.0E-05	4.0E-05	7.4E-06	3.0E-01	3.0E-02	6.0E-03	1.1E-03
Anthracene	9.98E-01	1.0E-01	4.0E-02	7.3E-03	4.8E-03	8.9E-04	1.4E+01	1.4E+00	2.6E-01	4.8E-02
Benzo(a)anthracene	5.2E-01	5.2E-02	1.03E+00	1.7E-02	4.8E-02	7.7E-04	9.2E+00	9.2E-01	1.8E+01	2.9E-01
Benzo(a)pyrene	6.5E-01	6.5E-02	2.5E+00	4.1E-02	3.0E-01	4.8E-03	5.8E+00	5.8E-01	1.1E+01	1.8E-01
Benzo(b)fluoranthene	1.4E+00	1.4E-01	7.1E+00	1.1E-01	9.6E-01	1.5E-02	1.3E+01	1.3E+00	2.6E+01	4.2E-01
Benzo(g,h,i)perylene	5.3E-01	5.3E-02	3.1E+00	5.0E-02	4.4E-01	7.0E-03	3.3E+00	3.3E-01	6.7E+00	1.1E-01
Benzo(k)fluoranthene	3.4E-01	3.4E-02	1.2E+00	1.8E-02	1.2E-01	1.9E-03	6.9E+00	6.9E-01	1.4E+01	2.3E-01
Butyl Benzyl Phthalate	NV	NV	4.0E-04	1.3E-04	3.7E-05	1.3E-05	NV	NV	2.3E-03	7.7E-04
Chrysene	4.2E-01	4.2E-02	8.5E-01	1.4E-02	4.2E-02	6.8E-04	1.0E+01	1.03E+00	2.1E+01	3.4E-01
Di-n-Butyl Phthalate	NV	NV	1.3E-05	3.9E-06	1.2E-06	3.6E-07	NV	NV	7.4E-05	2.2E-05
Dibenzo(a,h)anthracene	6.8E-02	6.8E-03	2.8E-01	4.5E-03	3.4E-02	5.4E-04	9.6E-01	9.6E-02	1.9E+00	3.1E-02
Fluoranthene	5.1E+00	5.1E-01	2.7E-01	5.0E-02	3.7E-02	6.9E-03	3.9E+01	3.9E+00	7.5E-01	1.4E-01
Fluorene	3.0E-01	3.0E-02	4.4E-03	8.2E-04	2.2E-06	4.1E-07	3.2E+01	3.2E+00	6.4E-01	1.2E-01
Indeno(1,2,3-cd)pyrene	2.5E-01	2.5E-02	9.7E-01	1.6E-02	1.1E-01	1.8E-03	4.6E+00	4.6E-01	9.5E+00	1.5E-01
Phenanthrene	2.8E+00	2.8E-01	1.0E-01	1.9E-02	1.2E-02	2.1E-03	3.2E+01	3.2E+00	6.0E-01	1.1E-01
Pyrene	6.4E+00	6.4E-01	3.8E+01	6.1E-01	5.4E+00	8.6E-02	2.2E+01	2.2E+00	4.3E+01	6.9E-01
Pesticides/PCBs										
4,4'-DDD	2.9E-03	2.4E-04	2.2E-03	5.7E-05	1.3E-04	3.4E-06	2.7E-01	2.2E-02	2.7E-01	7.1E-03
4,4'-DDE	1.4E-02	1.1E-03	1.0E-02	2.7E-04	6.7E-05	1.8E-06	2.2E+00	1.8E-01	2.2E+00	5.8E-02
4,4'-DDT	2.9E-02	2.4E-03	2.2E-02	5.7E-04	4.9E-04	1.3E-05	3.0E+00	2.5E-01	3.0E+00	8.1E-02
Total DDT	7.1E-02	6.0E-03	1.2E-01	3.2E-03	1.4E-02	3.7E-04	4.3E+00	3.6E-01	4.3E+00	1.1E-01
Aldrin	NV	NV	1.3E-03	2.6E-04	1.9E-04	3.8E-05	NV	NV	2.8E-03	5.7E-04
Alpha-BHC	3.7E-04	9.2E-05	2.1E-02	2.1E-03	3.1E-03	3.1E-04	8.3E-03	2.1E-03	2.1E-01	2.1E-02
Beta-BHC	5.9E-05	1.5E-05	1.2E-04	2.3E-05	1.5E-05	2.9E-06	1.5E-03	3.6E-04	1.3E-03	2.6E-04
Delta-BHC	NA	NA	NA	NA	6.5E-05	6.5E-06	NA	NA	NA	NA
Alpha-Chlordane	1.9E-04	3.7E-05	6.3E-05	3.1E-05	5.1E-05	2.6E-05	9.0E-03	1.8E-03	2.7E-03	1.3E-03
Aroclor-1242	NA	NA	NA	NA	3.5E-04	3.5E-05	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	6.0E-03	6.0E-04	NA	NA	NA	NA
Aroclor-1254	7.5E-03	7.5E-04	1.2E-02	1.2E-03	3.9E-02	3.9E-03	1.2E+00	1.2E-01	2.1E+00	2.1E-01
Aroclor-1260	1.3E-02	1.3E-03	1.7E-02	1.7E-03	6.5E-04	6.5E-05	2.2E+00	2.2E-01	3.8E+00	3.8E-01
Dieldrin	5.1E-01	4.5E-02	4.0E+00	4.8E-02	5.7E-01	6.7E-03	1.5E+01	1.3E+00	4.6E+01	5.4E-01
Endosulfan I	1.5E-04	1.5E-05	1.6E-02	1.6E-03	2.2E-03	2.2E-04	5.6E-04	5.6E-05	2.2E-02	2.2E-03
Endosulfan II	8.0E-05	8.0E-06	8.6E-03	8.6E-04	1.2E-03	1.2E-04	3.0E-04	3.0E-05	1.2E-02	1.2E-03
Endosulfan Sulfate	1.6E-05	1.6E-06	1.7E-03	1.7E-04	2.4E-04	2.4E-05	6.0E-05	6.0E-06	2.3E-03	2.3E-04
Endrin	3.6E-02	3.6E-03	4.4E-03	4.4E-04	5.1E-04	5.1E-05	9.4E-01	9.4E-02	6.7E-02	6.7E-03
Endrin Aldehyde	1.9E-02	1.9E-03	2.2E-03	2.2E-04	3.0E-04	3.0E-05	4.9E-01	4.9E-02	3.4E-02	3.4E-03
Endrin Ketone	2.2E-02	2.2E-03	2.6E-03	2.6E-04	4.5E-04	4.5E-05	5.8E-01	5.8E-02	4.0E-02	4.0E-03
Gamma-BHC (Lindane)	2.4E-05	2.4E-06	9.2E-06	9.2E-07	1.8E-06	1.8E-07	4.6E-04	4.6E-05	7.4E-05	7.4E-06
Gamma-Chlordane	2.7E-04	5.3E-05	9.0E-05	4.5E-05	3.9E-05	1.9E-05	1.3E-02	2.6E-03	3.9E-03	1.9E-03
Heptachlor	NV	NV	1.3E-03	1.3E-04	1.6E-04	1.6E-05	NV	NV	4.2E-02	4.2E-03
Heptachlor Epoxide	NV	NV	2.7E-03	2.7E-04	2.6E-04	2.6E-05	NV	NV	2.1E-01	2.1E-02
Methoxychlor	NV	NV	3.8E-05	1.9E-05	6.8E-06	3.4E-06	NV	NV	1.4E-04	6.9E-05
Inorganics										
Antimony	NV	NV	2.6E+00	5.5E-02	3.3E+00	7.1E-02	NV	NV	1.9E+01	4.1E-01
Arsenic	1.1E-01	5.4E-02	1.9E-01	4.4E-02	4.7E-02	1.1E-02	2.6E-01	1.3E-01	1.9E-01	4.4E-02
Cadmium	4.0E-01	9.3E-02	1.04E+00	1.2E-01	3.3E-01	3.7E-02	9.6E+00	2.2E+00	1.2E+01	1.3E+00
Chromium	2.6E-01	4.4E-02	2.4E-01	9.9E-03	1.0E-01	4.1E-03	1.02E+00	1.7E-01	5.3E-01	2.2E-02
Copper	1.1E+00	1.2E-01	8.3E-01	5.6E-02	8.3E-01	5.6E-02	4.9E+00	5.7E-01	1.9E+00	1.3E-01
Cyanide	NV	NV	6.5E-02	6.5E-03	9.6E-03	9.6E-04	NV	NV	3.7E-03	3.7E-04
Lead	3.9E+00	1.4E-01	9.2E-01	2.3E-02	6.6E-01	1.7E-02	1.6E+01	5.8E-01	2.5E+00	6.2E-02
Mercury	6.5E+01	6.5E+00	2.7E+01	5.4E+00	4.1E+00	8.1E-01	2.8E+01	2.8E+00	3.4E+00	6.8E-01
Nickel	1.1E-01	4.0E-02	3.8E-01	4.4E-02	1.4E-01	1.6E-02	1.1E+00	4.1E-01	2.7E+00	3.1E-01
Selenium	7.8E-02	2.8E-02	2.7E-01	5.9E-02	4.0E-02	8.7E-03	2.8E-01	9.8E-02	3.4E-01	7.3E-02
Silver	2.1E-01	7.0E-03	4.4E-02	2.3E-03	5.8E-03	2.9E-04	4.6E+00	1.6E-01	9.7E-01	4.9E-02
Thallium	NV	NV	1.9E+00	1.9E-01	4.3E+00	4.3E-02	NV	NV	2.7E+01	2.7E+00
Vanadium	2.6E+00	5.3E-01	2.4E-01	1.0E-01	1.2E-01	5.3E-02	4.1E+00	8.4E-01	1.6E-01	7.2E-02
Zinc	3.4E-01	1.3E-01	4.7E-01	1.2E-01	1.8E-01	4.6E-02	1.8E+00	6.8E-01	9.3E-01	2.3E-01
Dioxins/Furans										
TEQ	3.4E-02	3.4E-03	1.0E-01	1.0E-02	1.8E-03	1.8E-04	8.0E+00	8.0E-01	3.0E+01	3.0E+00

Notes:
Cells are shaded if the value is greater than 1.0
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
HQ - Ecological Hazard Quotient
NV - NOAEL and LOAEL not available
NA - Analyte was detected in subsurface soil but not surface soil. Thus, HQs are applicable for woodchuck only (see Section 7.3 of text).

TABLE 7-12

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
CONSERVATIVE SCENARIO, PISCIVOROUS RECEPTORS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Piscivorous Receptor HQs			
	Green Heron		Mink	
Chemical	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Semivolatile Organics				
Acenaphthylene	9.2E-02	9.2E-03	2.0E-03	3.7E-04
Anthracene	2.3E-01	2.3E-02	5.0E-03	9.3E-04
Benzo(a)anthracene	3.9E-01	3.9E-02	9.2E-01	1.5E-02
Benzo(a)pyrene	4.6E-01	4.6E-02	1.1E+00	1.7E-02
Benzo(b)fluoranthene	8.2E-01	8.2E-02	1.9E+00	3.1E-02
Benzo(g,h,i)perylene	3.2E-01	3.2E-02	7.4E-01	1.2E-02
Benzo(k)fluoranthene	4.6E-01	4.6E-02	1.1E+00	1.7E-02
Chrysene	7.5E-01	7.5E-02	1.8E+00	2.8E-02
Dibenzo(a,h)anthracene	1.2E-01	1.2E-02	2.9E-01	4.7E-03
Fluoranthene	3.1E+00	3.1E-01	6.9E-02	1.3E-02
Fluorene	9.5E-02	9.5E-03	2.1E-03	3.8E-04
Indeno(1,2,3-cd)pyrene	4.3E-01	4.3E-02	1.0E+00	1.6E-02
Phenanthrene	2.4E+00	2.4E-01	5.2E-02	9.5E-03
Pyrene	2.2E+00	2.2E-01	5.2E+00	8.3E-02
Pesticides/PCBs				
4,4'-DDD	6.1E-03	5.2E-04	6.8E-03	1.8E-04
4,4'-DDE	2.2E+00	1.8E-01	2.4E+00	6.4E-02
4,4'-DDT	1.8E-01	1.5E-02	2.0E-01	5.3E-03
Total DDT	3.0E+00	2.5E-01	3.3E+00	8.8E-02
Aldrin	NA	NA	1.2E-01	2.3E-02
Alpha-Chlordane	4.2E-02	8.4E-03	1.4E-02	7.0E-03
Delta-BHC	2.7E-03	6.8E-04	7.8E-02	7.8E-03
Dieldrin	2.6E+00	2.3E-01	8.9E+00	1.1E-01
Endosulfan II	6.0E-03	6.0E-04	2.9E-01	2.9E-02
Endrin Aldehyde	3.6E+00	3.6E-01	2.8E-01	2.8E-02
Endrin Ketone	2.6E+00	2.6E-01	2.0E-01	2.0E-02
Gamma-Chlordane	1.3E-02	2.5E-03	4.2E-03	2.1E-03
Heptachlor	NA	NA	2.8E-02	2.8E-03
Heptachlor Epoxide	NA	NA	8.3E-02	8.3E-03
Methoxychlor	NA	NA	7.9E-03	3.9E-03
Inorganics				
Arsenic	5.7E-04	2.8E-04	9.2E-04	2.1E-04
Cadmium	4.1E-04	9.4E-05	5.6E-04	6.2E-05
Chromium	1.1E-03	1.9E-04	1.0E-03	4.2E-05
Copper	6.2E-03	7.2E-04	3.2E-03	2.2E-04
Lead	6.2E-03	2.3E-04	1.7E-03	4.3E-05
Mercury	4.3E-03	4.3E-04	6.2E-04	1.2E-04
Nickel	1.0E-03	3.8E-04	3.2E-03	3.6E-04
Selenium	6.2E-04	2.2E-04	9.3E-04	2.0E-04
Zinc	2.4E-03	9.3E-04	1.5E-03	3.9E-04

Cells are shaded if the value is greater than 1.0

NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
HQ - Ecological Hazard Quotient
NA - NOAEL and LOAEL not available

TABLE 7-13

DATA SUMMARY FOR SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED VALUES[1]		MEAN OF ALL DATA	MEAN OF DETECTED DATA	LOCATION OF MAXIMUM CONCENTRATION	RANGE OF NONDETECTS[2]	ECOLOGICAL SCREENING VALUE[3]	MAXIMUM HAZARD QUOTIENT (HQ)	NUMBER OF DETECTS > SCREENING VALUE	NUMBER OF NONDETECTS > SCREENING VALUE	MAXIMUM BACKGROUND CONCENTRATION	MEAN BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MAX BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MEAN BACKGROUND CONCENTRATION
		MINIMUM	MAXIMUM												
INORGANICS (mg/kg)															
Aluminum	68/68	8200	24600	15700	15700	03SS41		50	492	68		15000	11300	34	62
Antimony	21/51	0.22	10.4	4.21	1.38	03SB01_19910906	0.2-10.1	0.27	38.5	18	25				
Arsenic	61/61	0.37	13	4.92	4.92	03SB10_19910906		18	0.7			10.6	6.65	1	10
Cadmium	23/49	0.22	18.4	2.08	3.38	03SS09_19970408	0.03-1.4	0.36	51.1	23	24				
Chromium	68/68	6.4	35.8	20.5	20.5	03SS35		26	1.4	7		20.8	15.3	29	58
Copper	68/68	9.9	182	30.8	30.8	03SS37		28	6.5	17		13.4	10.7	46	63
Cyanide	6/68	0.11	2.3	1.19	0.909	03SS09_19970408	0.13-2.9	1.33	1.7	2	29	3.8	0.649		2
Iron	68/68	13800	70900	20600	20600	03SS35		200	354.5	68		17600	14800	45	63
Lead	68/68	3.2	379	37.9	37.9	03SS35		11	34.45	65		64.7	30.6	8	24
Manganese	68/68	318	1780	633	633	03SS11_19910905		220	8.1	68		1190	642	2	31
Mercury	29/68	0.021	0.77	0.129	0.156	03-SS-23	0.09-0.14	0.1	7.7	17	20				
Nickel	68/68	6.3	39	13	13	03SB06_19910906-D		38	1.03	1		11.2	9.79	44	63
Selenium	1/33	0.36	0.36	0.834	0.36	03SS32	0.3-0.73	0.52	0.7		30				
Silver	12/66	0.36	26.3	1.26	2.25	03SS35	0.035-1.6	4.2	6.3	1					
Thallium	24/61	0.26	1.8	0.419	0.541	03-SS-20	0.15-0.73	0.0569	31.6	23	38	0.34	0.226	16	23
Vanadium	68/68	16.5	45.7	30.4	30.4	03-SS-25		2	22.9	68		28.2	24.9	40	55
Zinc	68/68	16.9	466	65.7	65.7	03-SS-23		46	10.1	29		597	90.1		8
PESTICIDES (µg/kg)															
4,4'-DDD	13/68	1.2	45	19.5	15.2	03-SS-18	2-190	21	2.1	4	5				
4,4'-DDE	17/68	0.57	210	24.5	31.3	03SS35	2-190	21	10.0	4	6				
4,4'-DDT	17/67	1.1	450	32.6	62.2	03SS35	2-190	21	21.4	8	6	8.3	3.01	10	13
Total DDT	17/68	0.57	666	43.1	106	03SS35	2-190	21	31.7	12	6				
Aldrin	5/68	0.27	1.6	9.47	0.745	03SS34	2-94	3.32	0.5		35				
Alpha-BHC	3/68	0.86	5.6	9.58	2.48	03SS38	2-94	99.4	0.1						
Alpha-Chlordane	9/61	0.53	23	83.1	5.69	03TP12-0102-03-20070504	2-940	224	0.1		4				
Aroclor-1254	3/68	13	84	171	39.3	03SS09_19970408	19-1900	0.332	253	3	65				
Aroclor-1260	3/68	12	150	173	51.7	03SS35-D	19-1900	0.332	452	3	65				
Beta-BHC	2/66	0.8	0.98	9.21	0.89	03-SS-24	1-94	3.98	0.2		37				
Dieldrin	59/67	1.6	620	76.4	84.1	03SS12_19970408	3.9-43	4.9	127	52	7	760	179		8
Endosulfan I	6/68	0.25	30	9.92	10.2	03SB13_19910906	2-94	119	0.3						
Endosulfan II	5/68	0.49	16	19.2	3.06	03SS35-D	2-190	119	0.1		2				
Endosulfan Sulfate	2/68	1.3	3.2	18.9	2.25	03SS34	2-190	119	0.03		2				
Endrin	2/67	0.61	16	19.5	5.71	03SS35-D	2-190	10.1	1.6	1	36				
Endrin Aldehyde	11/38	0.61	8	7.79	3.13	03SS32	2-49	10.5	0.8		5				
Endrin Ketone	5/68	0.29	9.6	19	3.96	03SS38	2-190	---	---	---	---				
Gamma-BHC (Lindane)	1/68	1.1	1.1	9.55	1.1	03TP12-0102-03-20070504	2-94	5	0.2		35				
Gamma-Chlordane	6/64	0.58	33	80	10.7	03SS35-D	2-940	224	0.1		4				
Heptachlor	2/68	0.71	3.9	9.57	2.31	03SS31	2-94	5.98	0.7		35				
Heptachlor Epoxide	12/67	0.55	20	10	5.75	03SS35-D	2-94	152	0.1			47	7.79		4
Methoxychlor	1/68	5	5	94.9	5	03SS32	3.8-940	19.9	0.3		65				
SEMIVOLATILES (µg/kg)															
1,2,4-Trichlorobenzene	1/68	150	150	475	150	03SB07_19910906	4.8-19000	11100	0.01		1				
1,2-Dichlorobenzene	7/68	39	330	447	147	03SB07_19910906	9.9-20000	2960	0.1		2				
1,4-Dichlorobenzene	12/68	39	160	428	59.1	03SB01_19910906	9.9-740	546	0.3		5				
1-Methylnaphthalene	8/12	0.74	3.5	5.46	1.94	03-SS-27	200-20000	29000	0.0001						
2-Methylnaphthalene	19/68	0.93	9500	659	399	03SB06_19910906	350-740	29000	0.3						
Acenaphthene	23/68	0.8	33000	646	1260	03SB06_19910906	370-430	29000	1.1			64	178	7	3
Acenaphthylene	26/68	0.86	160	774	11.3	03SB01_19910906	200-20000	29000	0.006			62	177	1	

TABLE 7-13

DATA SUMMARY FOR SURFACE SOIL ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED VALUES[1]		MEAN OF ALL DATA	MEAN OF DETECTED DATA	LOCATION OF MAXIMUM CONCENTRATION	RANGE OF NONDETECTS[2]	ECOLOGICAL SCREENING VALUE[3]	MAXIMUM HAZARD QUOTIENT (HQ)	NUMBER OF DETECTS > SCREENING VALUE	NUMBER OF NONDETECTS > SCREENING VALUE	MAXIMUM BACKGROUND CONCENTRATION	MEAN BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MAX BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MEAN BACKGROUND CONCENTRATION
		MINIMUM	MAXIMUM												
Anthracene	34/68	0.86	66000	1190	1990	03SB06_19910906	350-740	29000	2.3	1		160	154	6	6
Benz(a)anthracene	55/68	4.2	65000	1250	1460	03SB06_19910906	370-430	1100	59.1	5		940	306	6	9
Benzaldehyde	2/26	29	77	980	53	03SS40		---	---	---	---				
Benzo(a)pyrene	55/68	5.1	48000	971	1110	03SB06_19910906	370-430	1100	43.6	5		1100	394	5	9
Benzo(b)fluoranthene	59/68	7.2	58000	1040	1140	03SB06_19910906	370-430	1100	52.7	6		1500	507	4	7
Benzo(g,h,i)perylene	45/68	3.7	13000	464	502	03SB06_19910906	350-450	1100	11.8	3		490	225	5	7
Benzo(k)fluoranthene	53/68	5.2	31000	732	825	03SB06_19910906	370-450	1100	28.2	3		920	370	5	9
Bis(2-ethylhexyl) Phthalate	22/56	38	690	905	159	03SS36	200-20000	925	0.7		3				
Butyl Benzyl Phthalate	1/68	330	330	860	330	03SS09_19970408	200-20000	239	1.4	1	49	280	208	1	1
Carbazole	3/38	79	3200	360	1160	03TP12-0102-03-20070504	200-460	---	---	---	---	310	212	1	1
Chrysene	62/68	6.6	52000	1070	1130	03SB06_19910906	370-400	1100	47.3	5		1200	420	4	9
Di-n-butyl Phthalate	2/59	60	370	947	215	03SS07_19910905	200-20000	150	2.5	1	57				
Dibenz(a,h)anthracene	26/65	1.7	4800	607	146	03SB06_19910906	350-20000	1100	4.4	1	1	160	161	2	2
Dibenzofuran	4/68	73	29000	963	5080	03SB06_19910906	200-20000	---	---	---	---	120	172	2	1
Fluoranthene	65/68	15	150000	2710	2820	03SB06_19910906	380-400	29000	5.2	2		2600	902	4	7
Fluorene	27/68	0.73	41000	766	1360	03SB06_19910906	11-740	29000	1.4			160	184	5	4
Indeno(1,2,3-cd)pyrene	45/68	4.4	19000	558	636	03SB06_19910906	350-740	1100	17.3	3		640	251	4	6
Naphthalene	4/48	3.1	13000	1010	2120	03SB06_19910906	200-20000	29000	0.4						
Phenanthrene	64/68	5.6	210000	3470	3660	03SB06_19910906	380-400	29000	7.2	3		1700	667	4	6
Pyrene	65/68	11	140000	2520	2610	03SB06_19910906	380-400	1100	127	6		2100	723	6	9
Total PAHs	65/68	71.6	953,300	23,300	24,600	03SB06_19910906	380-400	1000[4]	953	30		13747	4324	6	11
VOLATILES (µg/kg)															
2-Butanone	15/50	4	20	11.6	10.4	03SS40	5-19	---	---	---	---				
Acetone	20/37	89	270	147	156	03-SS-26	11-22	2500	0.1						
Benzene	1/56	1.4	1.4	1.4		03SS32	4.8-8	255	0.005						
Chloromethane	3/56	2.1	3.6	2.7		03SS32	4.8-12	10400	0.0003						
Methyl Acetate	1/26	5.5	5.5	4.38	4.38	03-SS-21	4.8-8	255	0.02						
Toluene	9/56	1.7	15	4.34	4.6	03-SS-18	4.8-7.8	5450	0.003						
DIOXIN/FURAN (ng/kg)															
TCDD TEQ (mammal)	2/2	4.51	12.55	8.53	8.53	03SS04_19970408		0.199	63.1	2					
TCDD TEQ (bird)	2/2	1.66	31.08	16.37	16.37	03SS04_19970408		0.199	156.2	2					
TCDD TEQ (fish)	2/2	0.59	7.21	3.9	3.9	03SS04_19970408		0.199	36.2	2					

Footnotes:

(1) The duplicate pair were treated as one result with the exception of the minimum and maximum concentrations.

(2) Sample-specific quantitation limits.

(3) Lowest ecological screening value from Table 7-6.

TABLE 7-14

DATA SUMMARY FOR SEDIMENT ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS[1]		MEAN OF ALL DATA	MEAN OF DETECTED DATA	LOCATION OF MAXIMUM CONCENTRATION	RANGE OF NONDETECTS[2]	ECOLOGICAL SCREENING VALUE	MAXIMUM HAZARD QUOTIENT (HQ)	NUMBER OF DETECTS > SCREENING VALUE	NUMBER OF NONDETECTS > SCREENING VALUE	MAXIMUM BACKGROUND CONCENTRATION	MEAN BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MAX BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MEAN BACKGROUND CONCENTRATION
		MINIMUM	MAXIMUM												
INORGANICS (µg/kg)															
Arsenic	3/3	3.1	11.1	6.4	6.4	03-SD-17		9.8	1.1	1		7.2	4.55	1	2
Barium	6/6	49.6	121	86.2	86.2	03-SD-17		---	---	---	---	160.5	98.2		2
Beryllium	5/5	0.555	1.9	0.957	0.957	03-SD-17		---	---	---	---	1.2	0.878	1	1
Cadmium	3/4	0.29	0.48	0.294	0.382	03-SD-12	0.06	0.99	0.5						
Chromium	6/6	8.9	34.8	16.3	16.3	03-SD-17		43.4	0.8			34.5	15.7	1	2
Copper	6/6	8.4	30.5	16.7	16.7	03-SD-17		31.6	1.0			27.8	13.4	1	4
Iron	6/6	7090	37600	14900	14900	03-SD-17		20000	1.9	1		35400	16500	1	1
Lead	6/6	12	95.6	35.1	35.1	03-SD-17		35.8	2.7	2		27.6	15.3	2	4
Manganese	6/6	62.3	631	255	255	03-SD-17		460	1.4	1		759	514		1
Mercury	5/6	0.038	0.061	0.0448	0.0512	03-SD-14	0.026	0.18	0.3						
Nickel	6/6	5	18.5	9.32	9.32	03-SD-17		22.7	0.8			22.7	12.5		1
Selenium	3/6	1	1.1	0.733	1.05	03-SD-12	0.58-1.2	2	0.6			0.475	0.198	3	3
Vanadium	6/6	11.9	62.1	25.8	25.8	03-SD-17		---	---	---	---	52.6	22.6	1	2
Zinc	6/6	25.6	134	56.1	56.1	03-SD-17		121	1.1	1		97.6	51.2	1	3
PESTICIDES (µg/kg)															
4,4'-DDD	1/6	2.2	2.2	6.42	2.2	03-SD-12	4.2-28	4.88	0.5		4				
4,4'-DDE	3/5	3.3	29	11	13	03-SD-14	4.2-28	3.16	9.2	3	2				
4,4'-DDT	4/6	2.4	11	7.23	6.83	03-SD-14	4.2-28	4.16	2.6	3	2				
Total DDT	4/6	5.7	40	14.1	32.3	03-SD-14	4.2-28	5.28	7.6	4	1				
Aldrin	5/6	0.85	8.1	3.21	3.39	03-SD-15	4.6	2	4.1	4	1				
Alpha-Chlordane	2/2	4.6	8.4	6.5	6.5	03-SD-12		3.24	2.6	2					
Delta-BHC	1/6	0.38	0.38	3.16	0.38	03-SD-12	2.2-14.5	6400	0.00006						
Dieldrin	6/6	4.4	46.5	28.5	28.5	03-SD-15-DUP		1.9	24	6		3.1	2.26	6	6
Endosulfan II	1/6	15	15	6.68	15	03-SD-15-DUP	4.2-26	14	1.1	1	1				
Endrin Aldehyde	3/4	0.94	8.9	6.84	4.45	03-SD-12	28	2.22	4.0	2	1				
Endrin Ketone	3/6	2.8	6.4	6.98	4.27	03-SD-17	4.2-28	2.22	2.9	3	3				
Gamma-Chlordane	4/4	1.3	5.45	2.94	2.94	03-SD-15-DUP		3.24	1.7	2					
Heptachlor	2/6	0.81	0.98	3.02	0.895	03-SD-17	2.2-14.5	68	0.01						
Heptachlor Epoxide	1/4	2.9	2.9	4.51	2.9	03-SD-17	2.8-14.5	2.47	1.2	1	3				
Methoxychlor	1/6	11	11	32.8	11	03-SD-12	22-145	18.7	0.6		5				

TABLE 7-14

DATA SUMMARY FOR SEDIMENT ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS[1]		MEAN OF ALL DATA	MEAN OF DETECTED DATA	LOCATION OF MAXIMUM CONCENTRATION	RANGE OF NONDETECTS[2]	ECOLOGICAL SCREENING VALUE	MAXIMUM HAZARD QUOTIENT (HQ)	NUMBER OF DETECTS > SCREENING VALUE	NUMBER OF NONDETECTS > SCREENING VALUE	MAXIMUM BACKGROUND CONCENTRATION	MEAN BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MAX BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MEAN BACKGROUND CONCENTRATION
		MINIMUM	MAXIMUM												
SEMIVOLATILES (µg/kg)															
1-Methylnaphthalene	2/2	39	75	57	57	03-SD-14		---	---	---	---				
2-Methylnaphthalene	2/2	37	65	51	51	03-SD-14		20.2	3.2	2					
Acenaphthene	2/2	97	200	149	149	03-SD-14		6.7	29.9	2					
Acenaphthylene	5/5	23.75	280	129	129	03-SD-14		5.9	47	5					
Anthracene	6/6	30	700	247	247	03-SD-14		57.2	12.2	5					
Benz(a)anthracene	6/6	61	1200	456	456	03-SD-14		108	11.1	5		580	275	2	2
Benzo(a)pyrene	6/6	75	1400	543	543	03-SD-14		150	9.3	5		530	268	2	3
Benzo(b)fluoranthene	6/6	80	2500	918	918	03-SD-12		---	---	---	---	670	286	2	4
Benzo(g,h,i)perylene	6/6	52	970	362	362	03-SD-14		170	5.7	4					
Benzo(k)fluoranthene	6/6	89	1400	512	512	03-SD-14		240	5.8	3		300	240	3	3
Carbazole	3/6	79	240	172	183	03-SD-14	220-460	---	---	---	---				
Chrysene	6/6	89	2300	836	836	03-SD-12		166	13.9	5		640	238	2	5
Dibenz(a,h)anthracene	5/5	33.75	380	163	163	03-SD-14		33	11.5	5					
Fluoranthene	6/6	210	9600	2970	2970	03-SD-14		423	22.7	4		510	221	4	5
Fluorene	3/3	29	290	163	163	03-SD-14		77.4	3.7	2					
Indeno(1,2,3-cd)pyrene	6/6	64	1300	474	474	03-SD-14		17	76.5	6					
Naphthalene	2/2	47	89	68	68	03-SD-14		176	0.5						
Phenanthrene	6/6	130	7200	2080	2080	03-SD-14		204	35.3	4		260	235	4	4
Pyrene	6/6	150	6800	2160	2160	03-SD-14		195	34.9	5		1300	315	2	5
Total PAHs	6/6	1030	35749	11999	11999	03-SD-14		1610	22.2	5		4790	834	2	6
VOLATILES (µg/kg)															
2-Butanone	4/6	13	21	15.2	17.3	03-SD-15	14-30	---	---	---	---				
Acetone	6/6	26	180	100	100	03-SD-17		---	---	---	---				
Carbon Disulfide	3/6	2	6.2	4.5	3.6	03-SD-13	9.4-12	0.851	7.3	3	3				

Footnotes:
(1) The duplicate pair was treated as one result with the exception of the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.

TABLE 7-15

DATA SUMMARY FOR SURFACE WATER ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS[1]		MEAN OF ALL DATA	MEAN OF DETECTED DATA	LOCATION OF MAXIMUM CONCENTRATION	RANGE OF NONDETECTS[2]	ECOLOGICAL SCREENING VALUE	MAXIMUM HAZARD QUOTIENT (HQ)	NUMBER OF DETECTS > SCREENING VALUE	NUMBER OF NONDETECTS > SCREENING VALUE	MAXIMUM BACKGROUND CONCENTRATION	MEAN BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MAX BACKGROUND CONCENTRATION	NUMBER OF DETECTS > MEAN BACKGROUND CONCENTRATION
		MINIMUM	MAXIMUM												
INORGANICS (µg/L)															
Aluminum	7/8	120	317	160	177	03-SW-17	80	87	3.6	7		351.5	352		
Barium	8/8	32.5	113	57.8	57.8	03SW11-20080319		4	28.3	8		112	101	1	1
Chromium	4/6	0.7675	1.3	0.856	1.07	03-SW-14	0.87	47	0.03						
Iron	8/8	185	1060	352	352	03SW11-20080319		300	3.5	2		635	321	1	2
Lead	8/8	0.07	2.7	1.85	1.85	03-SW-16		1.4	1.9	1		0.8	0.538	7	7
Manganese	8/8	30.9	197	67	67	03SW11-20080319		120	1.6	1		110.25	67.1	1	2
Nickel	2/8	1.2	2	0.768	1.6	03SW11-20080319	0.98	32	0.06			20.7	11.3		
Zinc	3/3	3.6	16	10.5	10.5	03SW11-20080319		73	0.2			12.85	5.28	1	2
PESTICIDES (µg/L)															
Dieldrin	6/6	0.0081	0.011	0.00983	0.00983	03-SW-14		0.056	0.2						
SEMIVOLATILES (µg/L)															
Acenaphthylene	1/6	0.016	0.016	0.0885	0.016	03-SW-14	0.2-0.22	4.84	0.003	1	5				
Benz(a)anthracene	1/6	0.027	0.027	0.0903	0.027	03-SW-14	0.2-0.22	0.018	1.5	1	5				
Benzo(a)pyrene	3/6	0.013	0.047	0.0638	0.026	03-SW-14	0.2-0.21	0.015	3.1	2	3				
Benzo(b)fluoranthene	5/6	0.015	0.097	0.0436	0.0323	03-SW-14	0.2	9.07	0.01						
Benzo(g,h,i)perylene	2/6	0.018	0.036	0.0765	0.027	03-SW-14	0.2-0.21	---	---	---	---				
Benzo(k)fluoranthene	4/6	0.013	0.085	0.0543	0.0315	03-SW-14	0.2	---	---	---	---				
Chrysene	1/6	0.053	0.053	0.0947	0.053	03-SW-14	0.2-0.22	---	---	---	---				
Dibenz(a,h)anthracene	1/6	0.012	0.012	0.087	0.012	03-SW-15-D	0.2-0.21	---	---	---	---				
Fluoranthene	3/6	0.012	0.12	0.0755	0.0493	03-SW-14	0.2-0.21	0.04	3.0	1	3				
Fluorene	6/6	0.59	0.69	0.643	0.643	03-SW-14		3	0.2						
Indeno(1,2,3-cd)pyrene	6/6	0.01	0.042	0.017	0.017	03-SW-14		4.31	0.01						
Phenanthrene	1/6	0.096	0.096	0.102	0.096	03-SW-14	0.2-0.22	0.4	0.2						
Pyrene	6/6	0.013	0.099	0.0293	0.0293	03-SW-14		0.025	4.0	1					
Total PAHs	6/6	0.644	1.408	0.797	0.797	03-SW-14		---							

Footnotes:
(1) The duplicate pair were treated as one result with the exception of the minimum and maximum concentrations.
(2) Values presented are sample-specific quantitation limits.

TABLE 7-16

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
AVERAGE SCENARIO, INSECTIVOROUS AND HERBIVOROUS RECEPTORS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

	Herbivorous Receptors HQs						Insectivorous Receptors HQs			
	Bobwhite Quail		Meadow Vole		Woodchuck		Robin		Short-Tailed Shrew	
Chemical	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**
Semivolatile Organics										
1,2,4-Trichlorobenzene	NV	NV	1.9E-03	1.9E-04	5.1E-04	5.1E-05	NV	NV	8.1E-05	8.1E-06
1,2-Dichlorobenzene	NV	NV	4.5E-04	4.5E-05	1.2E-04	1.2E-05	NV	NV	9.9E-04	9.9E-05
1,4-Dichlorobenzene	NV	NV	2.2E-04	2.2E-05	6.1E-05	6.1E-06	NV	NV	4.8E-04	4.8E-05
Acenaphthene	1.8E-03	1.8E-04	2.0E-05	3.6E-06	3.5E-06	6.4E-07	7.3E-02	7.3E-03	1.3E-03	2.4E-04
Acenaphthylene	3.3E-03	3.3E-04	1.1E-04	2.1E-05	3.4E-05	6.3E-06	2.7E-01	2.7E-02	5.0E-03	9.2E-04
Anthracene	1.9E-02	1.9E-03	6.5E-04	1.2E-04	1.9E-04	3.5E-05	2.2E-01	2.2E-02	3.9E-03	7.2E-04
Benzo(a)anthracene	5.9E-03	5.9E-04	1.4E-02	2.3E-04	8.6E-03	1.4E-04	1.5E-01	1.5E-02	2.9E-01	4.6E-03
Benzo(a)pyrene	7.1E-03	7.1E-04	2.1E-02	3.4E-04	1.0E-02	1.6E-04	1.0E-01	1.0E-02	1.9E-01	3.0E-03
Benzo(b)fluoranthene	1.5E-02	1.5E-03	5.3E-02	8.5E-04	2.1E-02	3.4E-04	2.0E-01	2.0E-02	3.9E-01	6.3E-03
Benzo(g,h,i)perylene	1.0E-01	1.0E-02	4.1E-01	6.6E-03	1.2E-01	1.9E-03	1.0E-01	1.0E-02	2.0E-01	3.2E-03
Benzo(k)fluoranthene	5.2E-03	5.2E-04	1.5E-02	2.5E-04	7.3E-03	1.2E-04	1.4E-01	1.4E-02	2.8E-01	4.4E-03
Butyl Benzyl Phthalate	NV	NV	1.4E-04	4.6E-05	3.2E-05	1.1E-05	NV	NV	1.9E-03	6.3E-04
Chrysene	5.3E-03	5.3E-04	1.3E-02	2.1E-04	7.7E-03	1.2E-04	1.9E-01	1.9E-02	3.6E-01	5.7E-03
Di-n-Butyl Phthalate	NV	NV	4.4E-06	1.3E-06	1.0E-06	3.1E-07	NV	NV	6.0E-05	1.8E-05
Dibenzo(a,h)anthracene	4.5E-03	4.5E-04	1.4E-02	2.2E-04	4.0E-03	6.4E-05	1.1E-01	1.1E-02	2.0E-01	3.3E-03
Fluoranthene	5.9E-02	5.9E-03	2.1E-03	3.8E-04	6.5E-04	1.2E-04	6.2E-01	6.2E-02	1.1E-02	2.1E-03
Fluorene	1.9E-03	1.9E-04	1.7E-05	3.1E-06	2.1E-06	3.9E-07	5.5E-01	5.5E-02	1.0E-02	1.8E-03
Indeno(1,2,3-cd)pyrene	3.7E-03	3.7E-04	1.1E-02	1.7E-04	4.4E-03	7.1E-05	1.2E-01	1.2E-02	2.3E-01	3.7E-03
Phenanthrene	8.0E-02	8.0E-03	2.8E-03	5.1E-04	8.1E-04	1.5E-04	4.6E-01	4.6E-02	8.1E-03	1.5E-03
Pyrene	7.7E-02	7.7E-03	2.9E-01	4.7E-03	9.1E-02	1.5E-03	3.4E-01	3.4E-02	6.4E-01	1.0E-02
Pesticides/PCBs										
4,4'-DDD	4.1E-04	3.4E-05	1.6E-04	4.1E-06	1.1E-04	2.9E-06	1.3E-01	1.1E-02	1.2E-01	3.3E-03
4,4'-DDE	5.1E-04	4.3E-05	1.9E-04	5.2E-06	5.7E-05	1.5E-06	3.0E-01	2.5E-02	2.8E-01	7.3E-03
4,4'-DDT	6.8E-04	5.7E-05	2.6E-04	6.9E-06	4.2E-04	1.1E-05	2.8E-01	2.4E-02	2.6E-01	6.8E-03
Total DDT	3.5E-03	3.0E-04	5.4E-03	1.4E-04	2.0E-03	5.2E-05	3.7E-01	3.1E-02	3.4E-01	9.1E-03
Aldrin	NV	NV	5.5E-04	1.1E-04	1.7E-04	3.3E-05	NV	NV	2.4E-03	4.7E-04
Alpha-BHC	2.1E-04	5.3E-05	8.7E-03	8.7E-04	2.6E-03	2.6E-04	7.5E-03	1.9E-03	1.8E-01	1.8E-02
Beta-BHC	3.3E-05	8.3E-06	4.6E-05	9.3E-06	1.3E-05	2.5E-06	1.3E-03	3.3E-04	1.1E-03	2.2E-04
Delta-BHC	NA	NA	NA	NA	5.6E-05	5.6E-06	NA	NA	NA	NA
Alpha-Chlordane	7.2E-05	1.4E-05	1.8E-05	8.9E-06	4.4E-05	2.2E-05	8.0E-03	1.6E-03	2.2E-03	1.1E-03
Aroclor-1242	NA	NA	NA	NA	3.0E-04	3.0E-05	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	5.2E-03	5.2E-04	NA	NA	NA	NA
Aroclor-1254	2.7E-03	2.7E-04	3.0E-03	3.0E-04	3.3E-02	3.3E-03	4.6E-01	4.6E-02	7.3E-01	7.3E-02
Aroclor-1260	4.2E-03	4.2E-04	3.2E-03	3.2E-04	5.6E-04	5.6E-05	8.3E-01	8.3E-02	1.3E+00	1.3E-01
Dieldrin	4.0E-02	3.5E-03	2.1E-01	2.5E-03	7.4E-02	8.7E-04	2.1E+00	1.9E-01	6.1E+00	7.2E-02
Endosulfan I	3.0E-05	3.0E-06	2.2E-03	2.2E-04	6.2E-04	6.2E-05	1.6E-04	1.6E-05	5.9E-03	5.9E-04
Endosulfan II	4.9E-05	4.9E-06	3.6E-03	3.6E-04	1.0E-03	1.0E-04	2.5E-04	2.5E-05	9.6E-03	9.6E-04
Endosulfan Sulfate	9.8E-06	9.8E-07	7.2E-04	7.2E-05	2.1E-04	2.1E-05	5.0E-05	5.0E-06	1.9E-03	1.9E-04
Endrin	1.7E-02	1.7E-03	1.6E-03	1.6E-04	4.4E-04	4.4E-05	8.4E-01	8.4E-02	5.6E-02	5.6E-03
Endrin Aldehyde	8.7E-03	8.7E-04	7.7E-04	7.7E-05	2.5E-04	2.5E-05	4.2E-01	4.2E-02	2.7E-02	2.7E-03
Endrin Ketone	1.1E-02	1.1E-03	9.5E-04	9.5E-05	3.9E-04	3.9E-05	5.2E-01	5.2E-02	3.4E-02	3.4E-03
Gamma-BHC (Lindane)	1.4E-05	1.4E-06	3.8E-06	3.8E-07	1.5E-06	1.5E-07	4.1E-04	4.1E-05	6.1E-05	6.1E-06
Gamma-Chlordane	1.0E-04	2.1E-05	2.6E-05	1.3E-05	3.3E-05	1.7E-05	1.2E-02	2.3E-03	3.2E-03	1.6E-03
Heptachlor	NV	NV	5.1E-04	5.1E-05	1.4E-04	1.4E-05	NV	NV	3.5E-02	3.5E-03
Heptachlor Epoxide	NV	NV	3.9E-04	3.9E-05	1.5E-04	1.5E-05	NV	NV	8.9E-02	8.9E-03
Methoxychlor	NV	NV	1.4E-05	7.2E-06	5.9E-06	2.9E-06	NV	NV	1.1E-04	5.6E-05
Inorganics										
Antimony	NV	NV	3.3E-01	7.1E-03	2.7E+00	5.9E-02	NV	NV	6.4E+00	1.4E-01
Arsenic	1.7E-02	8.4E-03	2.3E-02	5.2E-03	3.2E-02	7.3E-03	7.0E-02	3.5E-02	6.7E-02	1.5E-02
Cadmium	5.6E-02	1.3E-02	1.2E-01	1.3E-02	2.1E-01	2.3E-02	1.5E+00	3.5E-01	1.7E+00	1.9E-01
Chromium	6.1E-02	1.0E-02	4.4E-02	1.8E-03	7.9E-02	3.2E-03	4.2E-01	7.2E-02	2.4E-01	9.9E-03
Copper	1.8E-01	2.1E-02	1.4E-01	9.3E-03	6.7E-01	4.6E-02	6.5E-01	7.6E-02	2.6E-01	1.7E-02
Cyanide	NV	NV	1.5E-02	1.5E-03	4.3E-03	4.3E-04	NV	NV	1.6E-03	1.6E-04
Lead	2.1E-01	7.6E-03	5.2E-02	1.3E-03	5.4E-01	1.4E-02	1.6E+00	5.8E-02	2.9E-01	7.4E-03
Mercury	1.1E+00	1.1E-01	2.6E-01	5.2E-02	1.9E-01	3.8E-02	1.3E+01	1.3E+00	1.5E+00	3.0E-01
Nickel	1.8E-02	6.4E-03	5.1E-02	5.9E-03	1.0E-01	1.2E-02	3.2E-01	1.2E-01	7.3E-01	8.4E-02
Selenium	5.0E-02	1.8E-02	1.2E-01	2.5E-02	3.4E-02	7.5E-03	2.4E-01	8.3E-02	2.8E-01	6.0E-02
Silver	3.6E-03	1.2E-04	5.3E-04	2.7E-05	3.3E-03	1.7E-04	1.9E-01	6.5E-03	3.8E-02	1.9E-03
Thallium	NV	NV	8.8E-02	8.8E-03	3.7E+00	3.7E-01	NV	NV	5.1E+00	5.10E-01
Vanadium	9.0E-01	1.8E-01	7.1E-02	3.1E-02	1.0E-01	4.5E-02	2.0E+00	4.0E-01	1.1E-01	4.8E-02
Zinc	6.3E-02	2.4E-02	6.4E-02	1.6E-02	1.2E-01	3.0E-02	7.6E-01	3.0E-01	4.0E-01	1.0E-01
Dioxins/Furans										
TEQ	6.0E-03	6.0E-04	1.4E-02	1.4E-03	1.0E-03	1.0E-04	1.9E+00	1.9E-01	8.4E+00	8.4E-01

Notes:
Cells are shaded if the value is greater than 1.0
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
HQ - Ecological Hazard Quotient
NV - NOAEL and LOAEL not available
NA - Analyte was detected in subsurface soil but not surface soil. Thus, HQs are applicable for woodchuck only (see Section 7.3 of text).

TABLE 7-17

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
AVERAGE SCENARIO, PISCIVOROUS RECEPTORS
SITE 3 - NINTH STREET LANDFILL
NAS JRB, WILLOW GROVE, PENNSYLVANIA

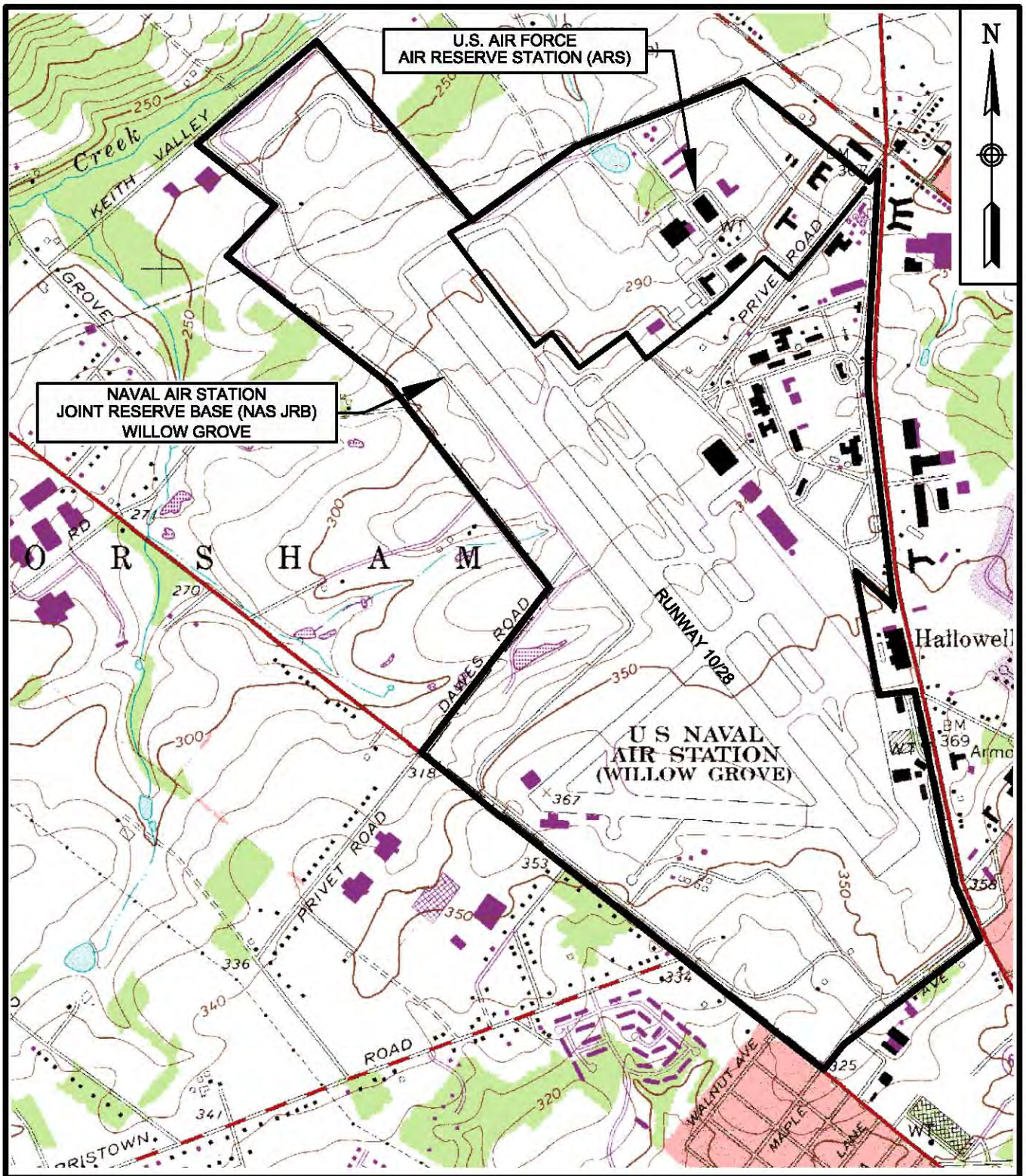
Chemical	Piscivorous Receptor HQs			
	Green Heron		Mink	
	NOAEL	LOAEL	NOAEL	LOAEL
Semivolatile Organics				
Acenaphthylene	3.9E-02	3.9E-03	3.4E-04	6.3E-05
Anthracene	7.4E-02	7.4E-03	6.6E-04	1.2E-04
Benzo(a)anthracene	1.4E-01	1.4E-02	1.3E-01	2.1E-03
Benzo(a)pyrene	1.6E-01	1.6E-02	1.5E-01	2.5E-03
Benzo(b)fluoranthene	2.7E-01	2.7E-02	2.6E-01	4.2E-03
Benzo(g,h,i)perylene	1.1E-01	1.1E-02	1.0E-01	1.6E-03
Benzo(k)fluoranthene	1.5E-01	1.5E-02	1.5E-01	2.3E-03
Chrysene	2.5E-01	2.5E-02	2.4E-01	3.8E-03
Dibenzo(a,h)anthracene	4.9E-02	4.9E-03	4.6E-02	7.4E-04
Fluoranthene	8.9E-01	8.9E-02	7.9E-03	1.5E-03
Fluorene	4.9E-02	4.9E-03	4.3E-04	8.0E-05
Indeno(1,2,3-cd)pyrene	1.4E-01	1.4E-02	1.3E-01	2.2E-03
Phenanthrene	6.2E-01	6.2E-02	5.5E-03	1.0E-03
Pyrene	6.5E-01	6.5E-02	6.1E-01	9.8E-03
Pesticides/PCBs				
4,4'-DDD	5.6E-03	4.7E-04	2.5E-03	6.7E-05
4,4'-DDE	7.6E-01	6.4E-02	3.4E-01	9.0E-03
4,4'-DDT	1.1E-01	9.1E-03	4.8E-02	1.3E-03
Total DDT	9.8E-01	8.2E-02	4.4E-01	1.2E-02
Aldrin	NA	NA	1.7E-02	3.4E-03
Alpha-Chlordane	3.0E-02	5.9E-03	4.0E-03	2.0E-03
Delta-BHC	2.5E-03	6.2E-04	2.9E-02	2.9E-03
Dieldrin	1.5E+00	1.3E-01	2.0E+00	2.4E-02
Endosulfan II	2.5E-03	2.5E-04	4.7E-02	4.7E-03
Endrin Aldehyde	2.5E+00	2.5E-01	7.9E-02	7.9E-03
Endrin Ketone	2.4E+00	2.4E-01	7.4E-02	7.4E-03
Gamma-Chlordane	6.2E-03	1.2E-03	8.4E-04	4.2E-04
Heptachlor	NA	NA	1.0E-02	1.0E-03
Heptachlor Epoxide	NA	NA	3.1E-02	3.1E-03
Methoxychlor	NA	NA	2.9E-03	1.5E-03
Inorganics				
Arsenic	7.8E-05	3.9E-05	6.0E-05	1.4E-05
Cadmium	1.8E-05	4.3E-06	1.1E-05	1.2E-06
Chromium	1.6E-04	2.8E-05	7.7E-05	3.2E-06
Copper	9.4E-04	1.1E-04	2.0E-04	1.4E-05
Lead	4.8E-04	1.8E-05	7.6E-05	1.9E-06
Mercury	1.2E-03	1.2E-04	7.0E-05	1.4E-05
Nickel	1.2E-04	4.2E-05	1.6E-04	1.8E-05
Selenium	3.8E-04	1.3E-04	2.3E-04	5.0E-05
Zinc	2.5E-04	9.8E-05	7.1E-05	1.8E-05

Cells are shaded if the value is greater than 1.0

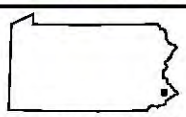
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
HQ - Ecological Hazard Quotient
NA - NOAEL and LOAEL not available

FIGURES

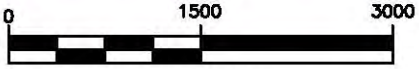
2192 WillowGrove\1227\2192BM01-1.DWG 07/22/08 MKB



BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.



QUADRANGLE LOCATION



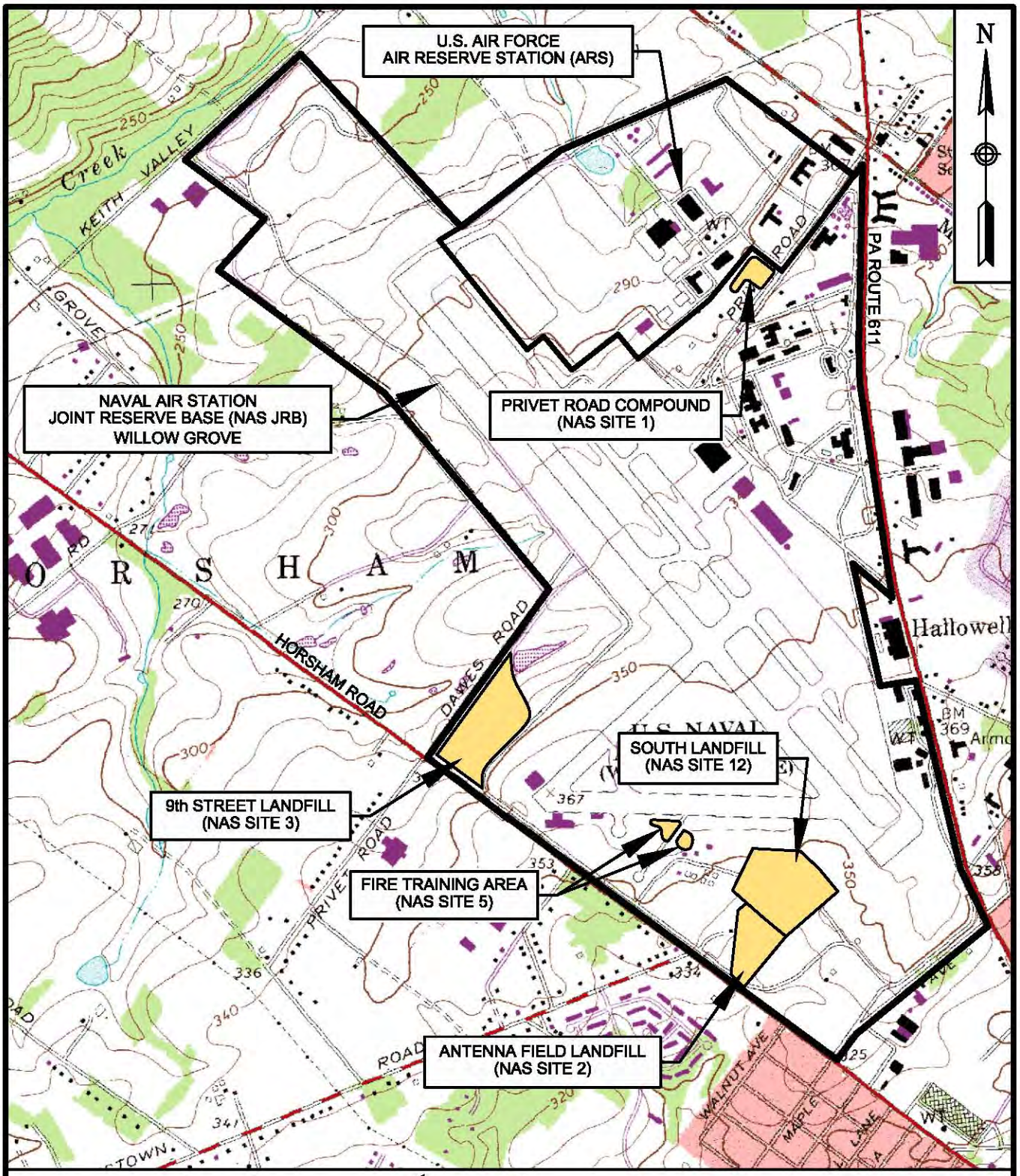
SCALE IN FEET

TETRA TECH NUS, INC.

LOCATION MAP
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	AS NOTED
FILE	2192BM01-1
REV	0
DATE	07/22/08
FIGURE NUMBER	FIGURE ES-1

112G02014\0904\112G02014CM03.DWG 03/11/10 MKB



BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.

QUADRANGLE LOCATION

0 1500 3000

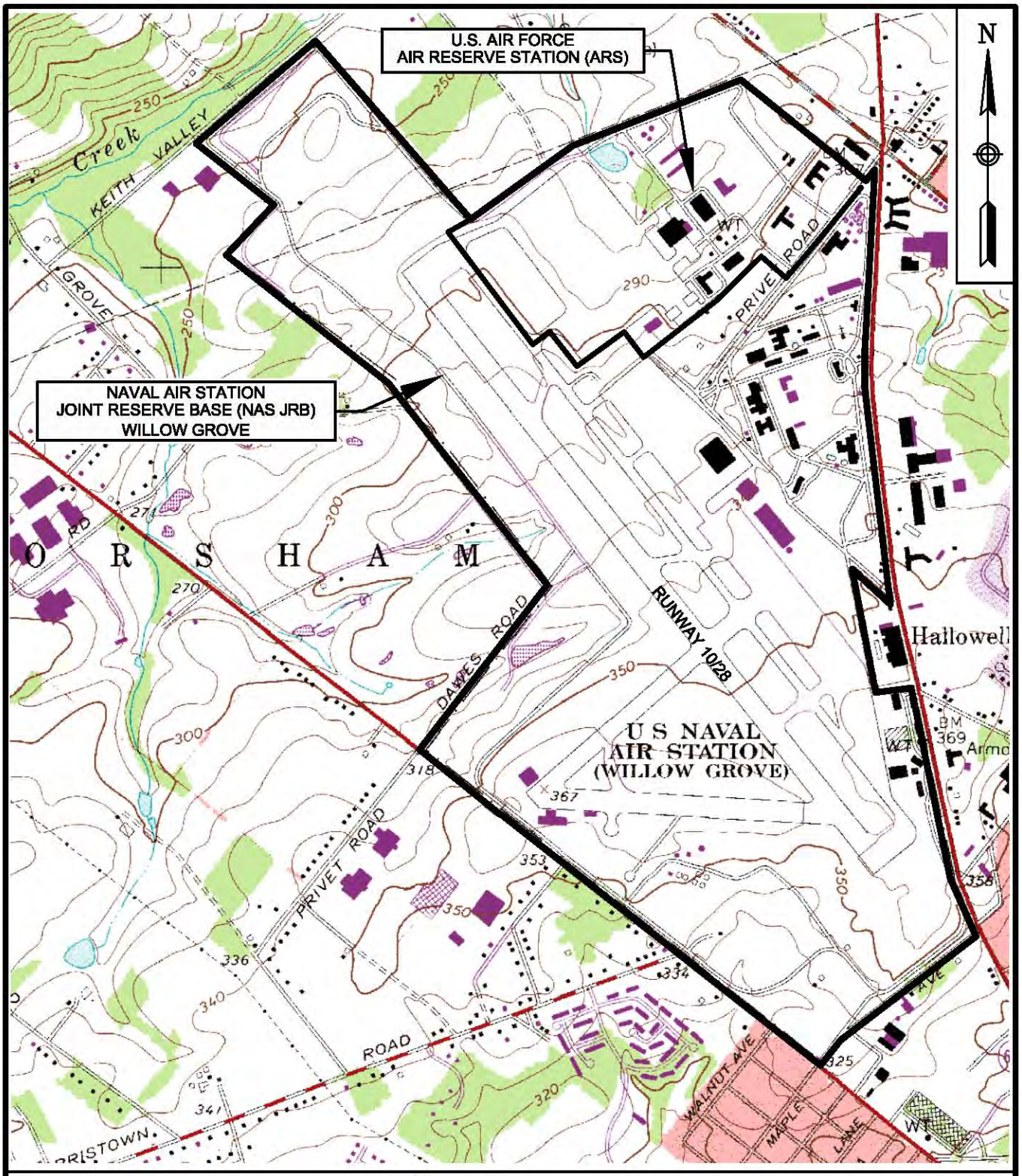
SCALE IN FEET

TETRA TECHNUS, INC.

LOCATION OF IR SITES
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

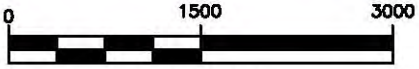
SCALE	AS NOTED
FILE	112G02014CM03
REV	0
DATE	03/11/10
FIGURE NUMBER	FIGURE ES-2

2192 WillowGrove\1227\2192BM01-1.DWG 07/22/08 MKB



BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.

QUADRANGLE LOCATION



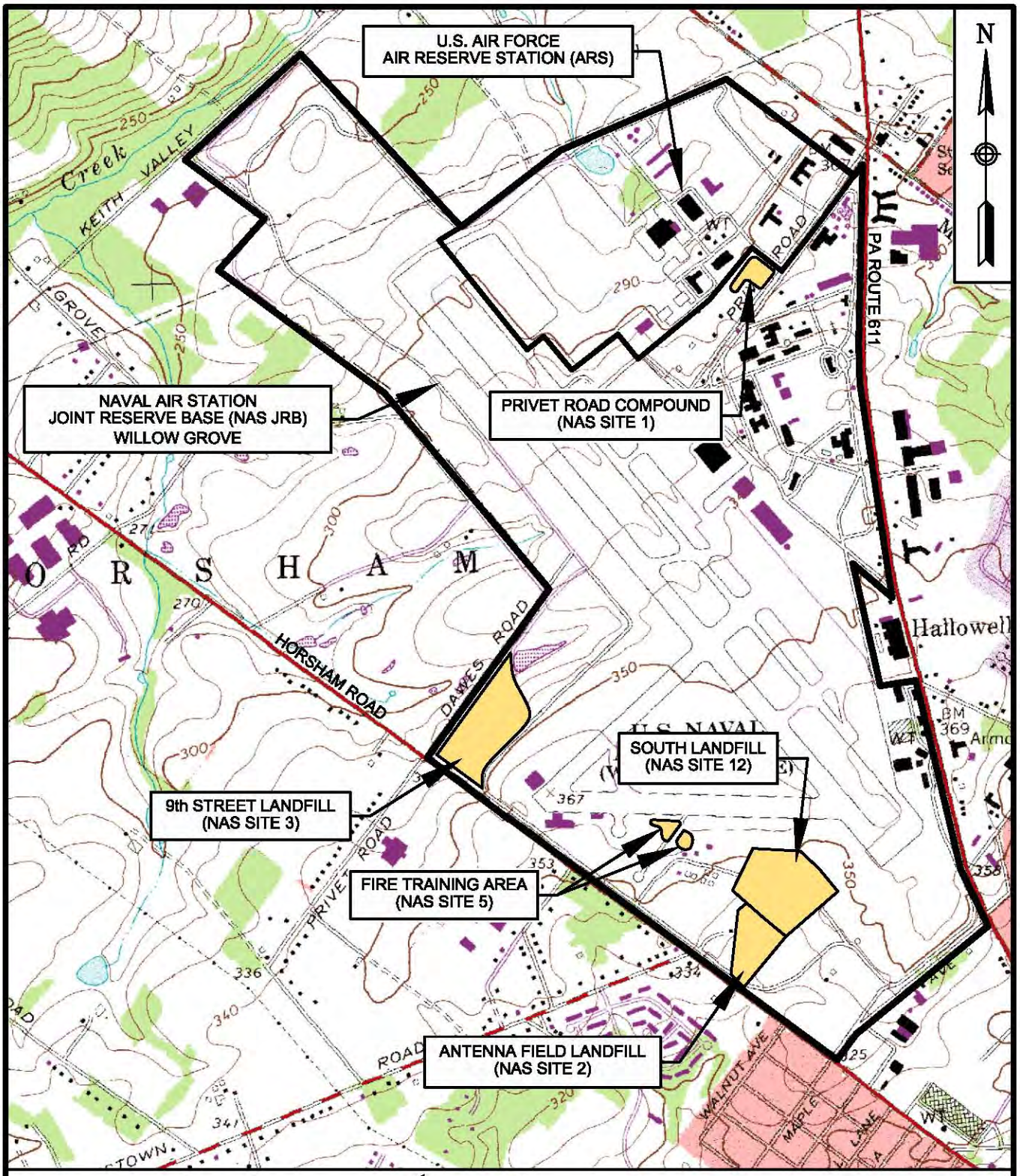
SCALE IN FEET

TETRA TECH NUS, INC.

LOCATION MAP
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	AS NOTED
FILE	2192BM01-1
REV	0
DATE	07/22/08
FIGURE NUMBER	FIGURE 1-1

112G02014\0904\112G02014CM03.DWG 03/11/10 MKB



BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.

QUADRANGLE LOCATION

0 1500 3000

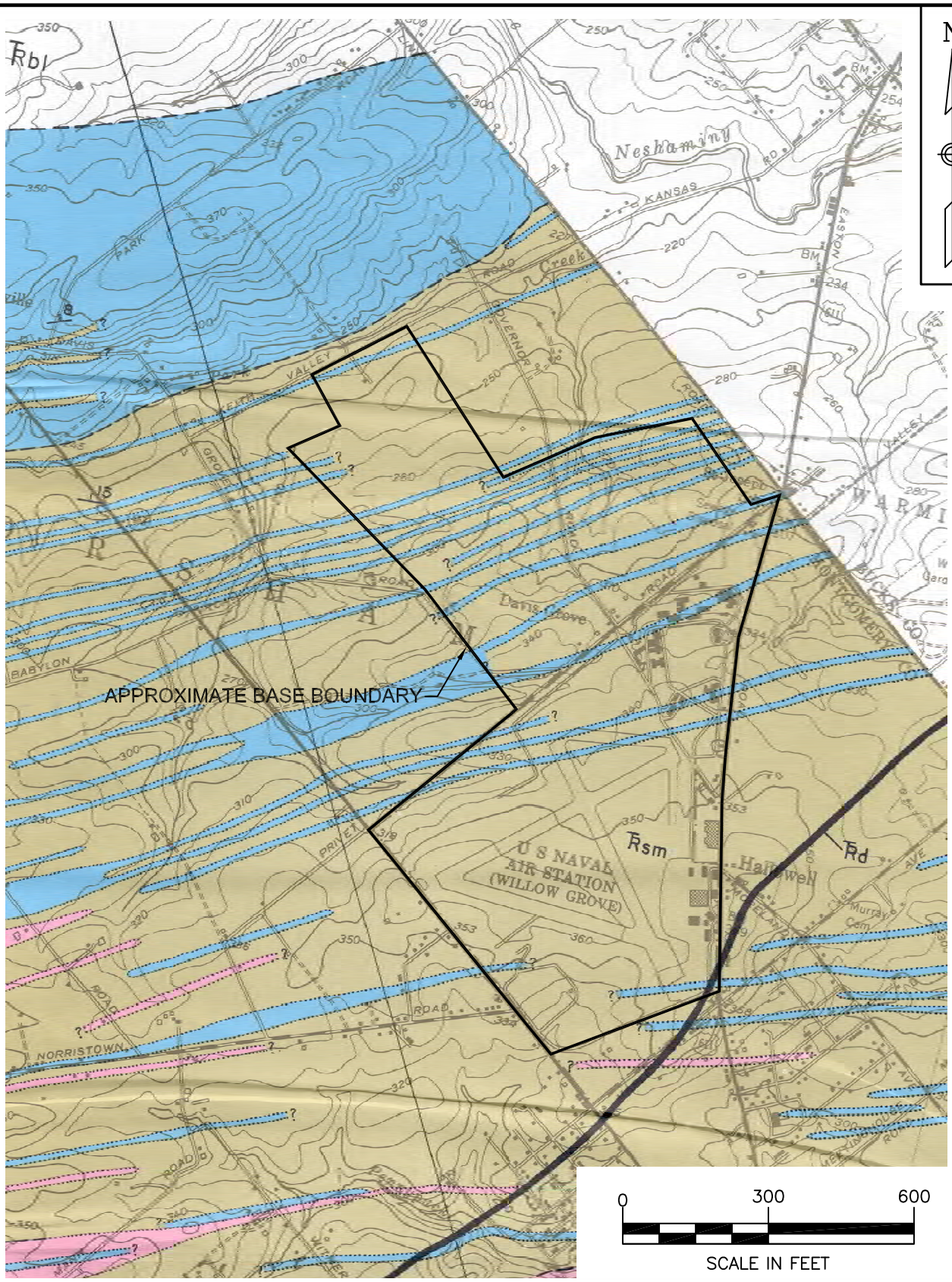
SCALE IN FEET

TETRA TECHNUS, INC.

LOCATION OF IR SITES
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	AS NOTED
FILE	112G02014CM03
REV	0
DATE	03/11/10
FIGURE NUMBER	FIGURE 1–2

112G02014\0904\112G02014GG01-1.DWG 04/13/10 MKB



TETRA TECH NUS, INC.

GENERAL GEOLOGICAL MAP
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	AS NOTED
FILE	112G02014GG01-1
REV	0
DATE	04/13/10
FIGURE NUMBER	FIGURE 1-3 (PAGE 1)

112G02014\0904\112G02014GG01-2.DWG 04/13/10 MKB

TRIASSIC

UPPER TRIASSIC

Td

Diabase

Not tapped by wells in this area.

Tbl

Brunswick and Lockatong formations, undifferentiated; gray to black, and red shale and sandstone; the water-bearing properties of these formations have not been studied for this report.

Stockton formation

Tsu

Upper shale member

Red shale and siltstone, containing beds of fine-grained arkosic sandstone (shown in brown); reported yields from wells in this member range from 10 to 80 gmp; average specific capacity of wells is 0.5 gpm per foot of drawdown.

Tsm

Middle arkose member

Fine- and medium-grained arkosic sandstone, containing beds of coarse-grained arkosic sandstone (shown in pink) and red shale and siltstone (shown in blue); reported yields from wells in this member range from 10 to 800 gpm and average 130 gpm; average specific capacity of wells is 5.0 gpm per foot of drawdown.

Tsl

Lower arkose member

Medium to coarse, coarse, and very coarse-grained arkosic sandstone and arkosic conglomerate, containing beds of fine- and meduim-grained arkosic sandstone (shown in brown) and red shale and siltstone (shown in blue); reported yields from wells in this member range from 10 to 500 gpm and average 110 gom; average specific capacity of wells is 3.0 gpm per foot of drawdown.

OEp Є

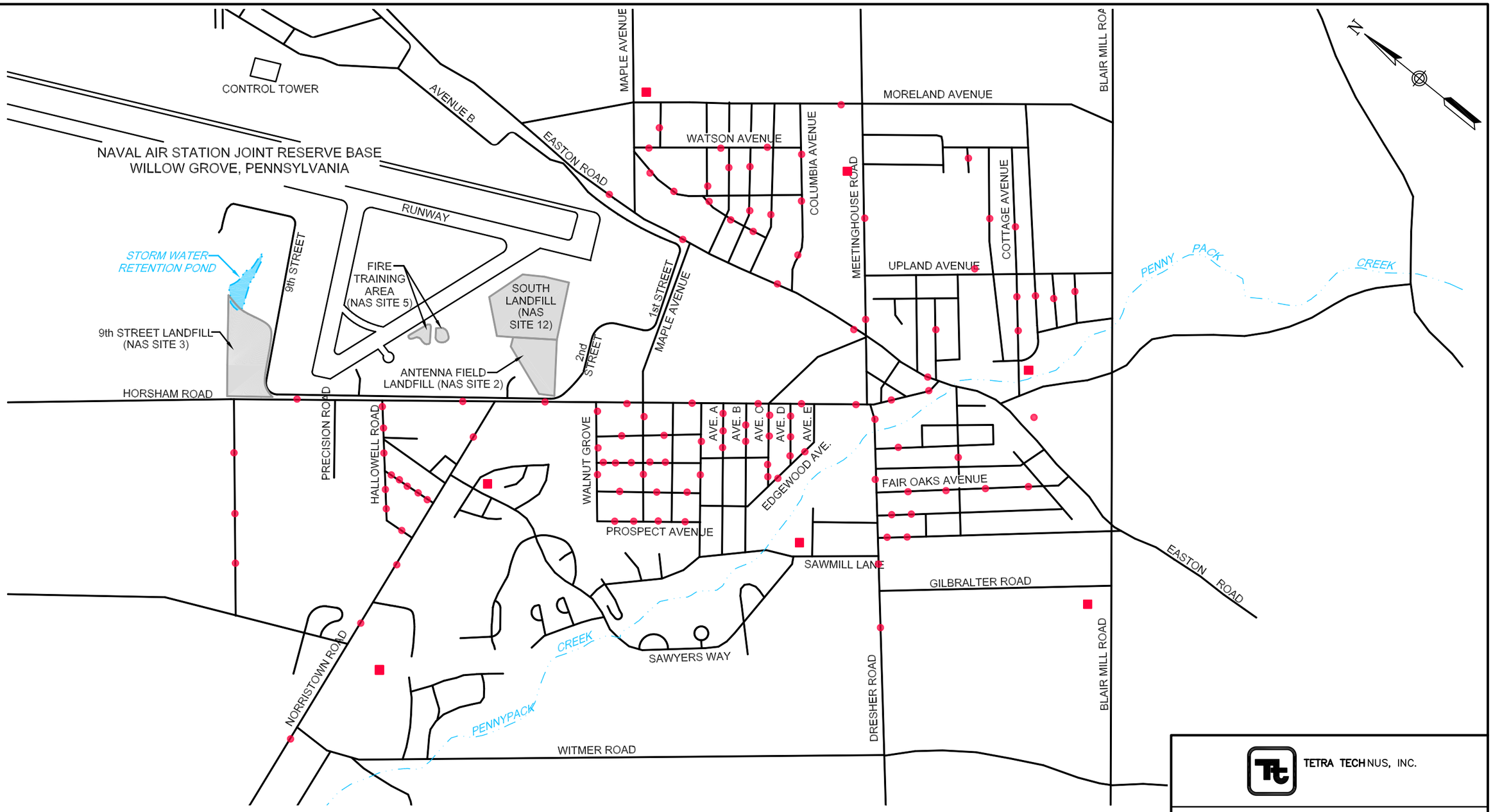
Rocks of Ordovician to Precambrian age; these rocks have not been studied in this area.

TETRA TECH NUS, INC.

GENERAL GEOLOGICAL MAP
LEGEND OF SYMBOLS
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	AS NOTED
FILE	112G02014GG01-2
REV	0
DATE	04/13/10
FIGURE NUMBER	FIGURE 1-3 (PAGE 2)

112G02014\0904\112G02014GM19.DWG 04/12/10 MKB

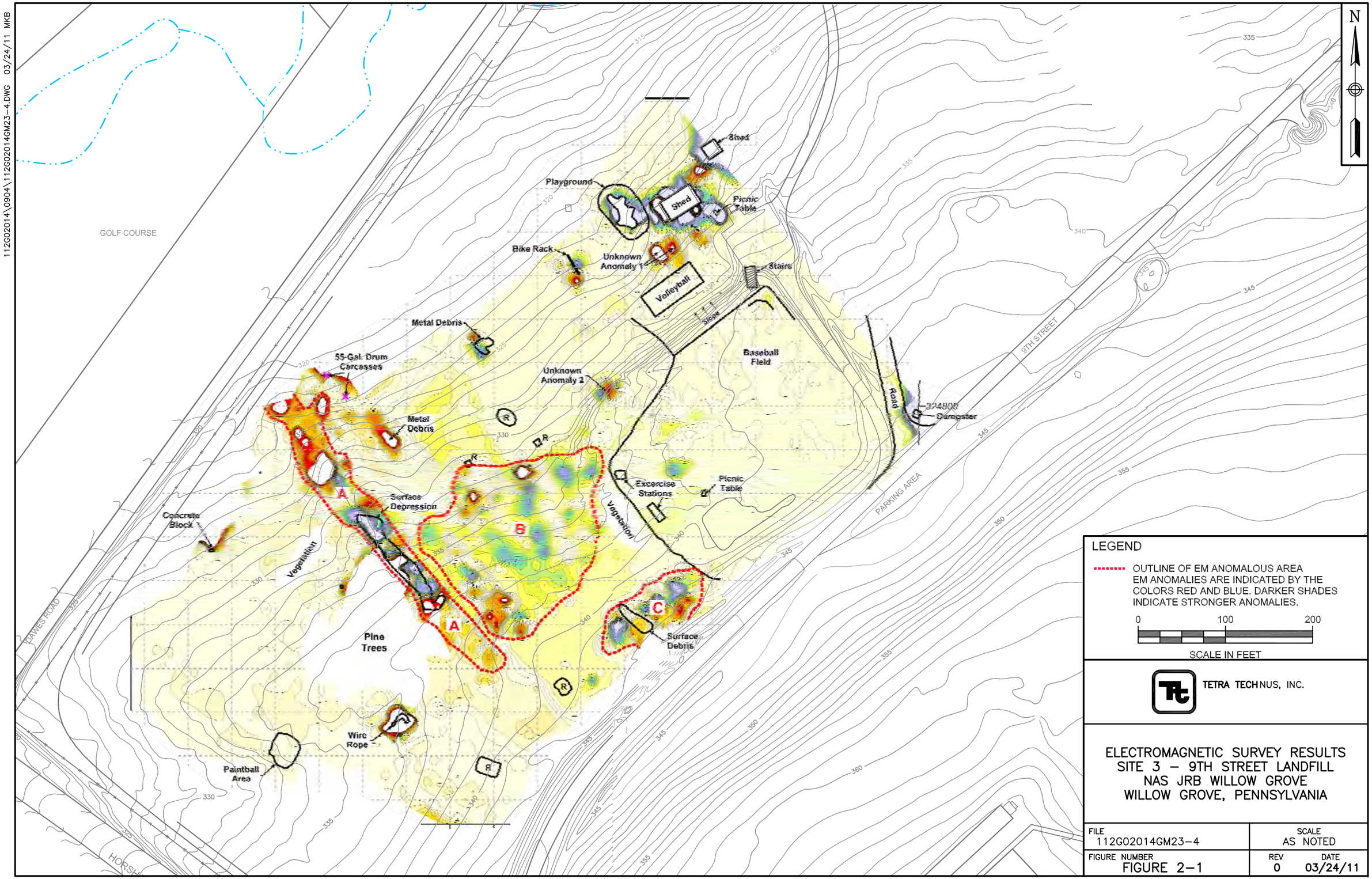


TETRA TECH NUS, INC.

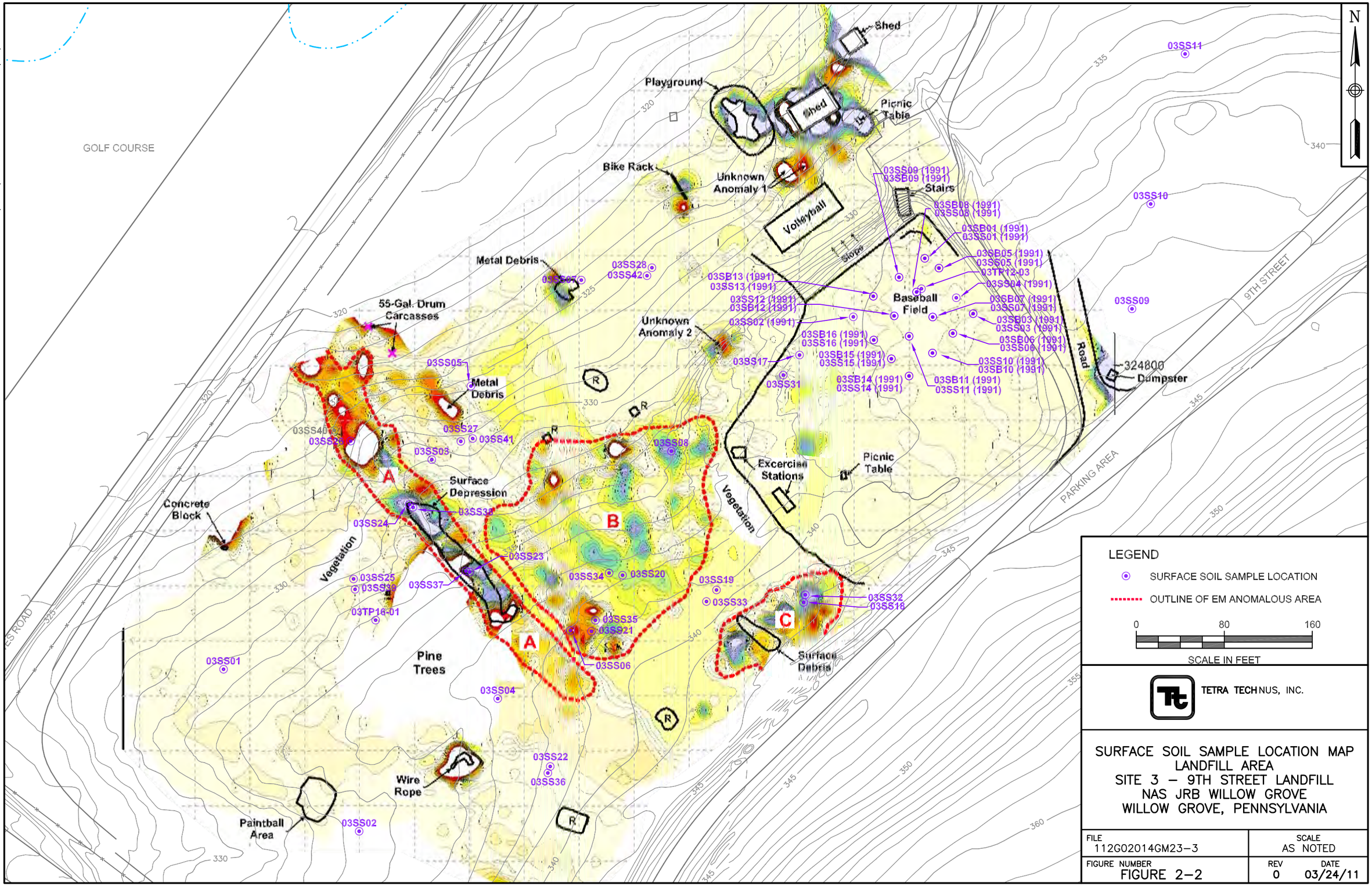
APPROXIMATE LOCATION OF
PUBLIC AND PRIVATE WELLS
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM19	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 1–4	0 / 04/12/10

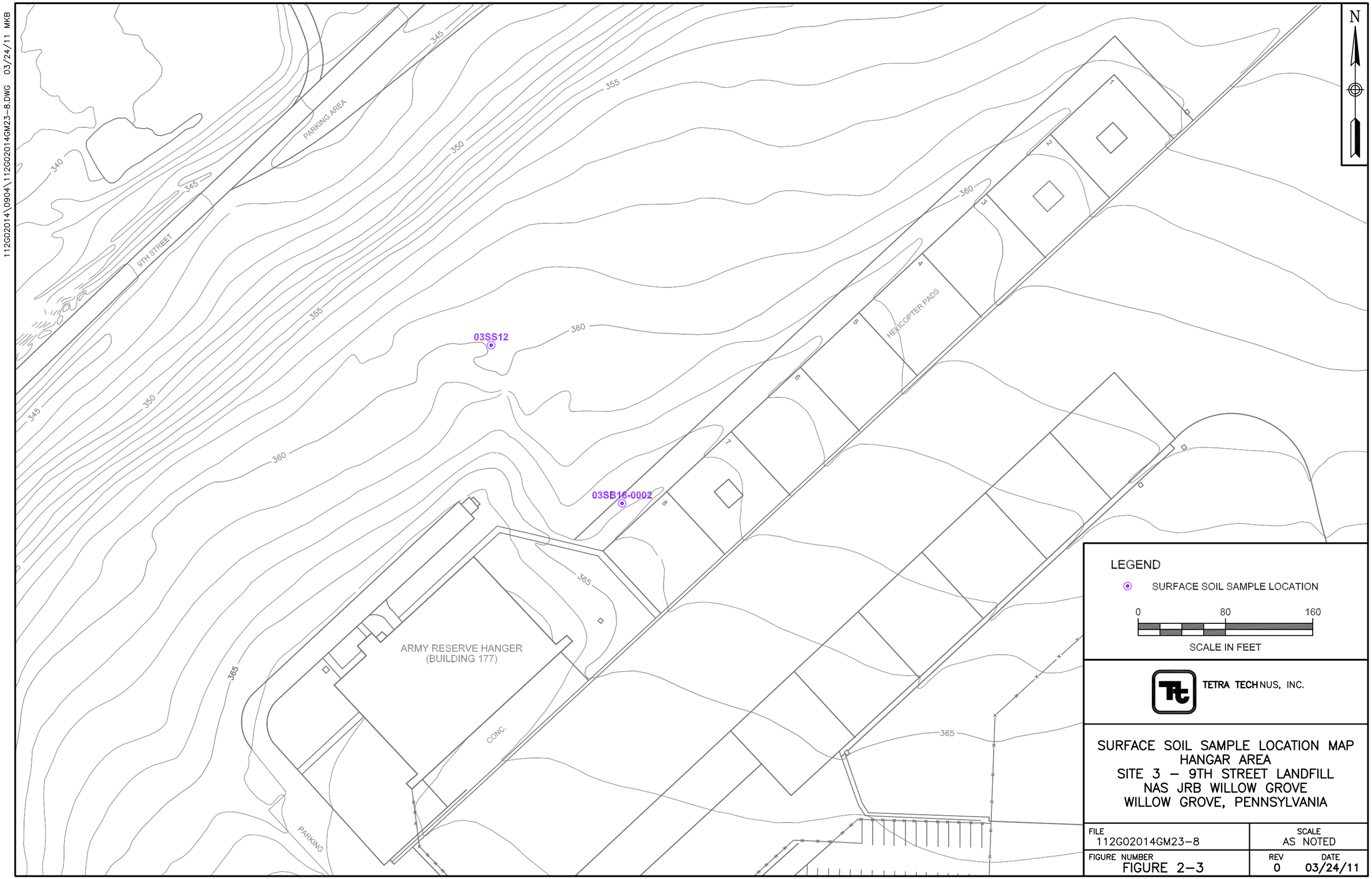
112G02014\0904\112G02014GM23-4.DWG 03/24/11 MKB



112G02014\0904\112G02014GM23-3.DWG 03/24/11 MKB



112G02014\0904\112G02014GM23-8.DWG 03/24/11 MKB

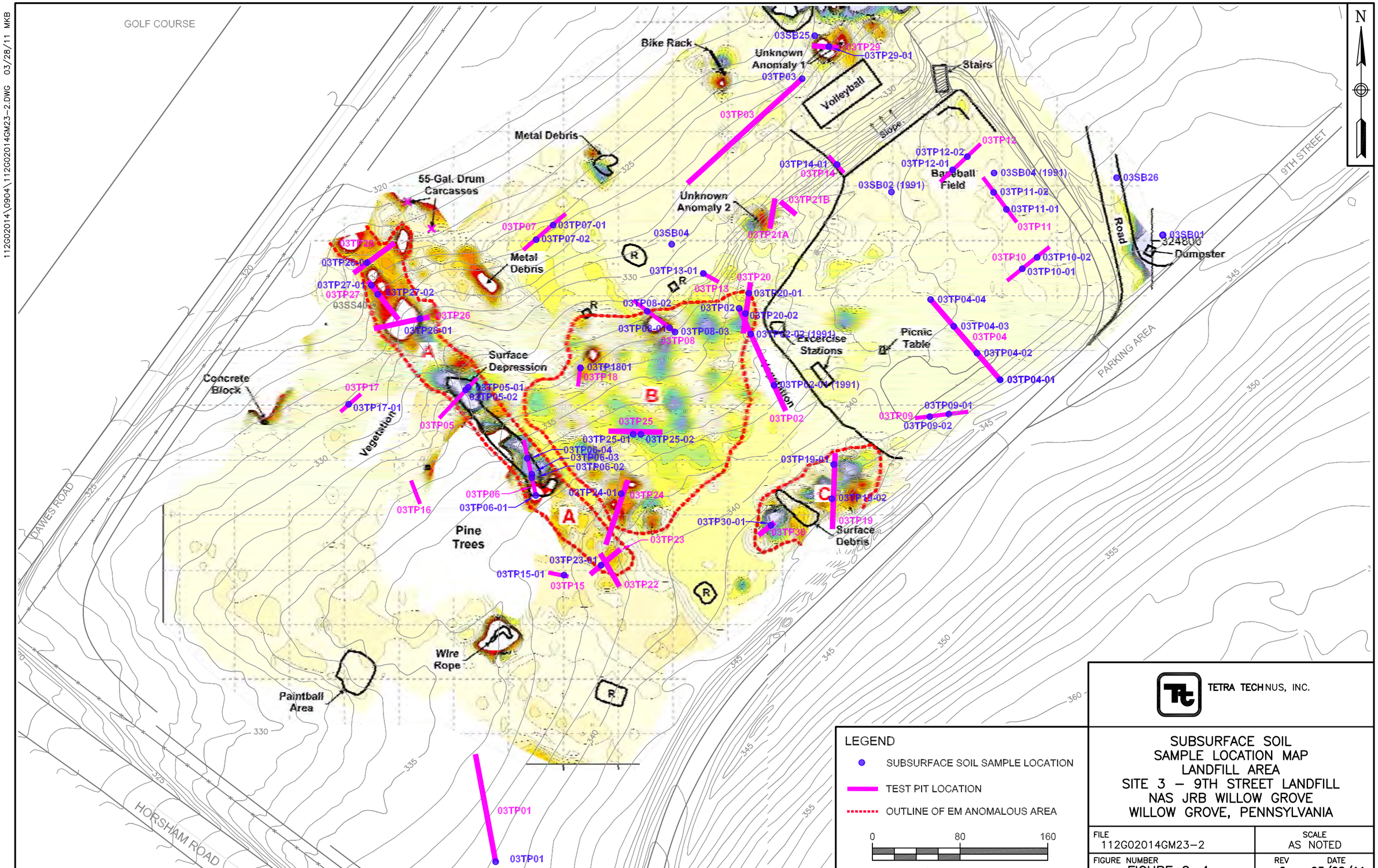


TETRA TECH NUS, INC.

SURFACE SOIL SAMPLE LOCATION MAP
HANGAR AREA
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM23–8	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2–3	0 / 03/24/11

112G02014\0904\112G02014GM23-2.DWG 03/28/11 MKB



LEGEND

- SUBSURFACE SOIL SAMPLE LOCATION
- TEST PIT LOCATION
- OUTLINE OF EM ANOMALOUS AREA

0 80 160

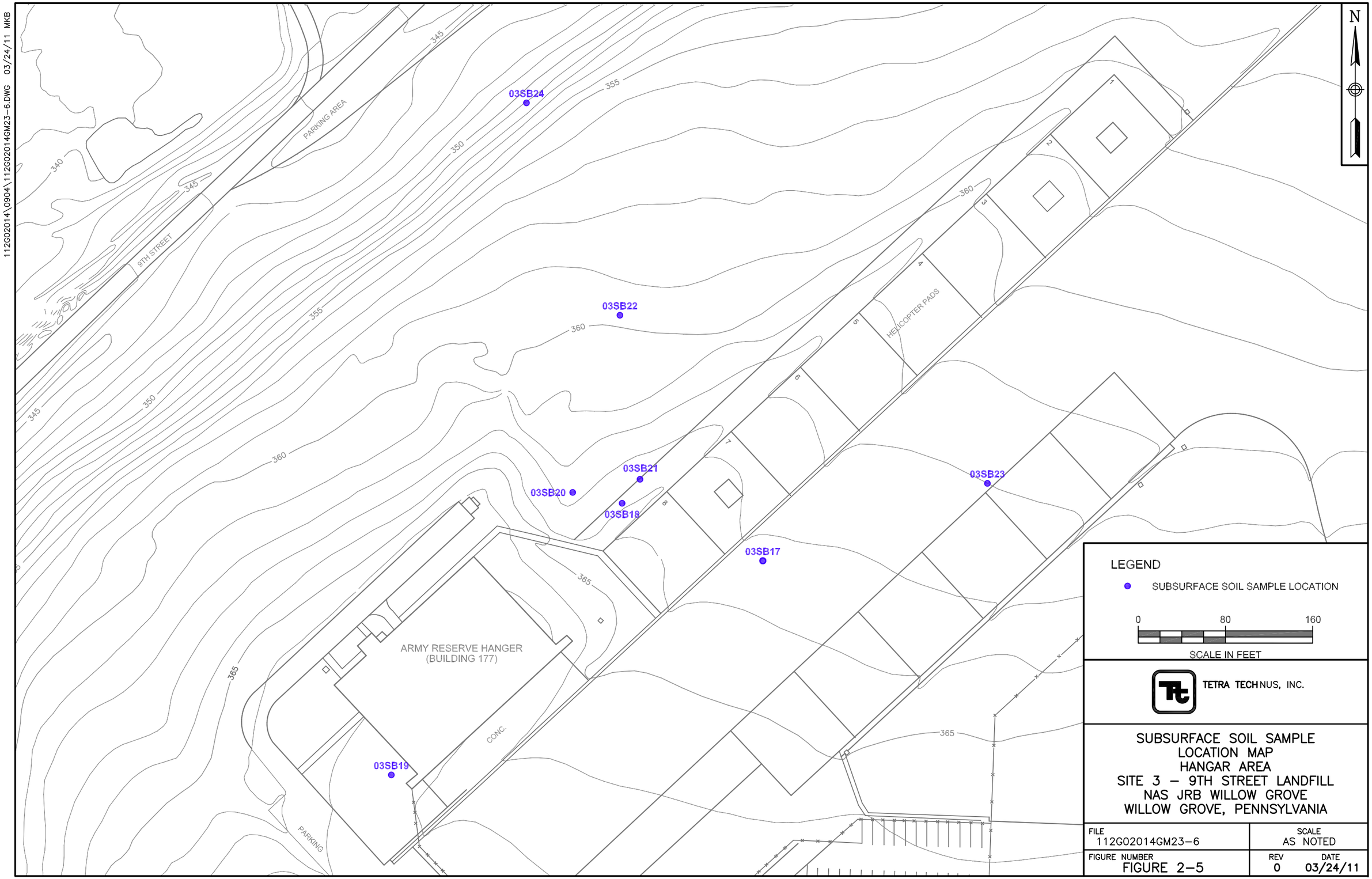
SCALE IN FEET

TETRA TECH NUS, INC.

SUBSURFACE SOIL
SAMPLE LOCATION MAP
LANDFILL AREA
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM23-2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2-4	0 / 03/28/11

112G02014\0904\112G02014GM23-6.DWG 03/24/11 MKB

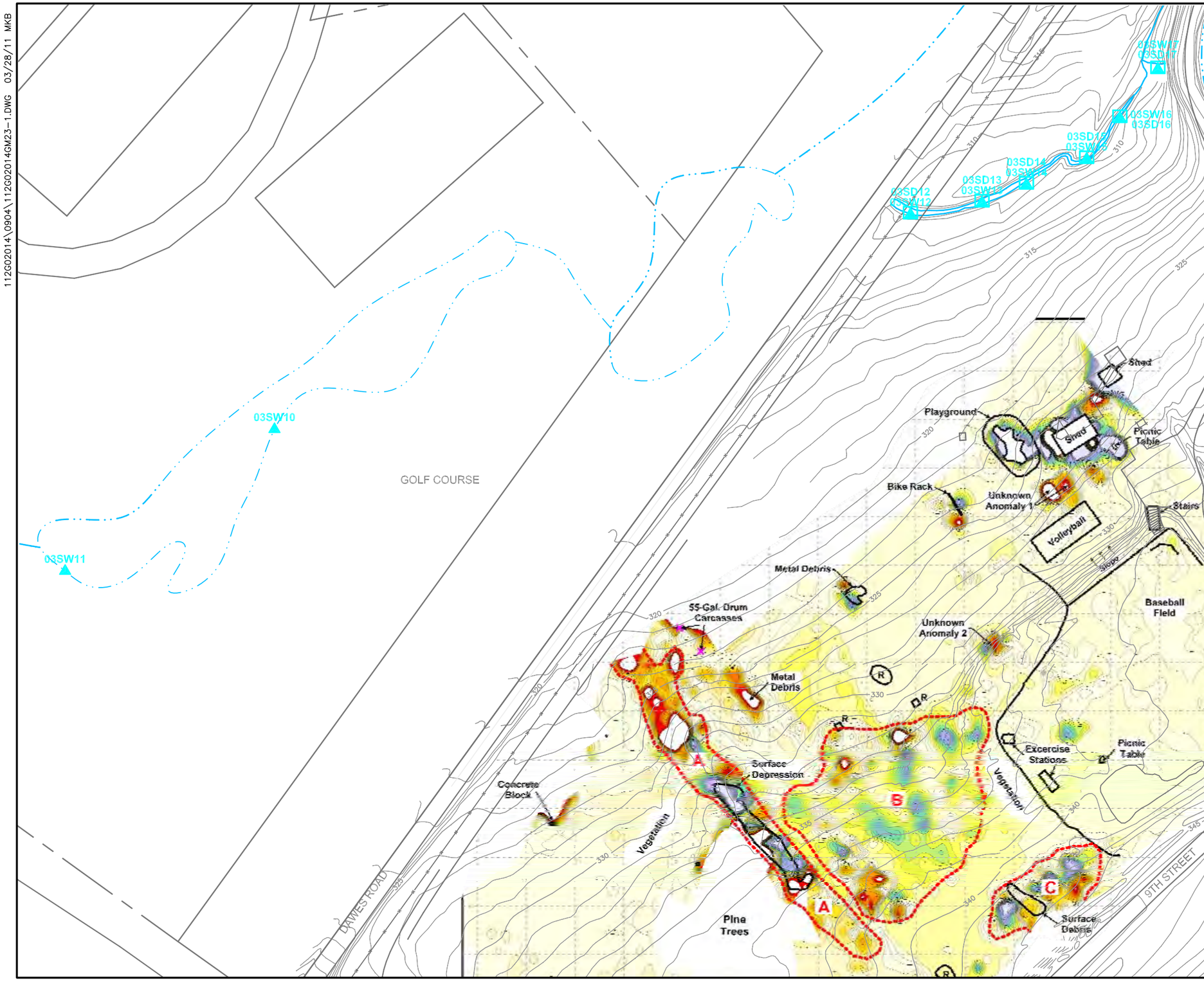


SUBSURFACE SOIL SAMPLE
LOCATION MAP
HANGAR AREA
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM23-6	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 2-5	0	03/24/11

112G02014\0904\112G02014GM23-1.DWG 03/28/11 MKB



LEGEND

- LANDFILL DELINEATION SURFACE WATER SAMPLE LOCATION
- LANDFILL DELINEATION SEDIMENT SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA

0 100 200

SCALE IN FEET

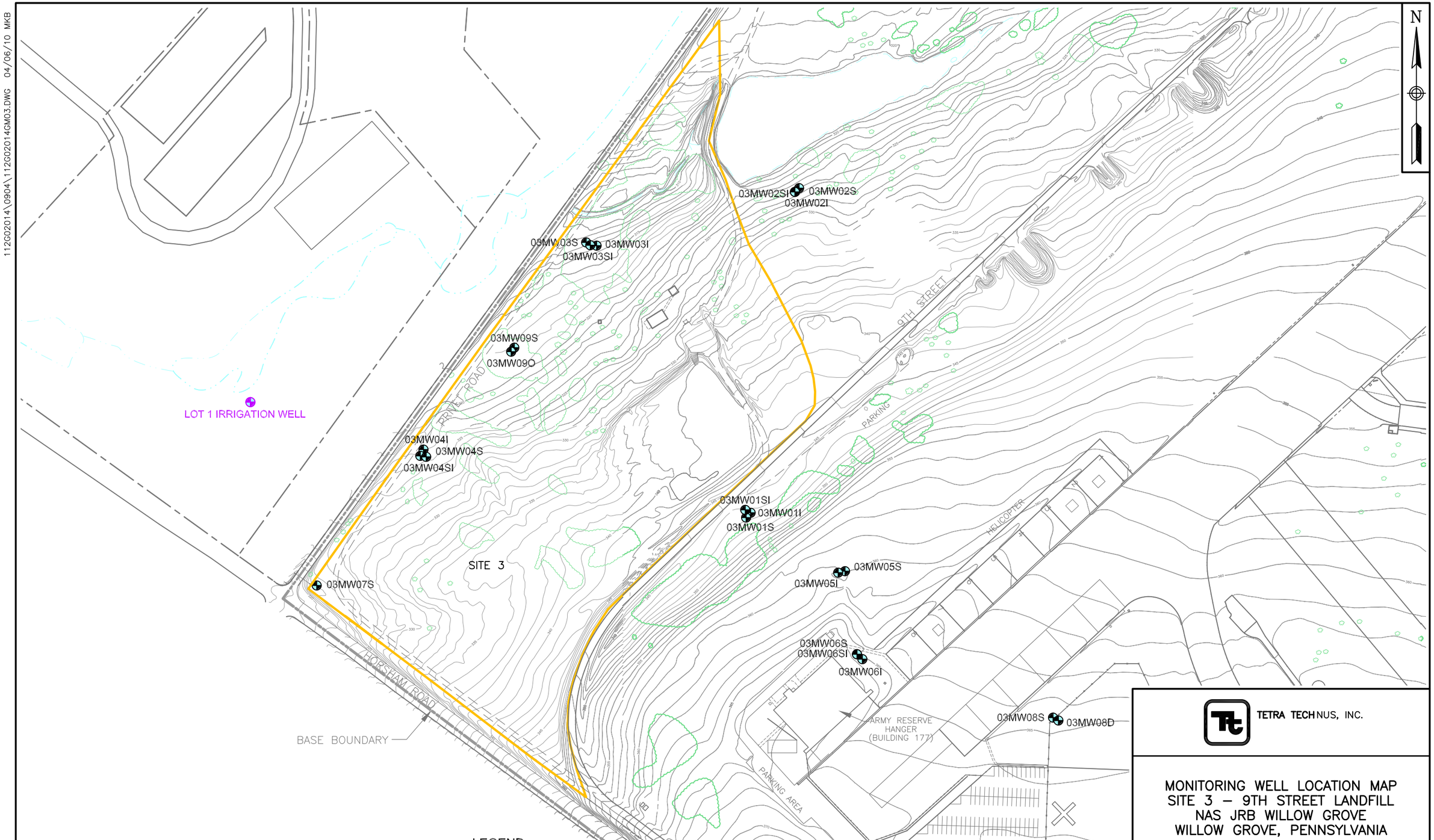
TETRA TECH NUS, INC.

SURFACE WATER AND SEDIMENT SAMPLE LOCATION MAP
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM23-1	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 2-6	0	03/28/11

112G02014\0904\112G02014GM03.DWG 04/06/10 MKB

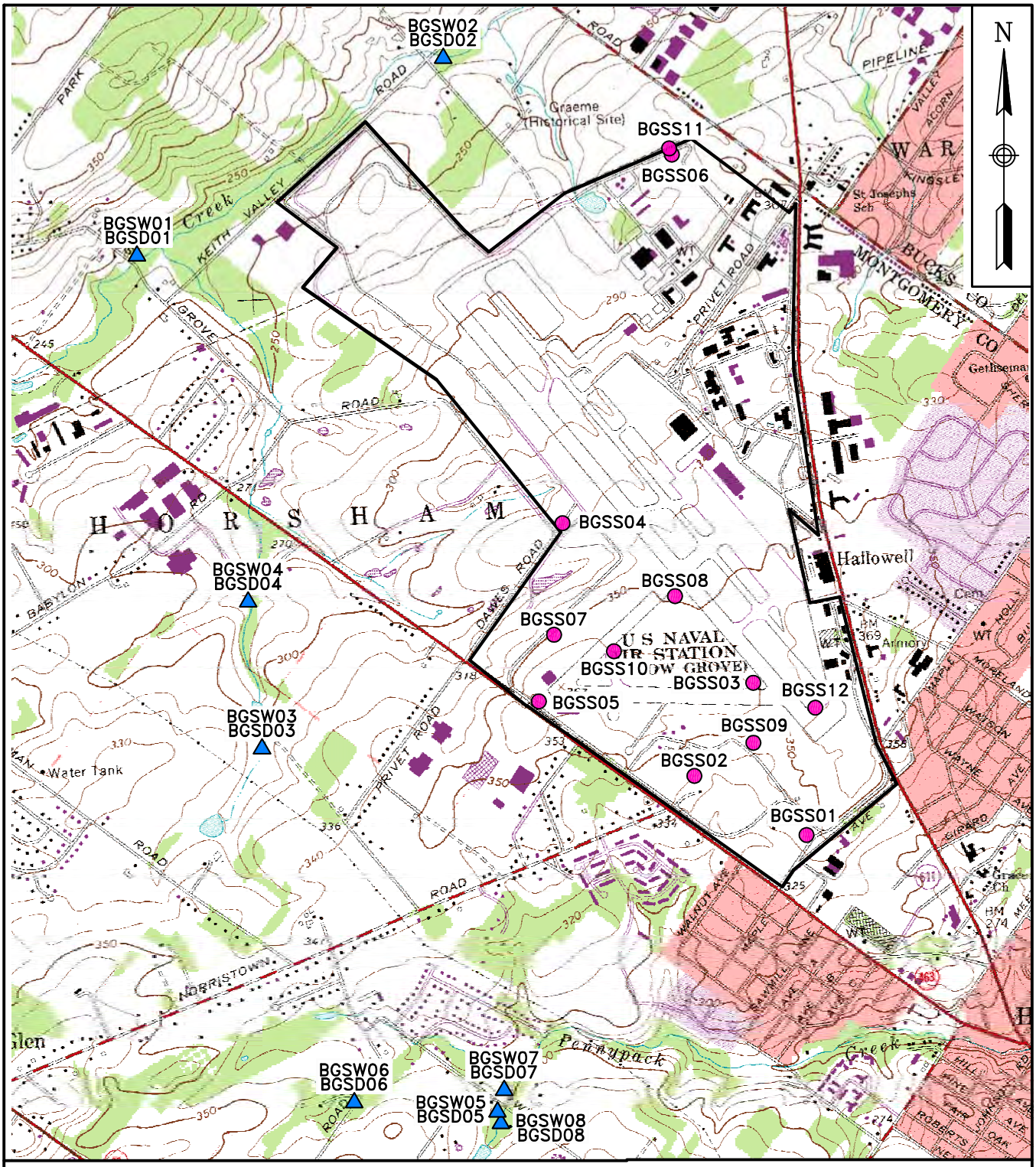


TETRA TECH NUS, INC.

MONITORING WELL LOCATION MAP
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM03	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2–7	0 / 04/06/10

112G02014\0904\112G02014CM01.DWG 10/28/09 MKB



LEGEND

- BACKGROUND SOIL SAMPLE
- BACKGROUND SURFACE WATER/SEDIMENT SAMPLE

0 2,000 4,000

SCALE IN FEET

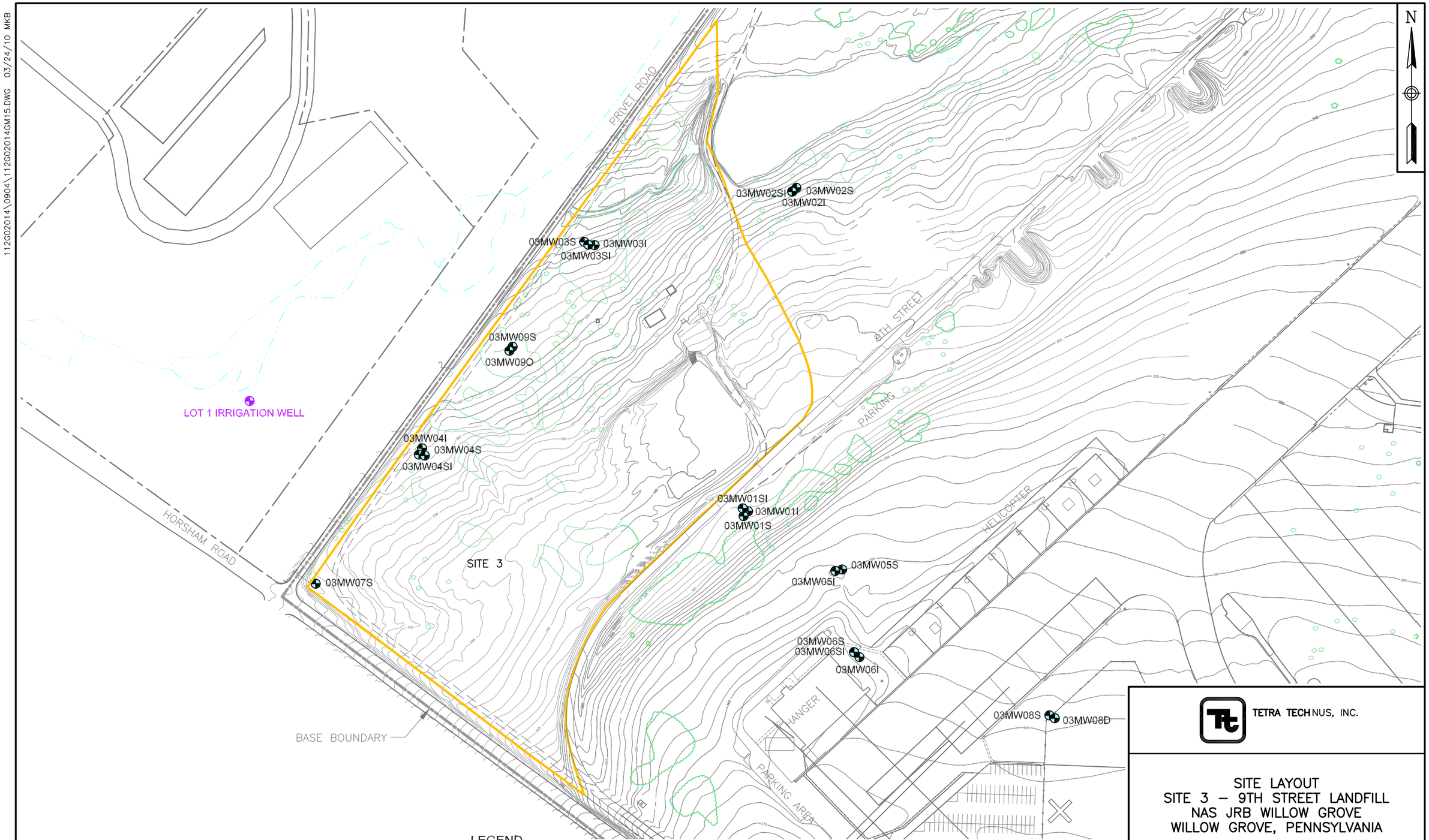
BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.

TETRA TECHNUS, INC.

BACKGROUND SAMPLE LOCATIONS
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	
AS NOTED	
FILE	
112G02014CM01	
REV	DATE
0	10/28/09
FIGURE NUMBER	
FIGURE 2–8	

112G02014\0904\112G02014GM15.DWG 03/24/10 MKB

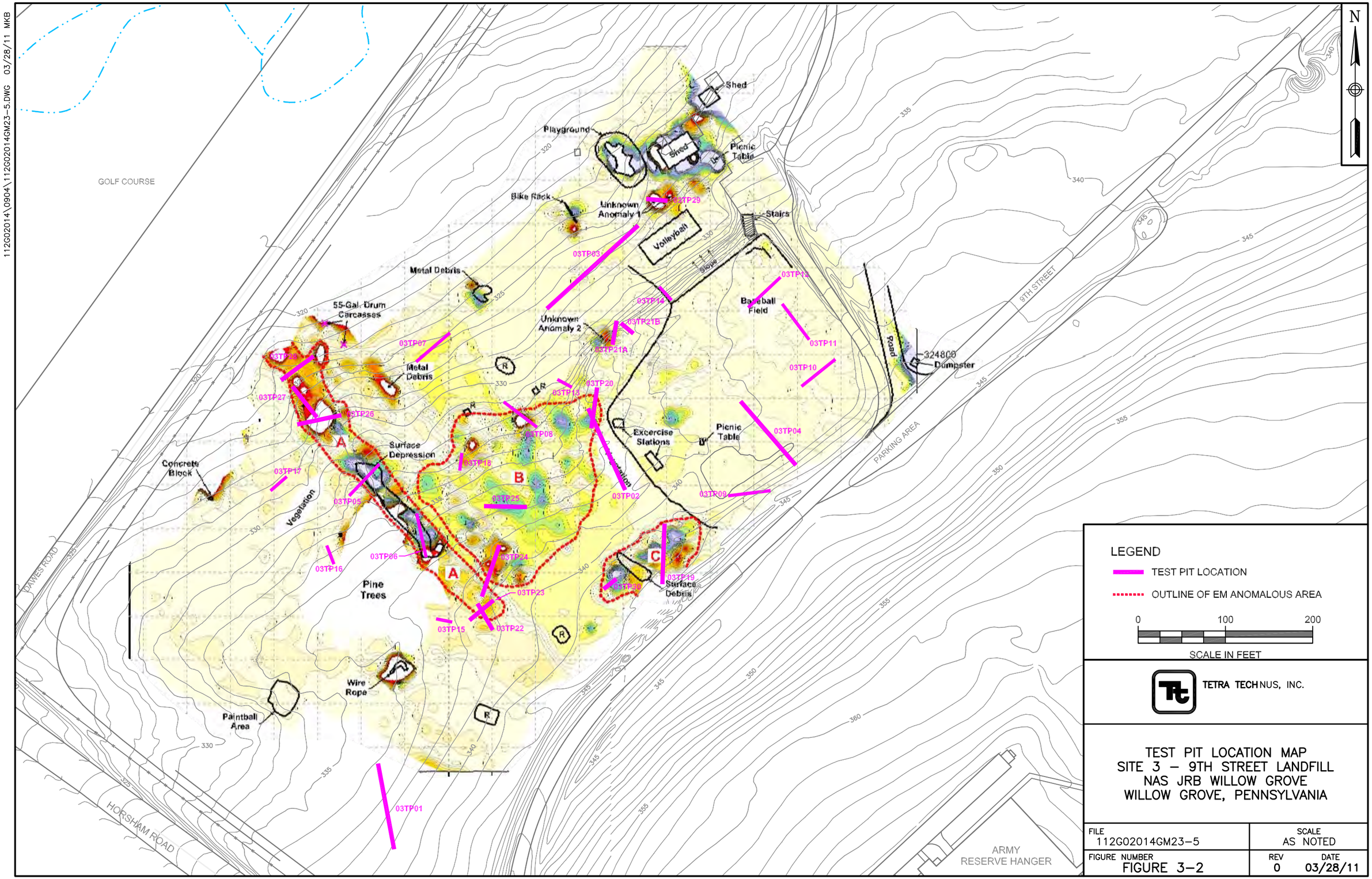


TETRA TECH NUS, INC.

SITE LAYOUT
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM15	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3–1	0 / 03/24/10

112G02014\0904\112G02014GM23-5.DWG 03/28/11 MKB

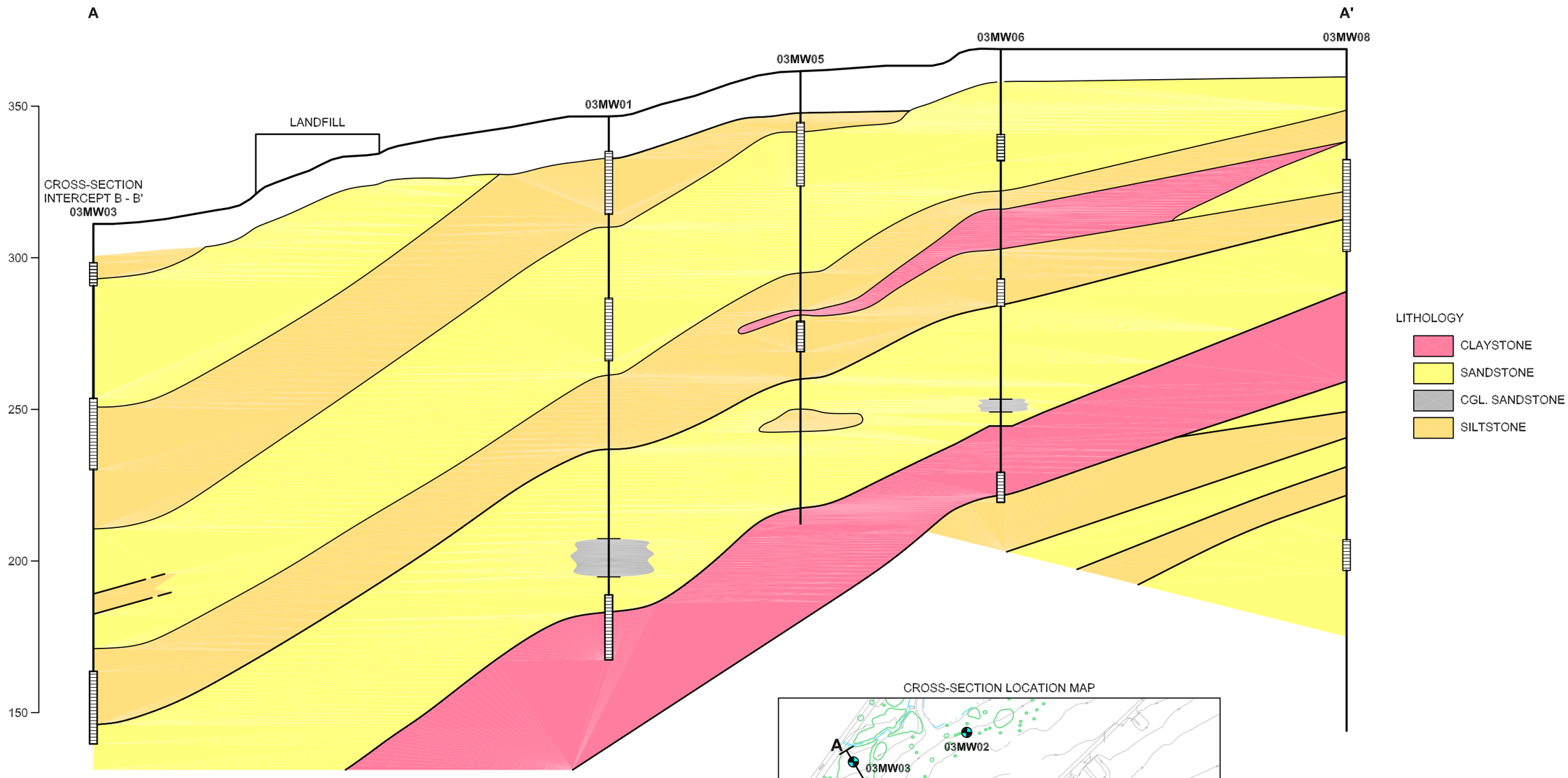


TEST PIT LOCATION MAP
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

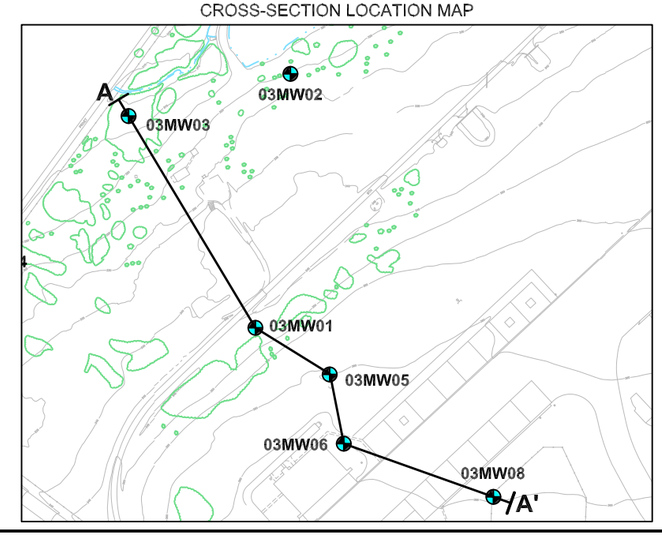
FILE	SCALE
112G02014GM23-5	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 3-2	0	03/28/11

112G02014\0904\112G02014GS01-5.DWG 04/15/10 MKB



CROSS-SECTION LOCATION MAP



0 140 280

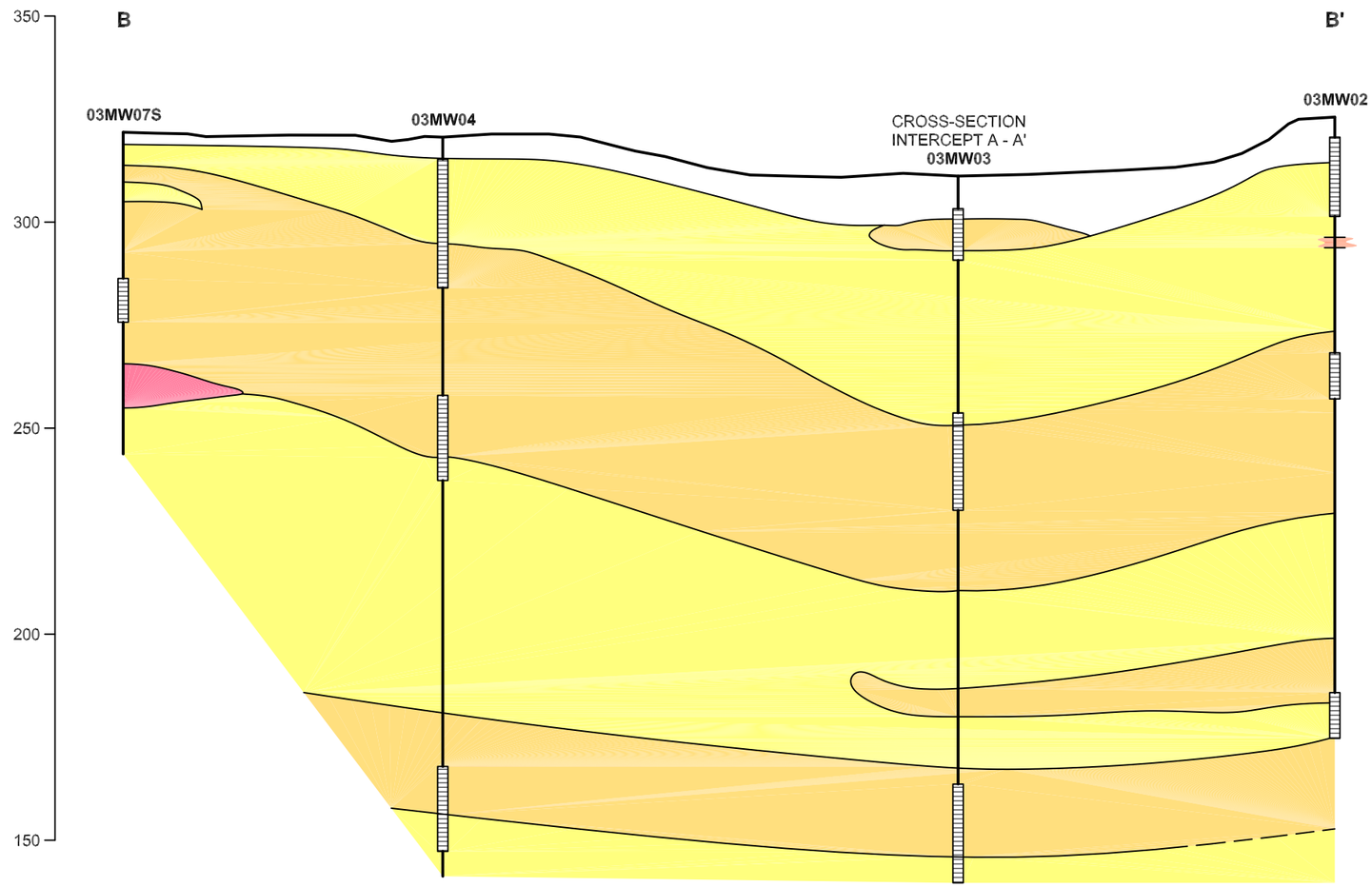
HORIZONTAL
SCALE IN FEET

TETRA TECH NUS, INC.

GEOLOGIC CROSS-SECTION A – A'
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS01-5	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-3	0 / 04/15/10

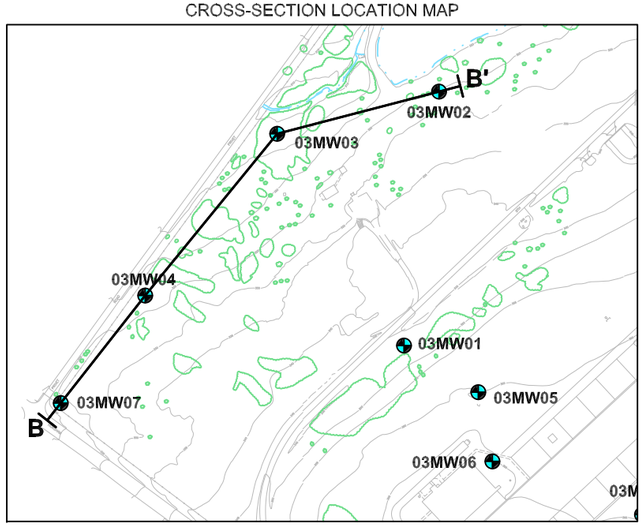
112G02014\0904\112G02014GS01-6.DWG 04/12/10 MKB



LITHOLOGY

- CLAYSTONE
- CONGLOMERATE
- SANDSTONE
- SILTSTONE

CROSS-SECTION LOCATION MAP



0 140 280

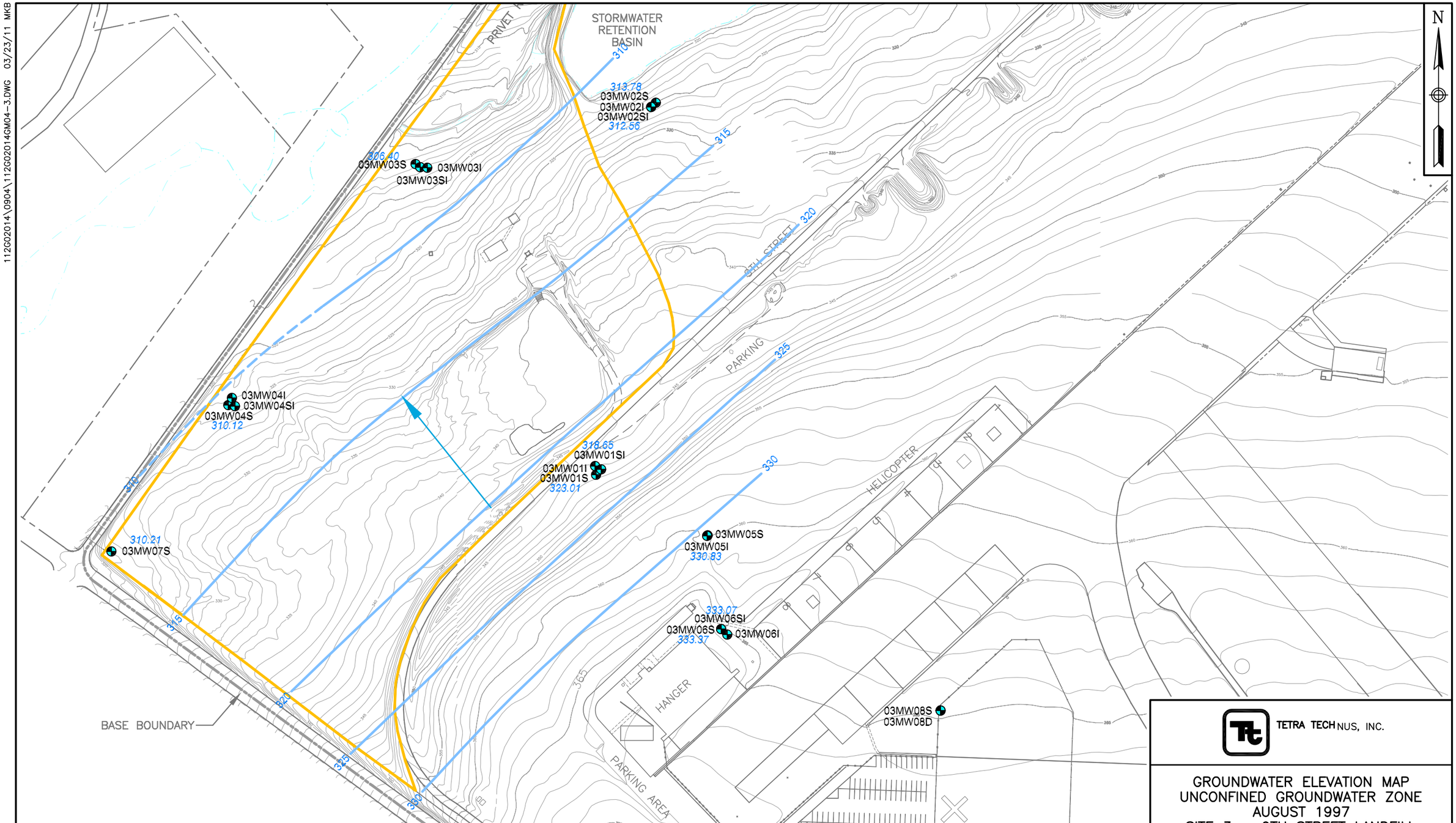
HORIZONTAL
SCALE IN FEET

TETRA TECH NUS, INC.

GEOLOGIC CROSS-SECTION B – B'
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS01-6.DWG	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-4	0 / 04/12/10

112G02014\0904\112G02014GM04-3.DWG 03/23/11 MKB



0 180 360

SCALE IN FEET

LEGEND

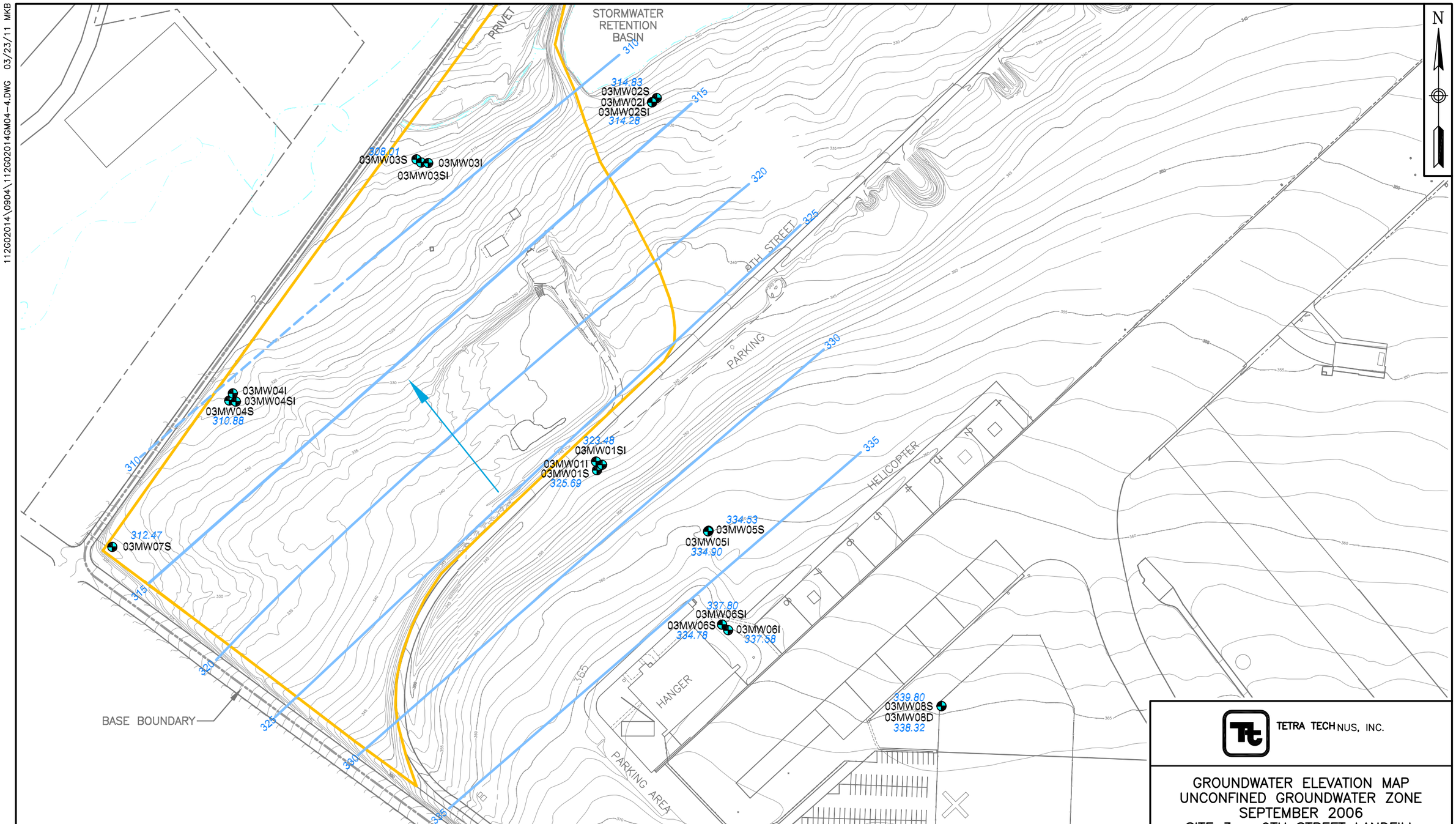
- MONITORING WELL LOCATION
- 322.12 GROUNDWATER ELEVATION (FEET, AMSL)
- 320 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

TETRA TECH NUS, INC.

GROUNDWATER ELEVATION MAP
UNCONFINED GROUNDWATER ZONE
AUGUST 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM04-3.DWG	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-5	0 / 03/23/11

112G02014\0904\112G02014GM04-4.DWG 03/23/11 MKB



LEGEND

- MONITORING WELL LOCATION
- 322.12 GROUNDWATER ELEVATION (FEET, AMSL)
- 320 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

0 180 360

SCALE IN FEET

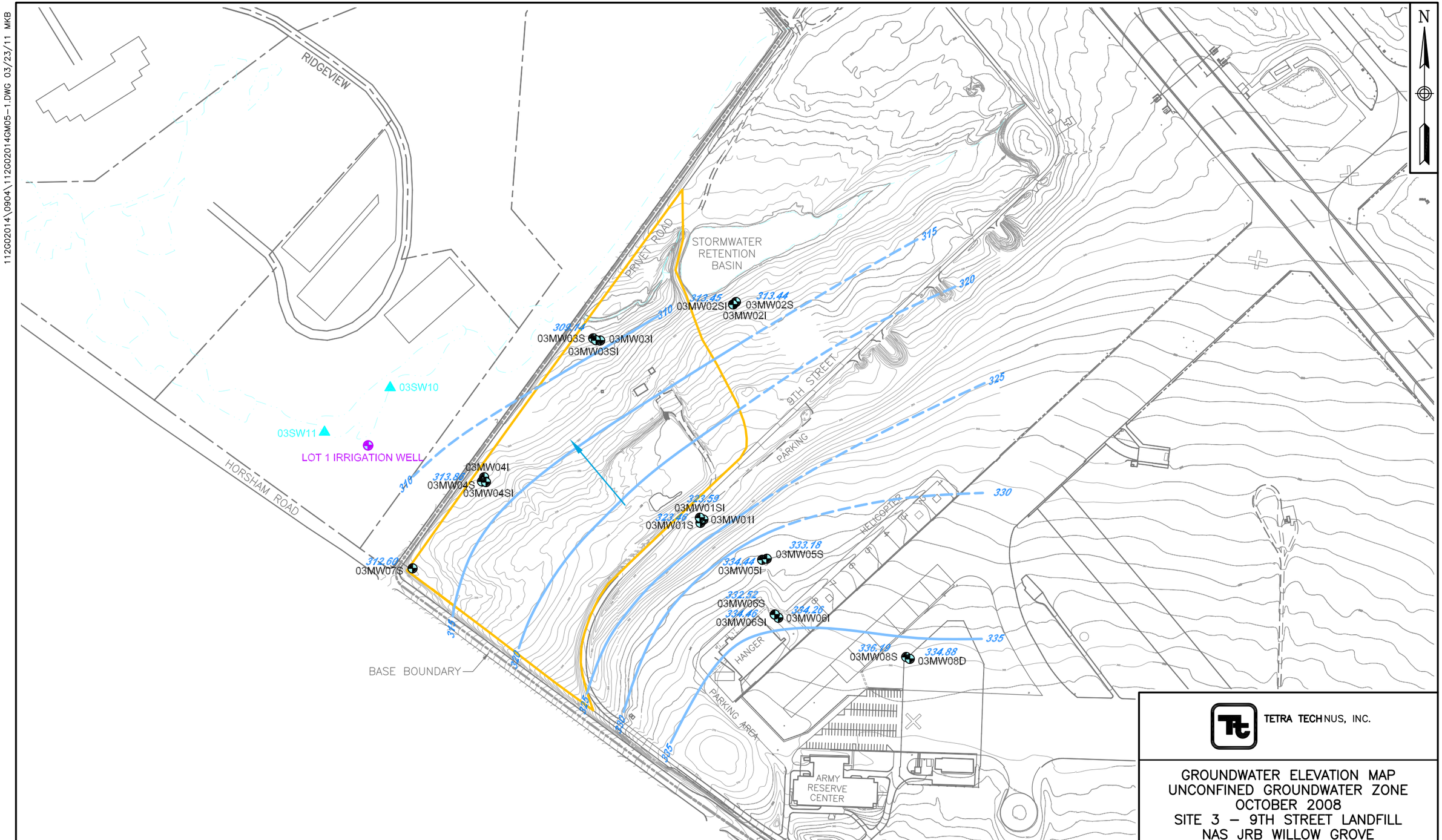
TETRA TECH NUS, INC.

GROUNDWATER ELEVATION MAP
UNCONFINED GROUNDWATER ZONE
SEPTEMBER 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM04-4.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 3-6	0	03/23/11

112G02014\0904\112G02014GM05-1.DWG 03/23/11 MKB

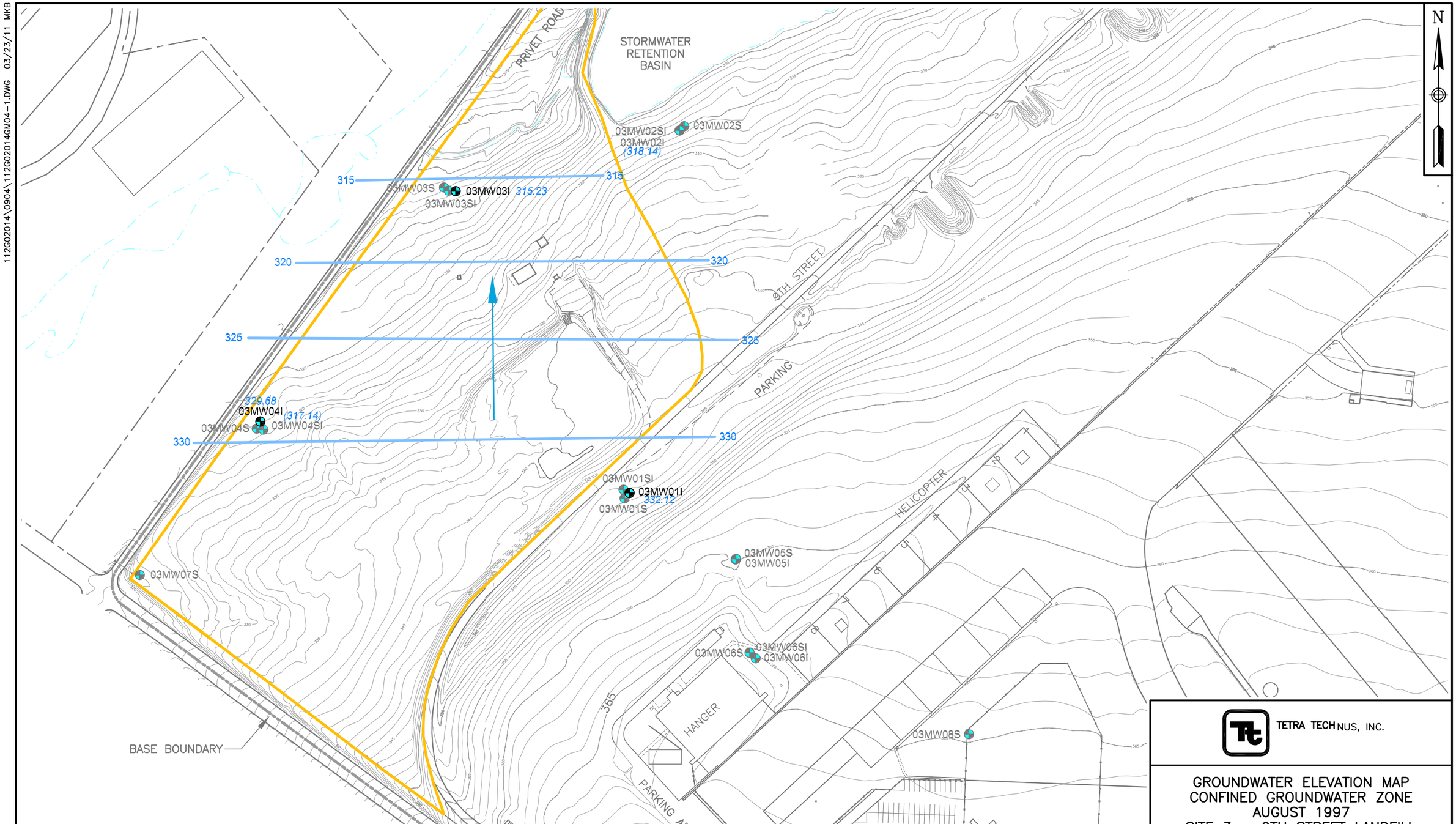


TETRA TECH NUS, INC.

GROUNDWATER ELEVATION MAP
UNCONFINED GROUNDWATER ZONE
OCTOBER 2008
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM05-1	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-7	0 / 03/23/11

112G02014\0904\112G02014GM04-1.DWG 03/23/11 MKB



LEGEND

- MONITORING WELL LOCATION
- 322.12 GROUNDWATER ELEVATION (FEET, AMSL)
- 320 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

0 180 360

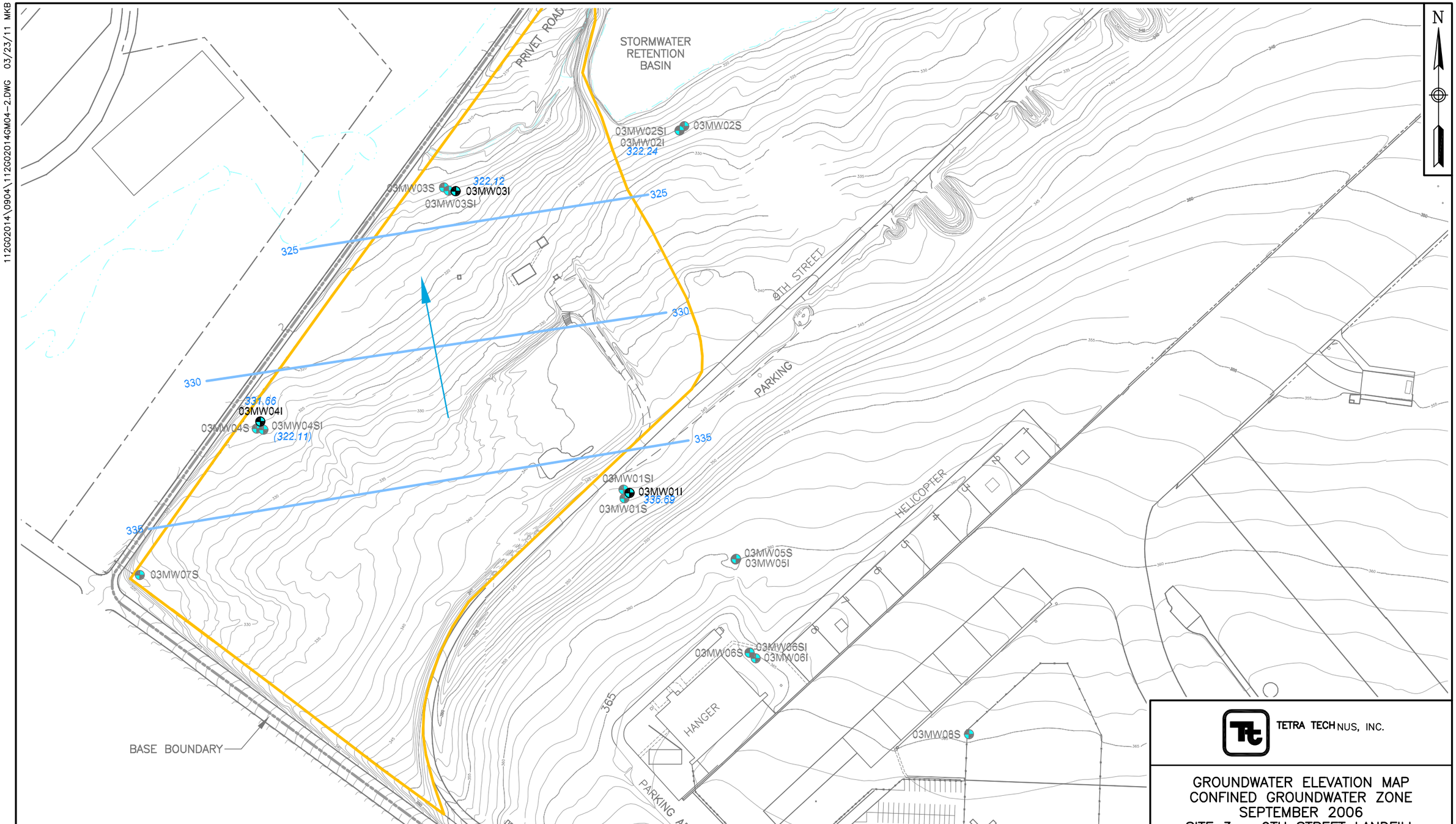
SCALE IN FEET

TETRA TECH NUS, INC.

GROUNDWATER ELEVATION MAP
CONFINED GROUNDWATER ZONE
AUGUST 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM04-1	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-8	0 / 03/23/11

112G02014\0904\112G02014GM04-2.DWG 03/23/11 MKB



LEGEND

- MONITORING WELL LOCATION
- 322.12 GROUNDWATER ELEVATION (FEET, AMSL)
- 320 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

0 180 360

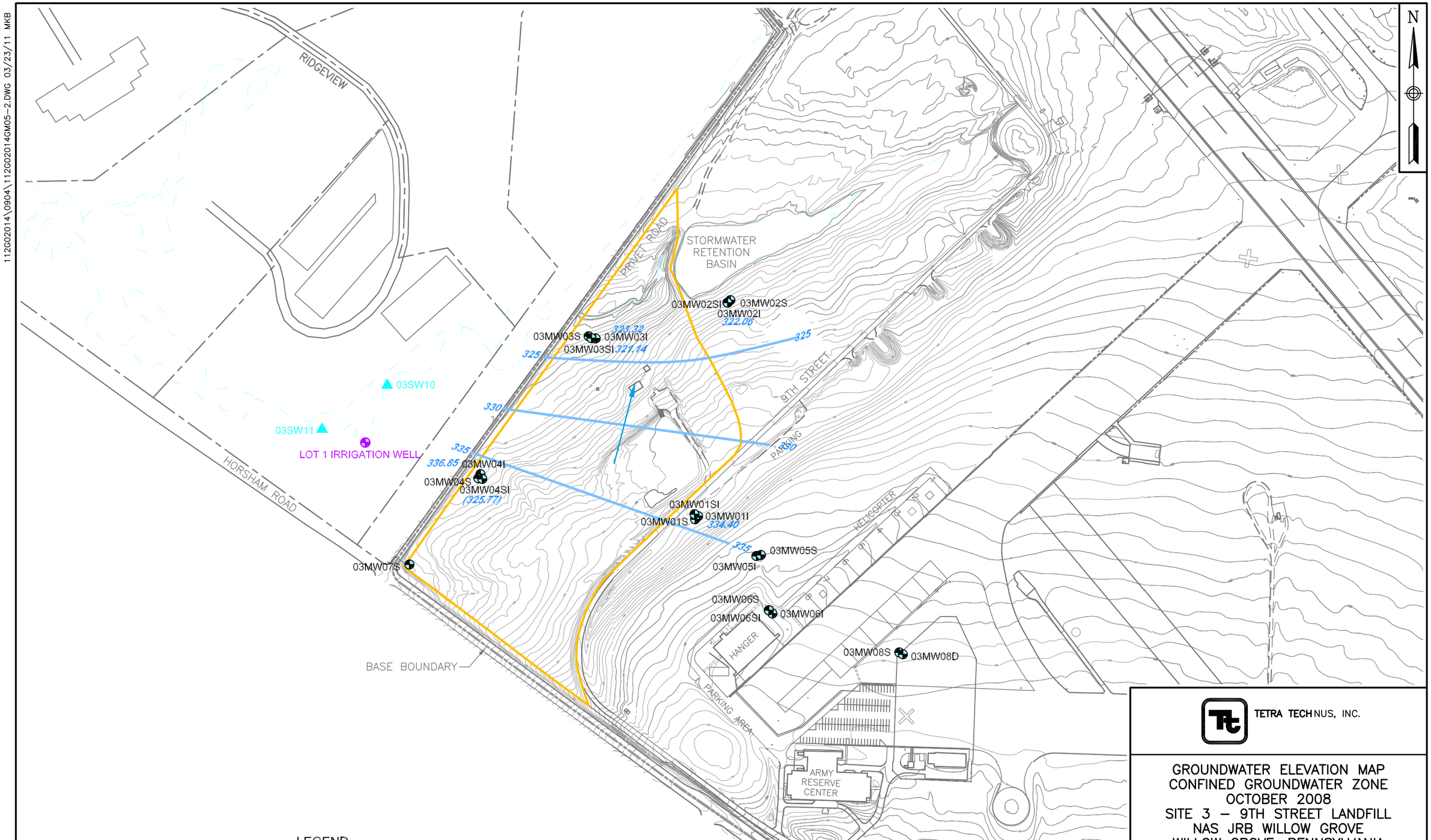
SCALE IN FEET

TETRA TECH NUS, INC.

GROUNDWATER ELEVATION MAP
CONFINED GROUNDWATER ZONE
SEPTEMBER 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM04-2.DWG	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-9	0 / 03/23/11

112G02014\0904\112G02014GM05-2.DWG 03/23/11 MKB



LEGEND

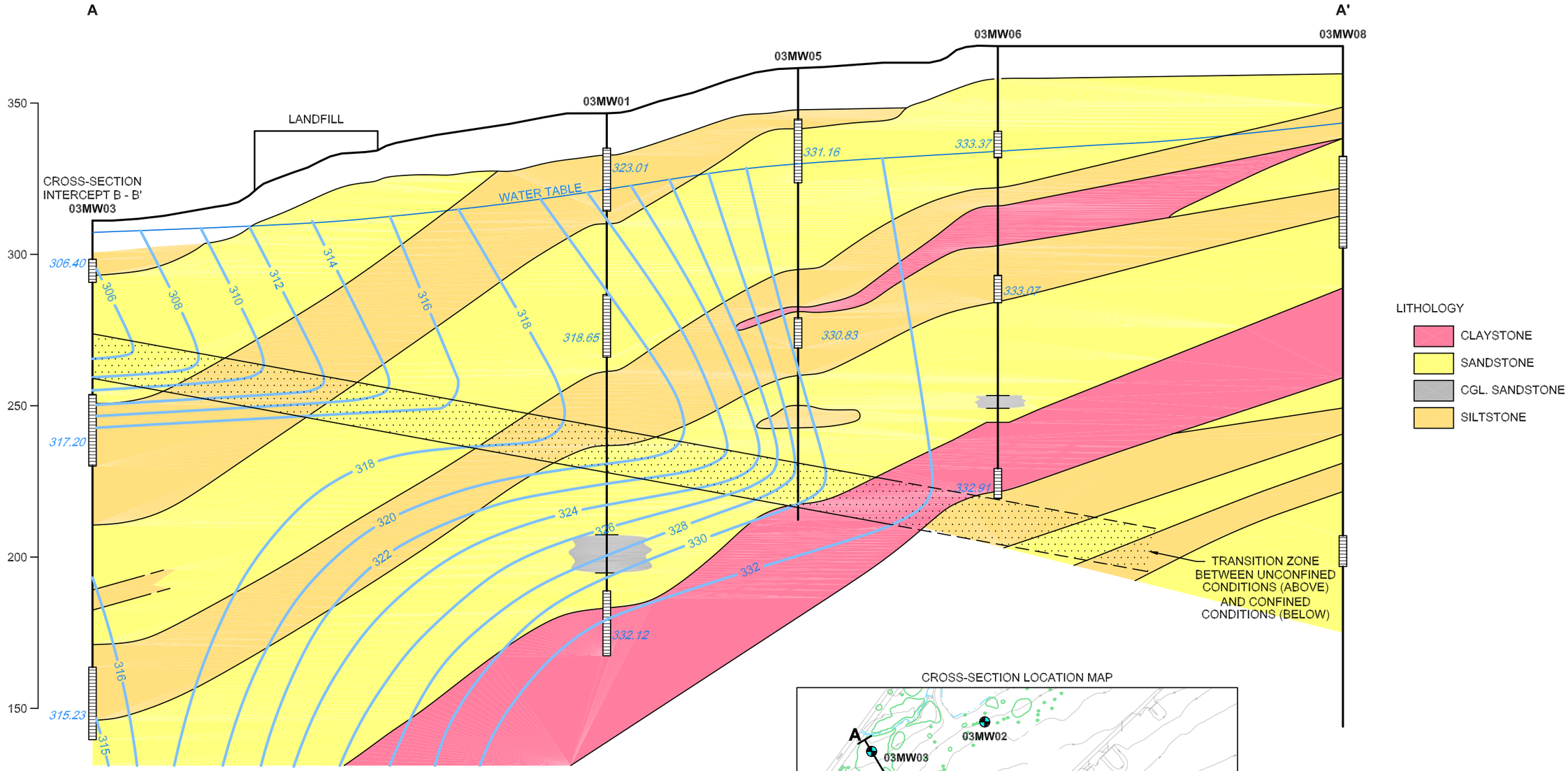
- ON-SITE MONITORING WELL LOCATION
- OFF BASE WELL LOCATION
- SURFACE WATER SAMPLE LOCATION
- 334.40 GROUNDWATER ELEVATION (FEET, AMSL)
- 330 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

TETRA TECH NUS, INC.

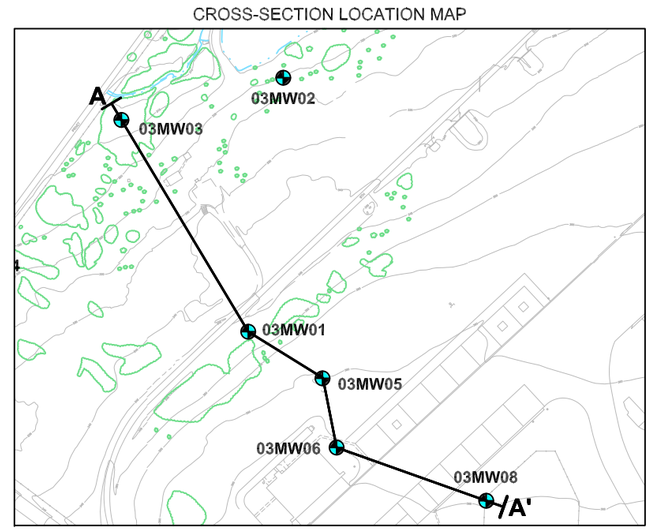
GROUNDWATER ELEVATION MAP
CONFINED GROUNDWATER ZONE
OCTOBER 2008
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM05-2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-10	0 / 03/23/11

112G02014\0904\112G02014GS02-3.DWG 04/20/10 MKB



CROSS-SECTION LOCATION MAP



0 140 280

HORIZONTAL SCALE IN FEET

LEGEND

10 GROUNDWATER CONTOUR

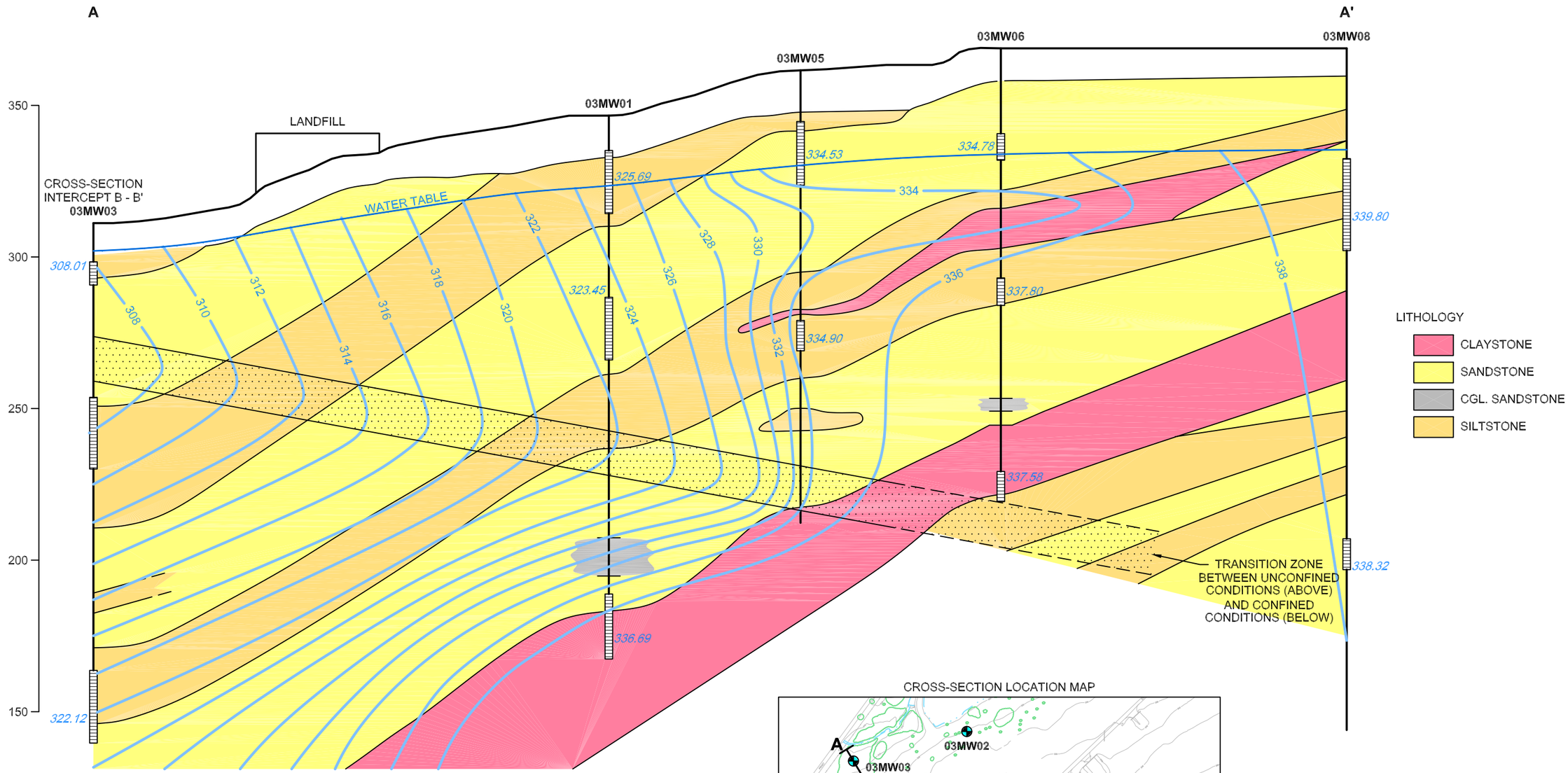
310.88 HYDRAULIC HEAD (FT MSL)

TETRA TECH NUS, INC.

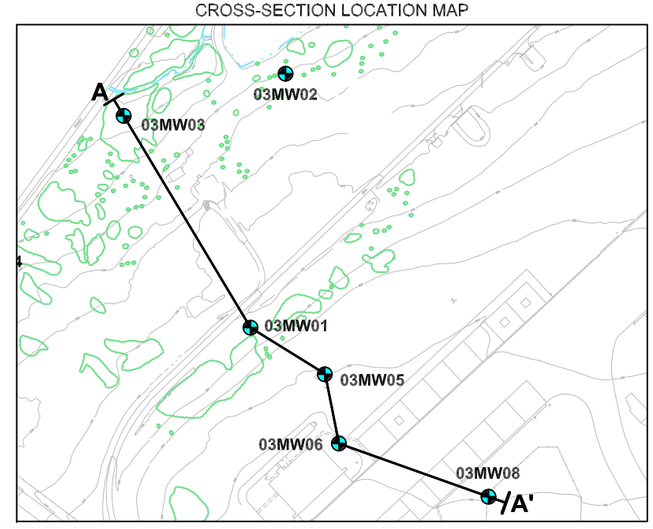
HYDROGEOLOGIC CROSS-SECTION A – A'
AUGUST 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS02-3.DWG	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-11	0 / 04/20/10

112G02014\0904\112G02014GS02-1.DWG 04/20/10 MKB



CROSS-SECTION LOCATION MAP



0 140 280

HORIZONTAL SCALE IN FEET

LEGEND

10 GROUNDWATER CONTOUR

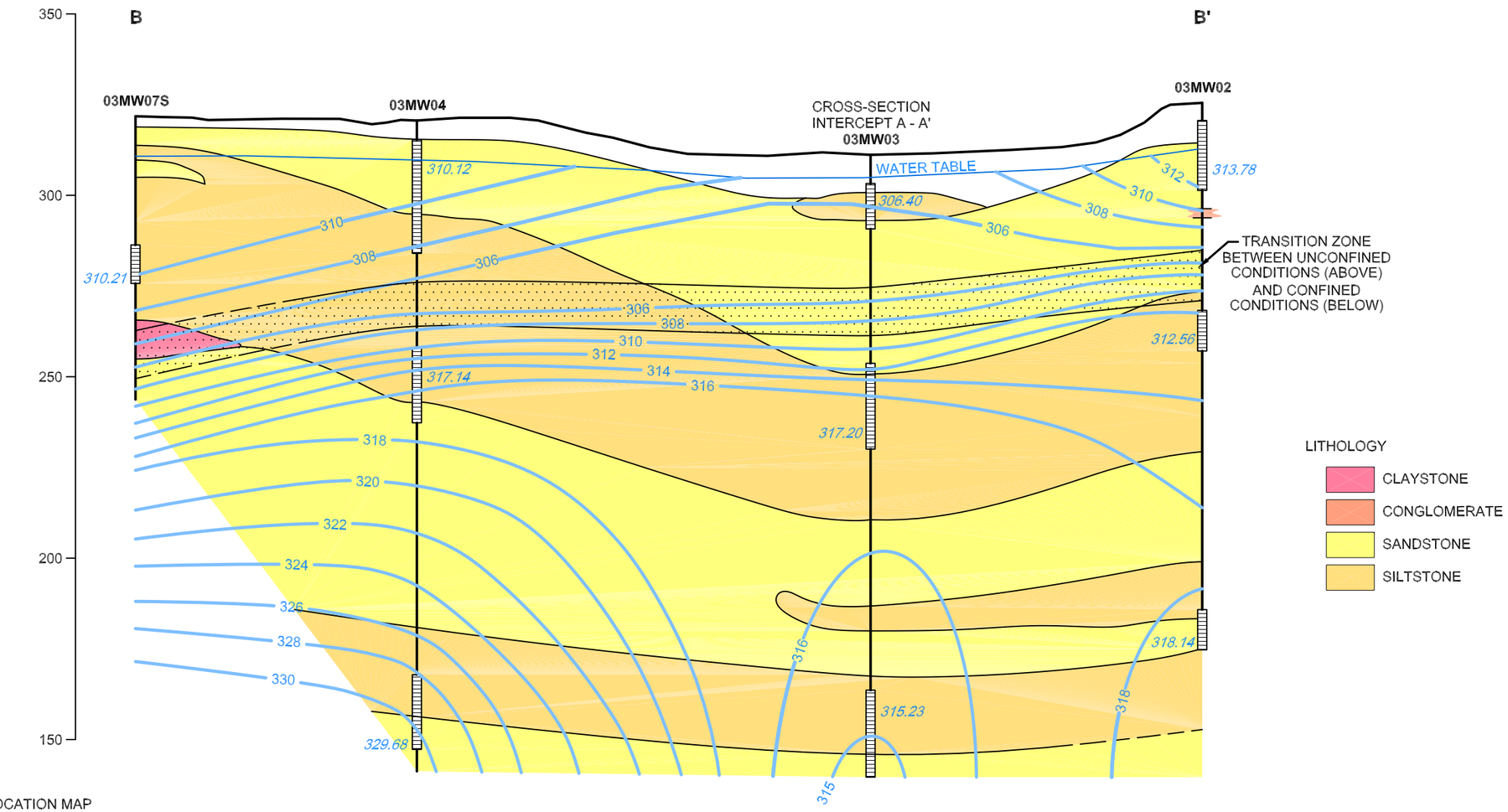
310.88 HYDRAULIC HEAD (FT MSL)

TETRA TECH NUS, INC.

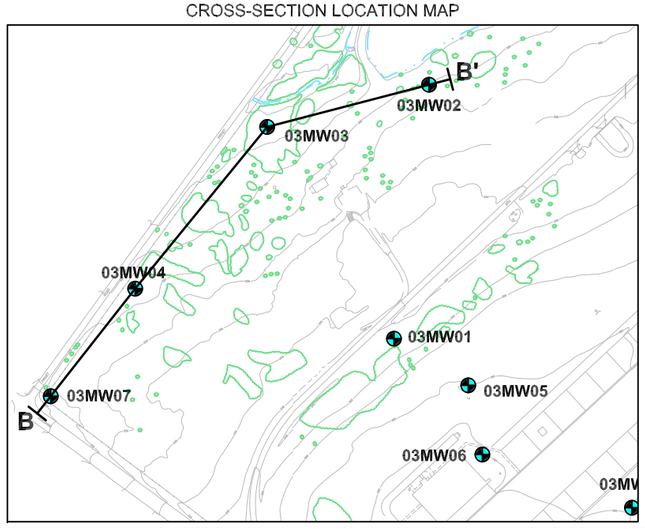
HYDROGEOLOGIC CROSS-SECTION A – A'
SEPTEMBER 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS02-1.DWG	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-12	0 / 04/20/10

112G02014\0904\112G02014GS02-4.DWG 04/20/10 MKB



CROSS-SECTION LOCATION MAP



0 140 280

HORIZONTAL
SCALE IN FEET

LEGEND

10 GROUNDWATER CONTOUR

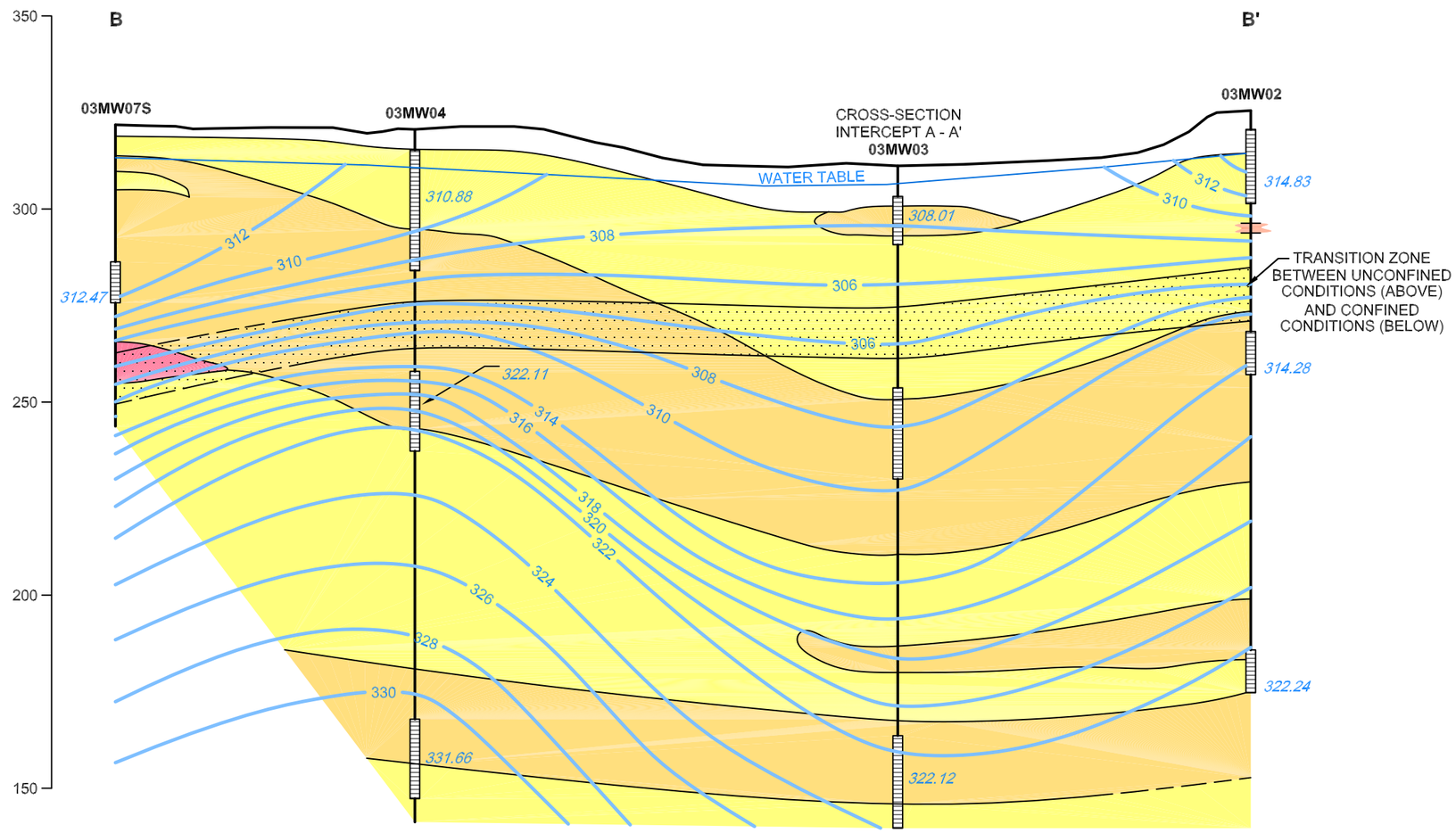
310.88 HYDRAULIC HEAD (FT MSL)

TETRA TECH NUS, INC.

HYDROGEOLOGIC CROSS-SECTION B – B'
AUGUST 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS02-4.DWG	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-13	0 / 04/20/10

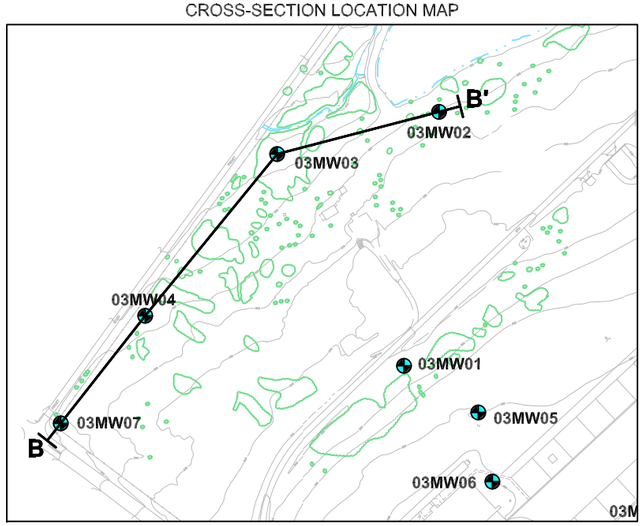
112G02014\0904\112G02014GS02-2.DWG 04/20/10 MKB



LITHOLOGY

- CLAYSTONE
- CONGLOMERATE
- SANDSTONE
- SILTSTONE

CROSS-SECTION LOCATION MAP



LEGEND

10 GROUNDWATER CONTOUR

310.88 HYDRAULIC HEAD (FT MSL)

0 140 280

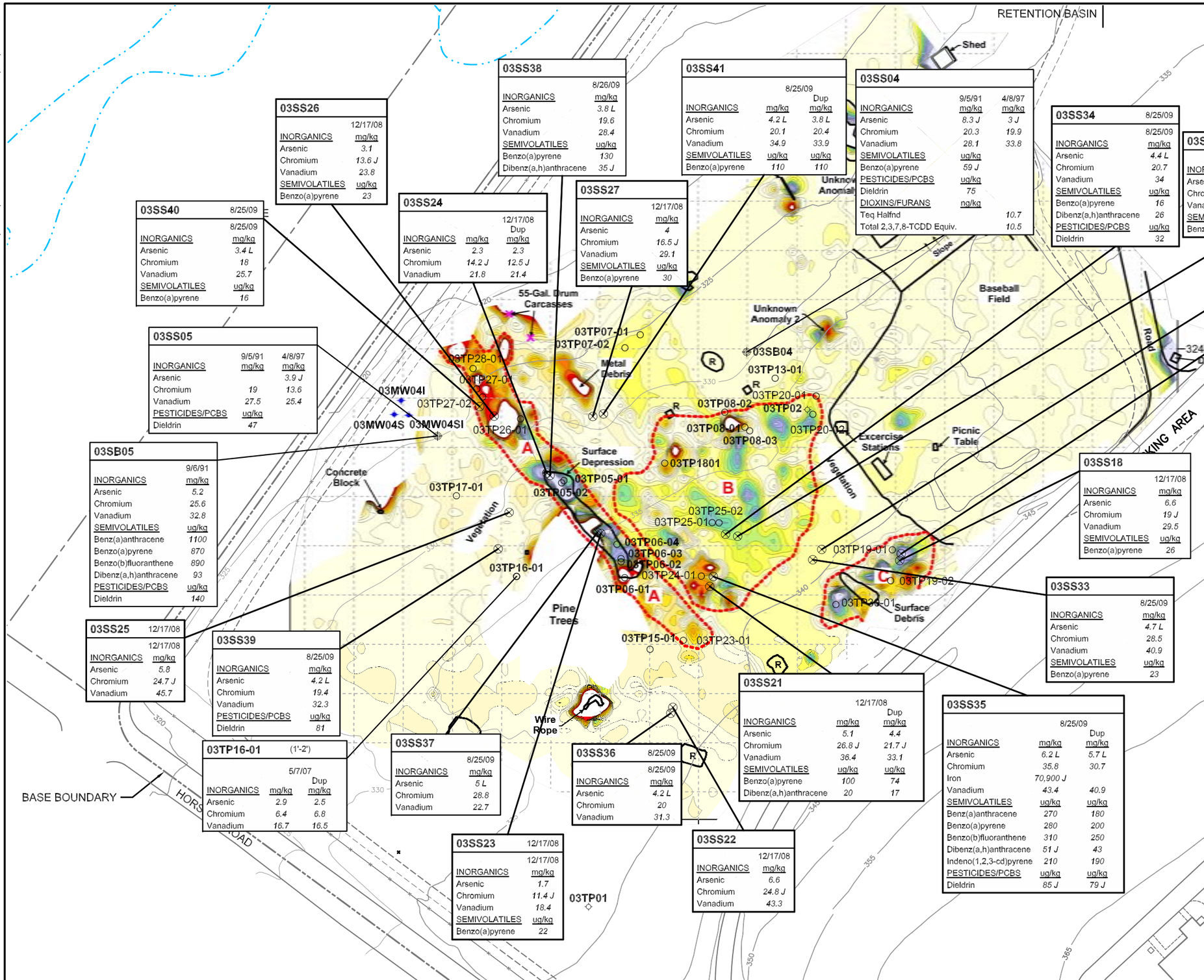
HORIZONTAL
SCALE IN FEET

TETRA TECH NUS, INC.

VERTICAL FLOW NET FOR
CROSS-SECTION B – B'
SEPTEMBER 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS02-2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3-14	0 / 04/20/10

112G02014\0904\112G02014GM08-2.DWG 05/07/10 MKB



03SS38

INORGANICS	8/26/09 mg/kg
Arsenic	3.8 L
Chromium	19.6
Vanadium	28.4
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	130
Dibenz(a,h)anthracene	35 J

03SS41

INORGANICS	8/25/09 mg/kg	Dup mg/kg
Arsenic	4.2 L	3.8 L
Chromium	20.1	20.4
Vanadium	34.9	33.9
SEMIVOLATILES	ug/kg	ug/kg
Benzo(a)pyrene	110	110

03SS04

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	8.3 J	3 J
Chromium	20.3	19.9
Vanadium	28.1	33.8
SEMIVOLATILES	ug/kg	
Benzo(a)pyrene	59 J	
PESTICIDES/PCBS	ug/kg	
Dieldrin	75	
DIOXINS/FURANS	ng/kg	
Teq Halfnd		10.7
Total 2,3,7,8-TCDD Equiv.		10.5

03SS26

INORGANICS	12/17/08 mg/kg
Arsenic	3.1
Chromium	13.6 J
Vanadium	23.8
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	23

03SS24

INORGANICS	12/17/08 mg/kg	Dup mg/kg
Arsenic	2.3	2.3
Chromium	14.2 J	12.5 J
Vanadium	21.8	21.4

03SS27

INORGANICS	12/17/08 mg/kg
Arsenic	4
Chromium	16.5 J
Vanadium	29.1
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	30

03SS34

INORGANICS	8/25/09 mg/kg
Arsenic	4.4 L
Chromium	20.7
Vanadium	34
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	16
Dibenz(a,h)anthracene	26
PESTICIDES/PCBS	ug/kg
Dieldrin	32

03SS20

INORGANICS	12/17/08 mg/kg
Arsenic	4.4
Chromium	20.5 J
Vanadium	35.6
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	25

03SS19

INORGANICS	12/17/08 mg/kg
Arsenic	5.2
Chromium	21.7 J
Vanadium	35.1
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	18

03SS40

INORGANICS	8/25/09 mg/kg
Arsenic	3.4 L
Chromium	18
Vanadium	25.7
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	16

03SS05

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic		3.9 J
Chromium	19	13.6
Vanadium	27.5	25.4
PESTICIDES/PCBS	ug/kg	
Dieldrin	47	

03SS32

INORGANICS	8/25/09 mg/kg
Arsenic	5.8 L
Chromium	26.1
Vanadium	31.7
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	110
Dibenz(a,h)anthracene	31

03SB05

INORGANICS	9/6/91 mg/kg
Arsenic	5.2
Chromium	25.6
Vanadium	32.8
SEMIVOLATILES	ug/kg
Benz(a)anthracene	1100
Benzo(a)pyrene	870
Benzo(b)fluoranthene	890
Dibenz(a,h)anthracene	93
PESTICIDES/PCBS	ug/kg
Dieldrin	140

03SS18

INORGANICS	12/17/08 mg/kg
Arsenic	6.6
Chromium	19 J
Vanadium	29.5
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	26

03SS25

INORGANICS	12/17/08 mg/kg
Arsenic	5.8
Chromium	24.7 J
Vanadium	45.7

03SS39

INORGANICS	8/25/09 mg/kg
Arsenic	4.2 L
Chromium	19.4
Vanadium	32.3
PESTICIDES/PCBS	ug/kg
Dieldrin	81

03SS33

INORGANICS	8/25/09 mg/kg
Arsenic	4.7 L
Chromium	28.5
Vanadium	40.9
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	23

03TP16-01 (1'-2')

INORGANICS	5/7/07 mg/kg	Dup mg/kg
Arsenic	2.9	2.5
Chromium	6.4	6.8
Vanadium	16.7	16.5

03SS37

INORGANICS	8/25/09 mg/kg
Arsenic	5 L
Chromium	28.8
Vanadium	22.7

03SS36

INORGANICS	8/25/09 mg/kg
Arsenic	4.2 L
Chromium	20
Vanadium	31.3

03SS21

INORGANICS	12/17/08 mg/kg	Dup mg/kg
Arsenic	5.1	4.4
Chromium	26.8 J	21.7 J
Vanadium	36.4	33.1
SEMIVOLATILES	ug/kg	ug/kg
Benzo(a)pyrene	100	74
Dibenz(a,h)anthracene	20	17

03SS35

INORGANICS	8/25/09 mg/kg	Dup mg/kg
Arsenic	6.2 L	5.7 L
Chromium	35.8	30.7
Iron	70,900 J	
Vanadium	43.4	40.9
SEMIVOLATILES	ug/kg	ug/kg
Benz(a)anthracene	270	180
Benzo(a)pyrene	280	200
Benzo(b)fluoranthene	310	250
Dibenz(a,h)anthracene	51 J	43
Indeno(1,2,3-cd)pyrene	210	190
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	85 J	79 J

03SS23

INORGANICS	12/17/08 mg/kg
Arsenic	1.7
Chromium	11.4 J
Vanadium	18.4
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	22

03SS22

INORGANICS	12/17/08 mg/kg
Arsenic	6.6
Chromium	24.8 J
Vanadium	43.3

LEGEND

- ⊗ SURFACE SOIL SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- *J* ESTIMATED VALUE
- *K* POSITIVE RESULT BIASED HIGH
- *L* POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM

0 100 200

SCALE IN FEET

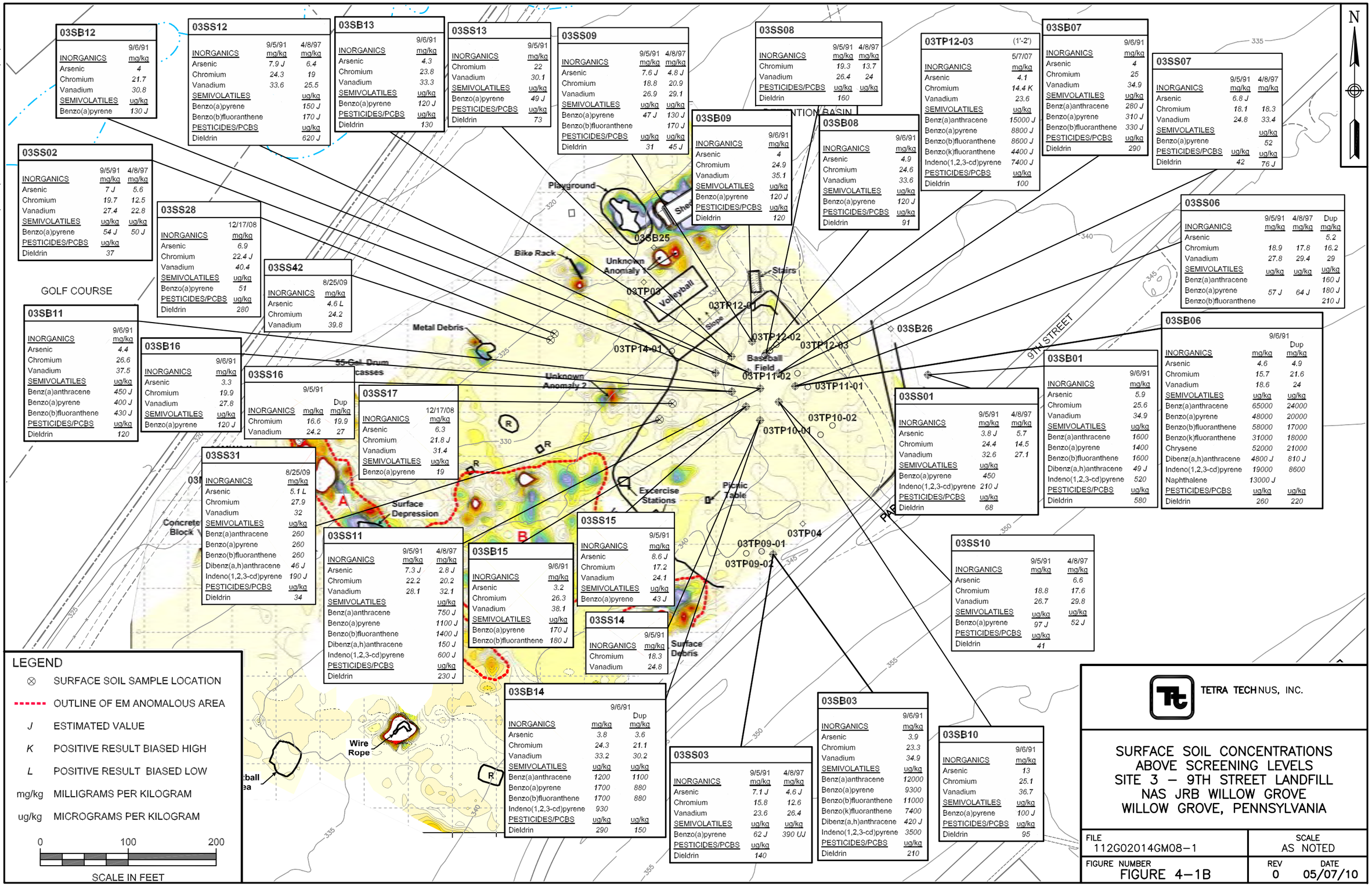
TETRA TECH NUS, INC.

SURFACE SOIL CONCENTRATIONS ABOVE SCREENING LEVELS
LANDFILL AREA – SOUTHWEST
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM08-2	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4-1A	0	05/07/10

112G02014\0904\112G02014GM08-1.DWG 05/07/10 MKB



03SB12

INORGANICS	9/6/91 mg/kg
Arsenic	4
Chromium	21.7
Vanadium	30.8
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	130 J

03SS12

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	7.9 J	6.4
Chromium	24.3	19
Vanadium	33.6	25.5
SEMIVOLATILES		ug/kg
Benzo(a)pyrene		150 J
Benzo(b)fluoranthene		170 J
PESTICIDES/PCBS		ug/kg
Dieldrin		620 J

03SB13

INORGANICS	9/6/91 mg/kg
Arsenic	4.3
Chromium	23.8
Vanadium	33.3
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	120 J
PESTICIDES/PCBS	ug/kg
Dieldrin	130

03SS13

INORGANICS	9/5/91 mg/kg
Chromium	22
Vanadium	30.1
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	49 J
PESTICIDES/PCBS	ug/kg
Dieldrin	73

03SS09

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	7.6 J	4.8 J
Chromium	18.8	20.9
Vanadium	26.9	29.1
SEMIVOLATILES	ug/kg	ug/kg
Benzo(a)pyrene	47 J	130 J
Benzo(b)fluoranthene		170 J
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	31	45 J

03SS08

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Chromium	19.3	13.7
Vanadium	26.4	24
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	160	

03SB09

INORGANICS	9/6/91 mg/kg
Arsenic	4
Chromium	24.9
Vanadium	35.1
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	120 J
PESTICIDES/PCBS	ug/kg
Dieldrin	120

03SB08

INORGANICS	9/6/91 mg/kg
Arsenic	4.9
Chromium	24.6
Vanadium	33.6
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	120 J
PESTICIDES/PCBS	ug/kg
Dieldrin	91

03TP12-03 (1'-2')

INORGANICS	5/7/07 mg/kg
Arsenic	4.1
Chromium	14.4 K
Vanadium	23.6
SEMIVOLATILES	ug/kg
Benz(a)anthracene	15000 J
Benzo(a)pyrene	8800 J
Benzo(b)fluoranthene	8600 J
Benzo(k)fluoranthene	4400 J
Indeno(1,2,3-cd)pyrene	7400 J
PESTICIDES/PCBS	ug/kg
Dieldrin	100

03SB07

INORGANICS	9/6/91 mg/kg
Arsenic	4
Chromium	25
Vanadium	34.9
SEMIVOLATILES	ug/kg
Benz(a)anthracene	280 J
Benzo(a)pyrene	310 J
Benzo(b)fluoranthene	330 J
PESTICIDES/PCBS	ug/kg
Dieldrin	290

03SS07

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	6.8 J	
Chromium	18.1	18.3
Vanadium	24.8	33.4
SEMIVOLATILES		ug/kg
Benzo(a)pyrene		52
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	42	76 J

03SS02

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	7 J	5.6
Chromium	19.7	12.5
Vanadium	27.4	22.8
SEMIVOLATILES	ug/kg	ug/kg
Benzo(a)pyrene	54 J	50 J
PESTICIDES/PCBS	ug/kg	
Dieldrin	37	

03SS28

INORGANICS	12/17/08 mg/kg
Arsenic	6.9
Chromium	22.4 J
Vanadium	40.4
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	51
PESTICIDES/PCBS	ug/kg
Dieldrin	280

03SS42

INORGANICS	8/25/09 mg/kg
Arsenic	4.6 L
Chromium	24.2
Vanadium	39.8

03SS06

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg	Dup mg/kg
Arsenic			5.2
Chromium	18.9	17.8	16.2
Vanadium	27.8	29.4	29
SEMIVOLATILES	ug/kg	ug/kg	ug/kg
Benz(a)anthracene			160 J
Benzo(a)pyrene	57 J	64 J	180 J
Benzo(b)fluoranthene			210 J

03SB11

INORGANICS	9/6/91 mg/kg
Arsenic	4.4
Chromium	26.6
Vanadium	37.5
SEMIVOLATILES	ug/kg
Benz(a)anthracene	450 J
Benzo(a)pyrene	400 J
Benzo(b)fluoranthene	430 J
PESTICIDES/PCBS	ug/kg
Dieldrin	120

03SB16

INORGANICS	9/6/91 mg/kg
Arsenic	3.3
Chromium	19.9
Vanadium	27.8
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	120 J

03SS16

INORGANICS	9/5/91 mg/kg	Dup mg/kg
Chromium	16.6	19.9
Vanadium	24.2	27

03SS17

INORGANICS	12/17/08 mg/kg
Arsenic	6.3
Chromium	21.8 J
Vanadium	31.4
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	19

03SS01

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	3.8 J	5.7
Chromium	24.4	14.5
Vanadium	32.6	27.1
SEMIVOLATILES	ug/kg	
Benzo(a)pyrene	450	
Indeno(1,2,3-cd)pyrene	210 J	
PESTICIDES/PCBS	ug/kg	
Dieldrin	68	

03SB01

INORGANICS	9/6/91 mg/kg
Arsenic	5.9
Chromium	25.6
Vanadium	34.9
SEMIVOLATILES	ug/kg
Benz(a)anthracene	1600
Benzo(a)pyrene	1400
Benzo(b)fluoranthene	1600
Dibenz(a,h)anthracene	49 J
Indeno(1,2,3-cd)pyrene	520
PESTICIDES/PCBS	ug/kg
Dieldrin	580

03SB06

INORGANICS	9/6/91 mg/kg	Dup mg/kg
Arsenic	4.6	4.9
Chromium	15.7	21.6
Vanadium	18.6	24
SEMIVOLATILES	ug/kg	ug/kg
Benz(a)anthracene	65000	24000
Benzo(a)pyrene	48000	20000
Benzo(b)fluoranthene	58000	17000
Benzo(k)fluoranthene	31000	18000
Chrysene	52000	21000
Dibenz(a,h)anthracene	4800 J	810 J
Indeno(1,2,3-cd)pyrene	19000	8600
Naphthalene	13000 J	
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	260	220

03SS31

INORGANICS	8/25/09 mg/kg
Arsenic	5.1 L
Chromium	27.9
Vanadium	32
SEMIVOLATILES	ug/kg
Benz(a)anthracene	260
Benzo(a)pyrene	260
Benzo(b)fluoranthene	260
Dibenz(a,h)anthracene	46 J
Indeno(1,2,3-cd)pyrene	190 J
PESTICIDES/PCBS	ug/kg
Dieldrin	34

03SS11

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	7.3 J	2.8 J
Chromium	22.2	20.2
Vanadium	28.1	32.1
SEMIVOLATILES		ug/kg
Benz(a)anthracene		750 J
Benzo(a)pyrene		1100 J
Benzo(b)fluoranthene		1400 J
Dibenz(a,h)anthracene		150 J
Indeno(1,2,3-cd)pyrene		600 J
PESTICIDES/PCBS		ug/kg
Dieldrin		230 J

03SB15

INORGANICS	9/6/91 mg/kg
Arsenic	3.2
Chromium	26.3
Vanadium	38.1
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	170 J
Benzo(b)fluoranthene	180 J

03SS15

INORGANICS	9/5/91 mg/kg
Arsenic	8.6 J
Chromium	17.2
Vanadium	24.1
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	43 J

03SS14

INORGANICS	9/5/91 mg/kg
Chromium	18.3
Vanadium	24.8

03SS10

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic		6.6
Chromium	18.8	17.6
Vanadium	26.7	29.8
SEMIVOLATILES	ug/kg	ug/kg
Benzo(a)pyrene	97 J	52 J
PESTICIDES/PCBS	ug/kg	
Dieldrin	41	

03SB14

INORGANICS	9/6/91 mg/kg	Dup mg/kg
Arsenic	3.8	3.6
Chromium	24.3	21.1
Vanadium	33.2	30.2
SEMIVOLATILES	ug/kg	ug/kg
Benz(a)anthracene	1200	1100
Benzo(a)pyrene	1700	880
Benzo(b)fluoranthene	1700	880
Indeno(1,2,3-cd)pyrene	930	
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	290	150

03SS03

INORGANICS	9/5/91 mg/kg	4/8/97 mg/kg
Arsenic	7.1 J	4.6 J
Chromium	15.8	12.6
Vanadium	23.6	26.4
SEMIVOLATILES	ug/kg	ug/kg
Benzo(a)pyrene	62 J	390 UJ
PESTICIDES/PCBS	ug/kg	
Dieldrin	140	

03SB03

INORGANICS	9/6/91 mg/kg
Arsenic	3.9
Chromium	23.3
Vanadium	34.9
SEMIVOLATILES	ug/kg
Benz(a)anthracene	12000
Benzo(a)pyrene	9300
Benzo(b)fluoranthene	11000
Benzo(k)fluoranthene	7400
Dibenz(a,h)anthracene	420 J
Indeno(1,2,3-cd)pyrene	3500
PESTICIDES/PCBS	ug/kg
Dieldrin	210

03SB10

INORGANICS	9/6/91 mg/kg
Arsenic	13
Chromium	25.1
Vanadium	36.7
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	100 J
PESTICIDES/PCBS	ug/kg
Dieldrin	95

LEGEND

- ⊗ SURFACE SOIL SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- J ESTIMATED VALUE
- K POSITIVE RESULT BIASED HIGH
- L POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM

0 100 200

SCALE IN FEET

TETRA TECH NUS, INC.

SURFACE SOIL CONCENTRATIONS ABOVE SCREENING LEVELS SITE 3 – 9TH STREET LANDFILL NAS JRB WILLOW GROVE WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM08-1	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4-1B	0	05/07/10

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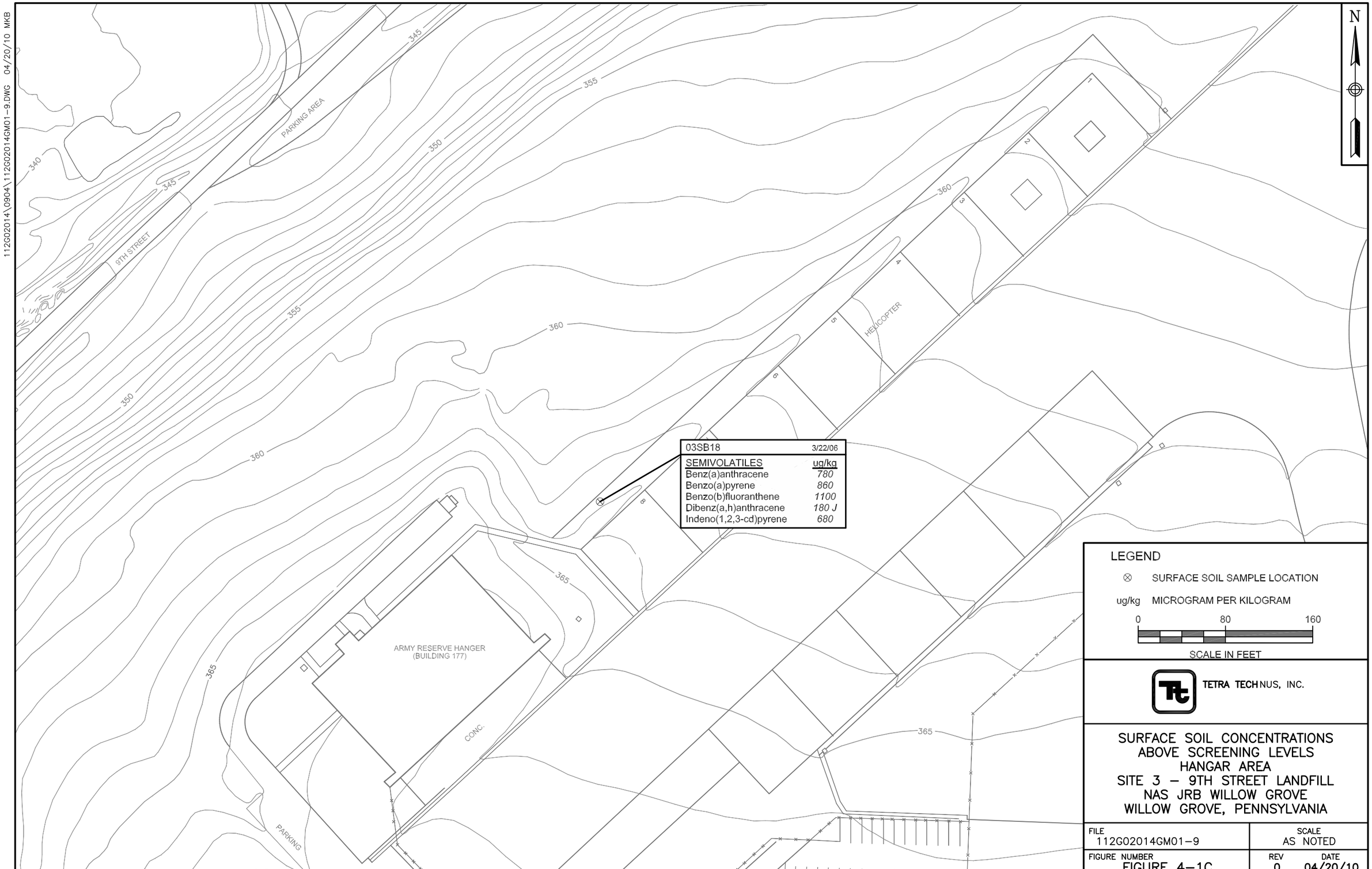

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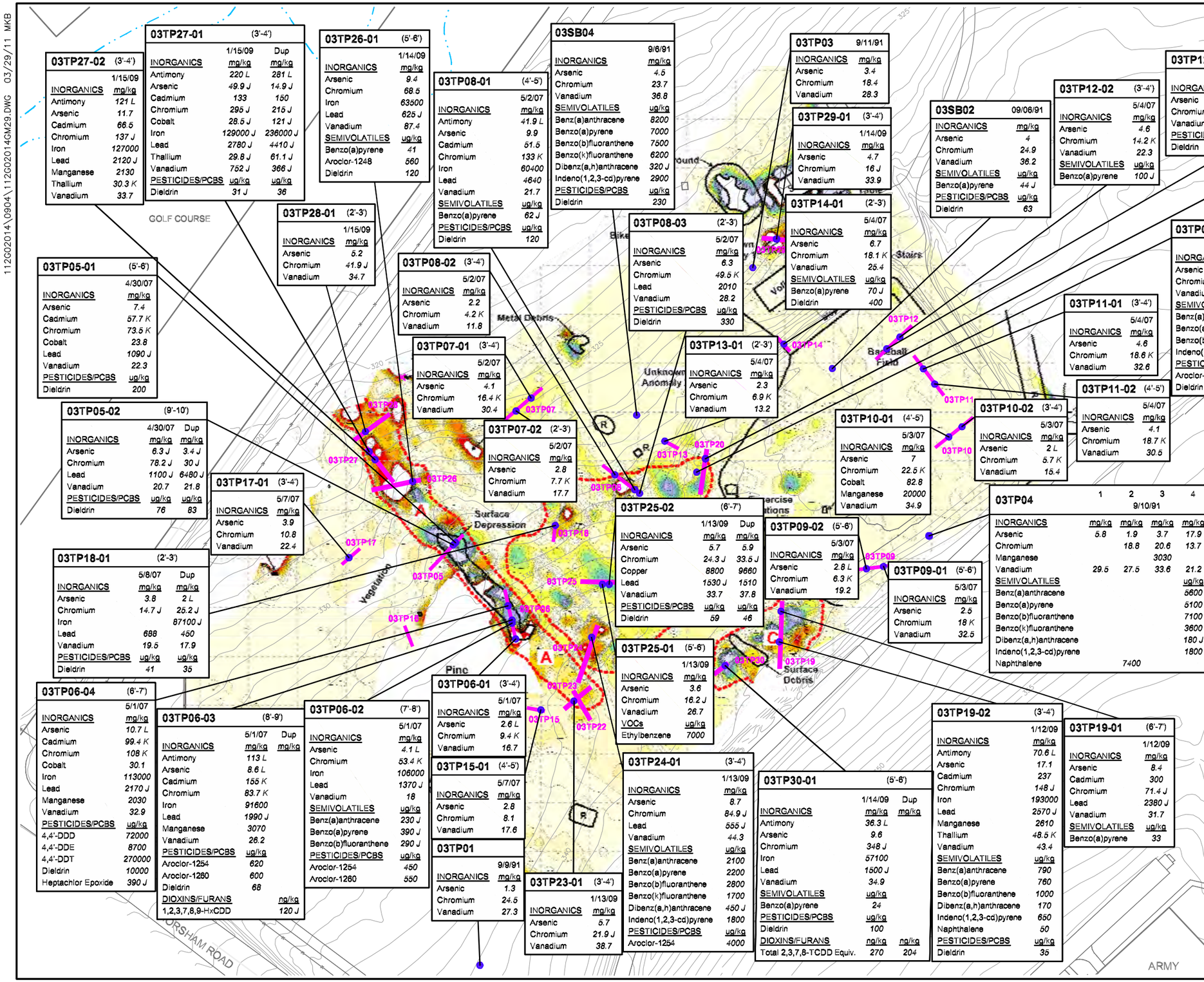


03TP27-02 (3'-4')

INORGANICS	1/15/09 mg/kg
Antimony	121 L
Arsenic	11.7
Cadmium	66.5
Chromium	137 J
Iron	127000
Lead	2120 J
Manganese	2130
Thallium	30.3 K
Vanadium	33.7

03TP27-01 (3'-4')

INORGANICS	1/15/09 mg/kg	Dup mg/kg
Antimony	220 L	281 L
Arsenic	49.9 J	14.9 J
Cadmium	133	150
Chromium	295 J	215 J
Cobalt	28.6 J	121 J
Iron	129000 J	236000 J
Lead	2780 J	4410 J
Thallium	29.8 J	61.1 J
Vanadium	752 J	366 J
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	31 J	36

03TP26-01 (5'-6')

INORGANICS	1/14/09 mg/kg
Arsenic	9.4
Chromium	68.5
Iron	63500
Lead	625 J
Vanadium	87.4
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	41
Aroclor-1248	560
Dieldrin	120

03TP08-01 (4'-5')

INORGANICS	5/2/07 mg/kg
Antimony	41.9 L
Arsenic	9.9
Cadmium	51.5
Chromium	133 K
Iron	60400
Lead	4640
Vanadium	21.7
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	62 J
PESTICIDES/PCBS	ug/kg
Dieldrin	120

03SB04

INORGANICS	9/6/91 mg/kg
Arsenic	4.5
Chromium	23.7
Vanadium	36.8
SEMIVOLATILES	ug/kg
Benz(a)anthracene	8200
Benzo(a)pyrene	7000
Benzo(b)fluoranthene	7500
Benzo(k)fluoranthene	6200
Dibenz(a,h)anthracene	320 J
Indeno(1,2,3-cd)pyrene	2900
PESTICIDES/PCBS	ug/kg
Dieldrin	230

03TP03 9/11/91

INORGANICS	mg/kg
Arsenic	3.4
Chromium	18.4
Vanadium	28.3

03TP29-01 (3'-4')

INORGANICS	1/14/09 mg/kg
Arsenic	4.7
Chromium	16 J
Vanadium	33.9

03TP14-01 (2'-3')

INORGANICS	5/4/07 mg/kg
Arsenic	6.7
Chromium	18.1 K
Vanadium	25.4
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	70 J
Dieldrin	400

03SB02 09/06/91

INORGANICS	mg/kg
Arsenic	4
Chromium	24.9
Vanadium	36.2
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	44 J
PESTICIDES/PCBS	ug/kg
Dieldrin	63

03TP12-02 (3'-4')

INORGANICS	5/4/07 mg/kg
Arsenic	4.6
Chromium	14.2 K
Vanadium	22.3
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	100 J

03TP12-01 (4'-5')

INORGANICS	5/4/07 mg/kg
Arsenic	5.3
Chromium	21.5 K
Vanadium	28.1
PESTICIDES/PCBS	ug/kg
Dieldrin	140

03TP20-01 (7'-8')

INORGANICS	1/12/09 mg/kg
Arsenic	6.5
Cadmium	48.7
Chromium	56.3 J
Lead	1210 J
Vanadium	37.7
SEMIVOLATILES	ug/kg
Benz(a)anthracene	15000
Benzo(a)pyrene	7900 J
Benzo(b)fluoranthene	9900 J
Benzo(k)fluoranthene	6600 J
Chrysene	23000
Dibenz(a,h)anthracene	1100 J
Indeno(1,2,3-cd)pyrene	3600 J
Naphthalene	14000
PESTICIDES/PCBS	ug/kg
Aroclor-1260	340
Dieldrin	86

03TP28-01 (2'-3')

INORGANICS	1/15/09 mg/kg
Arsenic	5.2
Chromium	41.9 J
Vanadium	34.7

03TP08-03 (2'-3')

INORGANICS	5/2/07 mg/kg
Arsenic	6.3
Chromium	49.5 K
Lead	2010
Vanadium	28.2
PESTICIDES/PCBS	ug/kg
Dieldrin	330

03TP05-01 (5'-6')

INORGANICS	4/30/07 mg/kg
Arsenic	7.4
Cadmium	57.7 K
Chromium	73.5 K
Cobalt	23.8
Lead	1090 J
Vanadium	22.3
PESTICIDES/PCBS	ug/kg
Dieldrin	200

03TP08-02 (3'-4')

INORGANICS	5/2/07 mg/kg
Arsenic	2.2
Chromium	4.2 K
Vanadium	11.8

03TP07-01 (3'-4')

INORGANICS	5/2/07 mg/kg
Arsenic	4.1
Chromium	16.4 K
Vanadium	30.4

03TP13-01 (2'-3')

INORGANICS	5/4/07 mg/kg
Arsenic	2.3
Chromium	6.9 K
Vanadium	13.2

03TP02

INORGANICS	1 9/10/91 mg/kg	2 mg/kg
Arsenic	4.8	5.2
Chromium	32	30.5
Vanadium	41.4	41.4
SEMIVOLATILES	ug/kg	ug/kg
Benz(a)anthracene		850
Benzo(a)pyrene	87	670
Benzo(b)fluoranthene		890
Indeno(1,2,3-cd)pyrene		310
PESTICIDES/PCBS	ug/kg	ug/kg
Aroclor-1254	490	810
Dieldrin	79	

03TP11-01 (3'-4')

INORGANICS	5/4/07 mg/kg
Arsenic	4.6
Chromium	18.6 K
Vanadium	32.6

03TP11-02 (4'-5')

INORGANICS	5/4/07 mg/kg
Arsenic	4.1
Chromium	18.7 K
Vanadium	30.5

03TP05-02 (9'-10')

INORGANICS	4/30/07 mg/kg	Dup mg/kg
Arsenic	6.3 J	3.4 J
Chromium	78.2 J	30 J
Lead	1100 J	6480 J
Vanadium	20.7	21.8
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	76	83

03TP07-02 (2'-3')

INORGANICS	5/2/07 mg/kg
Arsenic	2.8
Chromium	7.7 K
Vanadium	17.7

03TP10-01 (4'-5')

INORGANICS	5/3/07 mg/kg
Arsenic	7
Chromium	22.5 K
Cobalt	82.8
Manganese	20000
Vanadium	34.9

03TP10-02 (3'-4')

INORGANICS	5/3/07 mg/kg
Arsenic	2 L
Chromium	5.7 K
Vanadium	15.4

03TP17-01 (3'-4')

INORGANICS	5/7/07 mg/kg
Arsenic	3.9
Chromium	10.8
Vanadium	22.4

03TP25-02 (6'-7')

INORGANICS	1/13/09 mg/kg	Dup mg/kg
Arsenic	5.7	5.9
Chromium	24.3 J	33.5 J
Copper	8800	9660
Lead	1530 J	1510
Vanadium	33.7	37.8
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	59	46

03TP09-02 (5'-6')

INORGANICS	5/3/07 mg/kg
Arsenic	2.8 L
Chromium	6.3 K
Vanadium	19.2

03TP04

INORGANICS	1 9/10/91 mg/kg	2 mg/kg	3 mg/kg	4 mg/kg
Arsenic	5.8	1.9	3.7	17.9
Chromium		18.8	20.6	13.7
Manganese			3030	
Vanadium	29.5	27.5	33.6	21.2
SEMIVOLATILES				ug/kg
Benz(a)anthracene				5600
Benzo(a)pyrene				5100
Benzo(b)fluoranthene				7100
Benzo(k)fluoranthene				3600
Dibenz(a,h)anthracene				180 J
Indeno(1,2,3-cd)pyrene				1800
Naphthalene		7400		

03TP09-01 (5'-6')

INORGANICS	5/3/07 mg/kg
Arsenic	2.5
Chromium	18 K
Vanadium	32.5

03TP18-01 (2'-3')

INORGANICS	5/8/07 mg/kg	Dup mg/kg
Arsenic	3.8	2 L
Chromium	14.7 J	25.2 J
Iron		87100 J
Lead	688	450
Vanadium	19.5	17.9
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	41	35

03TP25-01 (5'-6')

INORGANICS	1/13/09 mg/kg
Arsenic	3.6
Chromium	16.2 J
Vanadium	26.7
VOCs	ug/kg
Ethylbenzene	7000

03TP06-04 (6'-7')

INORGANICS	5/1/07 mg/kg
Arsenic	10.7 L
Cadmium	99.4 K
Chromium	108 K
Cobalt	30.1
Iron	113000
Lead	2170 J
Manganese	2030
Vanadium	32.9
PESTICIDES/PCBS	ug/kg
4,4'-DDD	72000
4,4'-DDE	8700
4,4'-DDT	270000
Dieldrin	10000
Heptachlor Epoxide	390 J

03TP06-03 (8'-9')

INORGANICS	5/1/07 mg/kg	Dup mg/kg
Antimony	113 L	
Arsenic	8.6 L	
Cadmium	155 K	
Chromium	83.7 K	
Iron	91600	
Lead	1990 J	
Manganese	3070	
Vanadium	26.2	
PESTICIDES/PCBS	ug/kg	
Aroclor-1254	620	
Aroclor-1260	600	
Dieldrin	68	
DIOXINS/FURANS		ng/kg
1,2,3,7,8,9-HxCDD		120 J

03TP06-02 (7'-8')

INORGANICS	5/1/07 mg/kg
Arsenic	4.1 L
Chromium	53.4 K
Iron	106000
Lead	1370 J
Vanadium	18
SEMIVOLATILES	ug/kg
Benz(a)anthracene	230 J
Benzo(a)pyrene	390 J
Benzo(b)fluoranthene	290 J
PESTICIDES/PCBS	ug/kg
Aroclor-1254	450
Aroclor-1260	550

03TP06-01 (3'-4')

INORGANICS	5/1/07 mg/kg
Arsenic	2.6 L
Chromium	9.4 K
Vanadium	16.7

03TP15-01 (4'-5')

INORGANICS	5/7/07 mg/kg
Arsenic	2.8
Chromium	8.1
Vanadium	17.6

03TP01

INORGANICS	9/9/91 mg/kg
Arsenic	1.3
Chromium	24.5
Vanadium	27.3

03TP23-01 (3'-4')

INORGANICS	1/13/09 mg/kg
Arsenic	5.7
Chromium	21.9 J
Vanadium	38.7

03TP24-01 (3'-4')

INORGANICS	1/13/09 mg/kg
Arsenic	8.7
Chromium	84.9 J
Lead	555 J
Vanadium	44.3
SEMIVOLATILES	ug/kg
Benz(a)anthracene	2100
Benzo(a)pyrene	2200
Benzo(b)fluoranthene	2800
Benzo(k)fluoranthene	1700
Dibenz(a,h)anthracene	450 J
Indeno(1,2,3-cd)pyrene	1800
PESTICIDES/PCBS	ug/kg
Aroclor-1254	4000

03TP30-01 (5'-6')

INORGANICS	1/14/09 mg/kg	Dup mg/kg
Antimony	36.3 L	
Arsenic	9.6	
Chromium	348 J	
Iron	57100	
Lead	1500 J	
Vanadium	34.9	
SEMIVOLATILES	ug/kg	
Benzo(a)pyrene	24	
PESTICIDES/PCBS	ug/kg	
Dieldrin	100	
DIOXINS/FURANS	ng/kg	ng/kg
Total 2,3,7,8-TCDD Equiv.	270	204

03TP19-02 (3'-4')

INORGANICS	1/12/09 mg/kg
Antimony	70.6 L
Arsenic	17.1
Cadmium	237
Chromium	148 J
Iron	193000
Lead	2570 J
Manganese	2610
Thallium	48.5 K
Vanadium	43.4
SEMIVOLATILES	ug/kg
Benz(a)anthracene	790
Benzo(a)pyrene	760
Benzo(b)fluoranthene	1000
Dibenz(a,h)anthracene	170
Indeno(1,2,3-cd)pyrene	650
Naphthalene	50
PESTICIDES/PCBS	ug/kg
Dieldrin	35

03TP19-01 (6'-7')

INORGANICS	1/12/09 mg/kg
Arsenic	8.4
Cadmium	300
Chromium	71.4 J
Lead	2380 J
Vanadium	31.7
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	33

LEGEND

- SUBSURFACE SOIL SAMPLE LOCATION
- TEST PIT LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- J ESTIMATED VALUE
- K POSITIVE RESULT BIASED HIGH
- L POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM

0 80 160

SCALE IN FEET

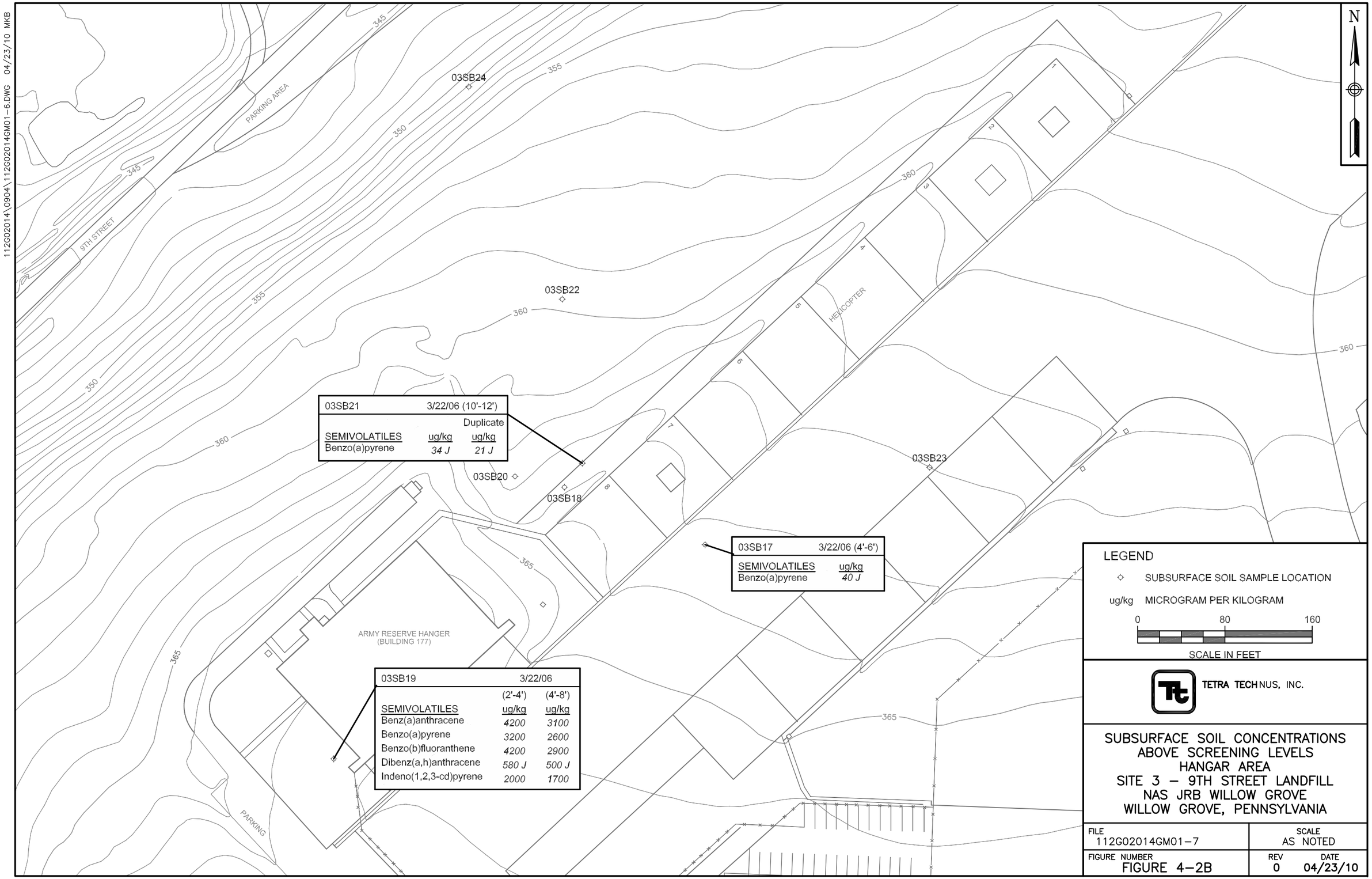
TETRA TECH NUS, INC.

SUBSURFACE SOIL CONCENTRATIONS ABOVE SCREENING LEVELS LANDFILL AREA SITE 3 – 9TH STREET LANDFILL NAS JRB WILLOW GROVE WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM29	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4–2A	0	03/29/11

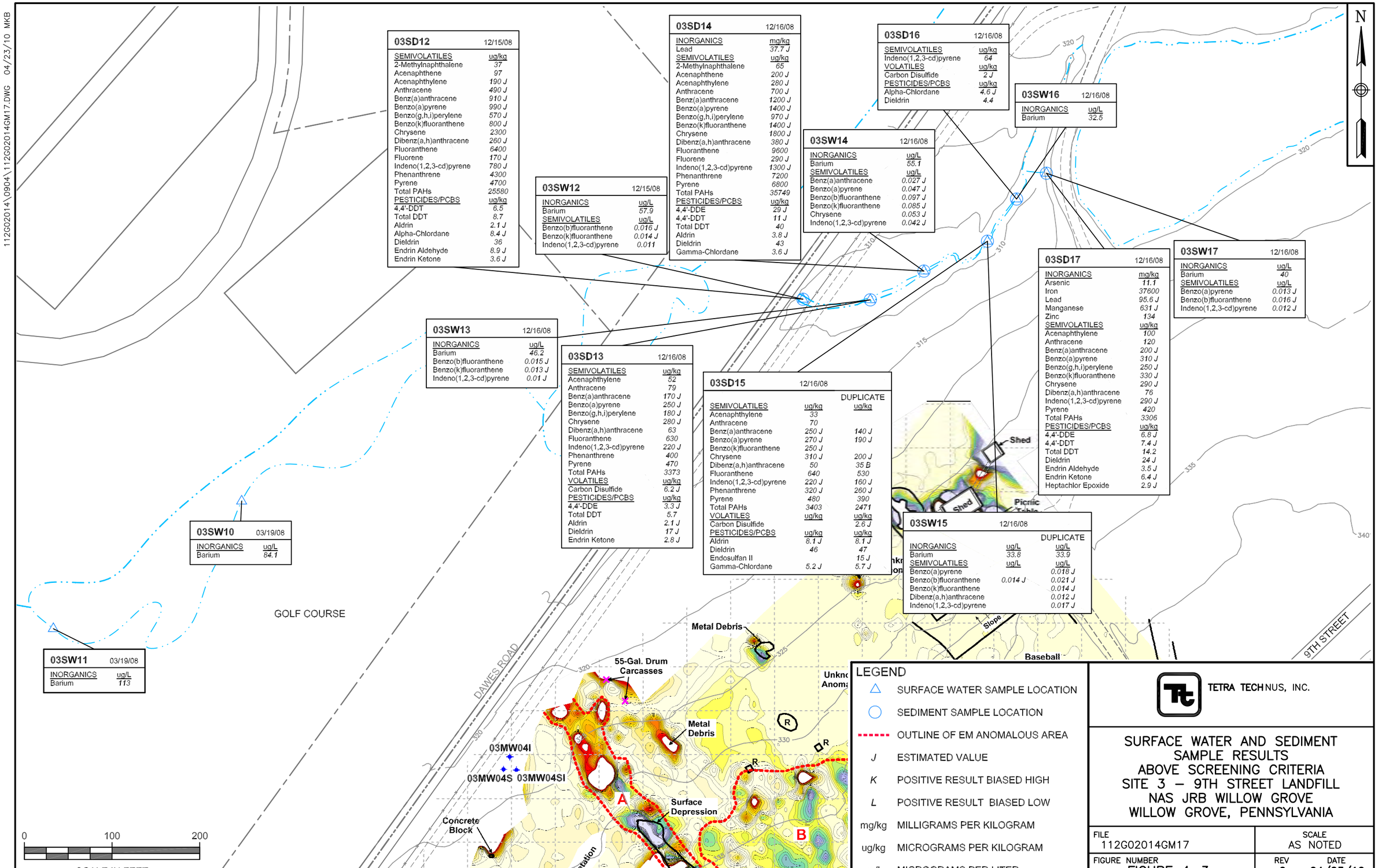
112G02014\0904\112G02014GM01-6.DWG 04/23/10 MKB



SUBSURFACE SOIL CONCENTRATIONS
ABOVE SCREENING LEVELS
HANGAR AREA
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM01-7	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-2B	0 / 04/23/10

112G02014\0904\112G02014GM17.DWG 04/23/10 MKB



03SD12 12/15/08

SEMIVOLATILES	ug/kg
2-Methylnaphthalene	37
Acenaphthene	97
Acenaphthylene	190 J
Anthracene	490 J
Benz(a)anthracene	910 J
Benzo(a)pyrene	990 J
Benzo(g,h,i)perylene	570 J
Benzo(k)fluoranthene	800 J
Chrysene	2300
Dibenz(a,h)anthracene	260 J
Fluoranthene	6400
Fluorene	170 J
Indeno(1,2,3-cd)pyrene	780 J
Phenanthrene	4300
Pyrene	4700
Total PAHs	25580
PESTICIDES/PCBS	ug/kg
4,4'-DDT	6.5
Total DDT	8.7
Aldrin	2.1 J
Alpha-Chlordane	8.4 J
Dieldrin	36
Endrin Aldehyde	8.9 J
Endrin Ketone	3.6 J

03SW12 12/15/08

INORGANICS	ug/L
Barium	57.9
SEMIVOLATILES	ug/L
Benzo(b)fluoranthene	0.016 J
Benzo(k)fluoranthene	0.014 J
Indeno(1,2,3-cd)pyrene	0.011

03SD14 12/16/08

INORGANICS	mg/kg
Lead	37.7 J
SEMIVOLATILES	ug/kg
2-Methylnaphthalene	65
Acenaphthene	200 J
Acenaphthylene	280 J
Anthracene	700 J
Benz(a)anthracene	1200 J
Benzo(a)pyrene	1400 J
Benzo(g,h,i)perylene	970 J
Benzo(k)fluoranthene	1400 J
Chrysene	1800 J
Dibenz(a,h)anthracene	380 J
Fluoranthene	9600
Fluorene	290 J
Indeno(1,2,3-cd)pyrene	1300 J
Phenanthrene	7200
Pyrene	6800
Total PAHs	35749
PESTICIDES/PCBS	ug/kg
4,4'-DDE	29 J
4,4'-DDT	11 J
Total DDT	40
Aldrin	3.8 J
Dieldrin	43
Gamma-Chlordane	3.6 J

03SD16 12/16/08

SEMIVOLATILES	ug/kg
Indeno(1,2,3-cd)pyrene	64
VOLATILES	ug/kg
Carbon Disulfide	2 J
PESTICIDES/PCBS	ug/kg
Alpha-Chlordane	4.6 J
Dieldrin	4.4

03SW16 12/16/08

INORGANICS	ug/L
Barium	32.5

03SW14 12/16/08

INORGANICS	ug/L
Barium	55.1
SEMIVOLATILES	ug/L
Benz(a)anthracene	0.027 J
Benzo(a)pyrene	0.047 J
Benzo(b)fluoranthene	0.097 J
Benzo(k)fluoranthene	0.085 J
Chrysene	0.053 J
Indeno(1,2,3-cd)pyrene	0.042 J

03SW17 12/16/08

INORGANICS	ug/L
Barium	40
SEMIVOLATILES	ug/L
Benzo(a)pyrene	0.013 J
Benzo(b)fluoranthene	0.016 J
Indeno(1,2,3-cd)pyrene	0.012 J

03SD17 12/16/08

INORGANICS	mg/kg
Arsenic	11.1
Iron	37600
Lead	95.6 J
Manganese	631 J
Zinc	134
SEMIVOLATILES	ug/kg
Acenaphthylene	100
Anthracene	120
Benz(a)anthracene	200 J
Benzo(a)pyrene	310 J
Benzo(g,h,i)perylene	250 J
Benzo(k)fluoranthene	330 J
Chrysene	290 J
Dibenz(a,h)anthracene	76
Indeno(1,2,3-cd)pyrene	290 J
Pyrene	420
Total PAHs	3306
PESTICIDES/PCBS	ug/kg
4,4'-DDE	6.8 J
4,4'-DDT	7.4 J
Total DDT	14.2
Dieldrin	24 J
Endrin Aldehyde	3.5 J
Endrin Ketone	6.4 J
Heptachlor Epoxide	2.9 J

03SW13 12/16/08

INORGANICS	ug/L
Barium	46.2
Benzo(b)fluoranthene	0.015 J
Benzo(k)fluoranthene	0.013 J
Indeno(1,2,3-cd)pyrene	0.01 J

03SD13 12/16/08

SEMIVOLATILES	ug/kg
Acenaphthylene	52
Anthracene	79
Benz(a)anthracene	170 J
Benzo(a)pyrene	250 J
Benzo(g,h,i)perylene	180 J
Chrysene	280 J
Dibenz(a,h)anthracene	63
Fluoranthene	630
Indeno(1,2,3-cd)pyrene	220 J
Phenanthrene	400
Pyrene	470
Total PAHs	3373
VOLATILES	ug/kg
Carbon Disulfide	6.2 J
PESTICIDES/PCBS	ug/kg
4,4'-DDE	3.3 J
Total DDT	5.7
Aldrin	2.1 J
Dieldrin	17 J
Endrin Ketone	2.8 J

03SD15 12/16/08

SEMIVOLATILES	ug/kg	DUPLICATE ug/kg
Acenaphthylene	33	
Anthracene	70	
Benz(a)anthracene	250 J	140 J
Benzo(a)pyrene	270 J	190 J
Benzo(k)fluoranthene	250 J	
Chrysene	310 J	200 J
Dibenz(a,h)anthracene	50	35 B
Fluoranthene	640	530
Indeno(1,2,3-cd)pyrene	220 J	160 J
Phenanthrene	320 J	260 J
Pyrene	480	390
Total PAHs	3403	2471
VOLATILES	ug/kg	ug/kg
Carbon Disulfide		2.6 J
PESTICIDES/PCBS	ug/kg	ug/kg
Aldrin	8.1 J	8.1 J
Dieldrin	46	47
Endosulfan II		15 J
Gamma-Chlordane	5.2 J	5.7 J

03SW15 12/16/08

INORGANICS	ug/L	DUPLICATE ug/L
Barium	33.8	33.9
SEMIVOLATILES	ug/L	ug/L
Benzo(a)pyrene		0.018 J
Benzo(b)fluoranthene	0.014 J	0.021 J
Benzo(k)fluoranthene		0.014 J
Dibenz(a,h)anthracene		0.012 J
Indeno(1,2,3-cd)pyrene		0.017 J

03SW10 03/19/08

INORGANICS	ug/L
Barium	84.1

03SW11 03/19/08

INORGANICS	ug/L
Barium	113

LEGEND

- SURFACE WATER SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- J ESTIMATED VALUE
- K POSITIVE RESULT BIASED HIGH
- L POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM
- ug/L MICROGRAMS PER LITER

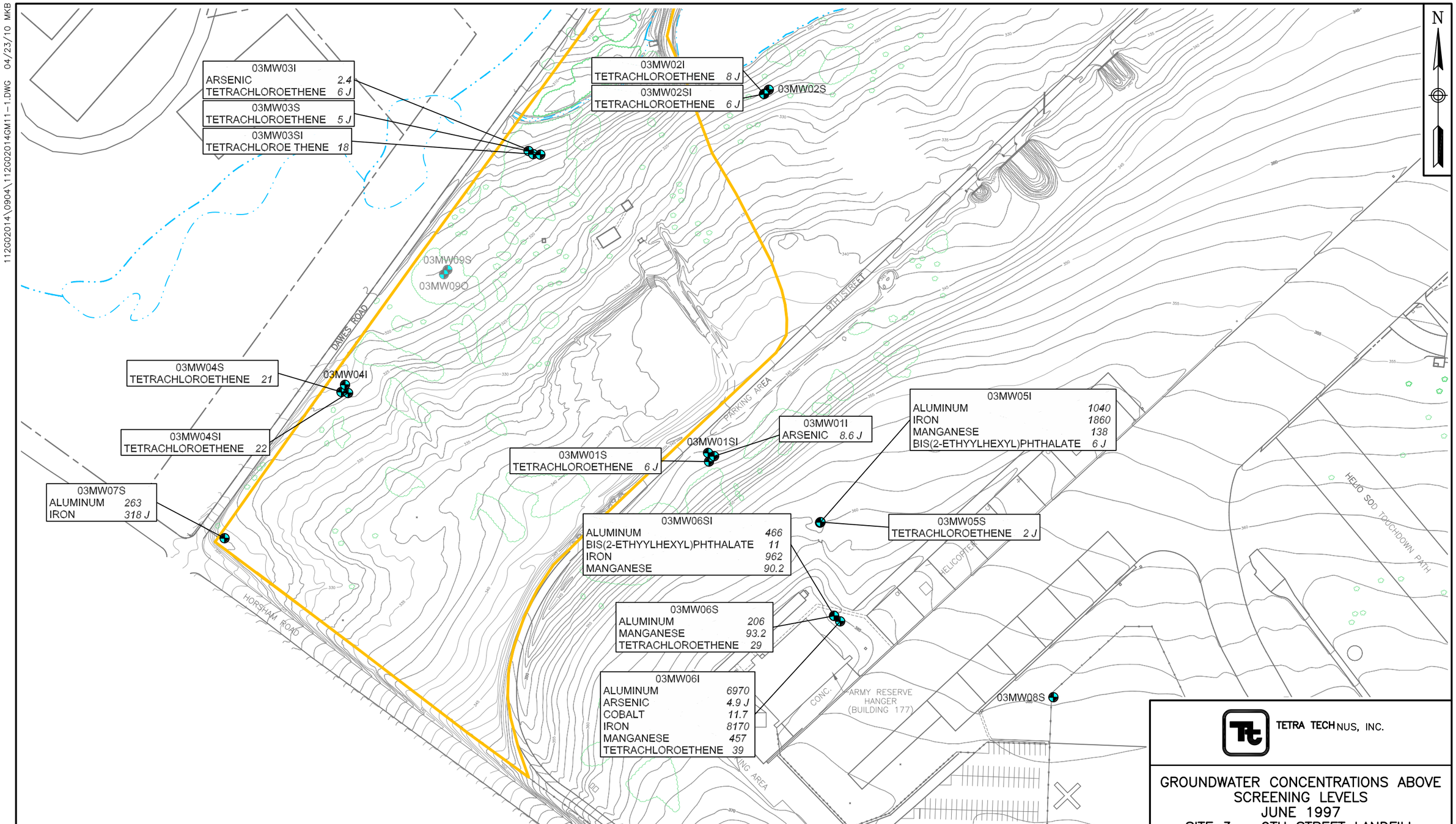
TETRA TECH NUS, INC.

SURFACE WATER AND SEDIMENT SAMPLE RESULTS ABOVE SCREENING CRITERIA SITE 3 – 9TH STREET LANDFILL NAS JRB WILLOW GROVE WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM17	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4–3	0	04/23/10

112G02014\0904\112G02014GM11-1.DWG 04/23/10 MKB



0 180 360

SCALE IN FEET

NOTE: ALL CONCENTRATIONS ARE IN ug/L.

LEGEND

MONITORING WELL LOCATION

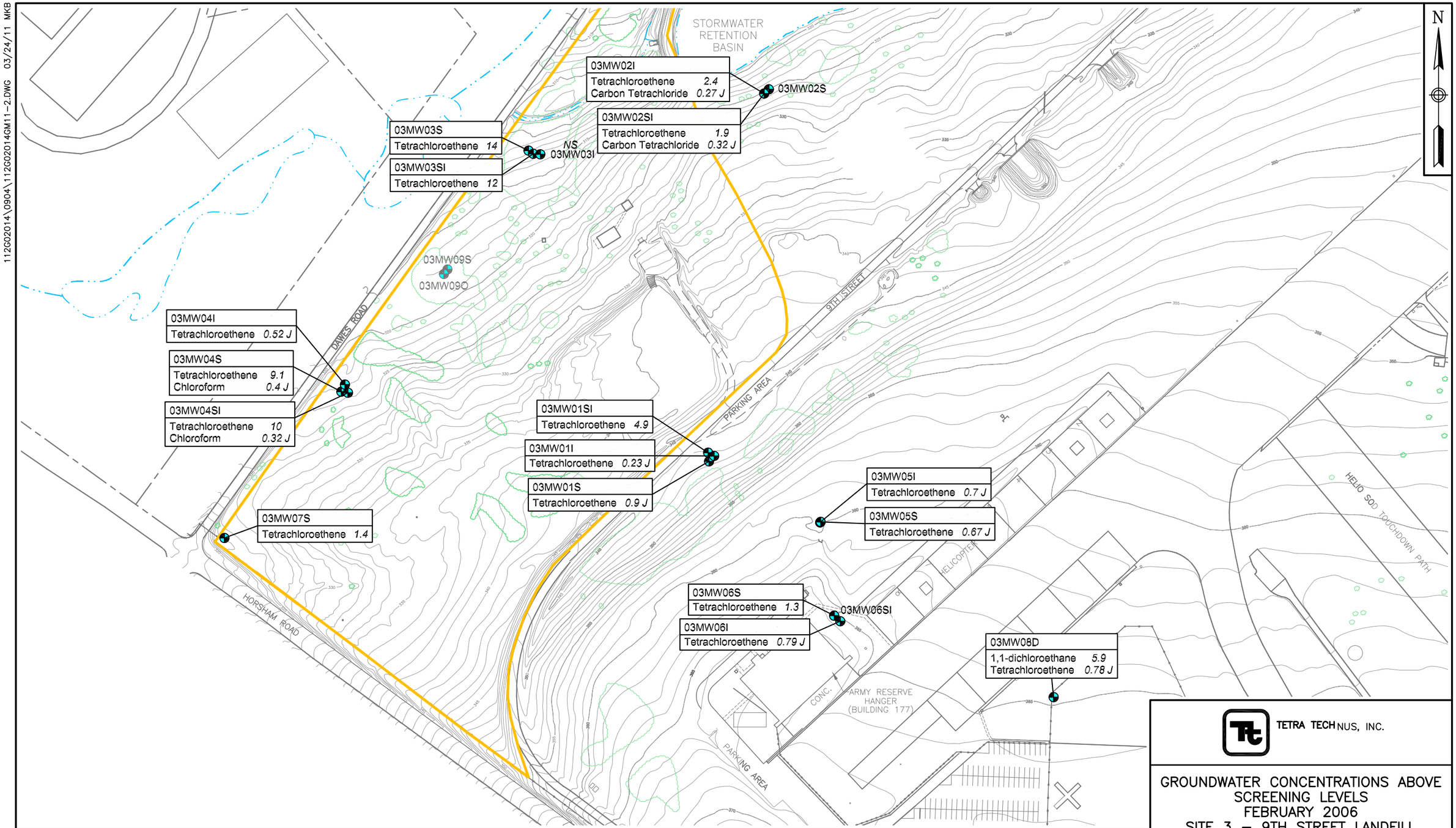
SITE BOUNDARY

TETRA TECH NUS, INC.

GROUNDWATER CONCENTRATIONS ABOVE SCREENING LEVELS
JUNE 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM11-1	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-4	0 / 04/23/10

112G02014\0904\112G02014GM11-2.DWG 03/24/11 MKB



0 180 360

SCALE IN FEET

NOTE: ALL CONCENTRATIONS ARE IN ug/L.

LEGEND

- MONITORING WELL LOCATION
- NS NOT SAMPLED
- SITE BOUNDARY

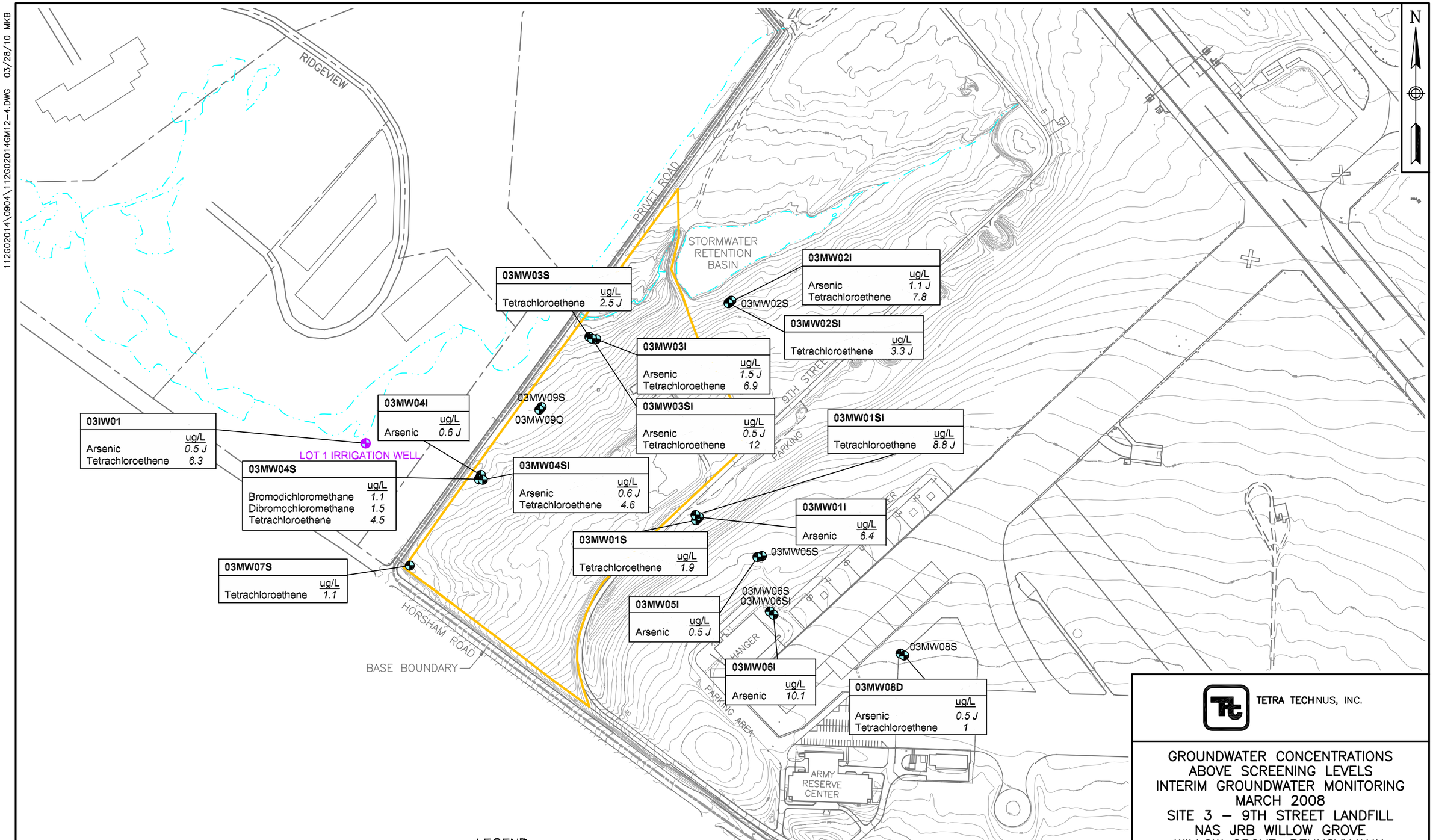
TETRA TECH NUS, INC.

GROUNDWATER CONCENTRATIONS ABOVE SCREENING LEVELS
FEBRUARY 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM11-2	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4-5	0	03/24/11

112G02014\0904\112G02014GM12-4.DWG 03/28/10 MKB

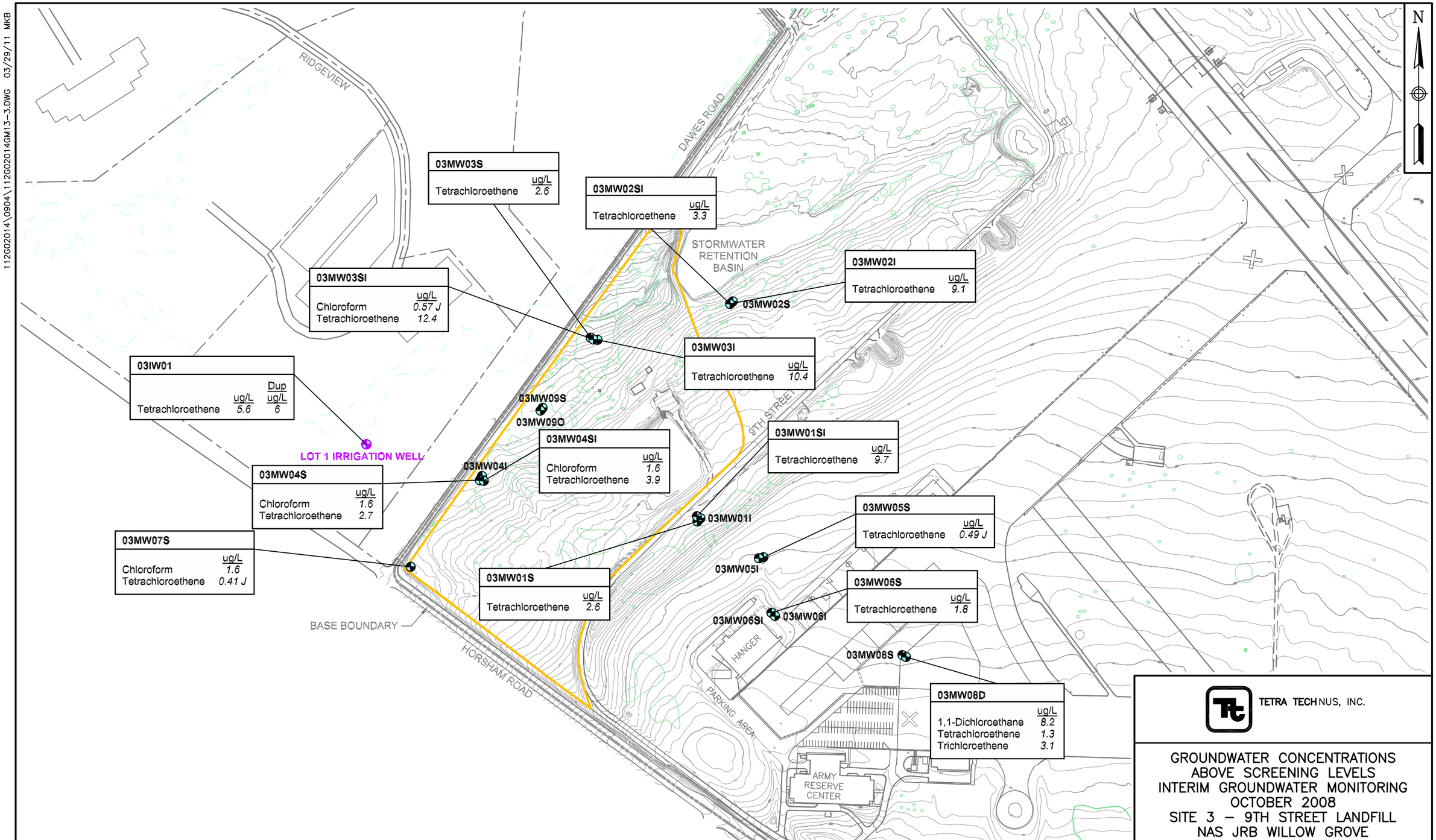


TETRA TECH NUS, INC.

GROUNDWATER CONCENTRATIONS
ABOVE SCREENING LEVELS
INTERIM GROUNDWATER MONITORING
MARCH 2008
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM12-4	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-6	0 / 03/28/10

112G02014\0904\112G02014GM13-3.DWG 03/29/11 MKB

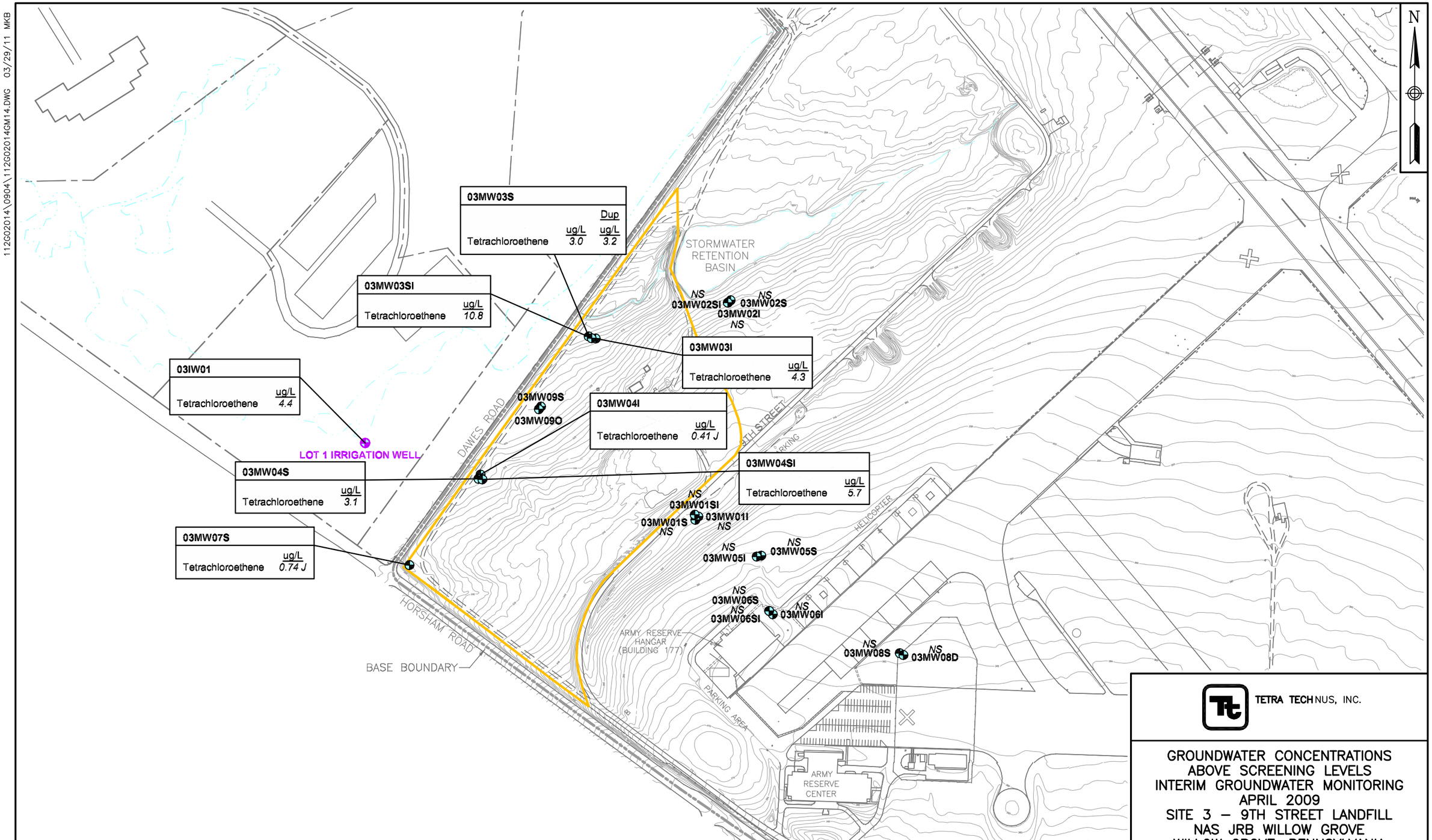


TETRA TECH NUS, INC.

GROUNDWATER CONCENTRATIONS
ABOVE SCREENING LEVELS
INTERIM GROUNDWATER MONITORING
OCTOBER 2008
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM13-3	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-7	0 / 03/29/11

112G02014\0904\112G02014GM14.DWG 03/29/11 MKB



0 300 600
SCALE IN FEET

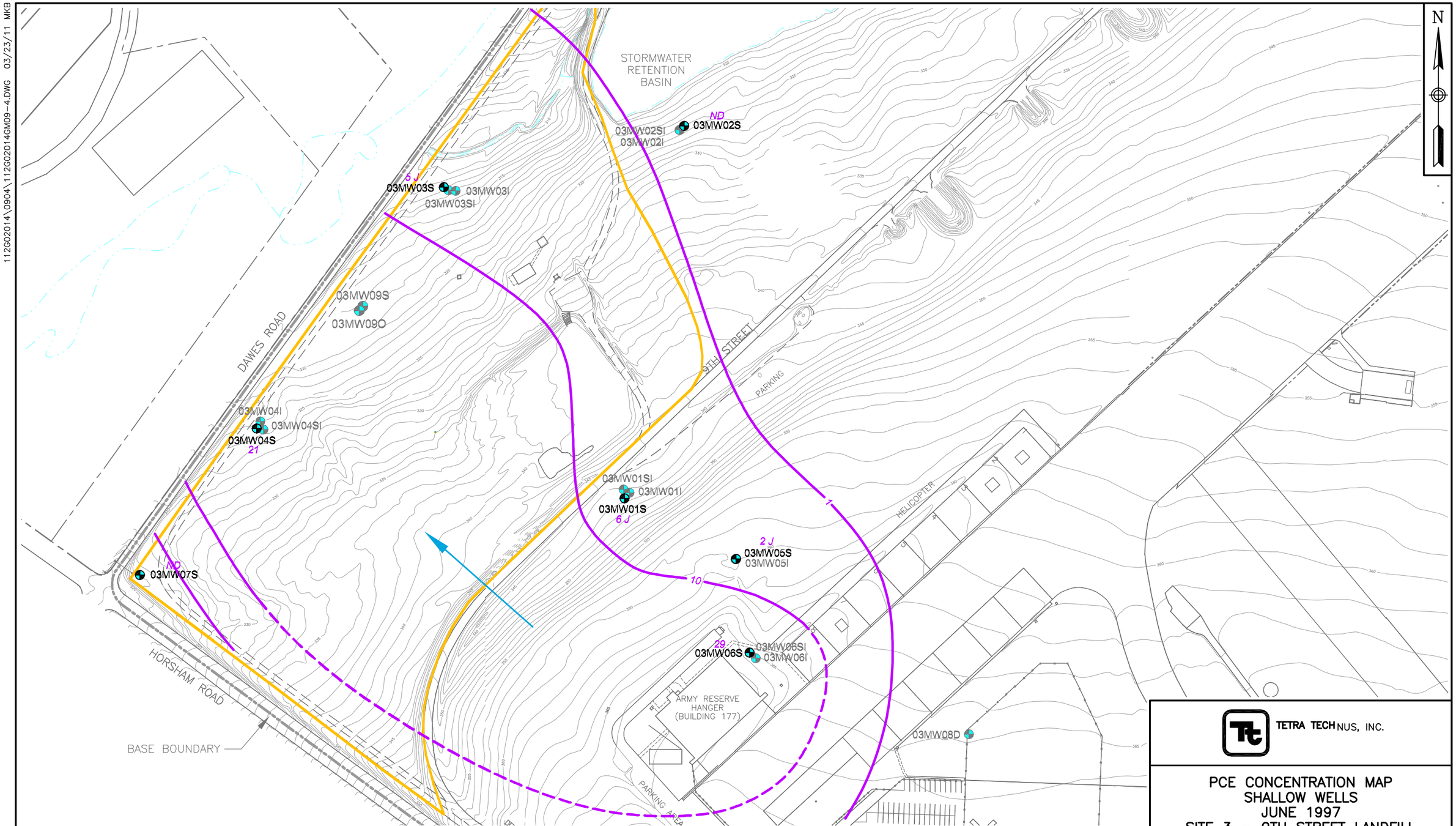
LEGEND
- ON-SITE MONITORING WELL LOCATION
- OFF BASE WELL LOCATION
- NS NOT SAMPLED
- SITE BOUNDARY

TETRA TECH NUS, INC.

GROUNDWATER CONCENTRATIONS
ABOVE SCREENING LEVELS
INTERIM GROUNDWATER MONITORING
APRIL 2009
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM14	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4–8	0 / 03/29/11

112G02014\0904\112G02014GM09-4.DWG 03/23/11 MKB



LEGEND

- MONITORING WELL LOCATION
- 10 SHALLOW PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

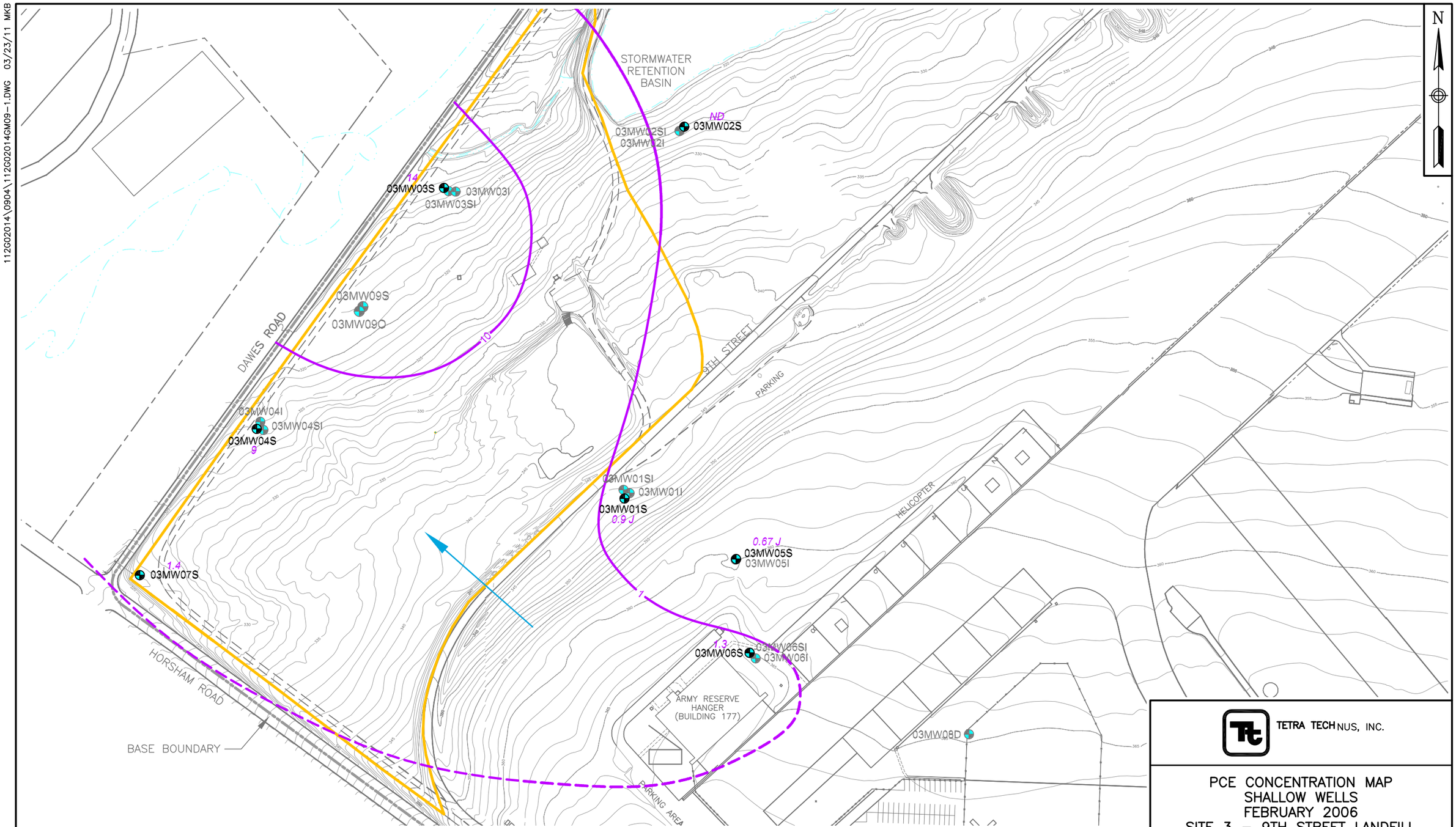
0 180 360
SCALE IN FEET

TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
SHALLOW WELLS
JUNE 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM09-4	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-9	0 / 03/23/11

112G02014\0904\112G02014GM09-1.DWG 03/23/11 MKB



LEGEND

- MONITORING WELL LOCATION
- 10 SHALLOW PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

0 180 360
SCALE IN FEET

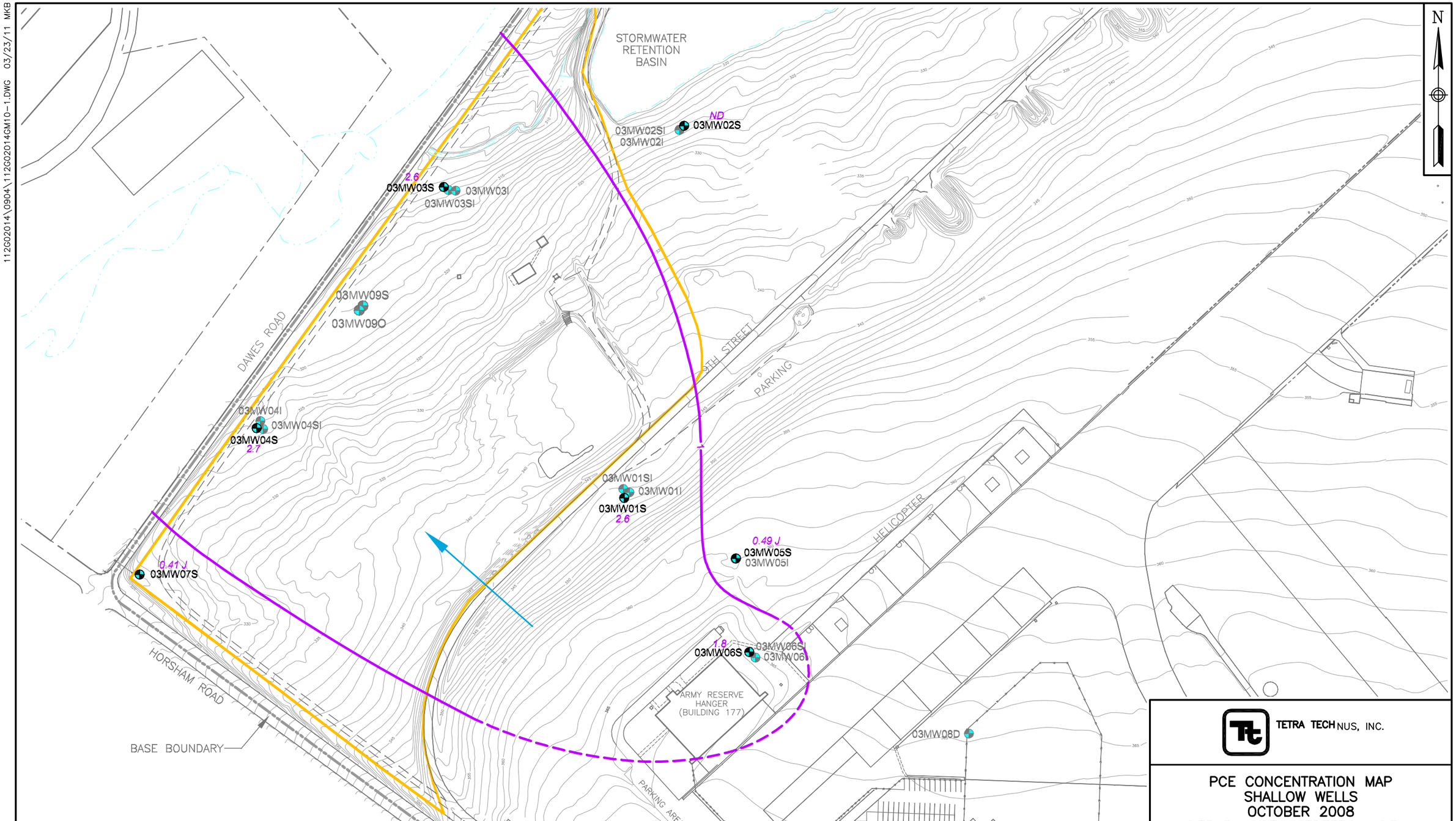
TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
SHALLOW WELLS
FEBRUARY 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM09-1	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4-10	0	03/23/11

112G02014\0904\112G02014GM10-1.DWG 03/23/11 MKB



0 180 360

SCALE IN FEET

LEGEND

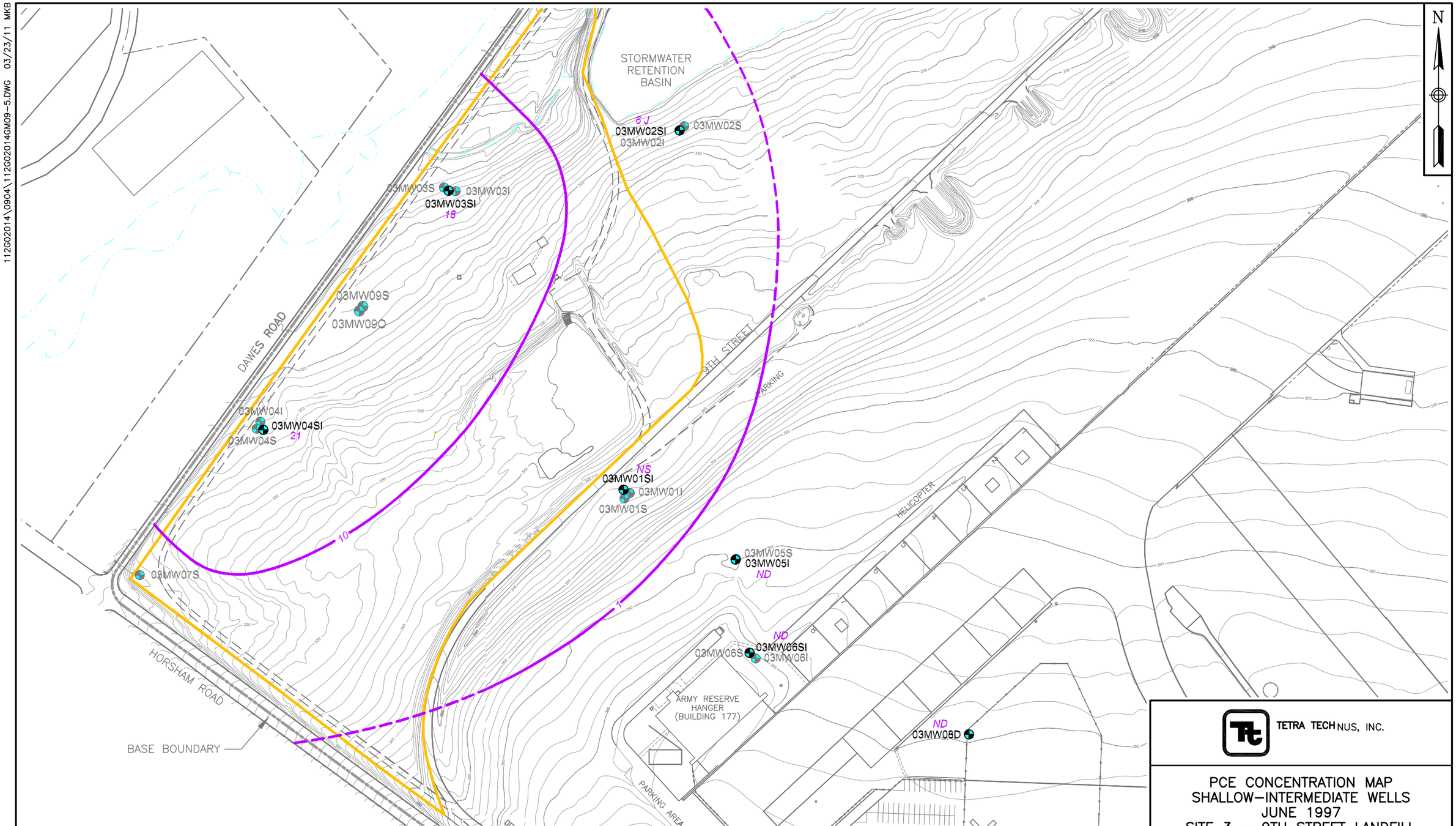
- MONITORING WELL LOCATION
- 10 SHALLOW PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
SHALLOW WELLS
OCTOBER 2008
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM10-1	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-11	0 / 03/23/11

112G02014\0904\112G02014GM09-5.DWG 03/23/11 MKB



0 180 360

SCALE IN FEET

LEGEND

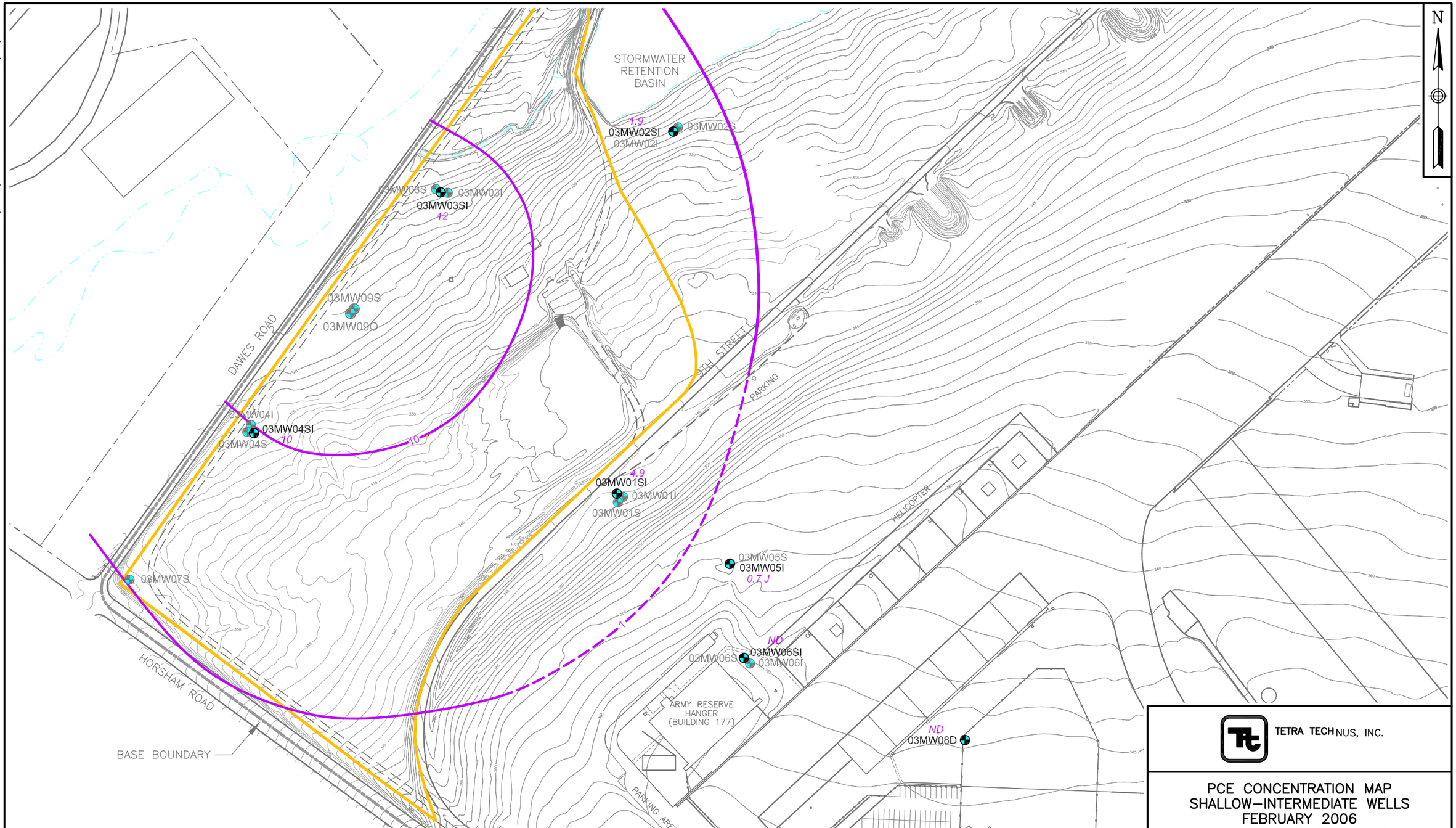
- MONITORING WELL LOCATION
- 10 — SHALLOW-INTERMEDIATE PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- NS NOT SAMPLED
- SITE BOUNDARY

TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
SHALLOW–INTERMEDIATE WELLS
JUNE 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM09–5	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4–12	0 / 03/23/11

112G02014\0904\112G02014GM09-2.DWG 03/23/11 MKB



TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
SHALLOW–INTERMEDIATE WELLS
FEBRUARY 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

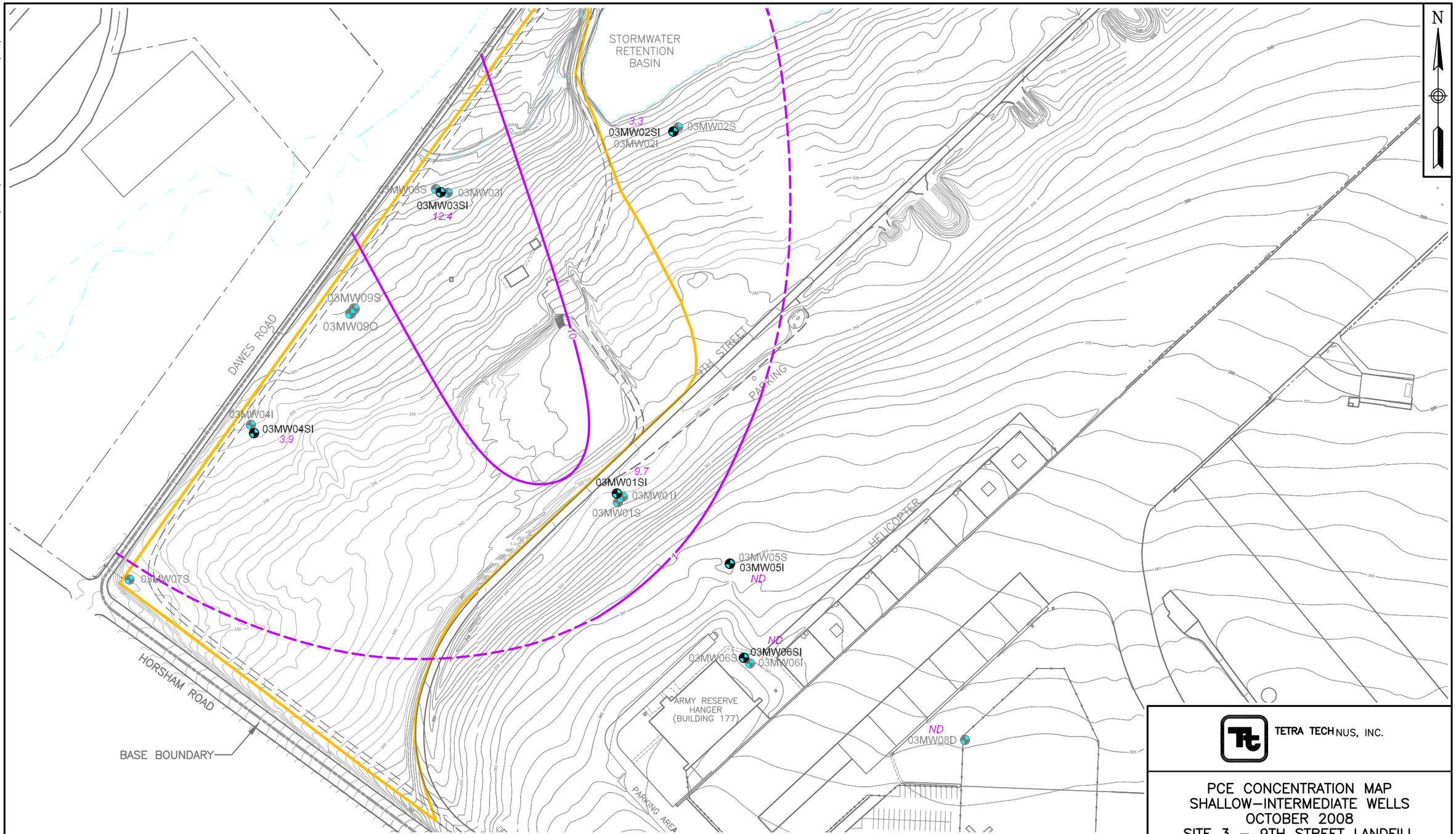
FILE	SCALE
112G02014GM09–2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4–13	0 / 03/23/11

LEGEND

- MONITORING WELL LOCATION
- 10 — SHALLOW-INTERMEDIATE PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- SITE BOUNDARY

0 180 360
SCALE IN FEET

112G02014\0904\112G02014GM10-2.DWG 03/23/11 MKB



TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
SHALLOW–INTERMEDIATE WELLS
OCTOBER 2008
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

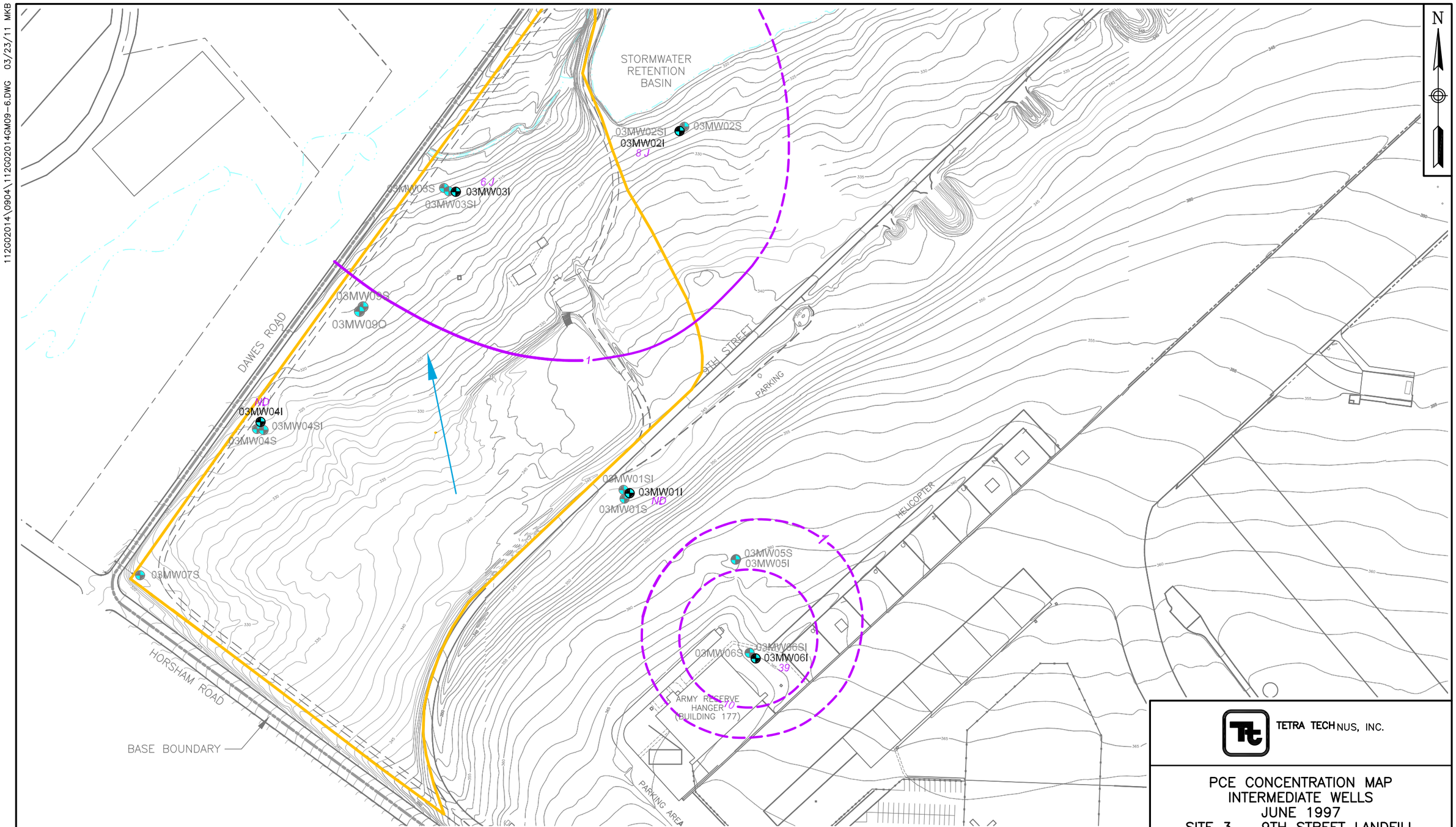
FILE	SCALE
112G02014GM10–2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4–14	0 / 03/23/11

0 180 360
SCALE IN FEET

LEGEND

- MONITORING WELL LOCATION
- 10 — SHALLOW-INTERMEDIATE PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- SITE BOUNDARY

112G02014\0904\112G02014GM09-6.DWG 03/23/11 MKB



LEGEND

- MONITORING WELL LOCATION
- 10 — INTERMEDIATE PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

0 180 360

SCALE IN FEET

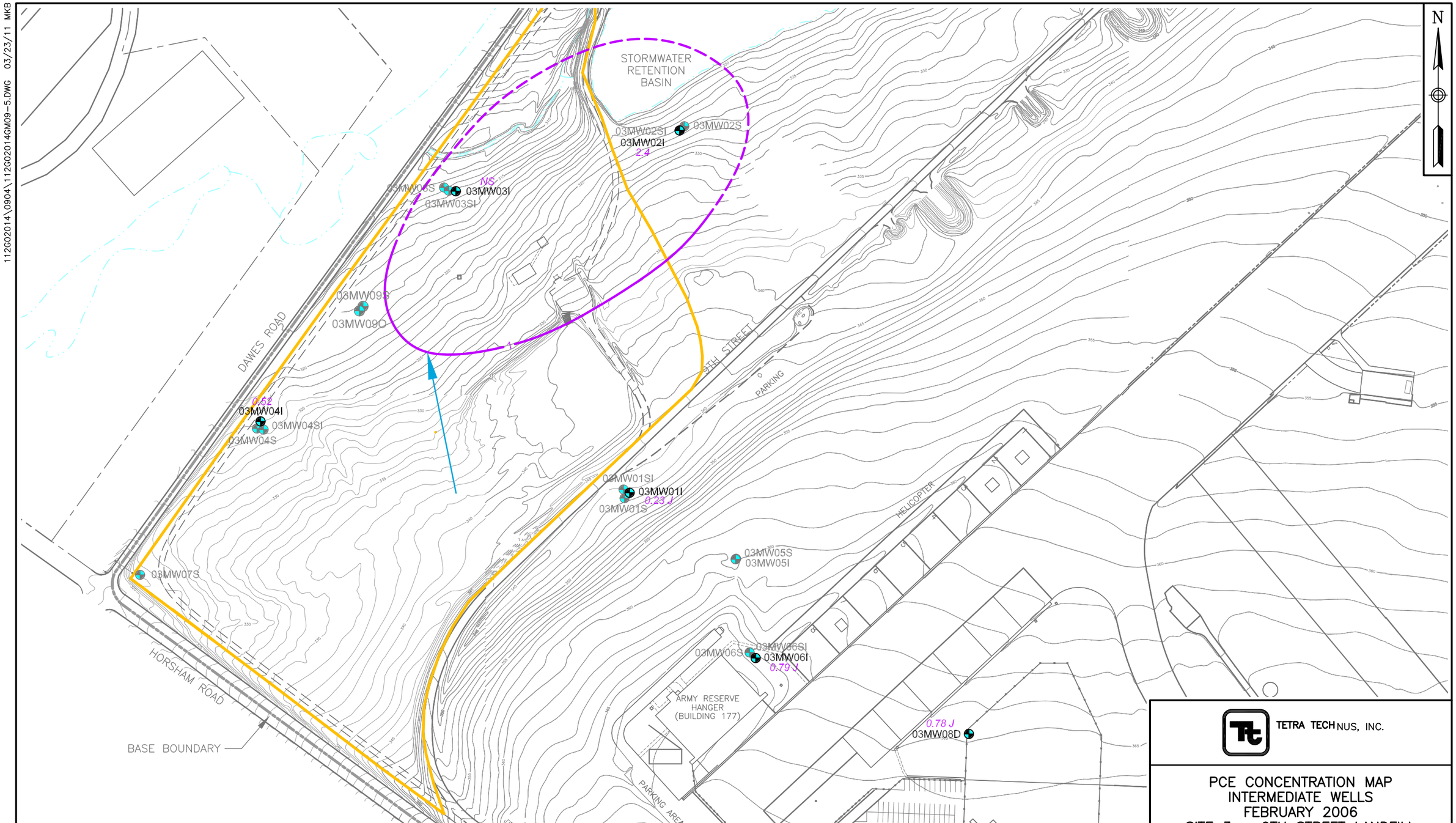
TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
INTERMEDIATE WELLS
JUNE 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM09-6	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4-15	0	03/23/11

112G02014\0904\112G02014GM09-5.DWG 03/23/11 MKB



0 180 360

SCALE IN FEET

LEGEND

- MONITORING WELL LOCATION
- 10 — INTERMEDIATE PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- NS NOT SAMPLED
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

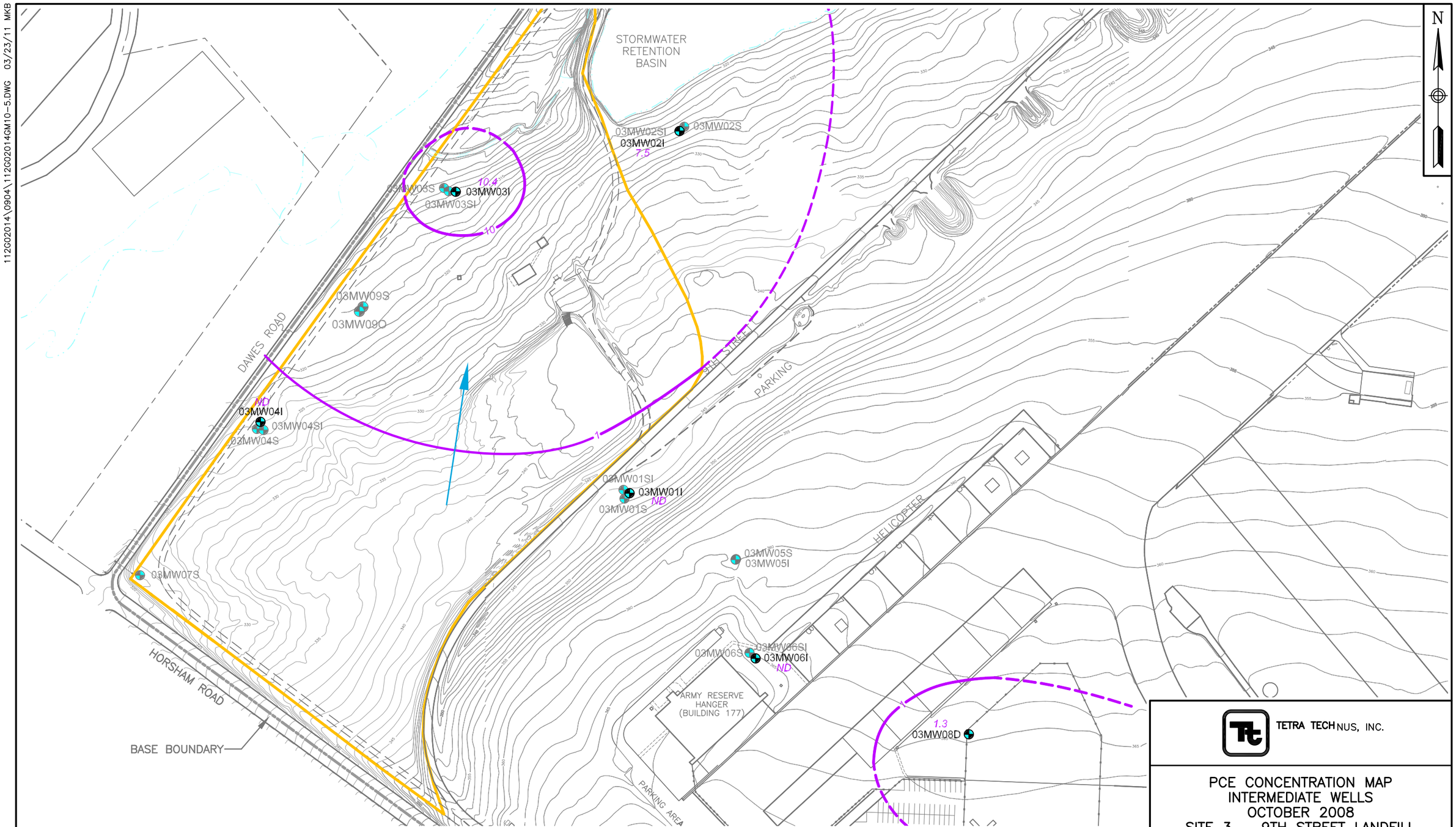
TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
INTERMEDIATE WELLS
FEBRUARY 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM09-3	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4-16	0	03/23/11

112G02014\0904\112G02014GM10-5.DWG 03/23/11 MKB



LEGEND

- MONITORING WELL LOCATION
- 10 — INTERMEDIATE PCE ISOCONTOUR (DASHED WHERE INFERRED)
- 4.9 PCE RESULT (µg/L)
- J APPROXIMATE
- ND NON-DETECT
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

0 180 360

SCALE IN FEET

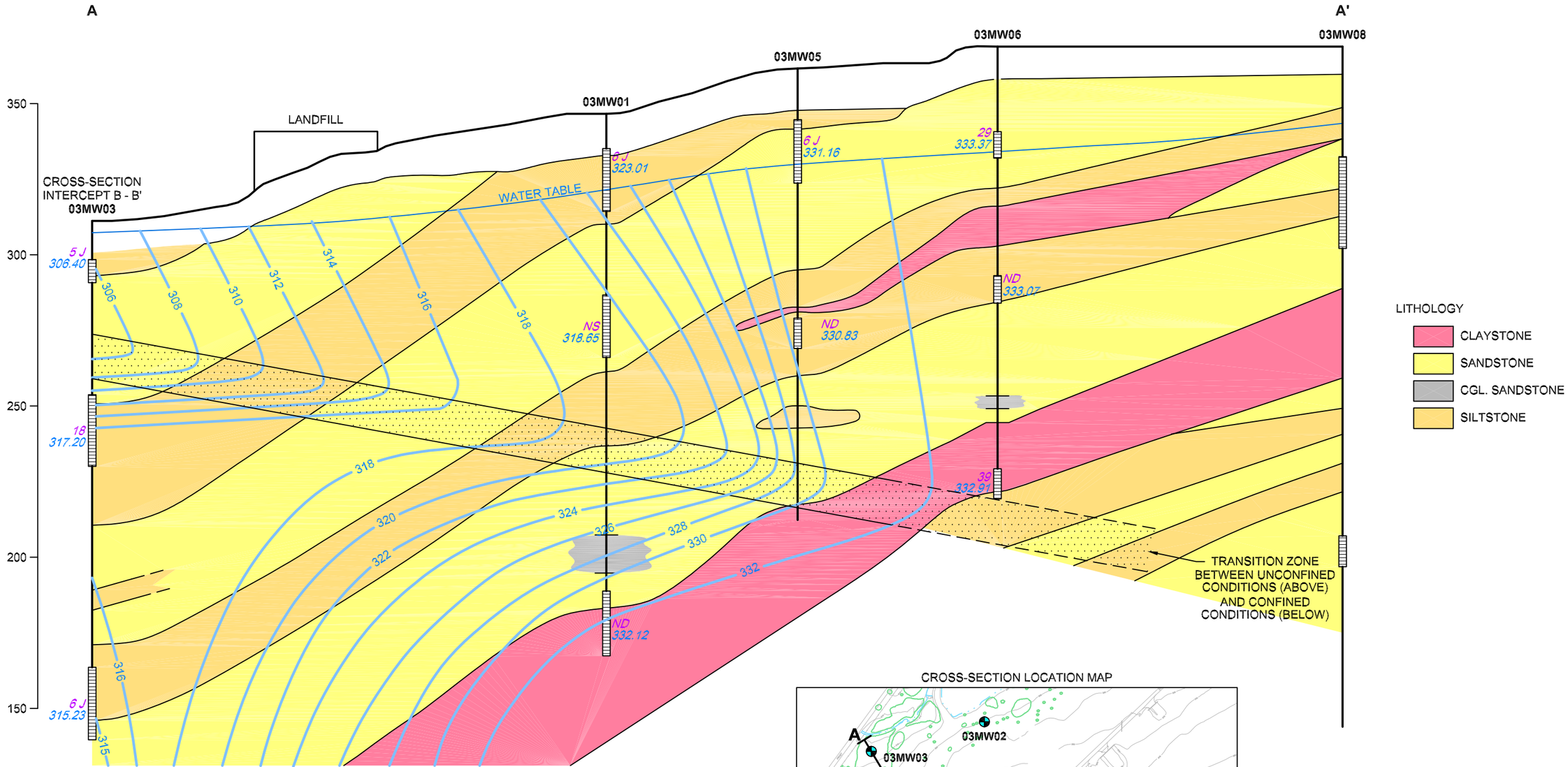
TETRA TECH NUS, INC.

PCE CONCENTRATION MAP
INTERMEDIATE WELLS
OCTOBER 2008
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

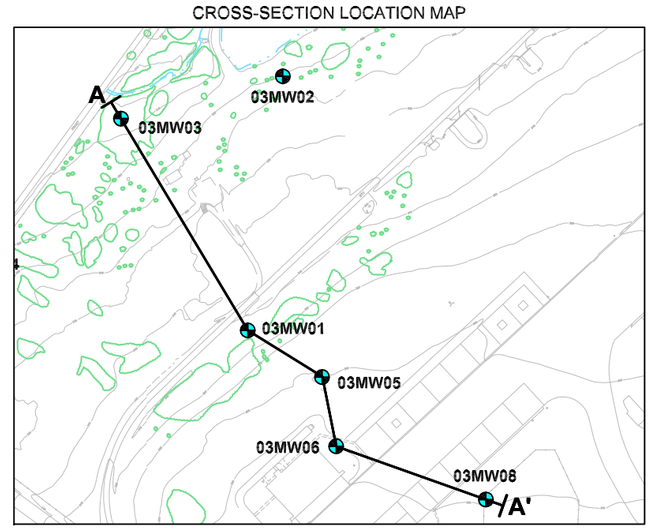
FILE	SCALE
112G02014GM10-3	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4-17	0	03/23/11

112G02014\0904\112G02014GS01-3.DWG 04/15/10 MKB



CROSS-SECTION LOCATION MAP



LEGEND

4.9	PCE RESULT (µg/L)
NS	NOT SAMPLED
ND	NON-DETECT
10	GROUNDWATER CONTOUR
310.88	HYDRAULIC HEAD (FT MSL)

0 140 280

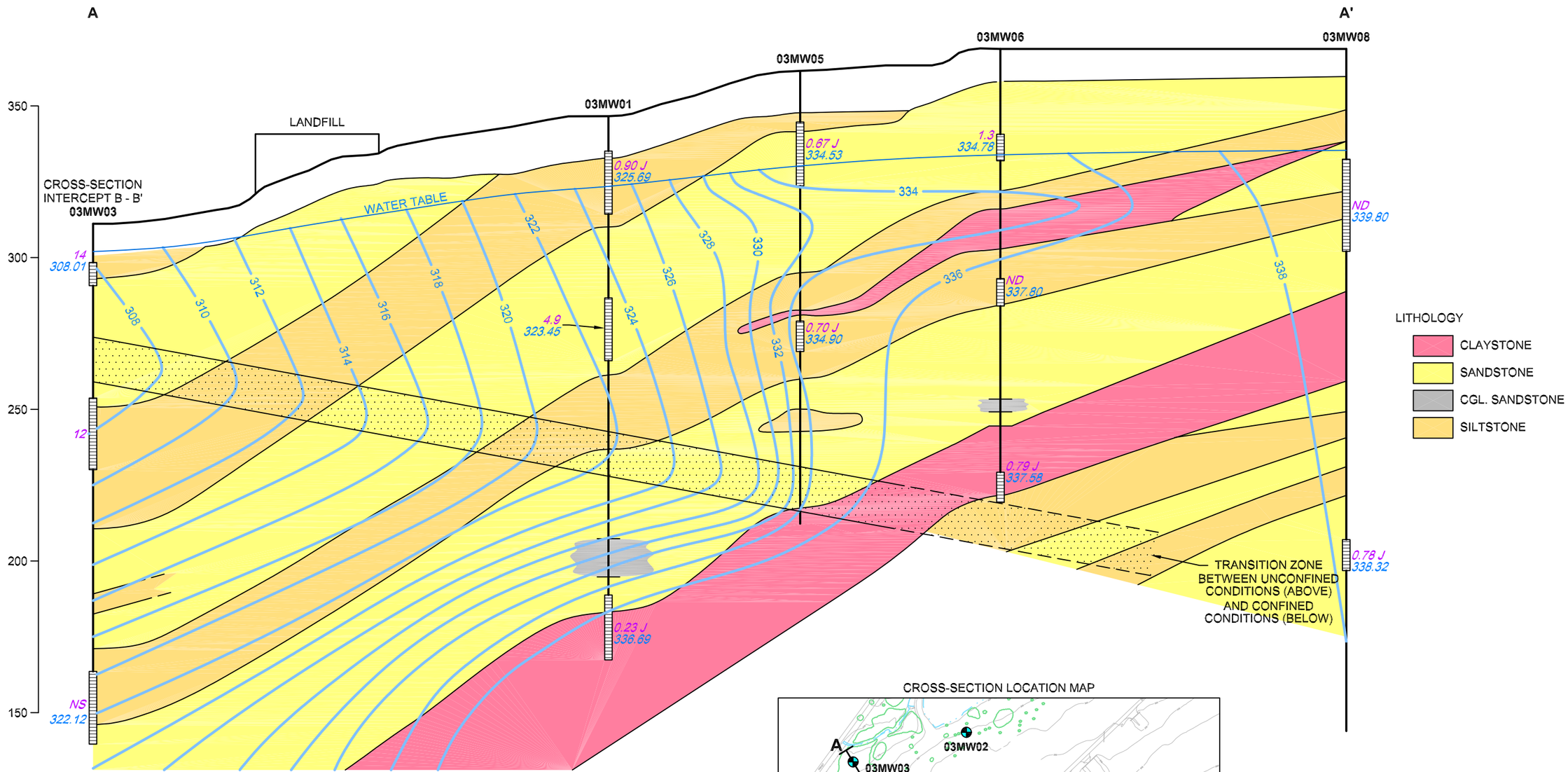
HORIZONTAL SCALE IN FEET

TETRA TECH NUS, INC.

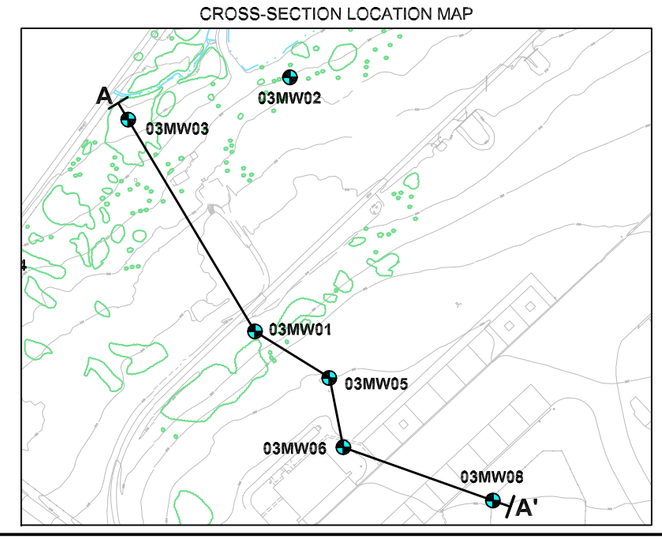
HYDROGEOLOGIC CROSS-SECTION A – A'
SHOWING PCE CONCENTRATIONS
JUNE 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS01-3	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-18	0 / 04/15/10

112G02014\0904\112G02014GS01-1.DWG 04/15/10 MKB



CROSS-SECTION LOCATION MAP



LEGEND

4.9	PCE RESULT (µg/L)
NS	NOT SAMPLED
ND	NON-DETECT
10	GROUNDWATER CONTOUR
310.88	HYDRAULIC HEAD (FT MSL)

0 140 280

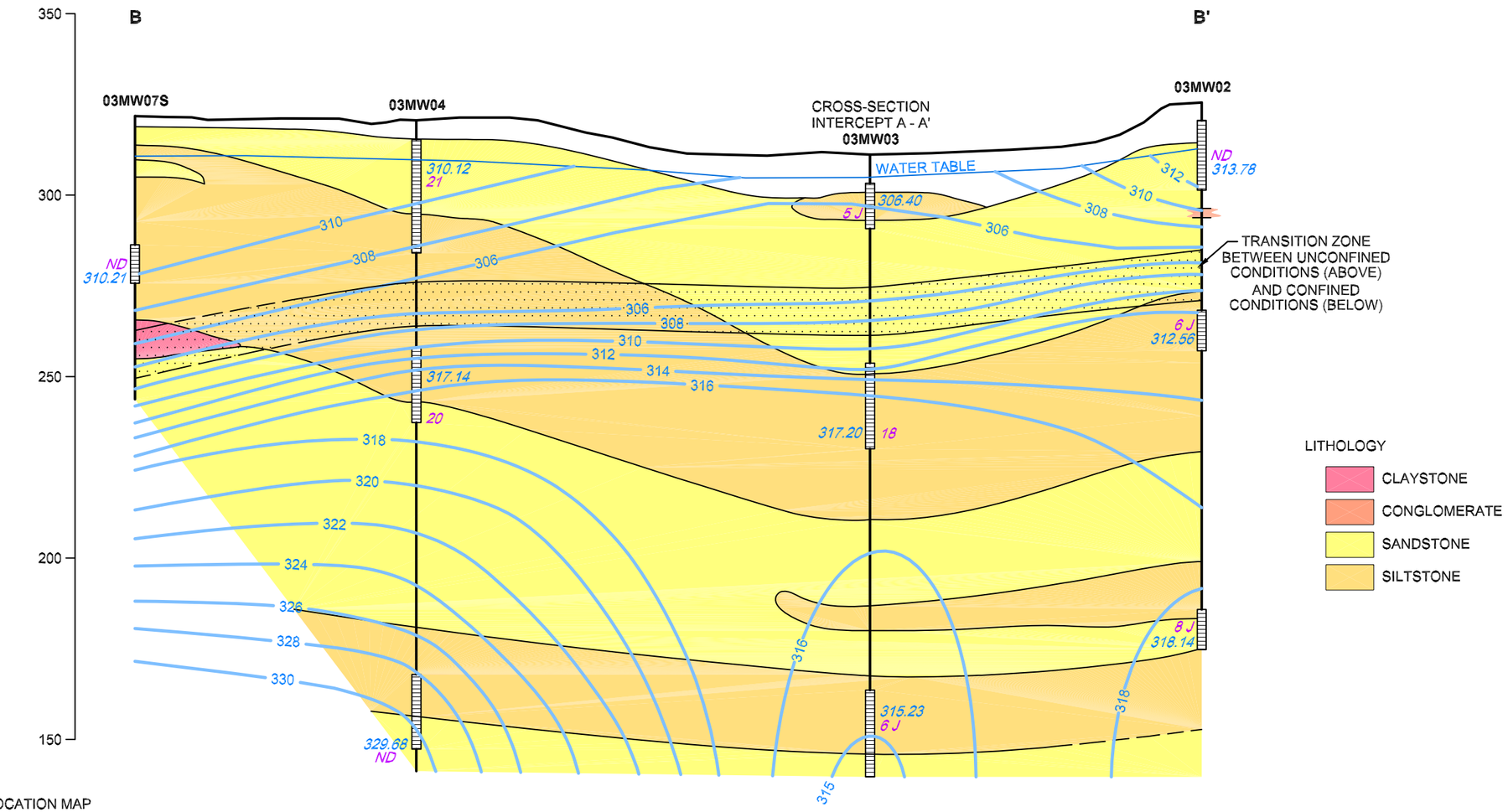
HORIZONTAL SCALE IN FEET

TETRA TECH NUS, INC.

HYDROGEOLOGIC CROSS–SECTION A – A'
SHOWING PCE CONCENTRATIONS
SEPTEMBER 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS01–1	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4–19	0 / 04/15/10

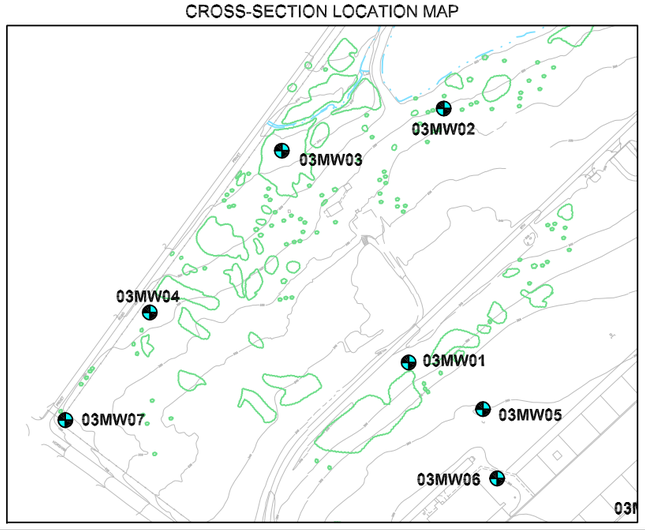
112G02014\0904\112G02014GS02-4.DWG 03/26/10 MKB



LITHOLOGY

- CLAYSTONE
- CONGLOMERATE
- SANDSTONE
- SILTSTONE

CROSS-SECTION LOCATION MAP



0 140 280

HORIZONTAL
SCALE IN FEET

LEGEND

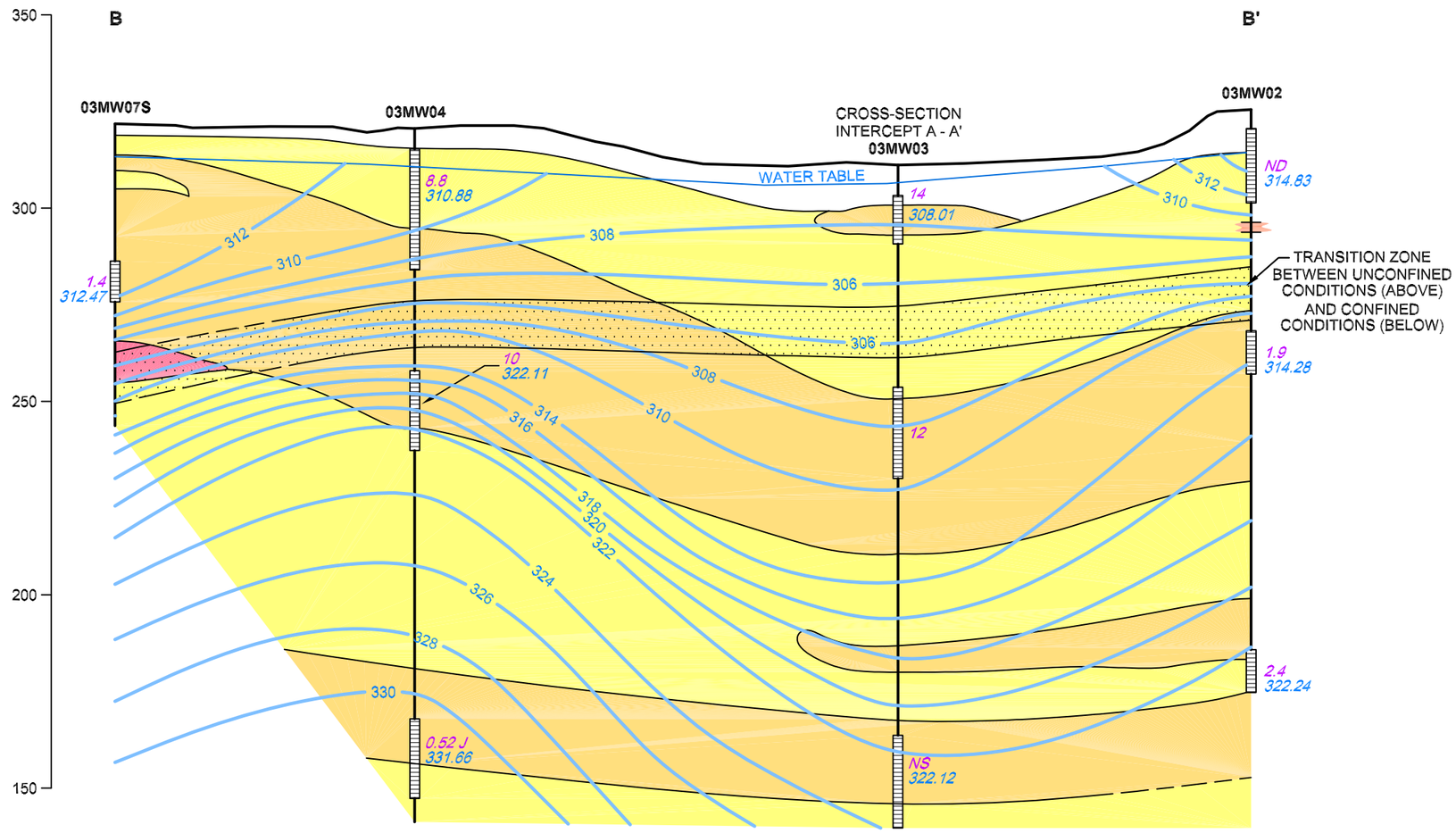
4.9	PCE RESULT
NS	NOT SAMPLED
10	GROUNDWATER CONTOUR
310.88	HYDRAULIC HEAD (FT MSL)

TETRA TECH NUS, INC.

HYDROGEOLOGIC CROSS-SECTION B – B'
SHOWING PCE CONCENTRATIONS
JUNE 1997
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS02-4.DWG	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4-20	0 / 05/07/10

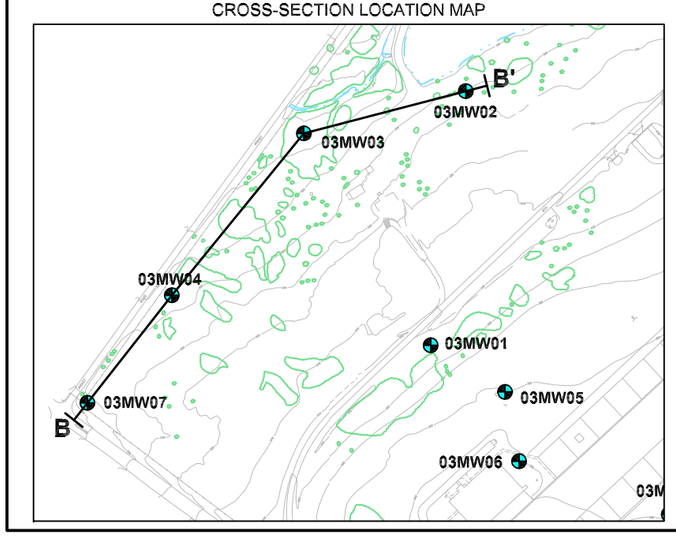
112G02014\0904\112G02014GS01-2.DWG 04/15/10 MKB



LITHOLOGY

- CLAYSTONE
- CONGLOMERATE
- SANDSTONE
- SILTSTONE

CROSS-SECTION LOCATION MAP



LEGEND

4.9	PCE RESULT (µg/L)
NS	NOT SAMPLED
ND	NON-DETECT
10	GROUNDWATER CONTOUR
310.88	HYDRAULIC HEAD (FT MSL)

0 140 280

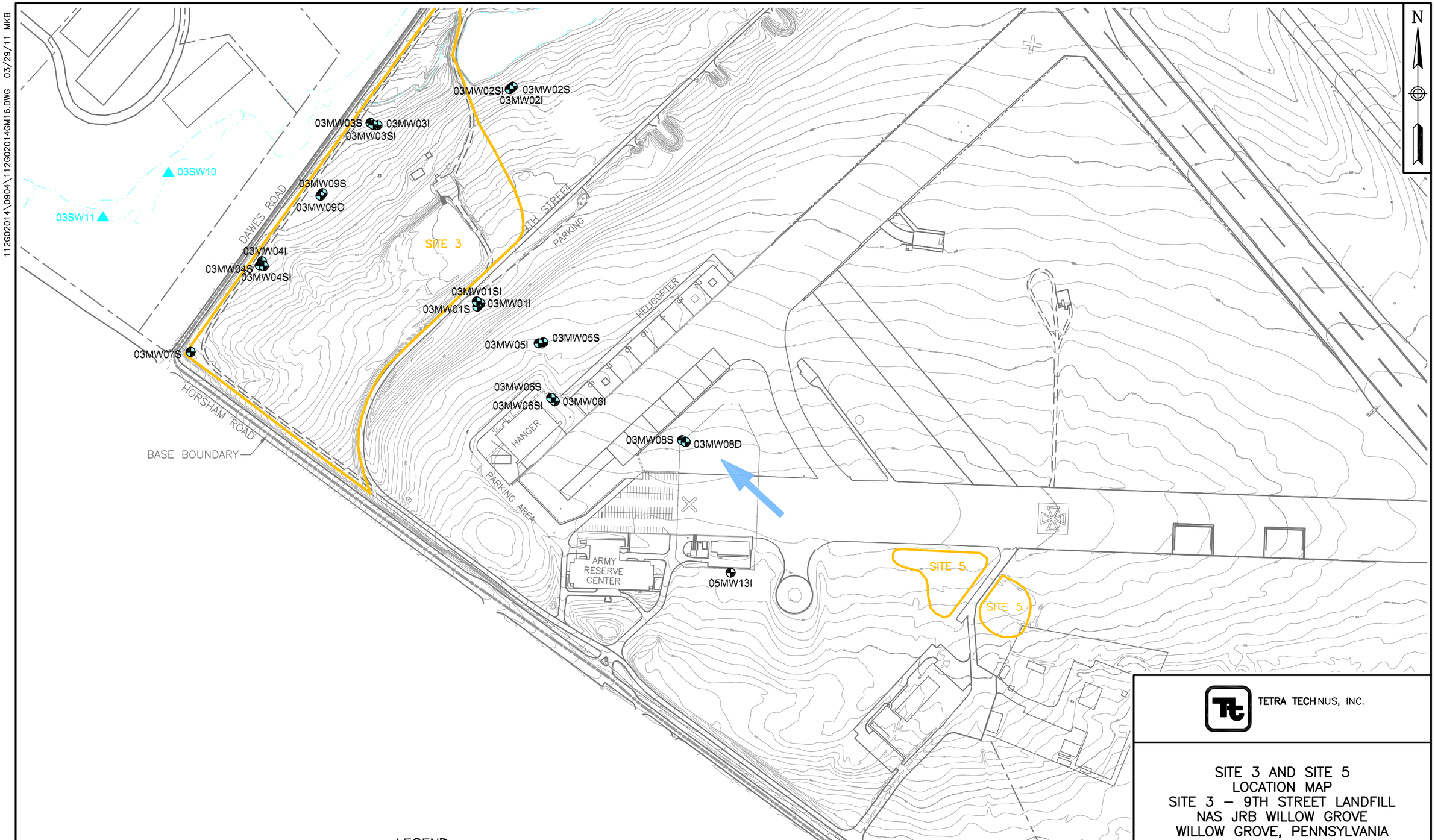
HORIZONTAL
SCALE IN FEET

TETRA TECH NUS, INC.

HYDROGEOLOGIC CROSS–SECTION B – B'
SHOWING PCE CONCENTRATIONS
SEPTEMBER 2006
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GS01–2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4–21	0 / 04/15/10

112G02014\0904\112G02014GM16.DWG 03/29/11 MKB



0 300 600

SCALE IN FEET

LEGEND

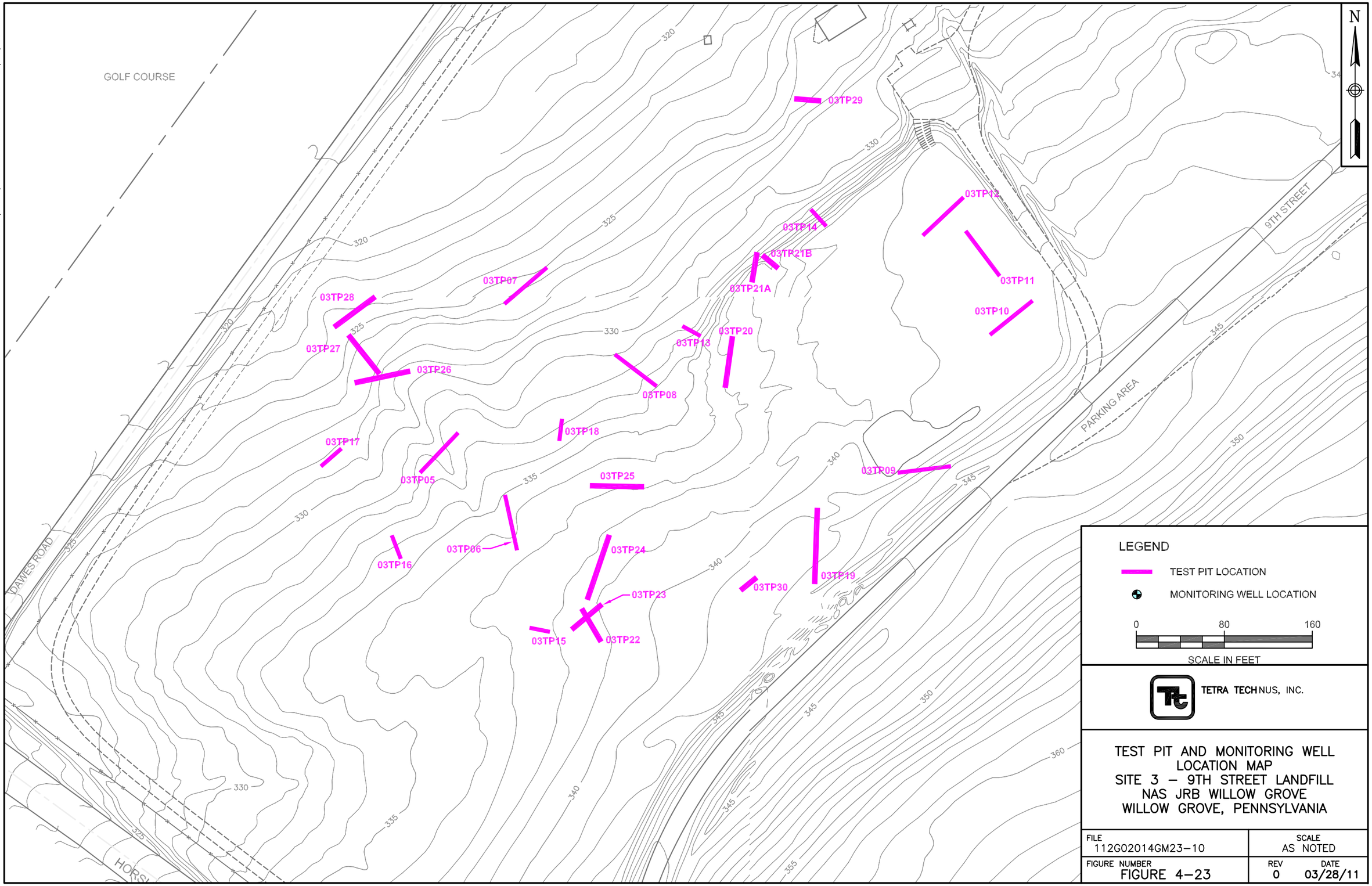
- ON-SITE MONITORING WELL LOCATION
- SURFACE WATER SAMPLE LOCATION
- *NS* NOT SAMPLED
- GROUNDWATER FLOW DIRECTION
- SITE BOUNDARY

TETRA TECH NUS, INC.

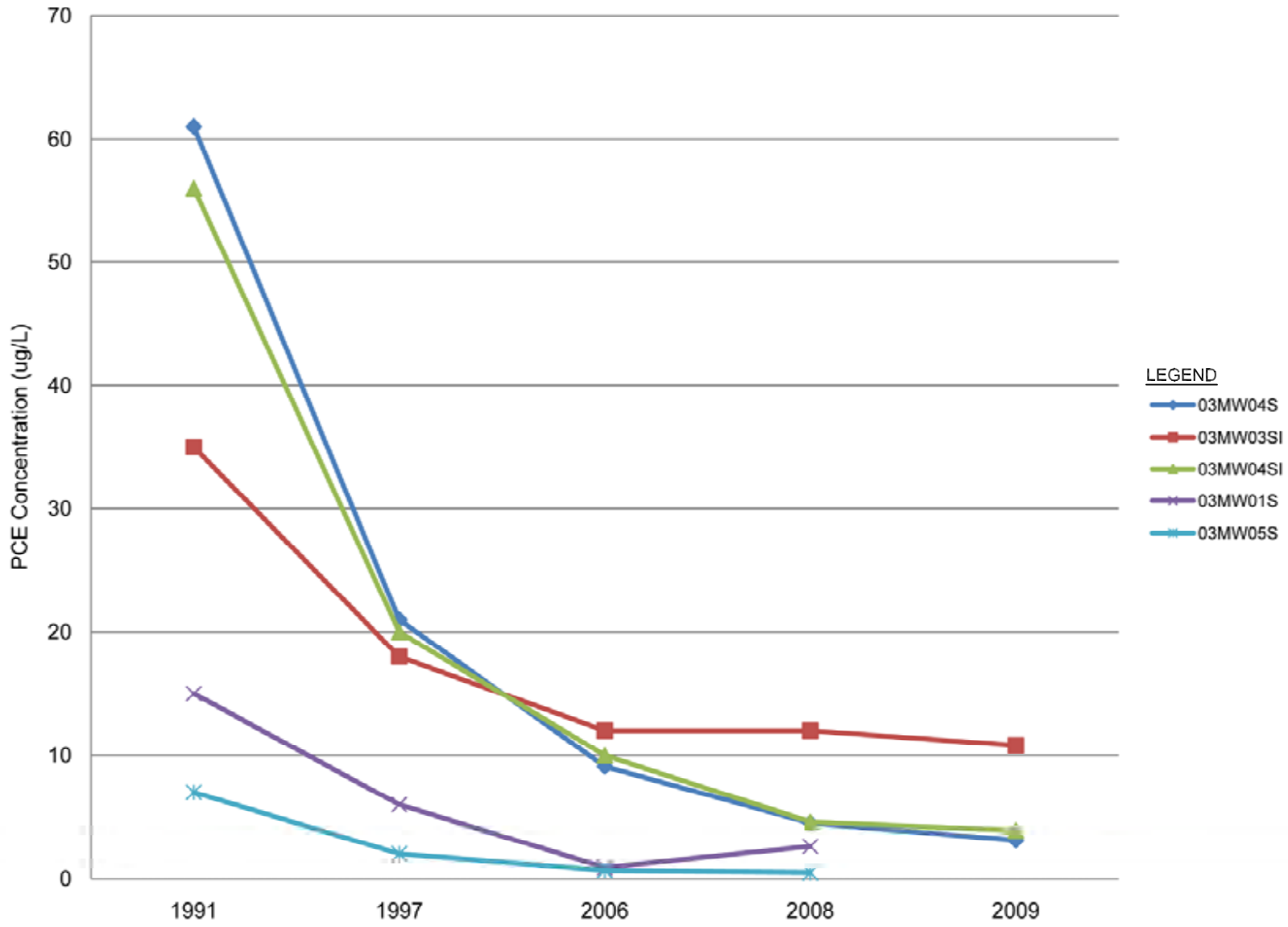
SITE 3 AND SITE 5
LOCATION MAP
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM16	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 4–22	0 / 03/29/11

112G02014\0904\112G02014GM23-10.DWG 03/28/11 MKB



112G02014\0904\112G02014AH01.DWG 05/07/10 MKB

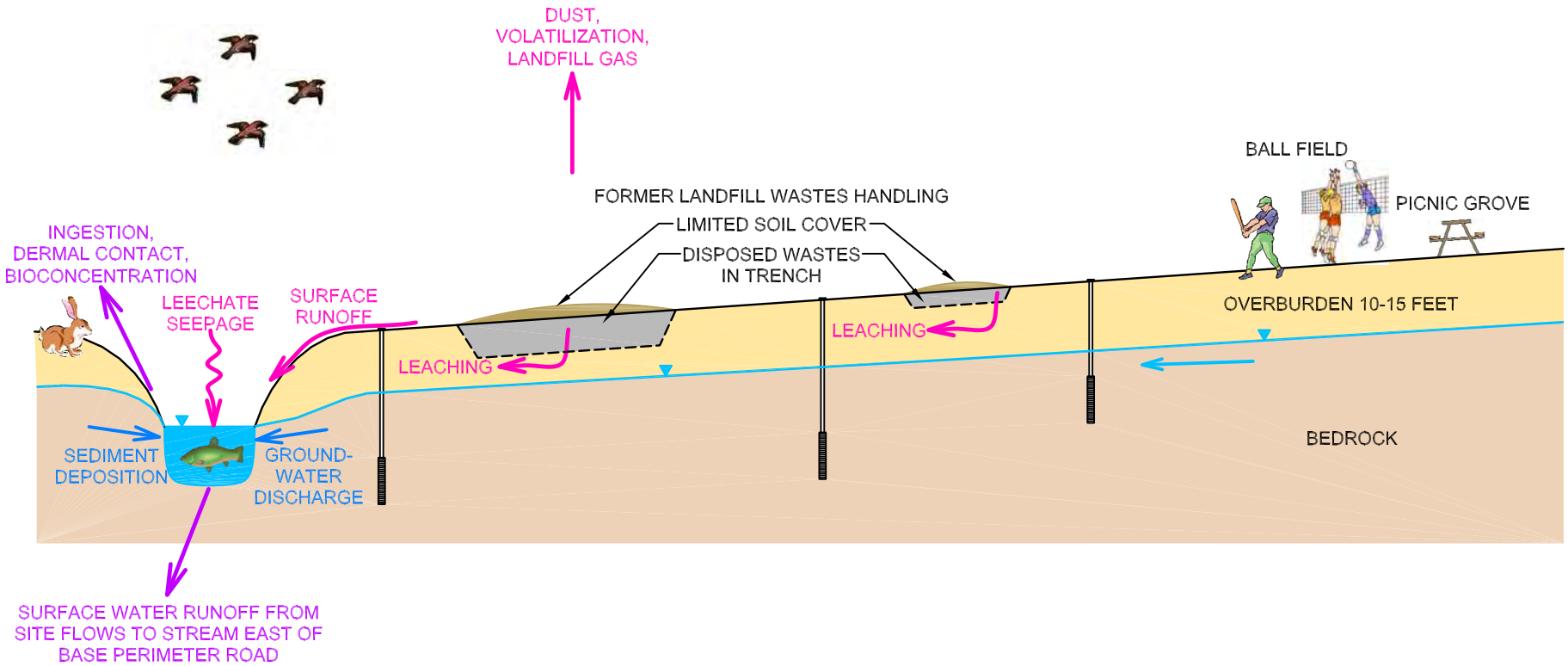


TETRA TECH NUS, INC.

PCE CONCENTRATION IN GROUNDWATER 1991 – 2009
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	AS NOTED
FILE	112G02014AH01
REV	0
DATE	05/07/10
FIGURE NUMBER	FIGURE 4–24

112G02014\0911\112G02014CM02.DWG 04/07/10 MKB



LEGEND

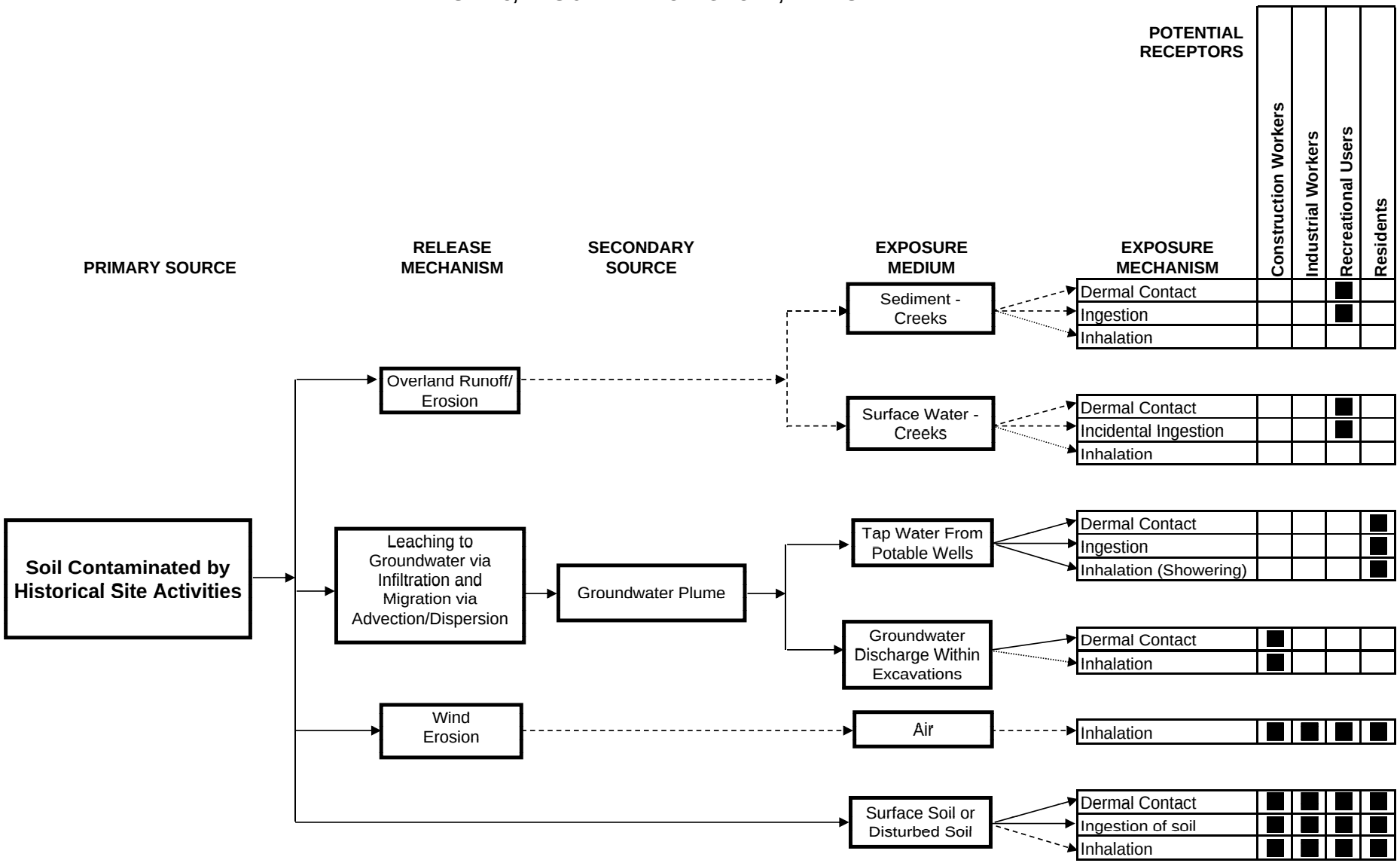
- GROUNDWATER LEVEL
- GROUNDWATER FLOW DIRECTION
- RELEASE MECHANISM
- EXPOSURE ROUTE

TETRA TECH NUS, INC.

CONCEPTUAL SITE MODEL
HUMAN HEALTH RISK ASSESMENT
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	AS NOTED
FILE	112G02014CM02
REV	0
DATE	04/07/10
FIGURE NUMBER	FIGURE 6–1

FIGURE 6-2
ECOLOGICAL CONCEPTUAL SITE MODEL - FLOW DIAGRAM
SITE 3, NAS JRB WILLOW GROVE, PENNSYLVANIA



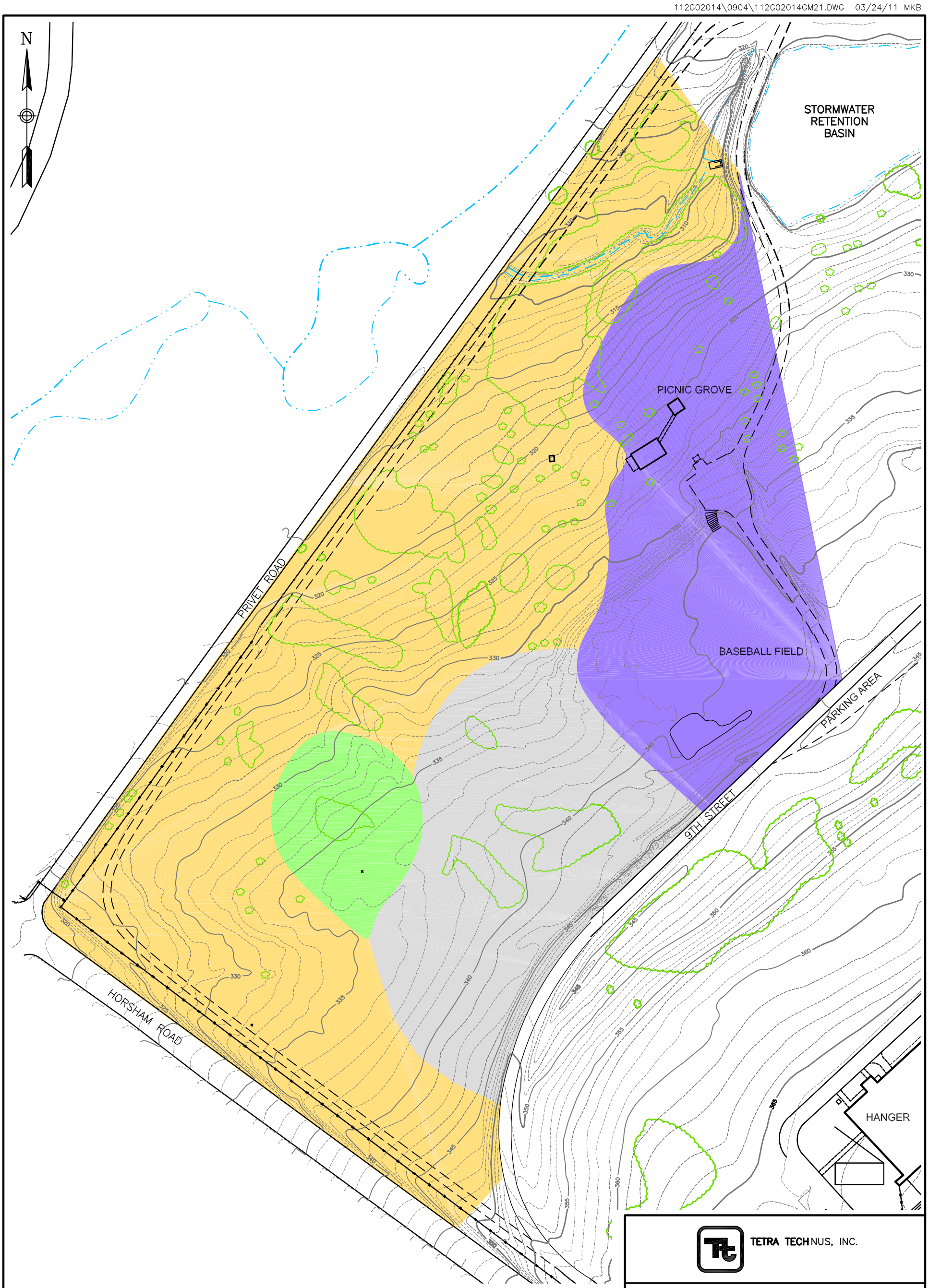
= ANTICIPATED SIGNIFICANT EXPOSURE PATHWAY BASED ON EXPECTED QUANTITATIVE RISK ANALYSIS

= ANTICIPATED LOW SIGNIFICANCE EXPOSURE PATHWAY BASED ON EXPECTED QUANTITATIVE DATA OR RISK ANALYSIS

= ANTICIPATED INSIGNIFICANT PATHWAY BASED ON EXPECTED LOW LEVELS IN EXPOSURE MEDIUM AND DISPERSION / ATTENUATION BEFORE REACHING EXPOSURE POINT

Blank space indicates incomplete exposure pathway or not applicable potential exposure.

112G02014\0904\112G02014GM21.DWG 03/24/11 MKB



LEGEND

- DECIDUOUS WOODED
- CONIFEROUS WOODED
- MOWED GRASS
- RECENTLY CLEARED, WEEDY

0 120 240

SCALE IN FEET

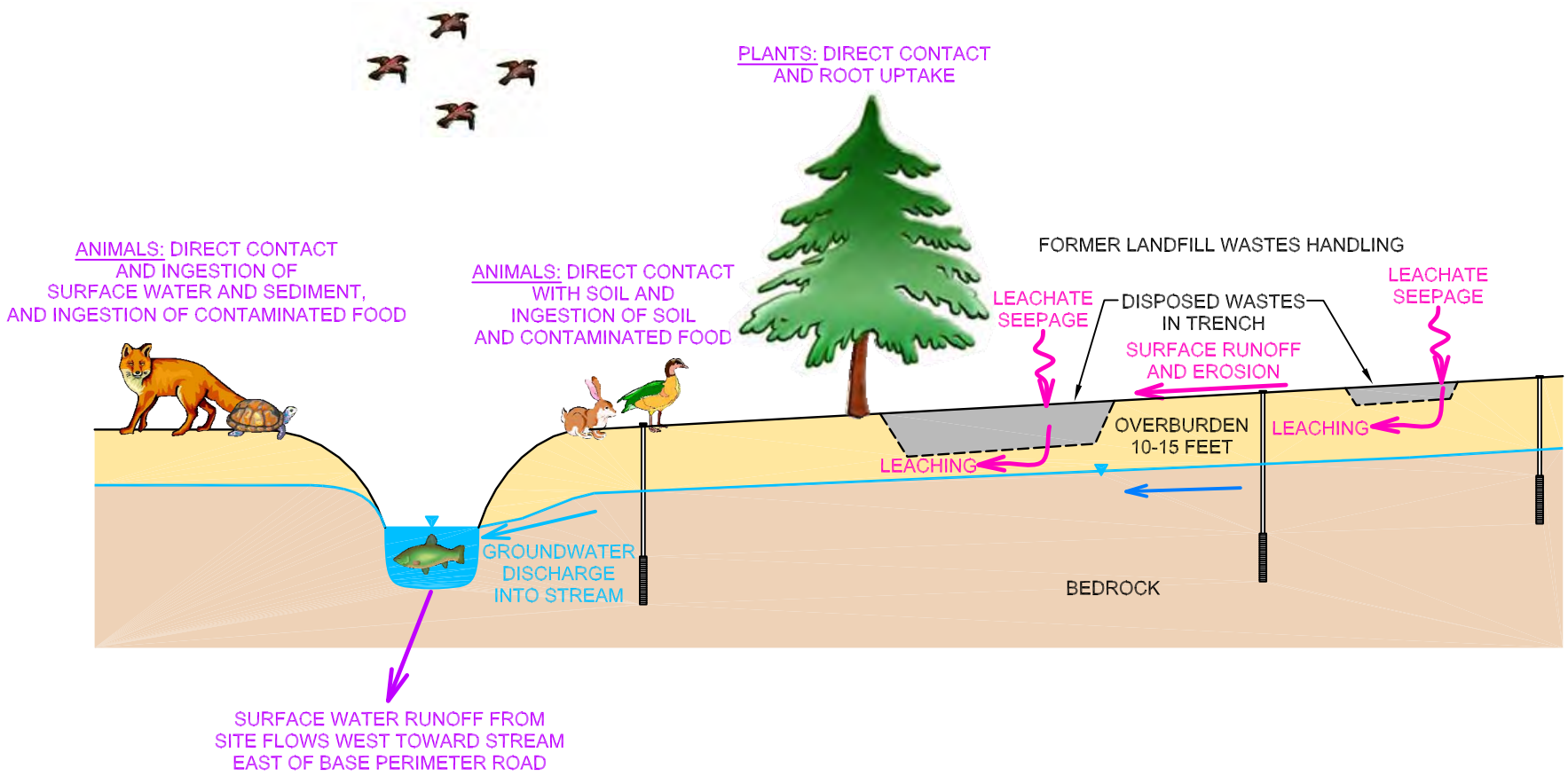
TETRA TECH NUS, INC.

HABITAT MAP
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM21	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 7–1	0	03/24/11

112G02014\0911\112G02014CM03.DWG 03/29/11 MKB



LEGEND

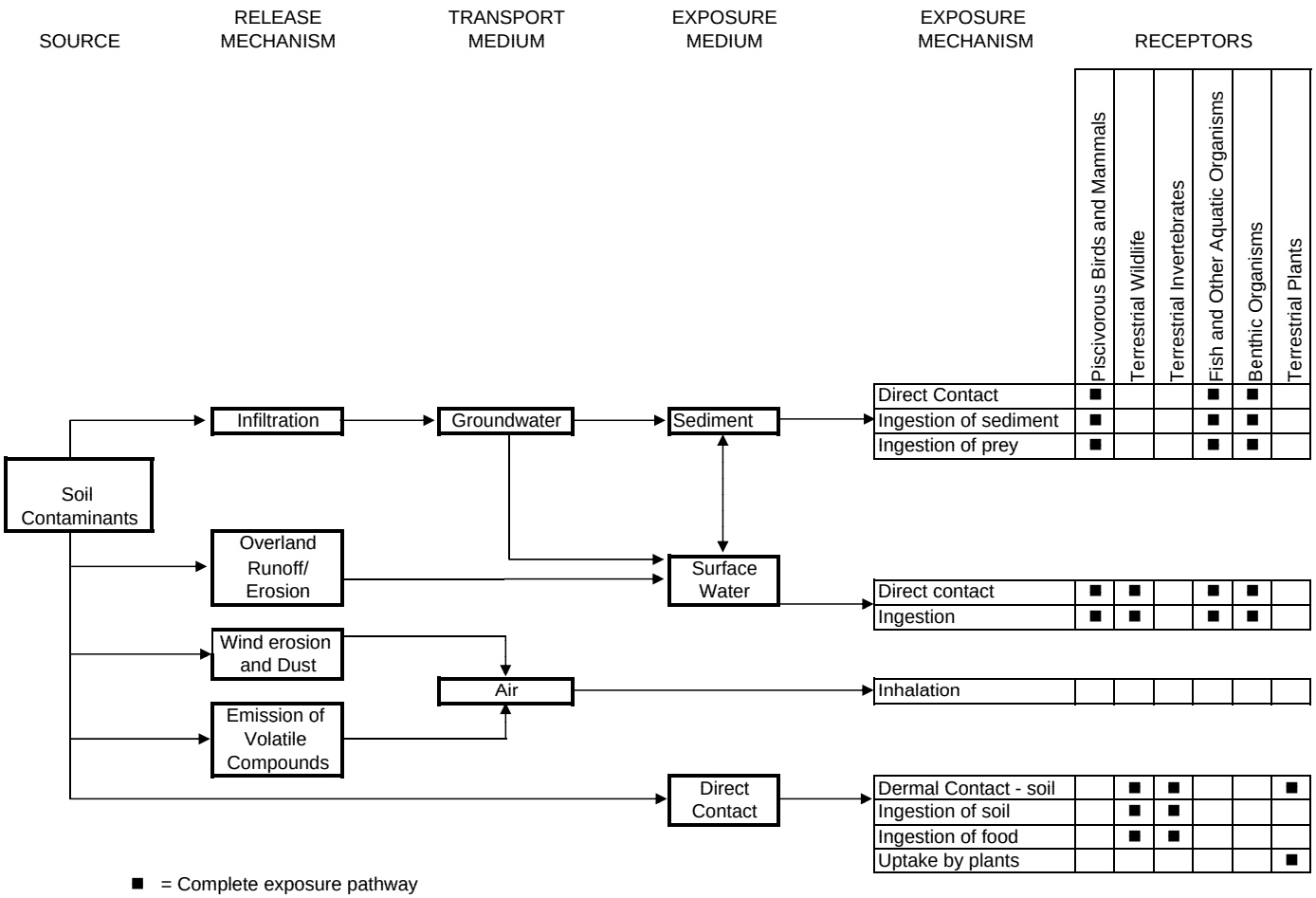
- GROUNDWATER LEVEL
- GROUNDWATER FLOW DIRECTION
- RELEASE MECHANISM
- EXPOSURE ROUTE

TETRA TECH NUS, INC.

CONCEPTUAL SITE MODEL
ECO RISK ASSESSMENT
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

SCALE	NOT TO SCALE
FILE	112G02014CM03
REV	0
DATE	03/29/11
FIGURE NUMBER	FIGURE 7–2A

FIGURE 7-2B
ECOLOGICAL CONCEPTUAL SITE MODEL - FLOW DIAGRAM
SITE 3 - NINTH STREET LANDFILL
NASJRB, WILLOW GROVE, PENNSYLVANIA



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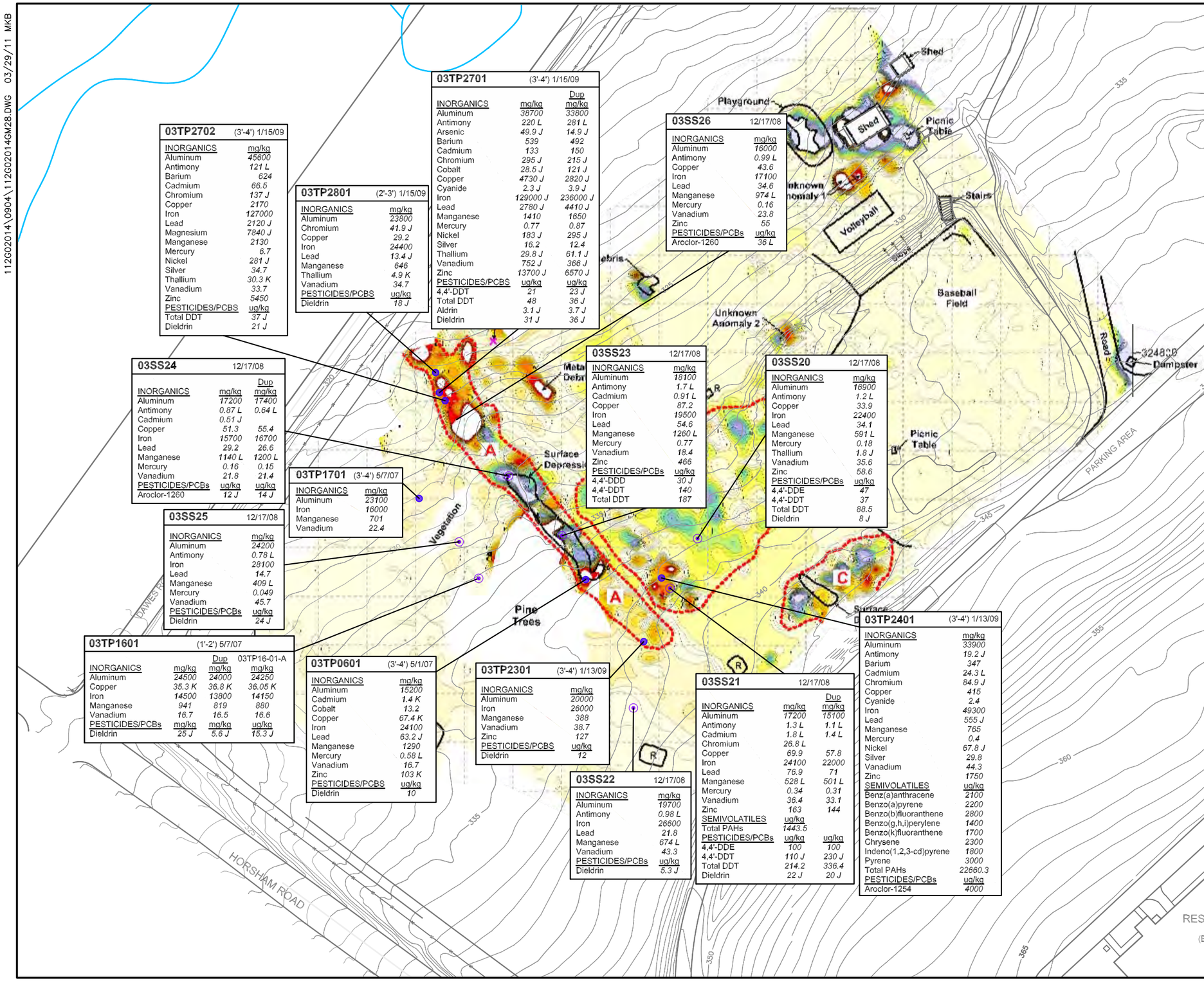


03TP2702 (3'-4') 1/15/09

INORGANICS	mg/kg
Aluminum	45600
Antimony	121 L
Barium	624
Cadmium	66.5
Chromium	137 J
Copper	2170
Iron	127000
Lead	2120 J
Magnesium	7840 J
Manganese	2130
Mercury	6.7
Nickel	281 J
Silver	34.7
Thallium	30.3 K
Vanadium	33.7
Zinc	5450
PESTICIDES/PCBS	ug/kg
Total DDT	37 J
Dieldrin	21 J

03TP2801 (2'-3') 1/15/09

INORGANICS	mg/kg
Aluminum	23800
Chromium	41.9 J
Copper	29.2
Iron	24400
Lead	13.4 J
Manganese	646
Thallium	4.9 K
Vanadium	34.7
PESTICIDES/PCBS	ug/kg
Dieldrin	18 J

03TP2701 (3'-4') 1/15/09

INORGANICS	mg/kg	Dup mg/kg
Aluminum	38700	33800
Antimony	220 L	281 L
Arsenic	49.9 J	14.9 J
Barium	539	492
Cadmium	133	150
Chromium	295 J	215 J
Cobalt	28.5 J	121 J
Copper	4730 J	2820 J
Cyanide	2.3 J	3.9 J
Iron	129000 J	236000 J
Lead	2780 J	4410 J
Manganese	1410	1650
Mercury	0.77	0.87
Nickel	183 J	295 J
Silver	16.2	12.4
Thallium	29.8 J	61.1 J
Vanadium	752 J	366 J
Zinc	13700 J	6570 J
PESTICIDES/PCBS	ug/kg	ug/kg
4,4'-DDT	21	23 J
Total DDT	48	36 J
Aldrin	3.1 J	3.7 J
Dieldrin	31 J	36 J

03SS26 12/17/08

INORGANICS	mg/kg
Aluminum	16000
Antimony	0.99 L
Copper	43.6
Iron	17100
Lead	34.6
Manganese	974 L
Mercury	0.16
Vanadium	23.8
Zinc	55
PESTICIDES/PCBs	ug/kg
Aroclor-1260	36 L

03SS24 12/17/08

INORGANICS	mg/kg	Dup mg/kg
Aluminum	17200	17400
Antimony	0.87 L	0.64 L
Cadmium	0.51 J	
Copper	51.3	55.4
Iron	15700	16700
Lead	29.2	26.6
Manganese	1140 L	1200 L
Mercury	0.16	0.15
Vanadium	21.8	21.4
PESTICIDES/PCBs	ug/kg	ug/kg
Aroclor-1260	12 J	14 J

03SS23 12/17/08

INORGANICS	mg/kg
Aluminum	18100
Antimony	1.7 L
Cadmium	0.91 L
Copper	87.2
Iron	19500
Lead	54.6
Manganese	1260 L
Mercury	0.77
Vanadium	18.4
Zinc	466
PESTICIDES/PCBs	ug/kg
4,4'-DDD	30 J
4,4'-DDT	140
Total DDT	187

03SS20 12/17/08

INORGANICS	mg/kg
Aluminum	16900
Antimony	1.2 L
Copper	33.9
Iron	22400
Lead	34.1
Manganese	591 L
Mercury	0.18
Thallium	1.8 J
Vanadium	35.6
Zinc	58.6
PESTICIDES/PCBs	ug/kg
4,4'-DDE	47
4,4'-DDT	37
Total DDT	88.5
Dieldrin	8 J

03TP1701 (3'-4') 5/7/07

INORGANICS	mg/kg
Aluminum	23100
Iron	16000
Manganese	701
Vanadium	22.4

03SS25 12/17/08

INORGANICS	mg/kg
Aluminum	24200
Antimony	0.78 L
Iron	28100
Lead	14.7
Manganese	409 L
Mercury	0.049
Vanadium	45.7
PESTICIDES/PCBs	ug/kg
Dieldrin	24 J

03TP1601 (1'-2') 5/7/07

INORGANICS	mg/kg	Dup mg/kg	03TP16-01-A mg/kg
Aluminum	24500	24000	24250
Copper	35.3 K	36.8 K	36.05 K
Iron	14500	13800	14150
Manganese	941	819	880
Vanadium	16.7	16.5	16.6
PESTICIDES/PCBs	mg/kg	mg/kg	ug/kg
Dieldrin	25 J	5.6 J	15.3 J

03TP0601 (3'-4') 5/1/07

INORGANICS	mg/kg
Aluminum	15200
Cadmium	1.4 K
Cobalt	13.2
Copper	67.4 K
Iron	24100
Lead	63.2 J
Manganese	1290
Mercury	0.58 L
Vanadium	16.7
Zinc	103 K
PESTICIDES/PCBS	ug/kg
Dieldrin	10

03TP2301 (3'-4') 1/13/09

INORGANICS	mg/kg
Aluminum	20000
Iron	26000
Manganese	388
Vanadium	38.7
Zinc	127
PESTICIDES/PCBS	ug/kg
Dieldrin	12

03SS22 12/17/08

INORGANICS	mg/kg
Aluminum	19700
Antimony	0.98 L
Iron	26600
Lead	21.8
Manganese	674 L
Vanadium	43.3
PESTICIDES/PCBs	ug/kg
Dieldrin	5.3 J

03SS21 12/17/08

INORGANICS	mg/kg	Dup mg/kg
Aluminum	17200	15100
Antimony	1.3 L	1.1 L
Cadmium	1.8 L	1.4 L
Chromium	26.8 L	
Copper	69.9	57.8
Iron	24100	22000
Lead	76.9	71
Manganese	528 L	501 L
Mercury	0.34	0.31
Vanadium	36.4	33.1
Zinc	163	144
SEMIVOLATILES	ug/kg	
Total PAHs	1443.5	
PESTICIDES/PCBs	ug/kg	ug/kg
4,4'-DDE	100	100
4,4'-DDT	110 J	230 J
Total DDT	214.2	336.4
Dieldrin	22 J	20 J

03TP2401 (3'-4') 1/13/09

INORGANICS	mg/kg
Aluminum	33900
Antimony	19.2 J
Barium	347
Cadmium	24.3 L
Chromium	84.9 J
Copper	415
Cyanide	2.4
Iron	49300
Lead	555 J
Manganese	765
Mercury	0.4
Nickel	67.8 J
Silver	29.8
Vanadium	44.3
Zinc	1750
SEMIVOLATILES	ug/kg
Benz(a)anthracene	2100
Benzo(a)pyrene	2200
Benzo(b)fluoranthene	2800
Benzo(g,h,i)perylene	1400
Benzo(k)fluoranthene	1700
Chrysene	2300
Indeno(1,2,3-cd)pyrene	1800
Pyrene	3000
Total PAHs	22660.3
PESTICIDES/PCBs	ug/kg
Aroclor-1254	4000

LEGEND

- SURFACE SOIL SAMPLE LOCATION DEPTH 0-6" UNLESS OTHERWISE NOTED
- SUBSURFACE SOIL SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- J ESTIMATED VALUE
- K POSITIVE RESULT BIASED HIGH
- L POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM

0 100 200

SCALE IN FEET

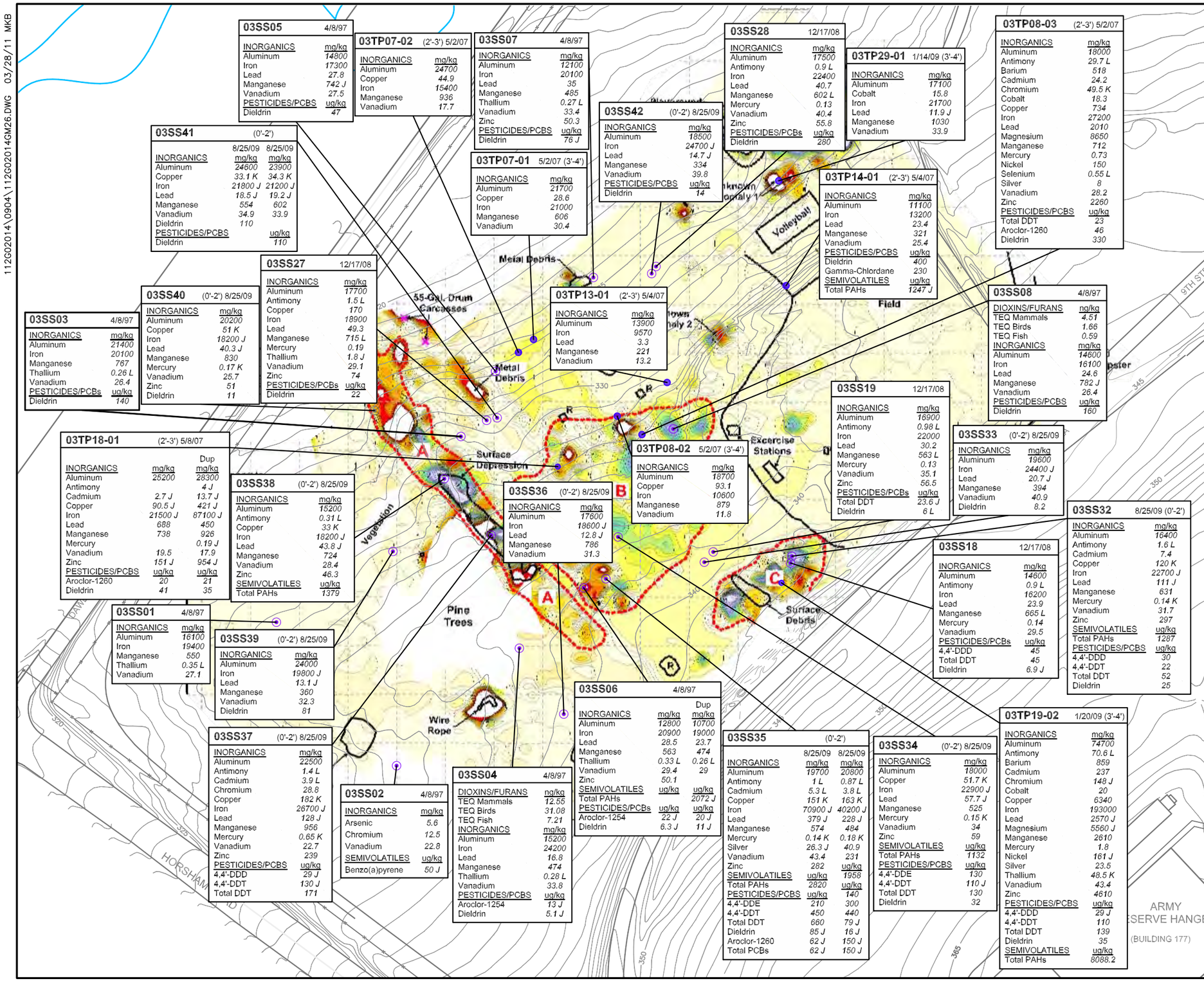
TETRA TECH NUS, INC.

SOIL SAMPLE RESULTS
ABOVE ECOLOGICAL SCREENING CRITERIA
LANDFILL AREA – SOUTHWEST
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM28	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 7–3	0	03/29/11

112G02014\0904\112G02014GM26.DWG 03/28/11 MKB



03SS05 4/8/97

INORGANICS	mg/kg
Aluminum	14800
Iron	17300
Lead	27.8
Manganese	742 J
Vanadium	27.5
PESTICIDES/PCBS	ug/kg
Dieldrin	47

03TP07-02 (2'-3') 5/2/07

INORGANICS	mg/kg
Aluminum	24700
Copper	44.9
Iron	15400
Manganese	936
Vanadium	17.7

03SS07 4/8/97

INORGANICS	mg/kg
Aluminum	12100
Iron	20100
Lead	35
Manganese	485
Thallium	0.27 L
Vanadium	33.4
Zinc	50.3
PESTICIDES/PCBS	ug/kg
Dieldrin	76 J

03SS28 12/17/08

INORGANICS	mg/kg
Aluminum	17500
Antimony	0.9 L
Iron	22400
Lead	40.7
Manganese	602 L
Mercury	0.13
Vanadium	40.4
Zinc	55.8
PESTICIDES/PCBs	ug/kg
Dieldrin	280

03TP29-01 1/14/09 (3'-4')

INORGANICS	mg/kg
Aluminum	17100
Cobalt	15.8
Iron	21700
Lead	11.9 J
Manganese	1030
Vanadium	33.9

03TP08-03 (2'-3') 5/2/07

INORGANICS	mg/kg
Aluminum	18000
Antimony	29.7 L
Barium	518
Cadmium	24.2
Chromium	49.5 K
Cobalt	18.3
Copper	734
Iron	27200
Lead	2010
Magnesium	8650
Manganese	712
Mercury	0.73
Nickel	150
Selenium	0.55 L
Silver	8
Vanadium	28.2
Zinc	2260
PESTICIDES/PCBS	ug/kg
Total DDT	23
Aroclor-1260	46
Dieldrin	330

03SS41 (0'-2')

INORGANICS	8/25/09 mg/kg	8/25/09 mg/kg
Aluminum	24600	23900
Copper	33.1 K	34.3 K
Iron	21800 J	21200 J
Lead	18.5 J	19.2 J
Manganese	554	602
Vanadium	34.9	33.9
Dieldrin	110	
PESTICIDES/PCBS		ug/kg
Dieldrin		110

03SS42 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	18500
Iron	24700 J
Lead	14.7 J
Manganese	334
Vanadium	39.8
PESTICIDES/PCBS	ug/kg
Dieldrin	14

03TP07-01 5/2/07 (3'-4')

INORGANICS	mg/kg
Aluminum	21700
Copper	28.6
Iron	21000
Manganese	606
Vanadium	30.4

03TP14-01 (2'-3') 5/4/07

INORGANICS	mg/kg
Aluminum	11100
Iron	13200
Lead	23.4
Manganese	321
Vanadium	25.4
PESTICIDES/PCBS	ug/kg
Dieldrin	400
Gamma-Chlordane	230
SEMIVOLATILES	ug/kg
Total PAHs	1247 J

03SS27 12/17/08

INORGANICS	mg/kg
Aluminum	17700
Antimony	1.5 L
Copper	170
Iron	18900
Lead	49.3
Manganese	715 L
Mercury	0.19
Thallium	1.8 J
Vanadium	29.1
Zinc	74
PESTICIDES/PCBs	ug/kg
Dieldrin	22

03SS40 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	20200
Copper	51 K
Iron	18200 J
Lead	40.3 J
Manganese	830
Mercury	0.17 K
Vanadium	25.7
Zinc	51
Dieldrin	11

03SS03 4/8/97

INORGANICS	mg/kg
Aluminum	21400
Iron	20100
Manganese	767
Thallium	0.26 L
Vanadium	26.4
PESTICIDES/PCBs	ug/kg
Dieldrin	140

03TP13-01 (2'-3') 5/4/07

INORGANICS	mg/kg
Aluminum	13900
Iron	9570
Lead	3.3
Manganese	221
Vanadium	13.2

03SS08 4/8/97

DIOXINS/FURANS	ng/kg
TEQ Mammals	4.51
TEQ Birds	1.66
TEQ Fish	0.59
INORGANICS	mg/kg
Aluminum	14600
Iron	16100
Lead	24.6
Manganese	782 J
Vanadium	26.4
PESTICIDES/PCBS	ug/kg
Dieldrin	160

03SS19 12/17/08

INORGANICS	mg/kg
Aluminum	16900
Antimony	0.98 L
Iron	22000
Lead	30.2
Manganese	563 L
Mercury	0.13
Vanadium	35.1
Zinc	56.5
PESTICIDES/PCBs	ug/kg
Total DDT	23.6 J
Dieldrin	6 L

03SS33 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	19600
Iron	24400 J
Lead	20.7 J
Manganese	394
Vanadium	40.9
Dieldrin	8.2

03TP18-01 (2'-3') 5/8/07

INORGANICS	mg/kg	Dup mg/kg
Aluminum	25200	28300
Antimony		4 J
Cadmium	2.7 J	13.7 J
Copper	90.5 J	421 J
Iron	21500 J	87100 J
Lead	688	450
Manganese	738	926
Mercury		0.19 J
Vanadium	19.5	17.9
Zinc	151 J	954 J
PESTICIDES/PCBS	ug/kg	ug/kg
Aroclor-1260	20	21
Dieldrin	41	35

03SS38 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	15200
Antimony	0.31 L
Copper	33 K
Iron	18200 J
Lead	43.8 J
Manganese	724
Vanadium	28.4
Zinc	46.3
SEMIVOLATILES	ug/kg
Total PAHs	1379

03SS36 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	17600
Iron	18600 J
Lead	12.8 J
Manganese	786
Vanadium	31.3

03TP08-02 5/2/07 (3'-4')

INORGANICS	mg/kg
Aluminum	18700
Copper	93.1
Iron	10600
Manganese	879
Vanadium	11.8

03SS18 12/17/08

INORGANICS	mg/kg
Aluminum	14600
Antimony	0.9 L
Iron	16200
Lead	23.9
Manganese	665 L
Mercury	0.14
Vanadium	29.5
PESTICIDES/PCBs	ug/kg
4,4'-DDD	45
Total DDT	45
Dieldrin	6.9 J

03SS32 8/25/09 (0'-2')

INORGANICS	mg/kg
Aluminum	16400
Antimony	1.6 L
Cadmium	7.4
Copper	120 K
Iron	22700 J
Lead	111 J
Manganese	631
Mercury	0.14 K
Vanadium	31.7
Zinc	297
SEMIVOLATILES	ug/kg
Total PAHs	1287
PESTICIDES/PCBS	ug/kg
4,4'-DDD	30
4,4'-DDT	22
Total DDT	52
Dieldrin	25

03SS01 4/8/97

INORGANICS	mg/kg
Aluminum	16100
Iron	19400
Manganese	550
Thallium	0.35 L
Vanadium	27.1

03SS39 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	24000
Iron	19800 J
Lead	13.1 J
Manganese	360
Vanadium	32.3
Dieldrin	81

03SS06 4/8/97

INORGANICS	mg/kg	Dup mg/kg
Aluminum	12800	10700
Iron	20900	19000
Lead	28.5	23.7
Manganese	563	474
Thallium	0.33 L	0.26 L
Vanadium	29.4	29
Zinc	50.1	
SEMIVOLATILES	ug/kg	ug/kg
Total PAHs		2072 J
PESTICIDES/PCBs	ug/kg	ug/kg
Aroclor-1254	22 J	20 J
Dieldrin	6.3 J	11 J

03SS37 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	22500
Antimony	1.4 L
Cadmium	3.9 L
Chromium	28.8
Copper	182 K
Iron	26700 J
Lead	128 J
Manganese	956
Mercury	0.65 K
Vanadium	22.7
Zinc	239
PESTICIDES/PCBS	ug/kg
4,4'-DDD	29 J
4,4'-DDT	130 J
Total DDT	171

03SS02 4/8/97

INORGANICS	mg/kg
Arsenic	5.6
Chromium	12.5
Vanadium	22.8
SEMIVOLATILES	ug/kg
Benzo(a)pyrene	50 J

03SS04 4/8/97

DIOXINS/FURANS	ng/kg
TEQ Mammals	12.55
TEQ Birds	31.08
TEQ Fish	7.21
INORGANICS	mg/kg
Aluminum	15200
Iron	24200
Lead	16.8
Manganese	474
Thallium	0.28 L
Vanadium	33.8
PESTICIDES/PCBS	ug/kg
Aroclor-1254	13 J
Dieldrin	5.1 J

03SS35 (0'-2')

INORGANICS	8/25/09 mg/kg	8/25/09 mg/kg
Aluminum	19700	20800
Antimony	1 L	0.87 L
Cadmium	5.3 L	3.8 L
Copper	151 K	163 K
Iron	70900 J	40200 J
Lead	379 J	228 J
Manganese	574	484
Mercury	0.14 K	0.18 K
Silver	26.3 J	40.9
Vanadium	43.4	231
Zinc	282	ug/kg
SEMIVOLATILES	ug/kg	1958
Total PAHs	2820	ug/kg
PESTICIDES/PCBS	ug/kg	140
4,4'-DDE	210	300
4,4'-DDT	450	440
Total DDT	660	79 J
Dieldrin	85 J	16 J
Aroclor-1260	62 J	150 J
Total PCBs	62 J	150 J

03SS34 (0'-2') 8/25/09

INORGANICS	mg/kg
Aluminum	18000
Copper	51.7 K
Iron	22900 J
Lead	57.7 J
Manganese	525
Mercury	0.15 K
Vanadium	34
Zinc	59
SEMIVOLATILES	ug/kg
Total PAHs	1132
PESTICIDES/PCBS	ug/kg
4,4'-DDE	130
4,4'-DDT	110 J
Total DDT	130
Dieldrin	32

03TP19-02 1/20/09 (3'-4')

INORGANICS	mg/kg
Aluminum	74700
Antimony	70.6 L
Barium	859
Cadmium	237
Chromium	148 J
Cobalt	20
Copper	6340
Iron	193000
Lead	2570 J
Magnesium	5560 J
Manganese	2610
Mercury	1.8
Nickel	161 J
Silver	23.5
Thallium	48.5 K
Vanadium	43.4
Zinc	4610
PESTICIDES/PCBS	ug/kg
4,4'-DDD	29 J
4,4'-DDT	110
Total DDT	139
Dieldrin	35
SEMIVOLATILES	ug/kg
Total PAHs	8088.2

LEGEND

- SURFACE SOIL SAMPLE LOCATION DEPTH 0-6" UNLESS OTHERWISE NOTED
- SUBSURFACE SOIL SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- J ESTIMATED VALUE
- K POSITIVE RESULT BIASED HIGH
- L POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM

0 100 200

SCALE IN FEET

TETRA TECH NUS, INC.

SOIL SAMPLE RESULTS ABOVE ECOLOGICAL SCREENING CRITERIA LANDFILL AREA – SOUTHWEST SITE 3 – 9TH STREET LANDFILL NAS JRB WILLOW GROVE WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM26	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 7–4	0 / 03/28/11

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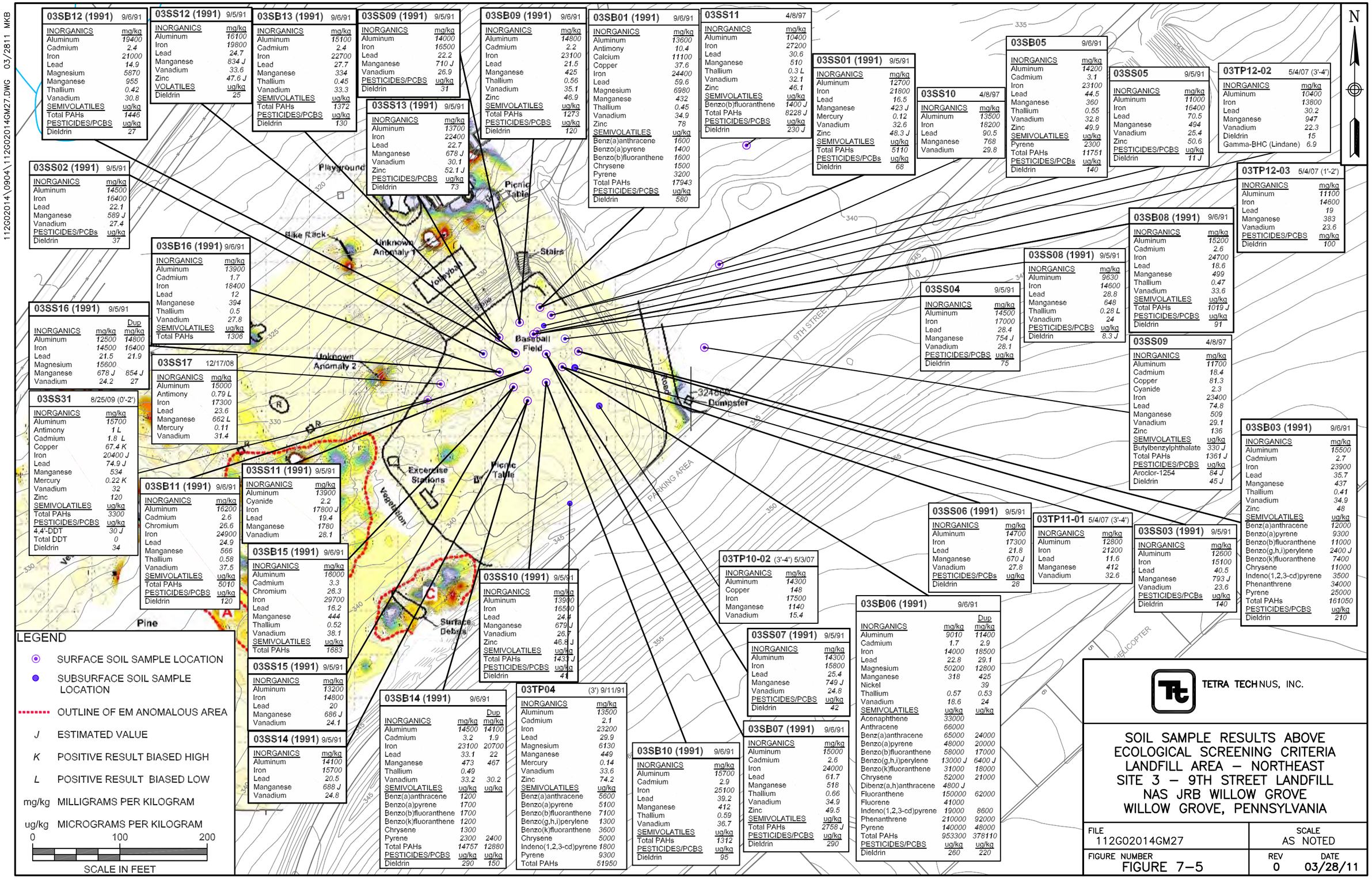


03SB12 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	19400
Cadmium	2.4
Iron	21000
Lead	14.9
Magnesium	5870
Manganese	955
Thallium	0.42
Vanadium	30.8
SEMIVOLATILES	ug/kg
Total PAHs	1446
PESTICIDES/PCBS	ug/kg
Dieldrin	27

03SS12 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	16100
Iron	19800
Lead	24.7
Manganese	834 J
Vanadium	33.6
Zinc	47.6 J
VOLATILES	ug/kg
Dieldrin	25

03SB13 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	15100
Cadmium	2.4
Iron	22700
Lead	27.7
Manganese	334
Thallium	0.45
Vanadium	33.3
SEMIVOLATILES	ug/kg
Total PAHs	1372
PESTICIDES/PCBS	ug/kg
Dieldrin	130

03SS09 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	14000
Iron	16500
Lead	22.2
Manganese	710 J
Vanadium	26.9
PESTICIDES/PCBS	ug/kg
Dieldrin	31

03SB09 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	14800
Cadmium	2.2
Iron	23100
Lead	21.5
Manganese	425
Thallium	0.56
Vanadium	35.1
Zinc	46.9
SEMIVOLATILES	ug/kg
Total PAHs	1273
PESTICIDES/PCBS	ug/kg
Dieldrin	120

03SB01 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	13600
Antimony	10.4
Calcium	11100
Copper	37.6
Iron	24400
Lead	59.6
Magnesium	6980
Manganese	432
Thallium	0.45
Vanadium	34.9
Zinc	78
SEMIVOLATILES	ug/kg
Benz(a)anthracene	1600
Benzo(a)pyrene	1400
Benzo(b)fluoranthene	1600
Chrysene	1500
Pyrene	3200
Total PAHs	17943
PESTICIDES/PCBS	ug/kg
Dieldrin	580

03SS11 4/8/97

INORGANICS	mg/kg
Aluminum	10400
Iron	27200
Lead	30.6
Manganese	510
Thallium	0.3 L
Vanadium	32.1
Zinc	46.1
SEMIVOLATILES	ug/kg
Benzo(b)fluoranthene	1400 J
Total PAHs	8228 J
PESTICIDES/PCBS	ug/kg
Dieldrin	230 J

03SS01 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	12700
Iron	21800
Lead	16.5
Manganese	423 J
Mercury	0.12
Vanadium	32.6
Zinc	48.3 J
SEMIVOLATILES	ug/kg
Total PAHs	5110
PESTICIDES/PCBs	ug/kg
Dieldrin	68

03SS10 4/8/97

INORGANICS	mg/kg
Aluminum	13500
Iron	18200
Lead	90.5
Manganese	768
Vanadium	29.8

03SB05 9/6/91

INORGANICS	mg/kg
Aluminum	14200
Cadmium	3.1
Iron	23100
Lead	44.5
Manganese	360
Thallium	0.55
Vanadium	32.8
Zinc	49.9
SEMIVOLATILES	ug/kg
Pyrene	2300
Total PAHs	11751
PESTICIDES/PCBs	ug/kg
Dieldrin	140

03SS05 9/5/91

INORGANICS	mg/kg
Aluminum	11000
Iron	16400
Lead	70.5
Manganese	494
Vanadium	25.4
Zinc	50.6
PESTICIDES/PCBS	ug/kg
Dieldrin	11 J

03TP12-02 5/4/07 (3'-4')

INORGANICS	mg/kg
Aluminum	10400
Iron	13800
Lead	30.2
Manganese	947
Vanadium	22.3
Dieldrin	15
Gamma-BHC (Lindane)	6.9

03SS02 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	14500
Iron	16400
Lead	22.1
Manganese	589 J
Vanadium	27.4
PESTICIDES/PCBs	ug/kg
Dieldrin	37

03TP12-03 5/4/07 (1'-2')

INORGANICS	mg/kg
Aluminum	11100
Iron	14600
Lead	19
Manganese	383
Vanadium	23.6
PESTICIDES/PCBS	mg/kg
Dieldrin	100

03SB08 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	15200
Cadmium	2.6
Iron	24700
Lead	18.6
Manganese	499
Thallium	0.47
Vanadium	33.6
SEMIVOLATILES	ug/kg
Total PAHs	1019 J
PESTICIDES/PCBS	ug/kg
Dieldrin	91

03SB16 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	13900
Cadmium	1.7
Iron	18400
Lead	12
Manganese	394
Thallium	0.5
Vanadium	27.8
SEMIVOLATILES	ug/kg
Total PAHs	1306

03SS08 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	9630
Iron	14600
Lead	28.8
Manganese	648
Thallium	0.28 L
Vanadium	24
PESTICIDES/PCBS	ug/kg
Dieldrin	8.3 J

03SS04 9/5/91

INORGANICS	mg/kg
Aluminum	14500
Iron	17000
Lead	28.4
Manganese	754 J
Vanadium	28.1
PESTICIDES/PCBS	ug/kg
Dieldrin	75

03SS16 (1991) 9/5/91

INORGANICS	mg/kg	Dup mg/kg
Aluminum	12500	14800
Iron	14500	16400
Lead	21.5	21.9
Magnesium	15600	
Manganese	678 J	854 J
Vanadium	24.2	27

03SS17 12/17/08

INORGANICS	mg/kg
Aluminum	15000
Antimony	0.79 L
Iron	17300
Lead	23.6
Manganese	662 L
Mercury	0.11
Vanadium	31.4

03SS09 4/8/97

INORGANICS	mg/kg
Aluminum	11700
Cadmium	18.4
Copper	81.3
Cyanide	2.3
Iron	23400
Lead	74.8
Manganese	509
Vanadium	29.1
Zinc	136
SEMIVOLATILES	ug/kg
Butylbenzylphthalate	330 J
Total PAHs	1361 J
PESTICIDES/PCBS	ug/kg
Aroclor-1254	84 J
Dieldrin	45 J

03SB03 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	15500
Cadmium	2.7
Iron	23900
Lead	35.7
Manganese	437
Thallium	0.41
Vanadium	34.9
Zinc	48
SEMIVOLATILES	ug/kg
Benz(a)anthracene	12000
Benzo(a)pyrene	9300
Benzo(b)fluoranthene	11000
Benzo(g,h,i)perylene	2400 J
Benzo(k)fluoranthene	7400
Chrysene	11000
Indeno(1,2,3-cd)pyrene	3500
Phenanthrene	34000
Pyrene	25000
Total PAHs	161050
PESTICIDES/PCBS	ug/kg
Dieldrin	210

03SS31 8/25/09 (0'-2')

INORGANICS	mg/kg
Aluminum	15700
Antimony	1 L
Cadmium	1.8 L
Copper	67.4 K
Iron	20400 J
Lead	74.9 J
Manganese	534
Mercury	0.22 K
Vanadium	32
Zinc	120
SEMIVOLATILES	ug/kg
Total PAHs	3300
PESTICIDES/PCBS	ug/kg
4,4'-DDT	30 J
Total DDT	0
Dieldrin	34

03SS11 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	13900
Cyanide	2.2
Iron	17800 J
Lead	19.4
Manganese	1780
Vanadium	28.1

03SB11 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	16200
Cadmium	2.6
Chromium	26.6
Iron	24900
Lead	24.9
Manganese	566
Thallium	0.58
Vanadium	37.5
SEMIVOLATILES	ug/kg
Total PAHs	5010
PESTICIDES/PCBS	ug/kg
Dieldrin	120

03SB15 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	16000
Cadmium	3.3
Chromium	26.3
Iron	29700
Lead	16.2
Manganese	444
Thallium	0.52
Vanadium	38.1
SEMIVOLATILES	ug/kg
Total PAHs	1683

03SS15 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	13200
Iron	14800
Lead	20
Manganese	686 J
Vanadium	24.1

03SS14 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	14100
Iron	15700
Lead	20.5
Manganese	688 J
Vanadium	24.8

03SS10 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	13900
Iron	16500
Lead	24.4
Manganese	679 J
Vanadium	26.7
Zinc	46.8 J
SEMIVOLATILES	ug/kg
Total PAHs	1433 J
PESTICIDES/PCBS	ug/kg
Dieldrin	41

03TP10-02 (3'-4') 5/3/07

INORGANICS	mg/kg
Aluminum	14300
Copper	148
Iron	17500
Manganese	1140
Vanadium	15.4

03SS06 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	14700
Iron	17300
Lead	21.8
Manganese	670 J
Vanadium	27.8
PESTICIDES/PCBs	ug/kg
Dieldrin	28

03TP11-01 5/4/07 (3'-4')

INORGANICS	mg/kg
Aluminum	12800
Iron	21200
Lead	11.6
Manganese	412
Vanadium	32.6

03SS03 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	12600
Iron	15100
Lead	40.5
Manganese	793 J
Vanadium	23.6
PESTICIDES/PCBs	ug/kg
Dieldrin	140

03SS07 (1991) 9/5/91

INORGANICS	mg/kg
Aluminum	14300
Iron	15800
Lead	25.4
Manganese	749 J
Vanadium	24.8
PESTICIDES/PCBS	ug/kg
Dieldrin	42

03SB06 (1991) 9/6/91

INORGANICS	mg/kg	Dup mg/kg
Aluminum	9010	11400
Cadmium	1.7	2.9
Iron	14000	18500
Lead	22.8	29.1
Magnesium	50200	12800
Manganese	318	425
Nickel		39
Thallium	0.57	0.53
Vanadium	18.6	24
SEMIVOLATILES	ug/kg	ug/kg
Acenaphthene	33000	
Anthracene	66000	
Benz(a)anthracene	65000	24000
Benzo(a)pyrene	48000	20000
Benzo(b)fluoranthene	58000	17000
Benzo(g,h,i)perylene	13000 J	6400 J
Benzo(k)fluoranthene	31000	18000
Chrysene	52000	21000
Dibenz(a,h)anthracene	4800 J	
Fluoranthene	150000	62000
Fluorene	41000	
Indeno(1,2,3-cd)pyrene	19000	8600
Phenanthrene	210000	92000
Pyrene	140000	48000
Total PAHs	953300	378110
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	260	220

03SB14 (1991) 9/6/91

INORGANICS	mg/kg	Dup mg/kg
Aluminum	14500	14100
Cadmium	3.2	1.9
Iron	23100	20700
Lead	33.1	22
Manganese	473	467
Thallium	0.49	
Vanadium	33.2	30.2
SEMIVOLATILES	ug/kg	ug/kg
Benz(a)anthracene	1200	
Benzo(a)pyrene	1700	
Benzo(b)fluoranthene	1700	
Benzo(k)fluoranthene	1200	
Chrysene	1300	
Pyrene	2300	2400
Total PAHs	14757	12880
PESTICIDES/PCBS	ug/kg	ug/kg
Dieldrin	290	150

03TP04 (3') 9/11/91

INORGANICS	mg/kg
Aluminum	13500
Cadmium	2.1
Iron	23200
Lead	29.9
Magnesium	6130
Manganese	449
Mercury	0.14
Vanadium	33.6
Zinc	74.2
SEMIVOLATILES	ug/kg
Benz(a)anthracene	5600
Benzo(a)pyrene	5100
Benzo(b)fluoranthene	7100
Benzo(g,h,i)perylene	1300
Benzo(k)fluoranthene	3600
Chrysene	5000
Indeno(1,2,3-cd)pyrene	1800
Pyrene	9300
Total PAHs	51950

03SB10 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	15700
Cadmium	2.9
Iron	25100
Lead	39.2
Manganese	412
Thallium	0.59
Vanadium	36.7
SEMIVOLATILES	ug/kg
Total PAHs	1312
PESTICIDES/PCBS	ug/kg
Dieldrin	95

03SB07 (1991) 9/6/91

INORGANICS	mg/kg
Aluminum	15000
Cadmium	2.6
Iron	24000
Lead	61.7
Manganese	518
Thallium	0.66
Vanadium	34.9
Zinc	49.5
SEMIVOLATILES	ug/kg
Total PAHs	2758 J
PESTICIDES/PCBS	ug/kg
Dieldrin	290

LEGEND

- SURFACE SOIL SAMPLE LOCATION
- SUBSURFACE SOIL SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- J ESTIMATED VALUE
- K POSITIVE RESULT BIASED HIGH
- L POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM

0 100 200

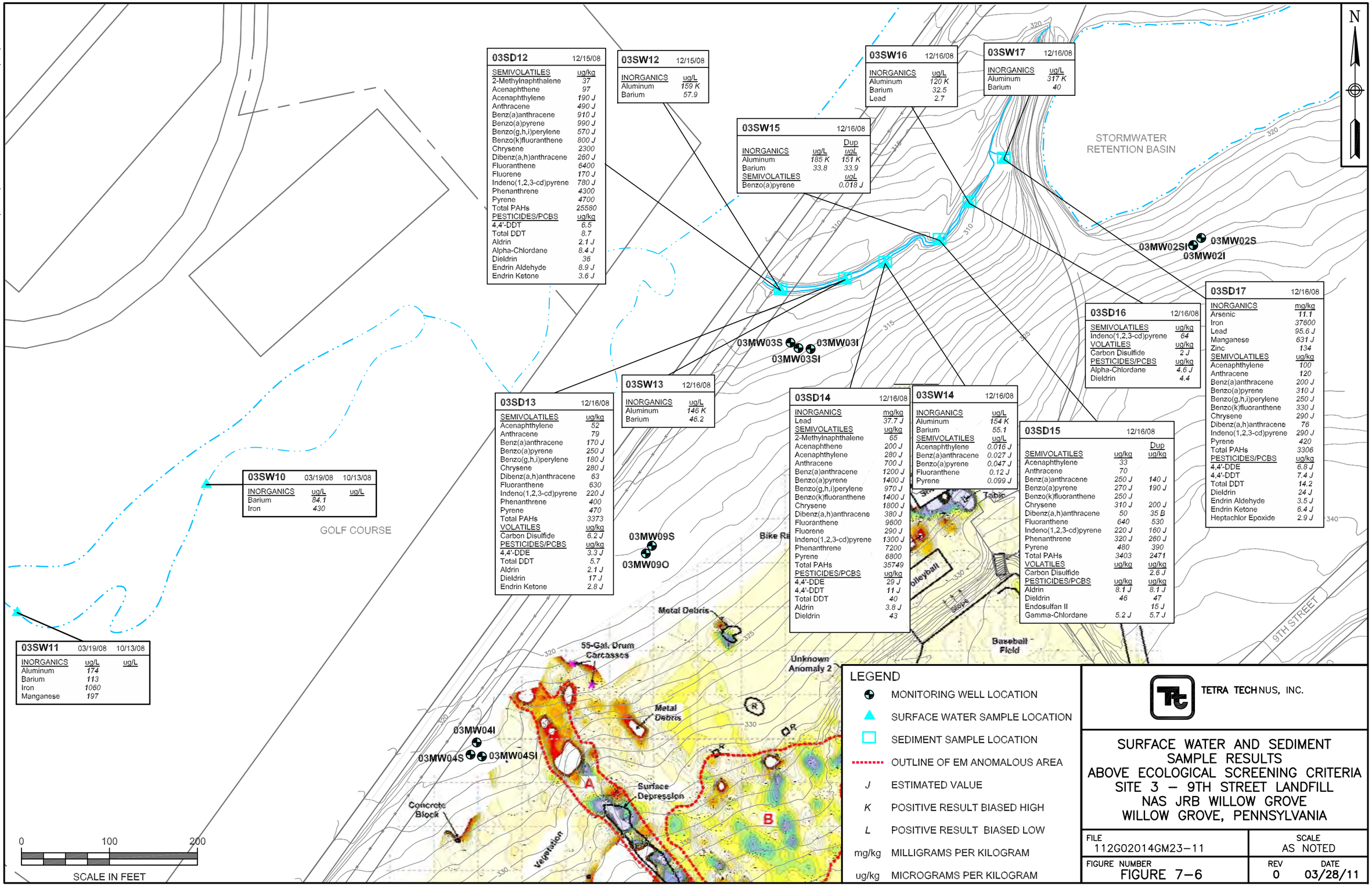
SCALE IN FEET

TETRA TECH NUS, INC.

SOIL SAMPLE RESULTS ABOVE ECOLOGICAL SCREENING CRITERIA LANDFILL AREA – NORTHEAST SITE 3 – 9TH STREET LANDFILL NAS JRB WILLOW GROVE WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM27	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 7–5	0 / 03/28/11

112G02014\0904\112G02014GM23-11.DWG 03/28/11 MKB



03SD12 12/15/08

SEMIVOLATILES	ug/kg
2-Methylnaphthalene	37
Acenaphthene	97
Acenaphthylene	190 J
Anthracene	490 J
Benz(a)anthracene	910 J
Benzo(a)pyrene	990 J
Benzo(g,h,i)perylene	570 J
Benzo(k)fluoranthene	800 J
Chrysene	2300
Dibenz(a,h)anthracene	260 J
Fluoranthene	6400
Fluorene	170 J
Indeno(1,2,3-cd)pyrene	780 J
Phenanthrene	4300
Pyrene	4700
Total PAHs	25580
PESTICIDES/PCBS	ug/kg
4,4'-DDT	6.5
Total DDT	8.7
Aldrin	2.1 J
Alpha-Chlordane	8.4 J
Dieldrin	36
Endrin Aldehyde	8.9 J
Endrin Ketone	3.6 J

03SW12 12/15/08

INORGANICS	ug/L
Aluminum	159 K
Barium	57.9

03SW16 12/16/08

INORGANICS	ug/L
Aluminum	120 K
Barium	32.5
Lead	2.7

03SW17 12/16/08

INORGANICS	ug/L
Aluminum	317 K
Barium	40

03SW15 12/16/08

		Dup
INORGANICS	ug/L	ug/L
Aluminum	185 K	151 K
Barium	33.8	33.9
SEMIVOLATILES		ug/L
Benzo(a)pyrene		0.018 J

03SD17 12/16/08

INORGANICS	mg/kg
Arsenic	11.1
Iron	37600
Lead	95.6 J
Manganese	631 J
Zinc	134
SEMIVOLATILES	ug/kg
Acenaphthylene	100
Anthracene	120
Benz(a)anthracene	200 J
Benzo(a)pyrene	310 J
Benzo(g,h,i)perylene	250 J
Benzo(k)fluoranthene	330 J
Chrysene	290 J
Dibenz(a,h)anthracene	76
Indeno(1,2,3-cd)pyrene	290 J
Pyrene	420
Total PAHs	3306
PESTICIDES/PCBS	ug/kg
4,4'-DDE	6.8 J
4,4'-DDT	7.4 J
Total DDT	14.2
Dieldrin	24 J
Endrin Aldehyde	3.5 J
Endrin Ketone	6.4 J
Heptachlor Epoxide	2.9 J

03SD16 12/16/08

SEMIVOLATILES	ug/kg
Indeno(1,2,3-cd)pyrene	64
VOLATILES	ug/kg
Carbon Disulfide	2 J
PESTICIDES/PCBS	ug/kg
Alpha-Chlordane	4.6 J
Dieldrin	4.4

03SD13 12/16/08

SEMIVOLATILES	ug/kg
Acenaphthylene	52
Anthracene	79
Benz(a)anthracene	170 J
Benzo(a)pyrene	250 J
Benzo(g,h,i)perylene	180 J
Chrysene	280 J
Dibenz(a,h)anthracene	63
Fluoranthene	630
Indeno(1,2,3-cd)pyrene	220 J
Phenanthrene	400
Pyrene	470
Total PAHs	3373
VOLATILES	ug/kg
Carbon Disulfide	6.2 J
PESTICIDES/PCBS	ug/kg
4,4'-DDE	3.3 J
Total DDT	5.7
Aldrin	2.1 J
Dieldrin	17 J
Endrin Ketone	2.8 J

03SW13 12/16/08

INORGANICS	ug/L
Aluminum	146 K
Barium	46.2

03SD14 12/16/08

INORGANICS	mg/kg
Lead	37.7 J
SEMIVOLATILES	ug/kg
2-Methylnaphthalene	65
Acenaphthene	200 J
Acenaphthylene	280 J
Anthracene	700 J
Benz(a)anthracene	1200 J
Benzo(a)pyrene	1400 J
Benzo(g,h,i)perylene	970 J
Benzo(k)fluoranthene	1400 J
Chrysene	1800 J
Dibenz(a,h)anthracene	380 J
Fluoranthene	9600
Fluorene	290 J
Indeno(1,2,3-cd)pyrene	1300 J
Phenanthrene	7200
Pyrene	6800
Total PAHs	35749
PESTICIDES/PCBS	ug/kg
4,4'-DDE	29 J
4,4'-DDT	11 J
Total DDT	40
Aldrin	3.8 J
Dieldrin	43

03SW14 12/16/08

INORGANICS	ug/L
Aluminum	154 K
Barium	55.1
SEMIVOLATILES	ug/L
Acenaphthylene	0.016 J
Benz(a)anthracene	0.027 J
Benzo(a)pyrene	0.047 J
Fluoranthene	0.12 J
Pyrene	0.099 J

03SD15 12/16/08

		Dup
SEMIVOLATILES	ug/kg	ug/kg
Acenaphthylene	33	
Anthracene	70	
Benz(a)anthracene	250 J	140 J
Benzo(a)pyrene	270 J	190 J
Benzo(k)fluoranthene	250 J	
Chrysene	310 J	200 J
Dibenz(a,h)anthracene	50	35 B
Fluoranthene	640	530
Indeno(1,2,3-cd)pyrene	220 J	160 J
Phenanthrene	320 J	260 J
Pyrene	480	390
Total PAHs	3403	2471
VOLATILES	ug/kg	ug/kg
Carbon Disulfide		2.6 J
PESTICIDES/PCBS	ug/kg	ug/kg
Aldrin	8.1 J	8.1 J
Dieldrin	46	47
Endosulfan II		15 J
Gamma-Chlordane	5.2 J	5.7 J

03SW10 03/19/08 10/13/08

INORGANICS	ug/L	ug/L
Barium	84.1	
Iron	430	

03SW11 03/19/08 10/13/08

INORGANICS	ug/L	ug/L
Aluminum	174	
Barium	113	
Iron	1060	
Manganese	197	

LEGEND

- MONITORING WELL LOCATION
- SURFACE WATER SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION
- OUTLINE OF EM ANOMALOUS AREA
- J ESTIMATED VALUE
- K POSITIVE RESULT BIASED HIGH
- L POSITIVE RESULT BIASED LOW
- mg/kg MILLIGRAMS PER KILOGRAM
- ug/kg MICROGRAMS PER KILOGRAM

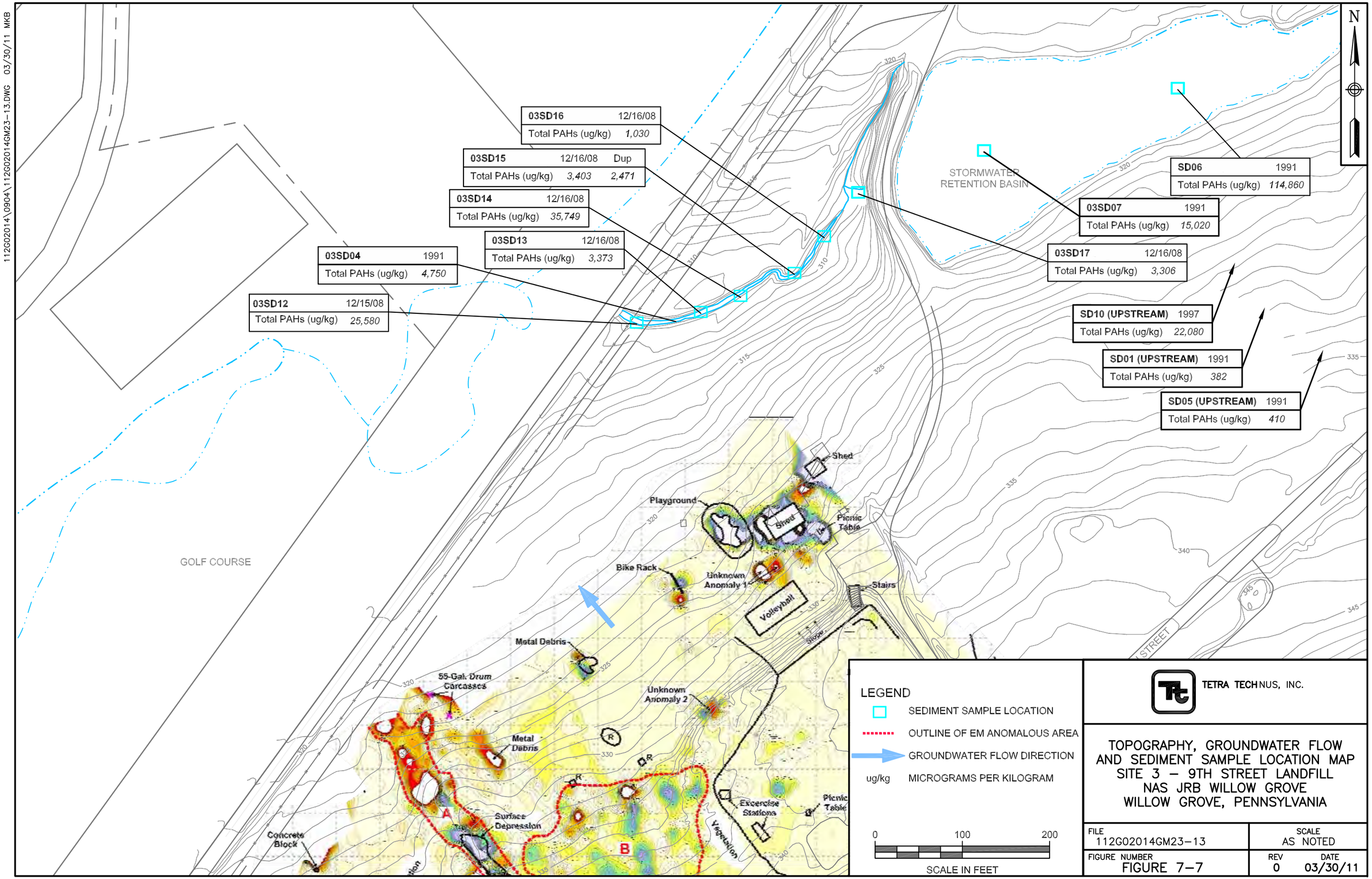
TETRA TECH NUS, INC.

SURFACE WATER AND SEDIMENT SAMPLE RESULTS
ABOVE ECOLOGICAL SCREENING CRITERIA
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM23-11	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 7-6	0	03/28/11

112G02014\0904\112G02014GM23-13.DWG 03/30/11 MKB



TETRA TECH NUS, INC.

TOPOGRAPHY, GROUNDWATER FLOW AND SEDIMENT SAMPLE LOCATION MAP
SITE 3 – 9TH STREET LANDFILL
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

FILE	SCALE
112G02014GM23-13	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 7-7	0 / 03/30/11

Remedial Investigation Report
for
Site 3 - Ninth Street Landfill

Naval Air Station
Joint Reserve Base (NAS JRB)
Willow Grove, Pennsylvania

Naval Facilities Engineering Command
Mid-Atlantic

Contract Number N62470-08-D-1001
Contract Task Order WE05

VOLUME II - APPENDICES

October 2011

TETRA TECH

APPENDIX A

ANALYTICAL RESULTS

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
TOTAL INORGANICS	**ug/L**				**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**					
Aluminum	1160		NA		2480	J	NA		73.9	B	80	U	80	U	NA		80	U	NA		NA	
Antimony	1.2	J	NA		45	U	NA		20	U	1.2	J	0.7	J	NA		2	U	NA		NA	
Arsenic	6		NA		7.4	J	NA		8.6	J	6	U	6	U	NA		6	U	NA		NA	
Barium	215		NA		379		NA		199		111		111		NA		107		NA		NA	
Beryllium	1	U	NA		3	B	NA		1	U	0.1	J	0.09	J	NA		1	U	NA		NA	
Cadmium	0.1	J	NA		4	U	NA		5	U	1	U	1	U	NA		1.1		NA		NA	
Calcium	25000		NA		57000		NA		13900		7220		7250		NA		17000		NA		NA	
Chromium	4.3		NA		7	U	NA		5	U	5		4.7		NA		1.5	J	NA		NA	
Cobalt	0.8	J	NA		10	U	NA		5	U	0.2	J	0.2	J	NA		6	U	NA		NA	
Copper	0.6	J	NA		5	B	NA		10	U	0.3	J	0.3	J	NA		0.4	J	NA		NA	
Cyanide	NA		NA		10	U	NA		5	U	NA		NA		NA		NA		NA		NA	
Iron	1200	K	NA		1660		NA		103		110	K	140	K	NA		70	U	NA		NA	
Lead	0.4	J	NA		7.6		NA		1	U	0.06	J	0.04	J	NA		2	U	NA		NA	
Magnesium	10600		NA		9790		NA		8990		1880		1880		NA		2670		NA		NA	
Manganese	16.3		NA		103		NA		38.1		3	J	2.8	J	NA		0.4	J	NA		NA	
Mercury	0.5	U	NA		0.2	U	NA		0.2	U	0.5	U	0.5	U	NA		0.5	U	NA		NA	
Nickel	3.9	J	NA		12	U	NA		20	U	3.8	J	3.9	J	NA		1.7	J	NA		NA	
Potassium	1480		NA		62600		NA		14100		670		600		NA		560	U	NA		NA	
Selenium	2	J	NA		20	UJ	NA		5	U	3	J	3	J	NA		2	J	NA		NA	
Silver	1	U	NA		6	U	NA		5	U	1	U	1	U	NA		0.6	B	NA		NA	
Sodium	12700		NA		30700		NA		16900		12300		12300		NA		9570		NA		NA	
Thallium	1	U	NA		2	UJ	NA		1	U	1	U	1	U	NA		1	U	NA		NA	
Vanadium	0.5	J	NA		4	U	NA		5	U	1	U	1	U	NA		0.4	B	NA		NA	
Zinc	3	J	NA		14	B	NA		6.9	B	2.8	J	2.8	J	NA		6	U	NA		NA	
DISSOLVED INORGANICS	**ug/L**						**ug/L**				**ug/L**		**ug/L**				**ug/L**					
Aluminum	36	J	NA		NA		72	U	NA		7	J	5	J	NA		80	U	NA		NA	
Antimony	2	U	NA		NA		45	U	NA		1.4	J	2	U	NA		2	U	NA		NA	
Arsenic	6.4		NA		NA		5.2	J	NA		3	U	3	U	NA		3	U	NA		NA	
Barium	199		NA		NA		49		NA		104		102		NA		106		NA		NA	
Beryllium	1	U	NA		NA		4	B	NA		0.2	J	1	U	NA		1	U	NA		NA	
Cadmium	1	U	NA		NA		4	U	NA		1	U	1	U	NA		1.2		NA		NA	
Calcium	24900		NA		NA		5020		NA		7690		7840		NA		19000		NA		NA	
Chromium	3.5		NA		NA		8		NA		6.1		6.3		NA		1.3	J	NA		NA	
Cobalt	5	U	NA		NA		10	U	NA		0.2	J	0.2	J	NA		5	U	NA		NA	
Copper	5	U	NA		NA		7	B	NA		5	U	5	U	NA		5	U	NA		NA	
Iron	20	J	NA		NA		40	B	NA		60	U	9	J	NA		60	U	NA		NA	
Lead	2	U	NA		NA		1	U	NA		2	U	2	U	NA		2	U	NA		NA	
Magnesium	10400	L	NA		NA		3760		NA		1900	L	1930	L	NA		2960		NA		NA	
Manganese	3.6	J	NA		NA		1	B	NA		1.8	J	2	J	NA		1.2	J	NA		NA	
Mercury	0.09	J	NA		NA		0.2	U	NA		0.09	J	0.09	J	NA		0.5	U	NA		NA	
Nickel	1.8	J	NA		NA		12	U	NA		4.8	J	5.4		NA		1.3	J	NA		NA	
Potassium	1560		NA		NA		45900		NA		790		780		NA		580		NA		NA	
Selenium	5	U	NA		NA		4	UJ	NA		3	J	3	J	NA		3	J	NA		NA	
Silver	1	U	NA		NA			R	NA		1	U	1	U	NA		1	U	NA		NA	
Sodium	13200		NA		NA		23700		NA		12700		12800		NA		11400		NA		NA	
Thallium	1	U	NA		NA		2	U	NA		1	U	1	U	NA		1	U	NA		NA	
Vanadium	1		NA		NA		4	U	NA		1	U	1	U	NA		0.8	B	NA		NA	
Zinc	0.4	J	NA		NA		5		NA		1.8	J	1.5	J	NA		0.6	J	NA		NA	
MISCELLANEOUS PARAMETERS	**mg/L**										**mg/L**		**mg/L**									
Hexavalent Chromium	0.01	U	NA		NA		NA		NA		0.01	U	0.01	U	NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
SEMIVOLATILES	**ug/L**				**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**					
1,2,4-Trichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,4-Dioxane	2.8	U	NA		NA		NA		NA		2.8	U	2.8	U	NA		2.9	U	NA		NA	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2,4,6-Trichlorophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dichlorophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dimethylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,4-Dinitrophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2,4-Dinitrotoluene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2,6-Dinitrotoluene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Chloronaphthalene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Chlorophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Methylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
2-Nitroaniline	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
2-Nitrophenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
3,3'-Dichlorobenzidine	NA		NA		20	U	NA		10	U	NA		NA		NA		NA		NA		NA	
3-Nitroaniline	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4,6-Dinitro-2-methylphenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4-Bromophenyl Phenyl Ether	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chloro-3-methylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chloroaniline	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Chlorophenyl Phenyl Ether	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Methylphenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
4-Nitroaniline	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
4-Nitrophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
Acenaphthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Acenaphthylene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Benzoic Acid	NA		NA		50	U	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Bis(2-chloroethyl)ether	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Bis(2-ethylhexyl)phthalate	NA		NA		4	J	NA		10	U	NA		NA		NA		NA		NA		NA	
Butylbenzylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA	
Chrysene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Di-n-butylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
Di-n-octylphthalate	NA		NA		5	J	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2,4-Trichlorobenzene	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	7	U	7	U	NA		NA		NA		7	U	7	U	7	U	7	U	7	U	7	U
1,2-Dibromoethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	NA		320	U	NA		NA		NA		NA		NA		320	U	NA		320	U	320	U
2-Butanone	10	UR	10	UR	10	U	NA		10	U	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
2-Hexanone	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	10	UR	10	U	10	U	NA		10	U	10	UR	10	UR	10	U	10	UR	10	U	10	U
Benzene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
Chlorobenzene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Acetate	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Cyclohexane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	1	U	1	U	1	B	NA		14	B	1	U	1	U	1	U	1	U	1	U	1	U
O-xylene	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Styrene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	1	U	1	U	5	U	NA		10	U	1.9		1.9		2.6		8.8	J	9.7		7.7	
Toluene	1	U	1	U	6		NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS					**ug/L**				**ug/L**													
4,4'-DDD	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		0.5	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		0.1	U	NA		0.1	UJ	NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		0.5	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		0.05	U	NA		0.05	UJ	NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		0.5	U	NA		0.5	UJ	NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		1	U	NA		5	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		0.5	U	NA		2	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		0.5	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01I**		**03MW01I**		**03MW01I**		**03MW01I-F**		**03MW01I**		**03MW01S**		**03MW01S-D**		**03MW01S**		**03MW01SI**		**03MW01SI**		**03MW01SI-L**	
Sample Date:	**3/11/2008**		**10/17/2008**		**9/23/1991**		**9/23/1991**		**6/25/1997**		**3/11/2008**		**3/11/2008**		**10/16/2008**		**3/20/2008**		**10/17/2008**		**10/17/2008**	
Duplicate:																						
Aroclor-1254	NA		NA		1	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	
Aroclor-1260	NA		NA		1	U	NA		1	UJ	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**	**03MW01SI**	**03MW01SI-F**	**03MW01S**	**03MW01S-D**	**03MW01S-F**	**03MW01S-F-D**	**03MW01S**	**03MW02I**	**03MW02I**	**03MW02I-L**
Sample Date:	**10/17/2008**	**9/20/1991**	**9/20/1991**	**9/18/1991**	**9/18/1991**	**9/18/1991**	**9/18/1991**	**6/25/1997**	**3/18/2008**	**10/20/2008**	**10/20/2008**
Duplicate:											
TOTAL INORGANICS		**ug/L**		**ug/L**	**ug/L**			**ug/L**	**ug/L**		
Aluminum	NA	363 B	NA	4000	6530	NA	NA	126 B	80 U	NA	NA
Antimony	NA	45 U	NA	45 U	45 U	NA	NA	20 U	2 U	NA	NA
Arsenic	NA	2 UJ	NA	2 U	2 U	NA	NA	1 UL	1 J	NA	NA
Barium	NA	263	NA	269	303	NA	NA	154	268	NA	NA
Beryllium	NA	3 B	NA	3 B	3 B	NA	NA	1 U	1 U	NA	NA
Cadmium	NA	4 U	NA	4 U	4 U	NA	NA	5 U	1 U	NA	NA
Calcium	NA	12700	NA	8420	8120	NA	NA	8540	21400	NA	NA
Chromium	NA	13 B	NA	11 B	13 B	NA	NA	23.3	2 B	NA	NA
Cobalt	NA	10 U	NA	10 U	10 U	NA	NA	5 U	6 U	NA	NA
Copper	NA	9 B	NA	2 U	2 U	NA	NA	10 U	0.7 B	NA	NA
Cyanide	NA	10 U	NA	16.7 U	10 U	NA	NA	5 U	NA	NA	NA
Iron	NA	508	NA	5680	8880	NA	NA	285	70 U	NA	NA
Lead	NA	1.6	NA	4.8	4.8	NA	NA	1.3 B	2 U	NA	NA
Magnesium	NA	2380	NA	2480	2880	NA	NA	1670	9550	NA	NA
Manganese	NA	37	NA	136	160	NA	NA	8.8 K	1.8 J	NA	NA
Mercury	NA	0.2 U	NA	0.2 U	0.2 U	NA	NA	0.2 U	0.5 U	NA	NA
Nickel	NA	14 B	NA	12 U	12 U	NA	NA	22.1	1.4 J	NA	NA
Potassium	NA	2140 U	NA	2140 U	2790	NA	NA	1500 U	660	NA	NA
Selenium	NA	4 UJ	NA	20 U	4 U	NA	NA	5 U	6 U	NA	NA
Silver	NA	6 U	NA	6 U	6 U	NA	NA	5 U	0.6 B	NA	NA
Sodium	NA	9560	NA	11700	11800	NA	NA	12400	7020	NA	NA
Thallium	NA	2 UJ	NA	2 U	2 U	NA	NA	1 U	1 U	NA	NA
Vanadium	NA	4 U	NA	8 B	12	NA	NA	5 U	1.8	NA	NA
Zinc	NA	5 B	NA	17 B	21 B	NA	NA	11.9 B	6 U	NA	NA
DISSOLVED INORGANICS			**ug/L**			**ug/L**	**ug/L**		**ug/L**		
Aluminum	NA	NA	73 B	NA	NA	141 B	141 B	NA	80 U	NA	NA
Antimony	NA	NA	45 U	NA	NA	47	45 U	NA	0.4 B	NA	NA
Arsenic	NA	NA	2 UJ	NA	NA	2 U	2 U	NA	1.1 J	NA	NA
Barium	NA	NA	255	NA	NA	135	143	NA	245	NA	NA
Beryllium	NA	NA	4 B	NA	NA	3 B	3 B	NA	1 U	NA	NA
Cadmium	NA	NA	4 U	NA	NA	4 U	4 U	NA	1 U	NA	NA
Calcium	NA	NA	12600	NA	NA	7730	8050	NA	24100	NA	NA
Chromium	NA	NA	7 U	NA	NA	7 U	7 B	NA	2.3	NA	NA
Cobalt	NA	NA	10 U	NA	NA	10 U	10 U	NA	5 U	NA	NA
Copper	NA	NA	7 B	NA	NA	7 B	7 B	NA	0.3 J	NA	NA
Iron	NA	NA	45 B	NA	NA	54	43	NA	60 U	NA	NA
Lead	NA	NA	1.6	NA	NA	1 U	1 U	NA	2 U	NA	NA
Magnesium	NA	NA	2370	NA	NA	1730	1760	NA	9740	NA	NA
Manganese	NA	NA	5 B	NA	NA	18	19	NA	0.08 B	NA	NA
Mercury	NA	NA	0.2 U	NA	NA	0.2 U	0.2 U	NA	0.5 U	NA	NA
Nickel	NA	NA	12 U	NA	NA	12 U	12 U	NA	0.8 J	NA	NA
Potassium	NA	NA	2140 U	NA	NA	2140 U	2140 U	NA	840	NA	NA
Selenium	NA	NA	4 UJ	NA	NA	4 U	4 U	NA	1 J	NA	NA
Silver	NA	NA	R	NA	NA	6 U	6 U	NA	1 UR	NA	NA
Sodium	NA	NA	8410	NA	NA	12400	12000	NA	8170	NA	NA
Thallium	NA	NA	2 U	NA	NA	2 U	2 U	NA	1 U	NA	NA
Vanadium	NA	NA	4 U	NA	NA	4 U	4 U	NA	1.7	NA	NA
Zinc	NA	NA	11	NA	NA	10 B	27	NA	6.5	NA	NA
MISCELLANEOUS PARAMETERS											
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**		**03MW01SI**		**03MW01SI-F**		**03MW01S**		**03MW01S-D**		**03MW01S-F**		**03MW01S-F-D**		**03MW01S**		**03MW02I**		**03MW02I**		**03MW02I-L**	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
SEMIVOLATILES			**ug/L**				**ug/L**		**ug/L**						**ug/L**		**ug/L**					
1,2,4-Trichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,2-Dichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,3-Dichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,4-Dichlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		NA		2.9	U	NA		NA	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4,5-Trichlorophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
2,4,6-Trichlorophenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4-Dichlorophenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4-Dimethylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,4-Dinitrophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
2,4-Dinitrotoluene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2,6-Dinitrotoluene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Chloronaphthalene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Chlorophenol	NA		10	U	NA		33	U	1	J	NA		NA		10	U	NA		NA		NA	
2-Methylnaphthalene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Methylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
2-Nitroaniline	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
2-Nitrophenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
3,3'-Dichlorobenzidine	NA		20	U	NA		33	U	20	U	NA		NA		10	U	NA		NA		NA	
3-Nitroaniline	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
4,6-Dinitro-2-methylphenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
4-Bromophenyl Phenyl Ether	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Chloro-3-methylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Chloroaniline	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Chlorophenyl Phenyl Ether	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Methylphenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
4-Nitroaniline	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
4-Nitrophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
Acenaphthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Acenaphthylene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzo(b)fluoranthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzo(g,h,i)perylene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzo(k)fluoranthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Benzoic Acid	NA		50	U	NA		160	U	50	U	NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		10	U	NA		33	U	10	U	NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Bis(2-chloroethyl)ether	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Bis(2-ethylhexyl)phthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Butylbenzylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		NA	
Chrysene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Di-n-butylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**		**03MW01SI**		**03MW01SI-F**		**03MW01S**		**03MW01S-D**		**03MW01S-F**		**03MW01S-F-D**		**03MW01S**		**03MW02I**		**03MW02I**		**03MW02I-L**	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
Di-n-octylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Dibenz(a,h)anthracene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Dibenzofuran	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Diethylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Dimethylphthalate	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Fluoranthene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Fluorene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachlorobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachlorobutadiene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachlorocyclopentadiene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Hexachloroethane	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Isophorone	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Naphthalene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Nitrobenzene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Pentachlorophenol	NA		50	U	NA		160	U	50	U	NA		NA		25	U	NA		NA		NA	
Phenanthrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Phenol	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
Pyrene	NA		10	U	NA		33	U	10	U	NA		NA		10	U	NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**				**ug/L**		**ug/L**						**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,1-Dichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2,4-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	7	U	NA		NA		NA		NA		NA		NA		NA		7	U	7	U	7	U
1,2-Dibromoethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		5	U	NA		5	U	5	U	NA		NA		10	U	NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloropropane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dioxane	320	U	NA		NA		NA		NA		NA		NA		NA		NA		320	U	320	U
2-Butanone	10	UR	10	U	NA		10	U	10	U	NA		NA		10	U	10	UR	10	UR	10	UR
2-Hexanone	5	U	10	U	NA		10	U	10	U	NA		NA		10	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	10	U	NA		10	U	10	U	NA		NA		10	U	5	U	5	U	5	U
Acetone	10	U	10	U	NA		10	U	10	U	NA		NA		10	U	10	UR	10	U	10	U
Benzene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Bromochloromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Bromodichloromethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Bromoform	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Bromomethane	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
Carbon Disulfide	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	0.38	J	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**		**03MW01SI**		**03MW01SI-F**		**03MW01S**		**03MW01S-D**		**03MW01S-F**		**03MW01S-F-D**		**03MW01S**		**03MW02I**		**03MW02I**		**03MW02I-L**	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
Chlorobenzene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Chloroethane	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
Chloroform	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Chloromethane	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Dibromochloromethane	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Ethylbenzene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Isopropylbenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
M+p-xylenes	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Acetate	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methylene Chloride	1	U	5	U	NA		4	B	3	B	NA		NA		14	B	1	U	1	U	1	U
O-xylene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Styrene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Tetrachloroethene	7.4		29		NA		15		15		NA		NA		6	J	7.8		9.1		7.3	
Toluene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Trichloroethene	1	U	5	U	NA		5	U	5	U	NA		NA		10	U	1	U	1	U	1	U
Trichlorofluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Vinyl Acetate	NA		10	U	NA		10	U	10	U	NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	10	U	NA		10	U	10	U	NA		NA		10	U	1	U	1	U	1	U
Xylene (Total)	NA		5	U	NA		5	U	5	U	NA		NA		10	U	NA		NA		NA	
PESTICIDES/PCBS			**ug/L**				**ug/L**		**ug/L**						**ug/L**							
4,4'-DDD	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
4,4'-DDE	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
4,4'-DDT	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Aldrin	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Alpha-BHC	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Alpha-Chlordane	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		0.05	U	NA		NA		NA	
Beta-BHC	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Delta-BHC	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Dieldrin	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endosulfan I	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Endosulfan II	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endosulfan Sulfate	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endrin	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		0.1	U	NA		NA		NA	
Endrin Ketone	NA		0.1	U	NA		0.33	U	0.1	U	NA		NA		0.1	U	NA		NA		NA	
Gamma-BHC (Lindane)	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Gamma-Chlordane	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		0.05	U	NA		NA		NA	
Heptachlor	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Heptachlor Epoxide	NA		0.05	U	NA		0.17	U	0.05	U	NA		NA		0.05	U	NA		NA		NA	
Methoxychlor	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		0.5	U	NA		NA		NA	
Toxaphene	NA		1	U	NA		3.3	U	1	U	NA		NA		5	U	NA		NA		NA	
Aroclor-1016	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1221	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		2	U	NA		NA		NA	
Aroclor-1232	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1242	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1248	NA		0.5	U	NA		1.7	U	0.5	U	NA		NA		1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW01SI-L-D**		**03MW01SI**		**03MW01SI-F**		**03MW01S**		**03MW01S-D**		**03MW01S-F**		**03MW01S-F-D**		**03MW01S**		**03MW02I**		**03MW02I**		**03MW02I-L**	
Sample Date:	**10/17/2008**		**9/20/1991**		**9/20/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/18/2008**		**10/20/2008**		**10/20/2008**	
Duplicate:																						
Aroclor-1254	NA		1	U	NA		3.3	U	1	U	NA		NA		1	U	NA		NA		NA	
Aroclor-1260	NA		1	U	NA		3.3	U	1	U	NA		NA		1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
TOTAL INORGANICS			**ug/L**		**ug/L**				**ug/L**				**ug/L**		**ug/L**				**ug/L**		**ug/L**		
Aluminum	NA		50	U	80	U	NA		80	U	NA		50	U	214	B	NA		50	U	80	U	NA
Antimony	NA		20	U	2	U	NA		2	U	NA		20	U	45	U	NA		20	U	2	U	NA
Arsenic	NA		1	U	6	U	NA		0.4	J	NA		1	U	2	U	NA		1	U	1.4	J	NA
Barium	NA		226		123		NA		347		NA		325		99		NA		111		209		NA
Beryllium	NA		1	U	1	U	NA		1	U	NA		1	U	3	B	NA		1	U	1	U	NA
Cadmium	NA		5	U	1	U	NA		1	U	NA		5	U	4	U	NA		5	U	1	U	NA
Calcium	NA		21600		9590		NA		23700		NA		24200		6820		NA		9190		23700		NA
Chromium	NA		5	U	1.9	B	NA		2.1	B	NA		5	U	7	U	NA		5	U	1.2	B	NA
Cobalt	NA		5	U	6	U	NA		0.2	J	NA		10.3		10	U	NA		5	U	6	U	NA
Copper	NA		10	U	0.3	B	NA		0.3	B	NA		10	U	6	B	NA		10	U	6	U	NA
Cyanide	NA		5	U	NA		NA		NA		NA		5	U	10	U	NA		5	U	NA		NA
Iron	NA		228	J	70	U	NA		30	J	NA		108	J	328		NA		50	U	70	U	NA
Lead	NA		1	U	2	U	NA		2	U	NA		1	U	1.4		NA		1	U	2	U	NA
Magnesium	NA		9440		4060		NA		9150		NA		9150		2940		NA		3710		11400		NA
Manganese	NA		14.6		2.5	J	NA		1.6	J	NA		5.4		15		NA		5	U	6	U	NA
Mercury	NA		0.2	U	0.5	U	NA		0.5	U	NA		0.2	U	0.2	U	NA		0.2	U	0.5	U	NA
Nickel	NA		20	U	1.6	J	NA		1.3	J	NA		20	U	12	U	NA		20	U	0.7	J	NA
Potassium	NA		1500	U	930		NA		640		NA		1500	U	2140	U	NA		1500	U	1200		NA
Selenium	NA		1	UL	6	U	NA		6	U	NA		5	U	4	U	NA		5	U	1	J	NA
Silver	NA		5	U	0.6	B	NA		0.6	B	NA		5	U	6	U	NA		5	U	0.6	B	NA
Sodium	NA		7240		7580		NA		7600		NA		8140		6680		NA		7540		8180		NA
Thallium	NA		1	U	1	U	NA		1	U	NA		1	U	2	U	NA		1	U	1	U	NA
Vanadium	NA		5	U	0.3	B	NA		2.6		NA		5	U	4	U	NA		5	U	1.8		NA
Zinc	NA		5	U	2.7	J	NA		2	J	NA		5		8	B	NA		5	U	6	U	NA
DISSOLVED INORGANICS					**ug/L**				**ug/L**								**ug/L**				**ug/L**		
Aluminum	NA		NA		80	U	NA		80	U	NA		NA		NA		137	B	NA		80	U	NA
Antimony	NA		NA		0.5	B	NA		0.4	B	NA		NA		NA		45	U	NA		0.6	B	NA
Arsenic	NA		NA		5	U	NA		0.4	J	NA		NA		NA		2	U	NA		1.5	J	NA
Barium	NA		NA		113		NA		313		NA		NA		NA		103		NA		197		NA
Beryllium	NA		NA		1	U	NA		1	U	NA		NA		NA		3	B	NA		1	U	NA
Cadmium	NA		NA		1	U	NA		1	U	NA		NA		NA		4	U	NA		1	U	NA
Calcium	NA		NA		10800		NA		26700		NA		NA		NA		7340		NA		26600		NA
Chromium	NA		NA		2.8		NA		2.4		NA		NA		NA		7	U	NA		2.2		NA
Cobalt	NA		NA		0.8	J	NA		5	U	NA		NA		NA		10	U	NA		5	U	NA
Copper	NA		NA		0.4	J	NA		5	U	NA		NA		NA		6	B	NA		5	U	NA
Iron	NA		NA		60	U	NA		60	U	NA		NA		NA		223		NA		60	U	NA
Lead	NA		NA		2	U	NA		2	U	NA		NA		NA		1	U	NA		2	U	NA
Magnesium	NA		NA		4450		NA		9360		NA		NA		NA		3140		NA		11600		NA
Manganese	NA		NA		4.5		NA		4	U	NA		NA		NA		3	B	NA		4	U	NA
Mercury	NA		NA		0.5	U	NA		0.5	U	NA		NA		NA		0.2	U	NA		0.5	U	NA
Nickel	NA		NA		1.3	J	NA		0.7	J	NA		NA		NA		12	U	NA		0.3	J	NA
Potassium	NA		NA		1070		NA		660		NA		NA		NA		2140	U	NA		1360		NA
Selenium	NA		NA		0.6	J	NA		1	J	NA		NA		NA		4	U	NA		2	J	NA
Silver	NA		NA		1	UR	NA		1	UR	NA		NA		NA		6	U	NA		1	UR	NA
Sodium	NA		NA		8740		NA		9130		NA		NA		NA		6840		NA		8080		NA
Thallium	NA		NA		1	U	NA		1	U	NA		NA		NA		2	U	NA		1	U	NA
Vanadium	NA		NA		0.3	J	NA		2.3		NA		NA		NA		4	U	NA		1.9		NA
Zinc	NA		NA		5	U	NA		5	U	NA		NA		NA		19	B	NA		5	U	NA
MISCELLANEOUS PARAMETERS																					**mg/L**		
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.01	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
SEMIVOLATILES			**ug/L**		**ug/L**				**ug/L**				**ug/L**		**ug/L**				**ug/L**		**ug/L**		
1,2,4-Trichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,2-Dichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,3-Dichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,4-Dichlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
1,4-Dioxane	NA		NA		2.9	U	NA		2.9	U	NA		NA		NA		NA		NA		2.8	U	NA
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4,5-Trichlorophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
2,4,6-Trichlorophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4-Dichlorophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4-Dimethylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,4-Dinitrophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
2,4-Dinitrotoluene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2,6-Dinitrotoluene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Chloronaphthalene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Chlorophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Methylnaphthalene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Methylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
2-Nitroaniline	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
2-Nitrophenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
3,3'-Dichlorobenzidine	NA		10	U	NA		NA		NA		NA		10	U	20	U	NA		10	U	NA		NA
3-Nitroaniline	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
4,6-Dinitro-2-methylphenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
4-Bromophenyl Phenyl Ether	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Chloro-3-methylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Chloroaniline	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Chlorophenyl Phenyl Ether	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Methylphenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
4-Nitroaniline	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
4-Nitrophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
Acenaphthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Acenaphthylene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Anthracene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benz(a)anthracene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzo(a)pyrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzo(b)fluoranthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzo(g,h,i)perylene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzo(k)fluoranthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		50	U	NA		NA		NA		NA
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		NA		NA
Bis(2-chloroethoxy)methane	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Bis(2-chloroethyl)ether	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Bis(2-ethylhexyl)phthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Butylbenzylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Carbazole	NA		10	U	NA		NA		NA		NA		10	U	NA		NA		10	U	NA		NA
Chrysene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Di-n-butylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
Di-n-octylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Dibenz(a,h)anthracene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Dibenzofuran	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Diethylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Dimethylphthalate	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Fluoranthene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Fluorene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachlorobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachlorobutadiene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachlorocyclopentadiene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Hexachloroethane	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Indeno(1,2,3-cd)pyrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Isophorone	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
N-Nitroso-di-n-propylamine	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
N-Nitrosodiphenylamine (1)	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Naphthalene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Nitrobenzene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Pentachlorophenol	NA		25	U	NA		NA		NA		NA		25	U	50	U	NA		25	U	NA		NA
Phenanthrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Phenol	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
Pyrene	NA		10	U	NA		NA		NA		NA		10	U	10	U	NA		10	U	NA		NA
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**
1,1,1-Trichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1,2,2-Tetrachloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1,2-Trichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1,2-Trichlorotrifluoroethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,1-Dichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,1-Dichloroethene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,2,3-Trichlorobenzene	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
1,2,4-Trichlorobenzene	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
1,2-Dibromo-3-chloropropane	7	U	NA		7	U	7	U	7	U	7	U	NA		NA		NA		NA		7	U	7
1,2-Dibromoethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichlorobenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,2-Dichloroethene (cis)	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichloroethene (Total)	NA		10	U	NA		NA		NA		NA		10	U	5	U	NA		10	U	NA		NA
1,2-Dichloroethene (trans)	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,2-Dichloropropane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
1,3-Dichlorobenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,4-Dichlorobenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
1,4-Dioxane	320	U	NA		NA		320	U	NA		320	U	NA		NA		NA		NA		NA		320
2-Butanone	10	UR	10	U	10	UR	10	UR	10	UR	10	UR	10	U	10	U	NA		10	U	10	UR	10
2-Hexanone	5	U	10	U	5	U	5	U	5	U	5	U	10	U	10	U	NA		10	U	5	U	5
4-Methyl-2-pentanone	5	U	10	U	5	U	5	U	5	U	5	U	10	U	10	U	NA		10	U	5	U	5
Acetone	10	U	10	U	10	UR	10	U	10	UR	10	U	10	U	10	U	NA		10	U	10	UR	10
Benzene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Bromochloromethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Bromodichloromethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Bromoform	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Bromomethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
Carbon Disulfide	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Carbon Tetrachloride	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
Chlorobenzene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Chloroethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
Chloroform	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Chloromethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
cis-1,3-Dichloropropene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Cyclohexane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Dibromochloromethane	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Dichlorodifluoromethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Ethylbenzene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Isopropylbenzene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
M+p-xylenes	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
Methyl Acetate	2	U	NA		2	U	2	U	2	U	2	U	NA		NA		NA		NA		2	U	2
Methyl Cyclohexane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Methyl Tert-butyl Ether	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Methylene Chloride	1	U	21	B	1	U	1	U	1	U	1	U	5	B	5	U	NA		12	B	1	U	1
O-xylene	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Styrene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Tetrachloroethene	7.6		8	J	1	U	1	U	3.3		3.3		6	J	5	U	NA		10	U	6.9		10.4
Toluene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
trans-1,3-Dichloropropene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Trichloroethene	1	U	10	U	1	U	1	U	1	U	1	U	10	U	5	U	NA		10	U	1	U	1
Trichlorofluoromethane	1	U	NA		1	U	1	U	1	U	1	U	NA		NA		NA		NA		1	U	1
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		NA		NA
Vinyl Chloride	1	U	10	U	1	U	1	U	1	U	1	U	10	U	10	U	NA		10	U	1	U	1
Xylene (Total)	NA		10	U	NA		NA		NA		NA		10	U	5	U	NA		10	U	NA		NA
PESTICIDES/PCBS			**ug/L**										**ug/L**		**ug/L**				**ug/L**				
4,4'-DDD	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
4,4'-DDE	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
4,4'-DDT	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Aldrin	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Alpha-BHC	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Alpha-Chlordane	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.5	U	NA		0.05	U	NA		NA
Beta-BHC	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Delta-BHC	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Dieldrin	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endosulfan I	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Endosulfan II	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endosulfan Sulfate	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endrin	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Endrin Aldehyde	NA		0.1	U	NA		NA		NA		NA		0.1	U	NA		NA		0.1	U	NA		NA
Endrin Ketone	NA		0.1	U	NA		NA		NA		NA		0.1	U	0.1	U	NA		0.1	U	NA		NA
Gamma-BHC (Lindane)	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Gamma-Chlordane	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.5	U	NA		0.05	U	NA		NA
Heptachlor	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Heptachlor Epoxide	NA		0.05	U	NA		NA		NA		NA		0.05	U	0.05	U	NA		0.05	U	NA		NA
Methoxychlor	NA		0.5	U	NA		NA		NA		NA		0.5	U	0.5	U	NA		0.5	U	NA		NA
Toxaphene	NA		5	U	NA		NA		NA		NA		5	U	1	U	NA		5	U	NA		NA
Aroclor-1016	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA
Aroclor-1221	NA		2	U	NA		NA		NA		NA		2	U	0.5	U	NA		2	U	NA		NA
Aroclor-1232	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA
Aroclor-1242	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA
Aroclor-1248	NA		1	U	NA		NA		NA		NA		1	U	0.5	U	NA		1	U	NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW02I-L-D**		**03MW02I**		**03MW02S**		**03MW02S**		**03MW02SI**		**03MW02SI**		**03MW02SI**		**03MW02S**		**03MW02S-F**		**03MW02S**		**03MW03I**		**03MW03I**
Sample Date:	**10/20/2008**		**7/7/1997**		**3/18/2008**		**10/16/2008**		**3/18/2008**		**10/17/2008**		**7/7/1997**		**9/18/1991**		**9/18/1991**		**6/26/1997**		**3/17/2008**		**10/21/2008**
Duplicate:																							
Aroclor-1254	NA		1	U	NA		NA		NA		NA		1	U	1	U	NA		1	U	NA		NA
Aroclor-1260	NA		1	U	NA		NA		NA		NA		1	U	1	U	NA		1	U	NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03I1**	**03MW03I**	**03MW03I-D**	**03MW03I-F**	**03MW03I-F-D**	**03MW03I**	**03MW03I-D**	**03MW03S**	**03MW03S**	**03MW03S**	**03MW03S-D**
Sample Date:	**4/11/2009**	**9/23/1991**	**9/23/1991**	**9/23/1991**	**9/23/1991**	**6/30/1997**	**6/30/1997**	**3/17/2008**	**10/20/2008**	**4/1/2009**	**4/1/2009**
Duplicate:											
TOTAL INORGANICS		**ug/L**	**ug/L**			**ug/L**	**ug/L**	**ug/L**			
Aluminum	NA	87 B	87 B	NA	NA	50 U	50 U	80 U	NA	NA	NA
Antimony	NA	45 U	45 U	NA	NA	20 U	20 U	2 U	NA	NA	NA
Arsenic	NA	2.4 J	2.4 J	NA	NA	2.4	2.5 B	6 U	NA	NA	NA
Barium	NA	175	177	NA	NA	197	194 B	157	NA	NA	NA
Beryllium	NA	3 B	3 B	NA	NA	1 U	1 U	1 U	NA	NA	NA
Cadmium	NA	4 U	4 U	NA	NA	5 U	5 U	1 U	NA	NA	NA
Calcium	NA	16900	177	NA	NA	21000	20900	13800	NA	NA	NA
Chromium	NA	14 B	7 U	NA	NA	5 U	5 U	2.4 B	NA	NA	NA
Cobalt	NA	10 U	10 U	NA	NA	5 U	5 U	6 U	NA	NA	NA
Copper	NA	6 B	6 B	NA	NA	10 U	10 U	1 B	NA	NA	NA
Cyanide	NA	10 U	10 U	NA	NA	5 U	5 U	NA	NA	NA	NA
Iron	NA	80 B	43 B	NA	NA	50 U	50 U	40 J	NA	NA	NA
Lead	NA	1 U	1 U	NA	NA	1 U	1 U	2 U	NA	NA	NA
Magnesium	NA	10200	10500	NA	NA	11400	11200	5580	NA	NA	NA
Manganese	NA	2	1	NA	NA	5 U	5 U	3.3 J	NA	NA	NA
Mercury	NA	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.5 U	NA	NA	NA
Nickel	NA	15 B	12 U	NA	NA	20 U	20 U	2.7 J	NA	NA	NA
Potassium	NA	2140 U	2140 U	NA	NA	1500 U	1500 U	1180	NA	NA	NA
Selenium	NA	4 UL	4 UL	NA	NA	5 UL	5 UL	2 J	NA	NA	NA
Silver	NA	6 U	6 U	NA	NA	5 U	5 U	0.6 B	NA	NA	NA
Sodium	NA	5930	6120	NA	NA	6840	6700	11300	NA	NA	NA
Thallium	NA	2 UJ	2 UJ	NA	NA	1 U	1 U	1 U	NA	NA	NA
Vanadium	NA	4 U	4 U	NA	NA	5 U	5 U	0.3 B	NA	NA	NA
Zinc	NA	3 B	7 B	NA	NA	5 U	5 U	4.3 J	NA	NA	NA
DISSOLVED INORGANICS				**ug/L**	**ug/L**			**ug/L**			
Aluminum	NA	NA	NA	72 U	72 U	NA	NA	80 U	NA	NA	NA
Antimony	NA	NA	NA	45 U	45 U	NA	NA	0.6 B	NA	NA	NA
Arsenic	NA	NA	NA	3.8 J	2.8 J	NA	NA	5 U	NA	NA	NA
Barium	NA	NA	NA	184	175	NA	NA	141	NA	NA	NA
Beryllium	NA	NA	NA	4 B	4 B	NA	NA	1 U	NA	NA	NA
Cadmium	NA	NA	NA	4 B	4 U	NA	NA	1 U	NA	NA	NA
Calcium	NA	NA	NA	18400	17600	NA	NA	15500	NA	NA	NA
Chromium	NA	NA	NA	7 U	7 U	NA	NA	3.7	NA	NA	NA
Cobalt	NA	NA	NA	10 U	10 U	NA	NA	5 U	NA	NA	NA
Copper	NA	NA	NA	6 B	7 B	NA	NA	1.1 J	NA	NA	NA
Iron	NA	NA	NA	41 B	39 B	NA	NA	60 U	NA	NA	NA
Lead	NA	NA	NA	1 U	1.6	NA	NA	2 U	NA	NA	NA
Magnesium	NA	NA	NA	11400	10600	NA	NA	5870	NA	NA	NA
Manganese	NA	NA	NA	2 B	1 B	NA	NA	3.3 J	NA	NA	NA
Mercury	NA	NA	NA	0.2 U	0.2 U	NA	NA	0.5 U	NA	NA	NA
Nickel	NA	NA	NA	12 U	12 U	NA	NA	2.2 J	NA	NA	NA
Potassium	NA	NA	NA	2140 U	2140 U	NA	NA	1390	NA	NA	NA
Selenium	NA	NA	NA	4 UJ	4 UJ	NA	NA	3 J	NA	NA	NA
Silver	NA	NA	NA	R	R	NA	NA	1 UR	NA	NA	NA
Sodium	NA	NA	NA	5560	5460	NA	NA	11600	NA	NA	NA
Thallium	NA	NA	NA	2 U	2 U	NA	NA	1 U	NA	NA	NA
Vanadium	NA	NA	NA	4 U	4 U	NA	NA	0.5 J	NA	NA	NA
Zinc	NA	NA	NA	10	5	NA	NA	1.1 J	NA	NA	NA
MISCELLANEOUS PARAMETERS											
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03I1**	**03MW03I**	**03MW03I-D**	**03MW03I-F**	**03MW03I-F-D**	**03MW03I**	**03MW03I-D**	**03MW03S**	**03MW03S**	**03MW03S**	**03MW03S-D**
Sample Date:	**4/11/2009**	**9/23/1991**	**9/23/1991**	**9/23/1991**	**9/23/1991**	**6/30/1997**	**6/30/1997**	**3/17/2008**	**10/20/2008**	**4/1/2009**	**4/1/2009**
Duplicate:											
SEMIVOLATILES		**ug/L**	**ug/L**			**ug/L**	**ug/L**	**ug/L**			
1,2,4-Trichlorobenzene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	2.8 U	NA	NA	NA
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	50 U	50 U	NA	NA	25 U	25 U	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2,4-Dichlorophenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2,4-Dimethylphenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2,4-Dinitrophenol	NA	50 U	50 U	NA	NA	25 U	25 U	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2-Chloronaphthalene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2-Chlorophenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2-Methylnaphthalene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2-Methylphenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
2-Nitroaniline	NA	50 U	50 U	NA	NA	25 U	25 U	NA	NA	NA	NA
2-Nitrophenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	20 U	20 U	NA	NA	10 U	10 U	NA	NA	NA	NA
3-Nitroaniline	NA	50 U	50 U	NA	NA	25 U	25 U	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	50 U	50 U	NA	NA	25 U	25 U	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
4-Chloroaniline	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
4-Methylphenol	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
4-Nitroaniline	NA	50 U	50 U	NA	NA	25 U	25 U	NA	NA	NA	NA
4-Nitrophenol	NA	50 U	50 U	NA	NA	25 U	25 U	NA	NA	NA	NA
Acenaphthene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Acenaphthylene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Benzoic Acid	NA	50 U	50 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Butylbenzylphthalate	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA
Chrysene	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA
Di-n-butylphthalate	NA	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW03I1**		**03MW03I**		**03MW03I-D**		**03MW03I-F**		**03MW03I-F-D**		**03MW03I**		**03MW03I-D**		**03MW03S**		**03MW03S**		**03MW03S**		**03MW03S-D**	
Sample Date:		**4/11/2009**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**6/30/1997**		**6/30/1997**		**3/17/2008**		**10/20/2008**		**4/1/2009**		**4/1/2009**	
Duplicate:																							
Di-n-octylphthalate		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Dibenz(a,h)anthracene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Dibenzofuran		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Diethylphthalate		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Dimethylphthalate		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Fluoranthene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Fluorene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachlorobenzene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachlorobutadiene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachlorocyclopentadiene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Hexachloroethane		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Isophorone		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
N-Nitroso-di-n-propylamine		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Naphthalene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Nitrobenzene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Pentachlorophenol		NA		50	U	50	U	NA		NA		25	U	25	U	NA		NA		NA		NA	
Phenanthrene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Phenol		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
Pyrene		NA		10	U	10	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
VOLATILES		**ug/L**		**ug/L**		**ug/L**						**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,1-Dichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
1,2,4-Trichlorobenzene	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	U	7	U	NA		NA		NA		NA		NA		NA		7	U	7	U	7	U	7	U
1,2-Dibromoethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichloroethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)		NA		5	U	5	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
1,2-Dichloroethene (trans)	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,2-Dichloropropane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
1,4-Dioxane	U	NA		NA		NA		NA		NA		NA		NA		NA		320	U	NA		NA	
2-Butanone	UR	10	UR	10	U	10	U	NA		NA		10	U	10	U	10	UR	10	UR	10	UR	10	UR
2-Hexanone	U	5	U	10	U	10	U	NA		NA		10	U	10	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	U	5	U	10	U	10	U	NA		NA		10	U	10	U	5	U	5	U	5	U	5	U
Acetone	U	10	UR	10	U	10	U	NA		NA		10	U	10	U	10	UR	10	U	10	UR	10	UR
Benzene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Bromochloromethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Bromodichloromethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Bromoform	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Bromomethane	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Carbon Disulfide	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW03I1**		**03MW03I**		**03MW03I-D**		**03MW03I-F**		**03MW03I-F-D**		**03MW03I**		**03MW03I-D**		**03MW03S**		**03MW03S**		**03MW03S**		**03MW03S-D**	
Sample Date:		**4/11/2009**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**6/30/1997**		**6/30/1997**		**3/17/2008**		**10/20/2008**		**4/1/2009**		**4/1/2009**	
Duplicate:																							
Chlorobenzene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Chloroethane	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Chloroform	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Chloromethane	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Cyclohexane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Dibromochloromethane	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Ethylbenzene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Isopropylbenzene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
M+p-xylenes	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
Methyl Acetate	U	2	U	NA		NA		NA		NA		NA		NA		2	U	2	U	2	U	2	U
Methyl Cyclohexane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	0.63	J	0.42	J
Methylene Chloride	U	1	U	5	U	5	U	NA		NA		4	B	10	UJ	1	U	1	U	1	U	1	U
O-xylene	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Styrene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Tetrachloroethene		4.3		5		5		NA		NA		6	J	6	J	2.5		2.6		3		3.2	
Toluene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Trichloroethene	U	1	U	5	U	5	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	U	1	U	NA		NA		NA		NA		NA		NA		1	U	1	U	1	U	1	U
Vinyl Acetate		NA		10	U	10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	U	1	U	10	U	10	U	NA		NA		10	U	10	U	1	U	1	U	1	U	1	U
Xylene (Total)		NA		5	U	5	U	NA		NA		10	U	10	U	NA		NA		NA		NA	
PESTICIDES/PCBS				**ug/L**		**ug/L**						**ug/L**		**ug/L**									
4,4'-DDD		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
4,4'-DDE		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
4,4'-DDT		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Aldrin		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Alpha-BHC		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Alpha-Chlordane		NA		0.5	U	0.5	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Beta-BHC		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Delta-BHC		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Dieldrin		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endosulfan I		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Endosulfan II		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endosulfan Sulfate		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endrin		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endrin Aldehyde		NA		NA		NA		NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Endrin Ketone		NA		0.1	U	0.1	U	NA		NA		0.1	U	0.1	U	NA		NA		NA		NA	
Gamma-BHC (Lindane)		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Gamma-Chlordane		NA		0.5	U	0.5	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Heptachlor		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Heptachlor Epoxide		NA		0.05	U	0.05	U	NA		NA		0.05	U	0.05	U	NA		NA		NA		NA	
Methoxychlor		NA		0.5	U	0.5	U	NA		NA		0.5	U	0.5	U	NA		NA		NA		NA	
Toxaphene		NA		1	U	1	U	NA		NA		5	U	5	U	NA		NA		NA		NA	
Aroclor-1016		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	
Aroclor-1221		NA		0.5	U	0.5	U	NA		NA		2	U	2	U	NA		NA		NA		NA	
Aroclor-1232		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	
Aroclor-1242		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	
Aroclor-1248		NA		0.5	U	0.5	U	NA		NA		1	U	1	U	NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW03I1**		**03MW03I**		**03MW03I-D**		**03MW03I-F**		**03MW03I-F-D**		**03MW03I**		**03MW03I-D**		**03MW03S**		**03MW03S**		**03MW03S**		**03MW03S-D**	
Sample Date:		**4/11/2009**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**9/23/1991**		**6/30/1997**		**6/30/1997**		**3/17/2008**		**10/20/2008**		**4/1/2009**		**4/1/2009**	
Duplicate:																							
Aroclor-1254		NA		1	U	1	U	NA		NA		1	U	1	U	NA		NA		NA		NA	
Aroclor-1260		NA		1	U	1	U	NA		NA		1	U	1	U	NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**	**03MW03SI**	**03MW03SI-D**	**03MW03SI**	**03MW03SI**	**03MW03SI**	**03MW03SI-F**	**03MW03SI**	**03MW03S**	**03MW03S-F**	**03MW03S**
Sample Date:	**10/20/2008**	**3/17/2008**	**3/17/2008**	**10/21/2008**	**4/1/2009**	**9/20/1991**	**9/20/1991**	**6/25/1997**	**9/18/1991**	**9/18/1991**	**6/25/1997**
Duplicate:											
TOTAL INORGANICS		**ug/L**	**ug/L**			**ug/L**		**ug/L**	**ug/L**		**ug/L**
Aluminum	NA	80 U	80 U	NA	NA	72 UJ	NA	75.4 B	214 B	NA	50.4 B
Antimony	NA	2 U	0.08 J	NA	NA	45 U	NA	20 U	45 U	NA	20 U
Arsenic	NA	6 U	0.5 J	NA	NA	2 UJ	NA	1 U	2 U	NA	1 U
Barium	NA	353	362	NA	NA	250	NA	294	154	NA	147
Beryllium	NA	1 U	1 U	NA	NA	3 B	NA	1 U	3 B	NA	1 U
Cadmium	NA	1 U	1 U	NA	NA	4	NA	5 U	4 U	NA	5 U
Calcium	NA	25900	25600	NA	NA	19500	NA	22600	15100	NA	14700
Chromium	NA	1.8 B	1.4 B	NA	NA	7 U	NA	5 U	8 B	NA	5 U
Cobalt	NA	6 U	6 U	NA	NA	10 U	NA	5 U	10 U	NA	5 U
Copper	NA	6 U	6 U	NA	NA	9 B	NA	10 U	7 B	NA	10 U
Cyanide	NA	NA	NA	NA	NA	10 U	NA	5 U	10 U	NA	5 U
Iron	NA	70 U	70 U	NA	NA	43 B	NA	50 U	243	NA	50 U
Lead	NA	2 U	2 U	NA	NA	1 U	NA	13 B	1 U	NA	14.4 B
Magnesium	NA	9960	9860	NA	NA	7710	NA	8370	4570	NA	4950
Manganese	NA	6 U	6 U	NA	NA	1	NA	5 U	10 B	NA	5 U
Mercury	NA	0.03 J	0.5 U	NA	NA	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U
Nickel	NA	0.9 J	0.8 J	NA	NA	12 U	NA	20 U	12 U	NA	20 U
Potassium	NA	670	670	NA	NA	2140 U	NA	1500 U	2140 U	NA	1500 U
Selenium	NA	2 J	2 J	NA	NA	20 UJ	NA	5 UL	4 U	NA	5 U
Silver	NA	0.6 B	0.7 B	NA	NA	6 U	NA	5 U	6 U	NA	5 U
Sodium	NA	9300	9470	NA	NA	6420	NA	7840	7700	NA	7320
Thallium	NA	1 U	1 U	NA	NA	2 UJ	NA	1 U	2 U	NA	1 U
Vanadium	NA	1.5	1.5	NA	NA	4 U	NA	5 U	4 U	NA	5 U
Zinc	NA	6 U	6 U	NA	NA	5 B	NA	5 U	8 B	NA	12 B
DISSOLVED INORGANICS		**ug/L**	**ug/L**				**ug/L**			**ug/L**	
Aluminum	NA	80 U	80 U	NA	NA	NA	72 B	NA	NA	128 B	NA
Antimony	NA	1.6 B	0.8 B	NA	NA	NA	45 U	NA	NA	45 U	NA
Arsenic	NA	0.5 J	0.4 J	NA	NA	NA	2 UJ	NA	NA	2 U	NA
Barium	NA	344	351	NA	NA	NA	263	NA	NA	145	NA
Beryllium	NA	1 U	1 U	NA	NA	NA	4 B	NA	NA	3 B	NA
Cadmium	NA	1 U	1 U	NA	NA	NA	4 U	NA	NA	4 U	NA
Calcium	NA	28300	29000	NA	NA	NA	20000	NA	NA	14400	NA
Chromium	NA	2.7	2.6	NA	NA	NA	7 U	NA	NA	7 U	NA
Cobalt	NA	5 U	5 U	NA	NA	NA	10 U	NA	NA	10 U	NA
Copper	NA	5 U	5 U	NA	NA	NA	6 B	NA	NA	7 B	NA
Iron	NA	60 U	60 U	NA	NA	NA	48 B	NA	NA	42 B	NA
Lead	NA	2 U	2 U	NA	NA	NA	1.1 U	NA	NA	1 U	NA
Magnesium	NA	10200	10100	NA	NA	NA	7800	NA	NA	4340	NA
Manganese	NA	4 U	4 U	NA	NA	NA	1 B	NA	NA	2 B	NA
Mercury	NA	0.5 U	0.5 U	NA	NA	NA	0.2 U	NA	NA	0.2 U	NA
Nickel	NA	0.7 J	0.5 J	NA	NA	NA	12 U	NA	NA	12 U	NA
Potassium	NA	770	760	NA	NA	NA	2140 U	NA	NA	2140 U	NA
Selenium	NA	2 J	2 J	NA	NA	NA	4 UJ	NA	NA	4 U	NA
Silver	NA	1 UR	1 UR	NA	NA	NA	R	NA	NA	6 U	NA
Sodium	NA	9770	9900	NA	NA	NA	6090	NA	NA	7270	NA
Thallium	NA	1 U	1 U	NA	NA	NA	2 U	NA	NA	2 U	NA
Vanadium	NA	1.7	1.7	NA	NA	NA	4 U	NA	NA	4 U	NA
Zinc	NA	5 U	5 U	NA	NA	NA	14	NA	NA	11 B	NA
MISCELLANEOUS PARAMETERS											
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**		**03MW03SI**		**03MW03SI-D**		**03MW03SI**		**03MW03SI**		**03MW03SI**		**03MW03SI-F**		**03MW03SI**		**03MW03S**		**03MW03S-F**		**03MW03S**	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
SEMIVOLATILES			**ug/L**		**ug/L**						**ug/L**				**ug/L**		**ug/L**				**ug/L**	
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
1,4-Dioxane	NA		2.9	U	2.9	UJ	NA		NA		NA		NA		NA		NA		NA		NA	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4,5-Trichlorophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
2,4,6-Trichlorophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4-Dichlorophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4-Dimethylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,4-Dinitrophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
2,4-Dinitrotoluene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2,6-Dinitrotoluene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Chloronaphthalene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Chlorophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Methylnaphthalene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Methylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
2-Nitroaniline	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
2-Nitrophenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
3,3'-Dichlorobenzidine	NA		NA		NA		NA		NA		20	U	NA		10	U	20	U	NA		10	U
3-Nitroaniline	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
4,6-Dinitro-2-methylphenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
4-Bromophenyl Phenyl Ether	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Chloro-3-methylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Chloroaniline	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Chlorophenyl Phenyl Ether	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Methylphenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
4-Nitroaniline	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
4-Nitrophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
Acenaphthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Acenaphthylene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzo(b)fluoranthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzo(g,h,i)perylene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzo(k)fluoranthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Benzoic Acid	NA		NA		NA		NA		NA		50	U	NA		NA		50	U	NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		10	U	NA		NA		10	U	NA		NA	
Bis(2-chloroethoxy)methane	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Bis(2-chloroethyl)ether	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Bis(2-ethylhexyl)phthalate	NA		NA		NA		NA		NA		1	J	NA		10	U	10	U	NA		10	U
Butylbenzylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		10	U	NA		NA		10	U
Chrysene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Di-n-butylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**		**03MW03SI**		**03MW03SI-D**		**03MW03SI**		**03MW03SI**		**03MW03SI**		**03MW03SI-F**		**03MW03SI**		**03MW03S**		**03MW03S-F**		**03MW03S**	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
Di-n-octylphthalate	NA		NA		NA		NA		NA		2	J	NA		10	U	10	U	NA		10	U
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Dibenzofuran	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Diethylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Dimethylphthalate	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Fluoranthene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Fluorene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachlorobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachlorobutadiene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachlorocyclopentadiene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Hexachloroethane	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Isophorone	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Naphthalene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Nitrobenzene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Pentachlorophenol	NA		NA		NA		NA		NA		50	U	NA		25	U	50	U	NA		25	U
Phenanthrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Phenol	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
Pyrene	NA		NA		NA		NA		NA		10	U	NA		10	U	10	U	NA		10	U
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**				**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,2,3-Trichlorobenzene	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
1,2-Dibromo-3-chloropropane	7	U	7	U	7	U	7	U	7	U	NA		NA		NA		NA		NA		NA	
1,2-Dibromoethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		5	U	NA		10	U	5	U	NA		10	U
1,2-Dichloroethene (trans)	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
1,4-Dioxane	320	U	NA		NA		320	U	NA		NA		NA		NA		NA		NA		NA	
2-Butanone	10	UR	10	UR	10	UR	10	UR	10	UR	10	U	NA		10	U	10	U	NA		10	U
2-Hexanone	5	U	5	U	5	U	5	U	5	U	10	U	NA		10	U	10	U	NA		10	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	5	U	10	U	NA		10	U	10	U	NA		10	U
Acetone	10	U	10	UR	10	UR	10	U	10	UR	10	U	NA		10	U	10	U	NA		10	U
Benzene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Bromochloromethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Bromoform	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Bromomethane	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
Carbon Disulfide	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**		**03MW03SI**		**03MW03SI-D**		**03MW03SI**		**03MW03SI**		**03MW03SI**		**03MW03SI-F**		**03MW03SI**		**03MW03S**		**03MW03S-F**		**03MW03S**	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
Chlorobenzene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Chloroethane	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
Chloroform	1	U	1	U	1	U	0.57	J	1	U	5	U	NA		10	U	5	U	NA		10	U
Chloromethane	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Cyclohexane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Dichlorodifluoromethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Ethylbenzene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Isopropylbenzene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
M+p-xylenes	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
Methyl Acetate	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA		NA		NA	
Methyl Cyclohexane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Methylene Chloride	1	U	1	U	1	U	1	U	1	U	5	U	NA		13	B	3	B	NA		15	B
O-xylene	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Styrene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Tetrachloroethene	2.1		12		11.7		12.4		10.8		35		NA		18		8		NA		5	J
Toluene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U	5	U	NA		10	U	5	U	NA		10	U
Trichlorofluoromethane	1	U	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA	
Vinyl Acetate	NA		NA		NA		NA		NA		10	U	NA		NA		10	U	NA		NA	
Vinyl Chloride	1	U	1	U	1	U	1	U	1	U	10	U	NA		10	U	10	U	NA		10	U
Xylene (Total)	NA		NA		NA		NA		NA		5	U	NA		10	U	5	U	NA		10	U
PESTICIDES/PCBS											**ug/L**				**ug/L**		**ug/L**				**ug/L**	
4,4'-DDD	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
4,4'-DDE	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
4,4'-DDT	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Aldrin	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Alpha-BHC	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Alpha-Chlordane	NA		NA		NA		NA		NA		0.5	U	NA		0.05	U	0.5	U	NA		0.05	U
Beta-BHC	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Delta-BHC	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Dieldrin	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endosulfan I	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Endosulfan II	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endosulfan Sulfate	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endrin	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		0.1	U	NA		NA		0.1	U
Endrin Ketone	NA		NA		NA		NA		NA		0.1	U	NA		0.1	U	0.1	U	NA		0.1	U
Gamma-BHC (Lindane)	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Gamma-Chlordane	NA		NA		NA		NA		NA		0.5	U	NA		0.05	U	0.5	U	NA		0.05	U
Heptachlor	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Heptachlor Epoxide	NA		NA		NA		NA		NA		0.05	U	NA		0.05	U	0.05	U	NA		0.05	U
Methoxychlor	NA		NA		NA		NA		NA		0.5	U	NA		0.5	U	0.5	U	NA		0.5	U
Toxaphene	NA		NA		NA		NA		NA		1	U	NA		5	U	1	U	NA		5	U
Aroclor-1016	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U
Aroclor-1221	NA		NA		NA		NA		NA		0.5	U	NA		2	U	0.5	U	NA		2	U
Aroclor-1232	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U
Aroclor-1242	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U
Aroclor-1248	NA		NA		NA		NA		NA		0.5	U	NA		1	U	0.5	U	NA		1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03S-L**		**03MW03SI**		**03MW03SI-D**		**03MW03SI**		**03MW03SI**		**03MW03SI**		**03MW03SI-F**		**03MW03SI**		**03MW03S**		**03MW03S-F**		**03MW03S**	
Sample Date:	**10/20/2008**		**3/17/2008**		**3/17/2008**		**10/21/2008**		**4/1/2009**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**	
Duplicate:																						
Aroclor-1254	NA		NA		NA		NA		NA		1	U	NA		1	U	1	U	NA		1	U
Aroclor-1260	NA		NA		NA		NA		NA		1	U	NA		1	U	1	U	NA		1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**	**03MW04I**	**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**	**03MW04S**	**03MW04SI**		**03MW04SI**	**03MW04SI**
Sample Date:	**3/14/2008**		**10/14/2008**	**4/2/2009**	**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**	**4/2/2009**	**3/14/2008**		**10/14/2008**	**4/2/2009**
Duplicate:																		
TOTAL INORGANICS	**ug/L**				**ug/L**				**ug/L**		**ug/L**				**ug/L**			
Aluminum	80	U	NA	NA	87	B	NA		50	U	80	U	NA	NA	80	U	NA	NA
Antimony	0.7	J	NA	NA	45	U	NA		20	U	0.2	J	NA	NA	0.6	J	NA	NA
Arsenic	0.6	J	NA	NA	2	UJ	NA		1	U	6	U	NA	NA	0.6	J	NA	NA
Barium	455		NA	NA	405		NA		395		434		NA	NA	487		NA	NA
Beryllium	1	U	NA	NA	3	B	NA		1	U	1	U	NA	NA	1	U	NA	NA
Cadmium	1	U	NA	NA	4	U	NA		5	U	1	U	NA	NA	1	U	NA	NA
Calcium	31900		NA	NA	24000		NA		25600		36500		NA	NA	37200		NA	NA
Chromium	1	J	NA	NA	7	U	NA		5	U	5.4	B	NA	NA	0.9	J	NA	NA
Cobalt	6	U	NA	NA	10	U	NA		5	U	6	U	NA	NA	6	U	NA	NA
Copper	0.08	J	NA	NA	6	B	NA		10	U	1.3	B	NA	NA	0.1	J	NA	NA
Cyanide	NA		NA	NA	10	U	NA		5	U	NA		NA	NA	NA		NA	NA
Iron	40	J	NA	NA	35	B	NA		50	U	70	U	NA	NA	20	J	NA	NA
Lead	2	U	NA	NA	1	U	NA		1	U	2	U	NA	NA	2	U	NA	NA
Magnesium	8260		NA	NA	6440		NA		6220		13200		NA	NA	9650		NA	NA
Manganese	6	U	NA	NA	1		NA		5	U	1	J	NA	NA	6	U	NA	NA
Mercury	0.5	U	NA	NA	0.2	U	NA		0.2	U	0.5	U	NA	NA	0.5	U	NA	NA
Nickel	1.8	J	NA	NA	12	U	NA		20	U	4.2	J	NA	NA	2.6	J	NA	NA
Potassium	680		NA	NA	2140	U	NA		1500	U	840		NA	NA	880		NA	NA
Selenium	3	J	NA	NA	20	UJ	NA		5	UL	1	J	NA	NA	3	J	NA	NA
Silver	1	U	NA	NA	6	U	NA		5	U	0.7	B	NA	NA	1	U	NA	NA
Sodium	13300		NA	NA	8900		NA		11100		12100		NA	NA	17600		NA	NA
Thallium	1	U	NA	NA	2	UJ	NA		1	U	1	U	NA	NA	1	U	NA	NA
Vanadium	1	U	NA	NA	4	U	NA		5	U	0.8	B	NA	NA	1	U	NA	NA
Zinc	6.2		NA	NA	3	B	NA		5	U	6	U	NA	NA	1.9	J	NA	NA
DISSOLVED INORGANICS	**ug/L**						**ug/L**				**ug/L**				**ug/L**			
Aluminum	80	UL	NA	NA	NA		72	U	NA		80	U	NA	NA	80	UL	NA	NA
Antimony	2	U	NA	NA	NA		45	U	NA		0.4	B	NA	NA	2	U	NA	NA
Arsenic	3	U	NA	NA	NA		2	U	NA		0.3	J	NA	NA	3	U	NA	NA
Barium	461		NA	NA	NA		431		NA		411		NA	NA	496		NA	NA
Beryllium	1	U	NA	NA	NA		4	B	NA		1	U	NA	NA	1	U	NA	NA
Cadmium	1	U	NA	NA	NA		4	U	NA		1	U	NA	NA	1	U	NA	NA
Calcium	35700		NA	NA	NA		25200		NA		39900		NA	NA	42400		NA	NA
Chromium	1.5	J	NA	NA	NA		7	U	NA		3.6		NA	NA	2.5		NA	NA
Cobalt	0.1	J	NA	NA	NA		10	U	NA		5	U	NA	NA	0.2	J	NA	NA
Copper	5	U	NA	NA	NA		7	B	NA		5	U	NA	NA	5	U	NA	NA
Iron	60	U	NA	NA	NA		50	B	NA		60	U	NA	NA	60	U	NA	NA
Lead	2	U	NA	NA	NA		1	U	NA		2	U	NA	NA	2	U	NA	NA
Magnesium	8570	L	NA	NA	NA		6630		NA		13600		NA	NA	10100		NA	NA
Manganese	4	U	NA	NA	NA		2	B	NA		4	U	NA	NA	0.06	J	NA	NA
Mercury	0.09	J	NA	NA	NA		0.2	U	NA		0.5	U	NA	NA	0.09	J	NA	NA
Nickel	5	U	NA	NA	NA		12	U	NA		1.2	J	NA	NA	0.9	J	NA	NA
Potassium	870		NA	NA	NA		2140	U	NA		960		NA	NA	1020		NA	NA
Selenium	2	J	NA	NA	NA		4	UJ	NA		2	J	NA	NA	2	J	NA	NA
Silver	1	U	NA	NA	NA			R	NA		1	UR	NA	NA	1	U	NA	NA
Sodium	13600		NA	NA	NA		8170		NA		13000		NA	NA	18500		NA	NA
Thallium	1	U	NA	NA	NA		2	U	NA		1	U	NA	NA	1	U	NA	NA
Vanadium	1.2		NA	NA	NA		4	U	NA		1.1		NA	NA	1.3		NA	NA
Zinc	5	U	NA	NA	NA		6		NA		5	U	NA	NA	5	U	NA	NA
MISCELLANEOUS PARAMETERS																		
Hexavalent Chromium	NA		NA	NA	NA		NA		NA		NA		NA	NA	NA		NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**		**03MW04S**		**03MW04SI**		**03MW04SI**		**03MW04SI**
Sample Date:	**3/14/2008**		**10/14/2008**		**4/2/2009**		**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**		**4/2/2009**		**3/14/2008**		**10/14/2008**		**4/2/2009**
Duplicate:																							
SEMIVOLATILES	**ug/L**						**ug/L**				**ug/L**		**ug/L**						**ug/L**				
1,2,4-Trichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
1,2-Dichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
1,3-Dichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
1,4-Dichlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
1,4-Dioxane	2.9	U	NA		NA		NA		NA		NA		2.9	U	NA		NA		2.8	U	NA		NA
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2,4,5-Trichlorophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA
2,4,6-Trichlorophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2,4-Dichlorophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2,4-Dimethylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2,4-Dinitrophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA
2,4-Dinitrotoluene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2,6-Dinitrotoluene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2-Chloronaphthalene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2-Chlorophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2-Methylnaphthalene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2-Methylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
2-Nitroaniline	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA
2-Nitrophenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
3,3'-Dichlorobenzidine	NA		NA		NA		20	U	NA		10	U	NA		NA		NA		NA		NA		NA
3-Nitroaniline	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA
4,6-Dinitro-2-methylphenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA
4-Bromophenyl Phenyl Ether	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
4-Chloro-3-methylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
4-Chloroaniline	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
4-Chlorophenyl Phenyl Ether	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
4-Methylphenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
4-Nitroaniline	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA
4-Nitrophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA
Acenaphthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Acenaphthylene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Anthracene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benz(a)anthracene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzo(a)pyrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Benzo(b)fluoranthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Benzo(g,h,i)perylene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Benzo(k)fluoranthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Benzoic Acid	NA		NA		NA		50	U	NA		NA		NA		NA		NA		NA		NA		NA
Benzyl Alcohol	NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA
Bis(2-chloroethoxy)methane	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Bis(2-chloroethyl)ether	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Bis(2-ethylhexyl)phthalate	NA		NA		NA		1	J	NA		10	U	NA		NA		NA		NA		NA		NA
Butylbenzylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Carbazole	NA		NA		NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA
Chrysene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA
Di-n-butylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**		**03MW04S**		**03MW04SI**		**03MW04SI**		**03MW04SI**	
Sample Date:	**3/14/2008**		**10/14/2008**		**4/2/2009**		**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**		**4/2/2009**		**3/14/2008**		**10/14/2008**		**4/2/2009**	
Duplicate:																								
Di-n-octylphthalate	NA		NA		NA		2	J	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		NA		50	U	NA		25	U	NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		NA		10	U	NA		10	U	NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2,4-Trichlorobenzene	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	7	U	7	U	7	U	NA		NA		NA		7	U	7	U	7	U	7	U	7	U	7	U
1,2-Dibromoethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	NA		320	U	NA		NA		NA		NA		NA		320	U	NA		NA		320	U	NA	
2-Butanone	10	UR	10	U	10	UR	10	U	NA		10	U	10	UR	10	UR	10	UR	10	UR	10	U	10	UR
2-Hexanone	5	U	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	10	UR	10	U	10	UR	10	U	NA		10	U	10	UR	10	U	10	UR	10	UR	10	U	10	UR
Benzene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	1	U	1	U	1	U	5	U	NA		10	U	1.1		1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	1	U	1	U	5	U	NA		10	U	0.87	J	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**		**03MW04S**		**03MW04SI**		**03MW04SI**		**03MW04SI**	
Sample Date:	**3/14/2008**		**10/14/2008**		**4/2/2009**		**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**		**4/2/2009**		**3/14/2008**		**10/14/2008**		**4/2/2009**	
Duplicate:																								
Chlorobenzene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	1	U	5	U	NA		10	U	0.4	J	1.6		1	U	0.22	J	1.6		1	U
Chloromethane	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U	5	U	NA		10	U	1.5		1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Acetate	2	U	2	U	2	U	NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U
Methyl Cyclohexane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	0.26	J	1	U	1	U
Methylene Chloride	1	U	1	U	1	U	5	U	NA		10	UJ	1	U	1	U	1	U	1	U	1	U	1	U
O-xylene	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Styrene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	0.45	J	1	U	0.41	J	5	U	NA		10	U	4.5		2.7		3.1		4.6		3.9		5.7	
Toluene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	1	U	1	U	1	U	NA		NA		NA		1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	NA		NA		NA		5	U	NA		10	U	NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS							**ug/L**				**ug/L**													
4,4'-DDD	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		NA		0.5	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		0.1	U	NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		0.1	U	NA		0.1	U	NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		NA		0.5	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA		0.05	U	NA		0.05	U	NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		NA		0.5	U	NA		0.5	U	NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		NA		1	U	NA		5	U	NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		NA		0.5	U	NA		2	U	NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		NA		0.5	U	NA		1	U	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I**		**03MW04I-F**		**03MW04I**		**03MW04S**		**03MW04S**		**03MW04S**		**03MW04SI**		**03MW04SI**		**03MW04SI**	
Sample Date:	**3/14/2008**		**10/14/2008**		**4/2/2009**		**9/20/1991**		**9/20/1991**		**6/30/1997**		**3/14/2008**		**10/16/2008**		**4/2/2009**		**3/14/2008**		**10/14/2008**		**4/2/2009**	
Duplicate:																								
Aroclor-1254	NA		NA		NA		1	U	NA		1	U	NA		NA		NA		NA		NA		NA	
Aroclor-1260	NA		NA		NA		1	U	NA		1	U	NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04SI-L**	**03MW04SI**	**03MW04SI-F**	**03MW04SI**	**03MW04SI-D**	**03MW04S**	**03MW04S-F**	**03MW04S**	**03MW05I**	**03MW05I**	**03MW05I**	**03MW05S**
Sample Date:	**10/14/2008**	**9/20/1991**	**9/20/1991**	**6/25/1997**	**6/25/1997**	**9/18/1991**	**9/18/1991**	**6/25/1997**	**3/11/2008**	**10/16/2008**	**6/18/1997**	**3/12/2008**
Duplicate:												
TOTAL INORGANICS		**ug/L**		**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**		**ug/L**	**ug/L**
Aluminum	NA	379 B	NA	91.9 B	50 U	551 B	NA	67.1 B	80 U	NA	1040	80
Antimony	NA	45 U	NA	20 U	20 U	45 U	NA	20 U	0.8 J	NA	20 UL	0.7
Arsenic	NA	2 UJ	NA	1 U	1 U	2 U	NA	1 U	0.5 J	NA	1 UL	6
Barium	NA	326	NA	369	364	306	NA	322	209	NA	480	55
Beryllium	NA	3 B	NA	1 U	1 U	3 B	NA	1 U	1 U	NA	1 U	1
Cadmium	NA	4 U	NA	5 U	5 U	4 U	NA	5 U	1 U	NA	5 U	1
Calcium	NA	18800	NA	24400	23900	22900	NA	26300	12000	NA	12000	9690
Chromium	NA	12 B	NA	5 U	5 U	7 U	NA	5 U	7.6	NA	53.3	2.7
Cobalt	NA	10 U	NA	5 U	5 U	10 U	NA	5 U	4 J	NA	5 U	6
Copper	NA	9 B	NA	10 U	10 U	7 B	NA	10 U	1 J	NA	10 U	6
Cyanide	NA	10 U	NA	5 U	5 U	10 U	NA	5 U	NA	NA	5 U	NA
Iron	NA	757	NA	50 U	50 U	562	NA	59.6	130 K	NA	1860	40
Lead	NA	1.7	NA	4.2 B	1 U	1 U	NA	1 U	2 U	NA	4.7 B	2
Magnesium	NA	5330	NA	6150	6020	8460	NA	9040	3160	NA	3430	3240
Manganese	NA	226	NA	5 U	5 U	50	NA	5.1 K	2.8 J	NA	138	1.7
Mercury	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.5 U	NA	0.2 U	0.5
Nickel	NA	15 B	NA	20 U	20 U	12 U	NA	20 U	5.7 J	NA	44.4	1.8
Potassium	NA	2140 U	NA	1500 U	1500 U	2140 U	NA	1500 U	790	NA	1500 U	800
Selenium	NA	20 UJ	NA	5 UL	5 U	20 U	NA	5 UL	2 J	NA	5 U	3
Silver	NA	6 U	NA	5 U	5 U	6 U	NA	5 U	0.06 J	NA	5 U	1
Sodium	NA	9880	NA	12100	11900	7780	NA	9230	9320	NA	9760	11500
Thallium	NA	2 UJ	NA	1 U	1 U	2 U	NA	1 U	1 U	NA	1 U	1
Vanadium	NA	4 U	NA	5 U	5 U	5 B	NA	5 U	1 U	NA	5 U	1
Zinc	NA	9 B	NA	5 U	5 U	8 B	NA	5 U	6 U	NA	37.1	2.8
DISSOLVED INORGANICS			**ug/L**				**ug/L**		**ug/L**			**ug/L**
Aluminum	NA	NA	72 B	NA	NA	NA	105 B	NA	80 U	NA	NA	5
Antimony	NA	NA	45 U	NA	NA	NA	45 U	NA	2 U	NA	NA	2
Arsenic	NA	NA	2 UJ	NA	NA	NA	2 U	NA	3 U	NA	NA	3
Barium	NA	NA	358	NA	NA	NA	334	NA	201	NA	NA	54.8
Beryllium	NA	NA	4 B	NA	NA	NA	3 B	NA	1 U	NA	NA	1
Cadmium	NA	NA	4 U	NA	NA	NA	4 U	NA	1 U	NA	NA	1
Calcium	NA	NA	22000	NA	NA	NA	26100	NA	12800	NA	NA	11100
Chromium	NA	NA	7 U	NA	NA	NA	7 U	NA	3.9	NA	NA	4.9
Cobalt	NA	NA	10 U	NA	NA	NA	10 U	NA	2.5 J	NA	NA	0.5
Copper	NA	NA	6 B	NA	NA	NA	6 B	NA	5 U	NA	NA	5
Iron	NA	NA	54 B	NA	NA	NA	38 B	NA	60 U	NA	NA	9
Lead	NA	NA	1 U	NA	NA	NA	1 U	NA	2 U	NA	NA	2
Magnesium	NA	NA	6080	NA	NA	NA	9620	NA	3240 L	NA	NA	3720
Manganese	NA	NA	2 B	NA	NA	NA	1 B	NA	4 U	NA	NA	2.4
Mercury	NA	NA	0.2 U	NA	NA	NA	0.2 U	NA	0.1 J	NA	NA	0.09
Nickel	NA	NA	12 U	NA	NA	NA	12 U	NA	3.6 J	NA	NA	2.2
Potassium	NA	NA	2140 U	NA	NA	NA	2140 U	NA	860	NA	NA	1140
Selenium	NA	NA	4 UJ	NA	NA	NA	20 U	NA	5 U	NA	NA	3
Silver	NA	NA	R	NA	NA	NA	6 U	NA	1 U	NA	NA	1
Sodium	NA	NA	9840	NA	NA	NA	8680	NA	9470	NA	NA	12600
Thallium	NA	NA	2 U	NA	NA	NA	2 U	NA	1 U	NA	NA	1
Vanadium	NA	NA	4 U	NA	NA	NA	4 B	NA	1 U	NA	NA	1
Zinc	NA	NA	13	NA	NA	NA	6 B	NA	0.3 J	NA	NA	1.4
MISCELLANEOUS PARAMETERS									**mg/L**			**mg/L**
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	0.01 U	NA	NA	0.01

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04SI-L**	**03MW04SI**	**03MW04SI-F**	**03MW04SI**	**03MW04SI-D**	**03MW04S**	**03MW04S-F**	**03MW04S**	**03MW05I**	**03MW05I**	**03MW05I**	**03MW05S**
Sample Date:	**10/14/2008**	**9/20/1991**	**9/20/1991**	**6/25/1997**	**6/25/1997**	**9/18/1991**	**9/18/1991**	**6/25/1997**	**3/11/2008**	**10/16/2008**	**6/18/1997**	**3/12/2008**
Duplicate:												
SEMIVOLATILES		**ug/L**		**ug/L**	**ug/L**	**ug/L**		**ug/L**	**ug/L**		**ug/L**	**ug/L**
1,2,4-Trichlorobenzene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
1,2-Dichlorobenzene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
1,3-Dichlorobenzene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
1,4-Dichlorobenzene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	2.8 U	NA	NA	2.8
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2,4,5-Trichlorophenol	NA	50 U	NA	25 U	25 U	50 U	NA	25 U	NA	NA	25 U	NA
2,4,6-Trichlorophenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2,4-Dichlorophenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2,4-Dimethylphenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2,4-Dinitrophenol	NA	50 U	NA	25 U	25 U	50 U	NA	25 U	NA	NA	25 U	NA
2,4-Dinitrotoluene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2,6-Dinitrotoluene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2-Chloronaphthalene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2-Chlorophenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2-Methylnaphthalene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2-Methylphenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
2-Nitroaniline	NA	50 U	NA	25 U	25 U	50 U	NA	25 U	NA	NA	25 U	NA
2-Nitrophenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
3,3'-Dichlorobenzidine	NA	20 U	NA	10 U	10 U	20 U	NA	10 U	NA	NA	10 U	NA
3-Nitroaniline	NA	50 U	NA	25 U	25 U	50 U	NA	25 U	NA	NA	25 U	NA
4,6-Dinitro-2-methylphenol	NA	50 U	NA	25 U	25 U	50 U	NA	25 U	NA	NA	25 U	NA
4-Bromophenyl Phenyl Ether	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
4-Chloro-3-methylphenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
4-Chloroaniline	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
4-Chlorophenyl Phenyl Ether	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
4-Methylphenol	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
4-Nitroaniline	NA	50 U	NA	25 U	25 U	50 U	NA	25 U	NA	NA	25 U	NA
4-Nitrophenol	NA	50 U	NA	25 U	25 U	50 U	NA	25 U	NA	NA	25 U	NA
Acenaphthene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Acenaphthylene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Benzo(b)fluoranthene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Benzo(g,h,i)perylene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Benzo(k)fluoranthene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Benzoic Acid	NA	50 U	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Bis(2-chloroethyl)ether	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Bis(2-ethylhexyl)phthalate	NA	1 J	NA	10 U	10 U	10 U	NA	10 U	NA	NA	6 J	NA
Butylbenzylphthalate	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA	NA	10 U	NA
Chrysene	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA
Di-n-butylphthalate	NA	10 U	NA	10 U	10 U	10 U	NA	10 U	NA	NA	10 U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW04SI-L**		**03MW04SI**		**03MW04SI-F**		**03MW04SI**		**03MW04SI-D**		**03MW04S**		**03MW04S-F**		**03MW04S**		**03MW05I**		**03MW05I**		**03MW05I**		**03MW05S**
Sample Date:	**10/14/2008**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/11/2008**		**10/16/2008**		**6/18/1997**		**3/12/2008**
Duplicate:																							
Di-n-octylphthalate	NA		2	J	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Dibenz(a,h)anthracene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Dibenzofuran	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Diethylphthalate	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Dimethylphthalate	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Fluoranthene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Fluorene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachlorobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachlorobutadiene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachlorocyclopentadiene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Hexachloroethane	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Indeno(1,2,3-cd)pyrene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Isophorone	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
N-Nitroso-di-n-propylamine	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
N-Nitrosodiphenylamine (1)	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Naphthalene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Nitrobenzene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Pentachlorophenol	NA		50	U	NA		25	U	25	U	50	U	NA		25	U	NA		NA		25	U	NA
Phenanthrene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Phenol	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
Pyrene	NA		10	U	NA		10	U	10	U	10	U	NA		10	U	NA		NA		10	U	NA
VOLATILES	**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**
1,1,1-Trichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1,2,2-Tetrachloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1,2-Trichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1,2-Trichlorotrifluoroethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,1-Dichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,1-Dichloroethene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,2,3-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
1,2,4-Trichlorobenzene	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
1,2-Dibromo-3-chloropropane	7	U	NA		NA		NA		NA		NA		NA		NA		7	U	7	U	NA		7
1,2-Dibromoethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichloroethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,2-Dichloroethene (cis)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichloroethene (Total)	NA		5	U	NA		10	U	10	U	5	U	NA		10	U	NA		NA		10	U	NA
1,2-Dichloroethene (trans)	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,2-Dichloropropane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
1,3-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,4-Dichlorobenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
1,4-Dioxane	320	U	NA		NA		NA		NA		NA		NA		NA		NA		320	U	NA		NA
2-Butanone	10	U	10	U	NA		10	U	10	U	10	U	NA		10	U	10	UR	10	UR	10	U	10
2-Hexanone	5	U	10	U	NA		10	U	10	U	10	U	NA		10	U	5	U	5	U	10	U	5
4-Methyl-2-pentanone	5	U	10	U	NA		10	U	10	U	10	U	NA		10	U	5	U	5	U	10	U	5
Acetone	10	U	10	U	NA		10	U	10	U	10	U	NA		10	U	10	UR	10	U	10	U	10
Benzene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Bromochloromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Bromodichloromethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Bromoform	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Bromomethane	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
Carbon Disulfide	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Carbon Tetrachloride	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
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Sample ID:	**03MW04SI-L**		**03MW04SI**		**03MW04SI-F**		**03MW04SI**		**03MW04SI-D**		**03MW04S**		**03MW04S-F**		**03MW04S**		**03MW05I**		**03MW05I**		**03MW05I**		**03MW05S**
Sample Date:	**10/14/2008**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/11/2008**		**10/16/2008**		**6/18/1997**		**3/12/2008**
Duplicate:																							
Chlorobenzene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Chloroethane	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
Chloroform	1.5		5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Chloromethane	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
cis-1,3-Dichloropropene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Dibromochloromethane	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Dichlorodifluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Ethylbenzene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Isopropylbenzene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
M+p-xylenes	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
Methyl Acetate	2	U	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	NA		2
Methyl Cyclohexane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Methyl Tert-butyl Ether	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Methylene Chloride	1	U	5	U	NA		12	B	16	B	5	U	NA		18	B	1	U	1	U	8	B	1
O-xylene	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Styrene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Tetrachloroethene	4		56		NA		20		22		61		NA		21		0.46	J	1	U	10	U	1
Toluene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
trans-1,3-Dichloropropene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Trichloroethene	1	U	5	U	NA		10	U	10	U	5	U	NA		10	U	1	U	1	U	10	U	1
Trichlorofluoromethane	1	U	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	NA		1
Vinyl Acetate	NA		10	U	NA		NA		NA		10	U	NA		NA		NA		NA		NA		NA
Vinyl Chloride	1	U	10	U	NA		10	U	10	U	10	U	NA		10	U	1	U	1	U	10	U	1
Xylene (Total)	NA		5	U	NA		10	U	10	U	5	U	NA		10	U	NA		NA		10	U	NA
PESTICIDES/PCBS			**ug/L**				**ug/L**		**ug/L**		**ug/L**				**ug/L**						**ug/L**		
4,4'-DDD	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
4,4'-DDE	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
4,4'-DDT	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Aldrin	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Alpha-BHC	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Alpha-Chlordane	NA		0.5	U	NA		0.05	U	0.05	U	0.5	U	NA		0.05	U	NA		NA		0.05	U	NA
Beta-BHC	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Delta-BHC	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Dieldrin	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endosulfan I	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Endosulfan II	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endosulfan Sulfate	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endrin	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Endrin Aldehyde	NA		NA		NA		0.1	U	0.1	U	NA		NA		0.1	U	NA		NA		0.1	U	NA
Endrin Ketone	NA		0.1	U	NA		0.1	U	0.1	U	0.1	U	NA		0.1	U	NA		NA		0.1	U	NA
Gamma-BHC (Lindane)	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Gamma-Chlordane	NA		0.5	U	NA		0.05	U	0.05	U	0.5	U	NA		0.05	U	NA		NA		0.05	U	NA
Heptachlor	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Heptachlor Epoxide	NA		0.05	U	NA		0.05	U	0.05	U	0.05	U	NA		0.05	U	NA		NA		0.05	U	NA
Methoxychlor	NA		0.5	U	NA		0.5	U	0.5	U	0.5	U	NA		0.5	U	NA		NA		0.5	U	NA
Toxaphene	NA		1	U	NA		5	U	5	U	1	U	NA		5	U	NA		NA		5	U	NA
Aroclor-1016	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1221	NA		0.5	U	NA		2	U	2	U	0.5	U	NA		2	U	NA		NA		2	U	NA
Aroclor-1232	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1242	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1248	NA		0.5	U	NA		1	U	1	U	0.5	U	NA		1	U	NA		NA		1	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
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Sample ID:	**03MW04SI-L**		**03MW04SI**		**03MW04SI-F**		**03MW04SI**		**03MW04SI-D**		**03MW04S**		**03MW04S-F**		**03MW04S**		**03MW05I**		**03MW05I**		**03MW05I**		**03MW05S**
Sample Date:	**10/14/2008**		**9/20/1991**		**9/20/1991**		**6/25/1997**		**6/25/1997**		**9/18/1991**		**9/18/1991**		**6/25/1997**		**3/11/2008**		**10/16/2008**		**6/18/1997**		**3/12/2008**
Duplicate:																							
Aroclor-1254	NA		1	U	NA		1	U	1	U	1	U	NA		1	U	NA		NA		1	U	NA
Aroclor-1260	NA		1	U	NA		1	U	1	U	1	U	NA		1	U	NA		NA		1	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
TOTAL INORGANICS				**ug/L**				**ug/L**		**ug/L**						**ug/L**		**ug/L**				**ug/L**		
Aluminum	U	NA		185	J	NA		50	U	2030		NA		NA		6970		89		NA		144		NA
Antimony	J	NA		45	U	NA		20	UL	0.7	J	NA		NA		20	U	0.7	J	NA		0.7	J	NA
Arsenic	U	NA		2.1	J	NA		1	U	9.1		NA		NA		4.9	J	0.4	J	NA		6	U	NA
Barium		NA		172		NA		62.7		413		NA		NA		591		37		NA		111		NA
Beryllium	U	NA		4	B	NA		1	U	1	U	NA		NA		1	U	0.1	J	NA		1	U	NA
Cadmium	U	NA		4	U	NA		5	U	1	U	NA		NA		5	U	1	U	NA		1	U	NA
Calcium		NA		5020		NA		10100		25900		NA		NA		36300		12000		NA		7310		NA
Chromium		NA		17	B	NA		7.7		12		NA		NA		90.9		4.9		NA		5.1		NA
Cobalt	U	NA		10	U	NA		5	U	3	J	NA		NA		11.7		6	U	NA		6	U	NA
Copper	U	NA		32	B	NA		10	U	2.4	J	NA		NA		12.7	K	1.7	J	NA		1.7	J	NA
Cyanide		NA		10	U	NA		5	U	NA		NA		NA		5	U	NA		NA		NA		NA
Iron	J	NA		14300		NA		118		2400	K	NA		NA		8170		90	K	NA		230	K	NA
Lead	U	NA		2.6		NA		2.2	B	1.4	J	NA		NA		9.5	B	2	U	NA		2	U	NA
Magnesium		NA		2200		NA		2670		11100		NA		NA		14300		6420		NA		2260		NA
Manganese	J	NA		316		NA		7	K	103		NA		NA		457		8.2		NA		10.2		NA
Mercury	U	NA		1.7		NA		0.2	U	0.5	U	NA		NA		0.2	U	0.5	U	NA		0.5	U	NA
Nickel	J	NA		18	B	NA		20	U	9.6		NA		NA		84		5	J	NA		4.3	J	NA
Potassium		NA		2140	U	NA		1500	U	3080		NA		NA		6750		1370		NA		980		NA
Selenium	J	NA		20	UJ	NA		5	U	2	J	NA		NA		5	UL	5	J	NA		1	J	NA
Silver	U	NA		6	U	NA		5	U	1	U	NA		NA		5	U	1	U	NA		1	U	NA
Sodium		NA		6600		NA		12000		9550		NA		NA		20100		13500		NA		8680		NA
Thallium	U	NA		2	UJ	NA		1	U	1	U	NA		NA		1	U	1	U	NA		1	U	NA
Vanadium	U	NA		16		NA		5	U	6.4		NA		NA		14		1	U	NA		1	U	NA
Zinc	J	NA		39		NA		12.2		10.6		NA		NA		49.8		8.4		NA		5.2	J	NA
DISSOLVED INORGANICS						**ug/L**				**ug/L**								**ug/L**				**ug/L**		
Aluminum	J	NA		NA		77	B	NA		4	J	NA		NA		NA		10	J	NA		3	J	NA
Antimony	U	NA		NA		45	U	NA		2	U	NA		NA		NA		2	U	NA		2	U	NA
Arsenic	U	NA		NA		2	UJ	NA		10.1		NA		NA		NA		3	U	NA		3	U	NA
Barium		NA		NA		61		NA		299		NA		NA		NA		34.8		NA		104		NA
Beryllium	U	NA		NA		4	B	NA		1	U	NA		NA		NA		0.4	J	NA		1	U	NA
Cadmium	U	NA		NA		4	U	NA		1	U	NA		NA		NA		1	U	NA		1	U	NA
Calcium		NA		NA		11500		NA		24900		NA		NA		NA		14000		NA		8310		NA
Chromium		NA		NA		7	U	NA		1.4	J	NA		NA		NA		4.7		NA		3.6		NA
Cobalt	J	NA		NA		10	U	NA		0.1	J	NA		NA		NA		5	U	NA		5	U	NA
Copper	U	NA		NA		7		NA		5	U	NA		NA		NA		1.4	J	NA		5	U	NA
Iron	J	NA		NA		37	B	NA		60	U	NA		NA		NA		10	J	NA		10	J	NA
Lead	U	NA		NA		1.6	B	NA		2	U	NA		NA		NA		2	U	NA		2	U	NA
Magnesium	L	NA		NA		2840		NA		10200	L	NA		NA		NA		6760	L	NA		2490	L	NA
Manganese	J	NA		NA		16		NA		0.4	J	NA		NA		NA		5.8		NA		0.6	J	NA
Mercury	J	NA		NA		0.2	U	NA		0.09	J	NA		NA		NA		0.09	J	NA		0.08	J	NA
Nickel	J	NA		NA		12	U	NA		0.5	J	NA		NA		NA		4.4	J	NA		2.6	J	NA
Potassium		NA		NA		2140	U	NA		2090		NA		NA		NA		1670		NA		1100		NA
Selenium	J	NA		NA		4	U	NA		2	J	NA		NA		NA		5	J	NA		5	U	NA
Silver	U	NA		NA			R	NA		1	U	NA		NA		NA		1	U	NA		1	U	NA
Sodium		NA		NA		11800		NA		9310		NA		NA		NA		14400		NA		9110		NA
Thallium	U	NA		NA		2	U	NA		1	U	NA		NA		NA		1	U	NA		1	U	NA
Vanadium	U	NA		NA		4	U	NA		4.9		NA		NA		NA		1	U	NA		1	U	NA
Zinc	J	NA		NA		18		NA		5	U	NA		NA		NA		6		NA		0.7	J	NA
MISCELLANEOUS PARAMETERS										**mg/L**								**mg/L**				**mg/L**		
Hexavalent Chromium	U	NA		NA		NA		NA		0.01	U	NA		NA		NA		0.01	U	NA		0.01	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
SEMIVOLATILES				**ug/L**				**ug/L**		**ug/L**						**ug/L**		**ug/L**				**ug/L**		
1,2,4-Trichlorobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
1,2-Dichlorobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
1,3-Dichlorobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
1,4-Dichlorobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
1,4-Dioxane	U	NA		NA		NA		NA		2.8	U	NA		NA		NA		2.9	U	NA		2.8	U	NA
1,1'-Biphenyl		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2,4,5-Trichlorophenol		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
2,4,6-Trichlorophenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2,4-Dichlorophenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2,4-Dimethylphenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2,4-Dinitrophenol		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
2,4-Dinitrotoluene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2,6-Dinitrotoluene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2-Chloronaphthalene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2-Chlorophenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2-Methylnaphthalene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2-Methylphenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
2-Nitroaniline		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
2-Nitrophenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
3,3'-Dichlorobenzidine		NA		20	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
3-Nitroaniline		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
4,6-Dinitro-2-methylphenol		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
4-Bromophenyl Phenyl Ether		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
4-Chloro-3-methylphenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
4-Chloroaniline		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
4-Chlorophenyl Phenyl Ether		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
4-Methylphenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
4-Nitroaniline		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
4-Nitrophenol		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
Acenaphthene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Acenaphthylene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Acetophenone		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Anthracene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Atrazine		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benz(a)anthracene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Benzaldehyde		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzo(a)pyrene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Benzo(b)fluoranthene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Benzo(g,h,i)perylene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Benzo(k)fluoranthene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Benzoic Acid		NA		50	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzyl Alcohol		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Bis(2-chloroethoxy)methane		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Bis(2-chloroethyl)ether		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Bis(2-ethylhexyl)phthalate		NA		1	J	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Butylbenzylphthalate		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Caprolactam		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Carbazole		NA		NA		NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Chrysene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Di-n-butylphthalate		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA

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SITE 3 GROUNDWATER
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Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
Di-n-octylphthalate		NA		1	J	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Dibenz(a,h)anthracene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Dibenzofuran		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Diethylphthalate		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Dimethylphthalate		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Fluoranthene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Fluorene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachlorobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachlorobutadiene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachlorocyclopentadiene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Hexachloroethane		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Indeno(1,2,3-cd)pyrene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Isophorone		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
N-Nitroso-di-n-propylamine		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
N-Nitrosodiphenylamine (1)		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Naphthalene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Nitrobenzene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Pentachlorophenol		NA		50	U	NA		25	U	NA		NA		NA		26	U	NA		NA		NA		NA
Phenanthrene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Phenol		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
Pyrene		NA		10	U	NA		10	U	NA		NA		NA		11	U	NA		NA		NA		NA
VOLATILES		**ug/L**		**ug/L**				**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**
1,1,1-Trichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1,2,2-Tetrachloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1,2-Trichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1,2-Trichlorotrifluoroethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,1-Dichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,1-Dichloroethene	U	1	U	5	U	NA		10	U	0.2	J	1	U	1	U	10	U	1	U	1	U	1	U	1
1,2,3-Trichlorobenzene	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
1,2,4-Trichlorobenzene	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
1,2-Dibromo-3-chloropropane	U	7	U	NA		NA		NA		7	U	7	U	7	U	NA		7	U	7	U	7	U	7
1,2-Dibromoethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichlorobenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichloroethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,2-Dichloroethene (cis)	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichloroethene (Total)		NA		5	U	NA		10	U	NA		NA		NA		10	U	NA		NA		NA		NA
1,2-Dichloroethene (trans)	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,2-Dichloropropane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
1,3-Dichlorobenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,4-Dichlorobenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
1,4-Dioxane		320	U	NA		NA		NA		NA		320	U	320	U	NA		NA		320	U	NA		320
2-Butanone	UR	10	UR	10	U	NA		10	U	10	UR	10	U	10	U	10	U	10	UR	10	U	10	UR	10
2-Hexanone	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U	5
4-Methyl-2-pentanone	U	5	U	10	U	NA		10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U	5
Acetone	UR	10	U	10	U	NA		10	U	10	UR	10	U	10	U	10	U	10	UR	10	U	10	UR	10
Benzene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Bromochloromethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Bromodichloromethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Bromoform	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Bromomethane	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Carbon Disulfide	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Carbon Tetrachloride	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
Chlorobenzene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Chloroethane	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Chloroform	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Chloromethane	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
cis-1,3-Dichloropropene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Cyclohexane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Dibromochloromethane	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Dichlorodifluoromethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Ethylbenzene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Isopropylbenzene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
M+p-xylenes	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
Methyl Acetate	U	2	U	NA		NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U	2
Methyl Cyclohexane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Methyl Tert-butyl Ether	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Methylene Chloride	U	1	U	5	U	NA		7	B	1	U	1	U	1	U	15	B	1	U	1	U	1	U	1
O-xylene	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Styrene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Tetrachloroethene	U	0.49	J	7		NA		2	J	1	U	1	U	1	U	39		0.76	J	1.8		1	U	1
Toluene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
trans-1,3-Dichloropropene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Trichloroethene	U	1	U	5	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Trichlorofluoromethane	U	1	U	NA		NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U	1
Vinyl Acetate		NA		10	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Vinyl Chloride	U	1	U	10	U	NA		10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U	1
Xylene (Total)		NA		5	U	NA		10	U	NA		NA		NA		10	U	NA		NA		NA		NA
PESTICIDES/PCBS				**ug/L**				**ug/L**								**ug/L**								
4,4'-DDD		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
4,4'-DDE		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
4,4'-DDT		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Aldrin		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Alpha-BHC		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Alpha-Chlordane		NA		0.5	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Beta-BHC		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Delta-BHC		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Dieldrin		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endosulfan I		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Endosulfan II		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endosulfan Sulfate		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endrin		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endrin Aldehyde		NA		NA		NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Endrin Ketone		NA		0.1	U	NA		0.1	U	NA		NA		NA		0.1	U	NA		NA		NA		NA
Gamma-BHC (Lindane)		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Gamma-Chlordane		NA		0.5	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Heptachlor		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Heptachlor Epoxide		NA		0.05	U	NA		0.05	U	NA		NA		NA		0.05	U	NA		NA		NA		NA
Methoxychlor		NA		0.5	U	NA		0.5	U	NA		NA		NA		0.5	U	NA		NA		NA		NA
Toxaphene		NA		1	U	NA		5	U	NA		NA		NA		5	U	NA		NA		NA		NA
Aroclor-1016		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1221		NA		0.5	U	NA		2	U	NA		NA		NA		2	U	NA		NA		NA		NA
Aroclor-1232		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1242		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1248		NA		0.5	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW05S**		**03MW05S**		**03MW05S-F**		**03MW05S**		**03MW06I**		**03MW06I**		**03MW06I-L**		**03MW06I**		**03MW06S**		**03MW06S**		**03MW06SI**		**03MW06SI**
Sample Date:		**10/16/2008**		**9/20/1991**		**9/20/1991**		**6/18/1997**		**3/14/2008**		**10/15/2008**		**10/15/2008**		**6/25/1997**		**3/13/2008**		**10/15/2008**		**3/13/2008**		**10/15/2008**
Duplicate:																								
Aroclor-1254		NA		1	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA
Aroclor-1260		NA		1	U	NA		1	U	NA		NA		NA		1	U	NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW08D**		**03MW08D**		**03MW08S**	
Sample Date:	**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**		**4/2/2009**		**7/7/1997**		**3/12/2008**		**10/18/2008**		**3/12/2008**	
Duplicate:																		
TOTAL INORGANICS	**ug/L**		**ug/L**		**ug/L**						**ug/L**		**ug/L**				**ug/L**	
Aluminum	466		206		96		NA		NA		263		80	U	NA		80	U
Antimony	20	UL	20	U	2	U	NA		NA		20	U	0.7	J	NA		0.8	J
Arsenic	1	UL	1	UL	6	U	NA		NA		1	U	0.5	J	NA		6	U
Barium	162		102		625		NA		NA		339		340		NA		50.1	
Beryllium	1	U	1	U	1	U	NA		NA		1	U	1	U	NA		0.6	J
Cadmium	5	U	5	U	1	U	NA		NA		5	U	1	U	NA		1	U
Calcium	7770		16100		62900		NA		NA		25700		31900		NA		11500	
Chromium	36.9		10.7	K	2.2	B	NA		NA		5	U	2.5		NA		2.8	
Cobalt	6.6		5	U	0.2	J	NA		NA		5	U	2.4	J	NA		0.2	J
Copper	10	U	10	U	0.1	B	NA		NA		10	U	6	U	NA		2	J
Cyanide	5	U	5	U	NA		NA		NA		5	U	NA		NA		NA	
Iron	962		340	B	90		NA		NA		318	J	170	K	NA		70	K
Lead	1.7	B	2.5	B	2	U	NA		NA		2.7	B	2	U	NA		2	U
Magnesium	2350		6240		16200		NA		NA		6200		13800		NA		3470	
Manganese	90.2		93.2		12.9		NA		NA		12.2		1.9	J	NA		35.3	
Mercury	0.2	U	0.2	U	0.5	U	NA		NA		0.2	U	0.5	U	NA		0.5	U
Nickel	30		20	U	4.8	J	NA		NA		20	U	2.8	J	NA		4	J
Potassium	1500	U	1500	U	1060		NA		NA		1500	U	770		NA		1140	
Selenium	5	U	5	UL	6	U	NA		NA		5	U	1	J	NA		1	J
Silver	5	U	5	U	0.6	B	NA		NA		5	U	1	U	NA		1	U
Sodium	9310		14200		22400		NA		NA		25300		10800		NA		14600	
Thallium	1	U	1	U	1	U	NA		NA		1	U	1	U	NA		1	U
Vanadium	5	U	5	U	0.6	B	NA		NA		5	U	0.09	J	NA		1	U
Zinc	17		20.8	B	2.4	J	NA		NA		8.3	B	6	U	NA		3.1	J
DISSOLVED INORGANICS					**ug/L**								**ug/L**				**ug/L**	
Aluminum	NA		NA		80	U	NA		NA		NA		17	J	NA		5	J
Antimony	NA		NA		0.4	B	NA		NA		NA		2	U	NA		2	U
Arsenic	NA		NA		5	U	NA		NA		NA		3	U	NA		3	U
Barium	NA		NA		544		NA		NA		NA		324		NA		46.9	
Beryllium	NA		NA		1	U	NA		NA		NA		1	U	NA		0.6	J
Cadmium	NA		NA		1	U	NA		NA		NA		1	U	NA		1	U
Calcium	NA		NA		71100		NA		NA		NA		35500		NA		12600	
Chromium	NA		NA		3.4		NA		NA		NA		3.7		NA		3.9	
Cobalt	NA		NA		5	U	NA		NA		NA		1.9	J	NA		5	U
Copper	NA		NA		5	U	NA		NA		NA		5	U	NA		1.6	J
Iron	NA		NA		60	U	NA		NA		NA		60	U	NA		60	U
Lead	NA		NA		2	U	NA		NA		NA		2	U	NA		2	U
Magnesium	NA		NA		17100		NA		NA		NA		15300	L	NA		3780	L
Manganese	NA		NA		0.1	B	NA		NA		NA		0.05	J	NA		34.6	
Mercury	NA		NA		0.5	U	NA		NA		NA		0.1	J	NA		0.09	J
Nickel	NA		NA		2.9	J	NA		NA		NA		1.7	J	NA		3.8	J
Potassium	NA		NA		1180		NA		NA		NA		970		NA		1430	
Selenium	NA		NA		1	J	NA		NA		NA		9		NA		5	U
Silver	NA		NA		1	UR	NA		NA		NA		1	U	NA		1	U
Sodium	NA		NA		26000		NA		NA		NA		11300		NA		15300	
Thallium	NA		NA		1	U	NA		NA		NA		1	U	NA		1	U
Vanadium	NA		NA		0.7	J	NA		NA		NA		1	J	NA		1	U
Zinc	NA		NA		5	U	NA		NA		NA		0.7	J	NA		3.4	J
MISCELLANEOUS PARAMETERS																		
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**	**03MW07S**	**03MW07S**		**03MW08D**		**03MW08D**	**03MW08S**	
Sample Date:	**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**	**4/2/2009**	**7/7/1997**		**3/12/2008**		**10/18/2008**	**3/12/2008**	
Duplicate:															
SEMIVOLATILES	**ug/L**		**ug/L**		**ug/L**				**ug/L**		**ug/L**			**ug/L**	
1,2,4-Trichlorobenzene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
1,2-Dichlorobenzene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
1,3-Dichlorobenzene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
1,4-Dichlorobenzene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
1,4-Dioxane	NA		NA		2.9	U	NA	NA	NA		2.8	U	NA	2.8	U
1,1'-Biphenyl	NA		NA		NA		NA	NA	NA		NA		NA	NA	
2,2'-Oxybis(1-chloropropane)	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2,4,5-Trichlorophenol	25	U	25	U	NA		NA	NA	25	U	NA		NA	NA	
2,4,6-Trichlorophenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2,4-Dichlorophenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2,4-Dimethylphenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2,4-Dinitrophenol	25	U	25	U	NA		NA	NA	25	U	NA		NA	NA	
2,4-Dinitrotoluene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2,6-Dinitrotoluene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2-Chloronaphthalene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2-Chlorophenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2-Methylnaphthalene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2-Methylphenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
2-Nitroaniline	25	U	25	U	NA		NA	NA	25	U	NA		NA	NA	
2-Nitrophenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
3,3'-Dichlorobenzidine	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
3-Nitroaniline	25	U	25	U	NA		NA	NA	25	U	NA		NA	NA	
4,6-Dinitro-2-methylphenol	25	U	25	U	NA		NA	NA	25	U	NA		NA	NA	
4-Bromophenyl Phenyl Ether	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
4-Chloro-3-methylphenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
4-Chloroaniline	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
4-Chlorophenyl Phenyl Ether	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
4-Methylphenol	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
4-Nitroaniline	25	U	25	U	NA		NA	NA	25	U	NA		NA	NA	
4-Nitrophenol	25	U	25	U	NA		NA	NA	25	U	NA		NA	NA	
Acenaphthene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Acenaphthylene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Acetophenone	NA		NA		NA		NA	NA	NA		NA		NA	NA	
Anthracene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Atrazine	NA		NA		NA		NA	NA	NA		NA		NA	NA	
Benz(a)anthracene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Benzaldehyde	NA		NA		NA		NA	NA	NA		NA		NA	NA	
Benzo(a)pyrene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Benzo(b)fluoranthene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Benzo(g,h,i)perylene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Benzo(k)fluoranthene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Benzoic Acid	NA		NA		NA		NA	NA	NA		NA		NA	NA	
Benzyl Alcohol	NA		NA		NA		NA	NA	NA		NA		NA	NA	
Bis(2-chloroethoxy)methane	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Bis(2-chloroethyl)ether	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Bis(2-ethylhexyl)phthalate	11		10	U	NA		NA	NA	10	U	NA		NA	NA	
Butylbenzylphthalate	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Caprolactam	NA		NA		NA		NA	NA	NA		NA		NA	NA	
Carbazole	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Chrysene	10	U	10	U	NA		NA	NA	10	U	NA		NA	NA	
Di-n-butylphthalate	10	U	10	U	NA		NA	NA	1	B	NA		NA	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW08D**		**03MW08D**		**03MW08S**	
Sample Date:		**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**		**4/2/2009**		**7/7/1997**		**3/12/2008**		**10/18/2008**		**3/12/2008**	
Duplicate:																			
Di-n-octylphthalate		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Dibenz(a,h)anthracene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Dibenzofuran		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Diethylphthalate		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Dimethylphthalate		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Fluoranthene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Fluorene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachlorobenzene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachlorobutadiene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachlorocyclopentadiene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Hexachloroethane		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Indeno(1,2,3-cd)pyrene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Isophorone		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
N-Nitroso-di-n-propylamine		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
N-Nitrosodiphenylamine (1)		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Naphthalene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Nitrobenzene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Pentachlorophenol		25	U	25	U	NA		NA		NA		25	U	NA		NA		NA	
Phenanthrene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Phenol		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
Pyrene		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
VOLATILES		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	2.6		4.1		1	U
1,1,2,2-Tetrachloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,1,2-Trichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	U	NA		NA		1	U	1	U	0.34	J	NA		1	U	1	U	1	U
1,1-Dichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	6.3		8.2		1	U
1,1-Dichloroethene	U	10	U	10	U	1	U	1	U	1	U	10	U	3.1		5.1		1	U
1,2,3-Trichlorobenzene	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
1,2,4-Trichlorobenzene	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	U	NA		NA		7	U	7	U	7	U	NA		7	U	7	U	7	U
1,2-Dibromoethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,2-Dichlorobenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,2-Dichloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	U	NA		NA		1	U	1	U	1	U	NA		1.2		1.5		1	U
1,2-Dichloroethene (Total)		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
1,2-Dichloroethene (trans)	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,2-Dichloropropane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
1,3-Dichlorobenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,4-Dichlorobenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
1,4-Dioxane	U	NA		NA		NA		320	U	NA		NA		NA		320	U	NA	
2-Butanone	U	10	U	10	U	10	UR	10	UR	10	UR	10	U	10	UR	10	U	10	UR
2-Hexanone	U	10	U	10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U
4-Methyl-2-pentanone	U	10	U	10	U	5	U	5	U	5	U	10	U	5	U	5	U	5	U
Acetone	U	10	U	10	U	10	UR	10	U	10	UR	10	U	10	UR	10	U	10	UR
Benzene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Bromochloromethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Bromodichloromethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Bromoform	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Bromomethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Carbon Disulfide	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Carbon Tetrachloride	U	10	U	10	U	1	U	1	U	1	U	10	U	0.28	J	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW08D**		**03MW08D**		**03MW08S**	
Sample Date:		**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**		**4/2/2009**		**7/7/1997**		**3/12/2008**		**10/18/2008**		**3/12/2008**	
Duplicate:																			
Chlorobenzene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Chloroethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Chloroform	U	10	U	10	U	1	U	1.6		1	U	10	U	1	U	1	U	1	U
Chloromethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Cyclohexane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Dibromochloromethane	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Dichlorodifluoromethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Ethylbenzene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Isopropylbenzene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
M+p-xylenes	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
Methyl Acetate	U	NA		NA		2	U	2	U	2	U	NA		2	U	2	U	2	U
Methyl Cyclohexane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Methyl Tert-butyl Ether	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Methylene Chloride	U	8	B	10	UJ	1	U	1	U	1	U	5	B	1	U	1	U	1	U
O-xylene	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Styrene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Tetrachloroethene	U	10	U	29		1.1		0.41	J	0.74	J	10	U	1		1.3		1	U
Toluene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Trichloroethene	U	10	U	10	U	1	U	1	U	1	U	10	U	1.9		3.1		1	U
Trichlorofluoromethane	U	NA		NA		1	U	1	U	1	U	NA		1	U	1	U	1	U
Vinyl Acetate		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	U	10	U	10	U	1	U	1	U	1	U	10	U	1	U	1	U	1	U
Xylene (Total)		10	U	10	U	NA		NA		NA		10	U	NA		NA		NA	
PESTICIDES/PCBS		**ug/L**		**ug/L**								**ug/L**							
4,4'-DDD		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
4,4'-DDE		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
4,4'-DDT		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Aldrin		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Alpha-BHC		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Alpha-Chlordane		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Beta-BHC		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Delta-BHC		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Dieldrin		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endosulfan I		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Endosulfan II		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endosulfan Sulfate		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endrin		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endrin Aldehyde		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Endrin Ketone		0.1	U	0.1	U	NA		NA		NA		0.1	U	NA		NA		NA	
Gamma-BHC (Lindane)		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Gamma-Chlordane		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Heptachlor		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Heptachlor Epoxide		0.05	U	0.05	U	NA		NA		NA		0.05	U	NA		NA		NA	
Methoxychlor		0.5	U	0.5	U	NA		NA		NA		0.5	U	NA		NA		NA	
Toxaphene		5	U	5	U	NA		NA		NA		5	U	NA		NA		NA	
Aroclor-1016		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	
Aroclor-1221		2	U	2	U	NA		NA		NA		2	U	NA		NA		NA	
Aroclor-1232		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	
Aroclor-1242		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	
Aroclor-1248		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03MW06SI**		**03MW06S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW07S**		**03MW08D**		**03MW08D**		**03MW08S**	
Sample Date:		**6/18/1997**		**6/30/1997**		**3/19/2008**		**10/21/2008**		**4/2/2009**		**7/7/1997**		**3/12/2008**		**10/18/2008**		**3/12/2008**	
Duplicate:																			
Aroclor-1254		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	
Aroclor-1260		1	U	1	U	NA		NA		NA		1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**	**03MW09S**	**03MW09O**	**03MW01I**	**03MW01I-DUP**	**03MW01S**	**03MW01SI**	**03MW02I**	**03MW02S**	**03MW02SI**	**03MW03S**
Sample Date:	**10/15/2008**	**2/17/2010**	**2/17/2010**	**2/6/2006**	**2/6/2006**	**2/3/2006**	**2/3/2006**	**2/1/2006**	**2/6/2006**	**2/1/2006**	**2/8/2006**
Duplicate:				**03MW01I-DUP**	**03MW01I**						
TOTAL INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DISSOLVED INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS											
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**	**03MW09S**	**03MW09O**	**03MW01I**	**03MW01I-DUP**	**03MW01S**	**03MW01SI**	**03MW02I**	**03MW02S**	**03MW02SI**	**03MW03S**
Sample Date:	**10/15/2008**	**2/17/2010**	**2/17/2010**	**2/6/2006**	**2/6/2006**	**2/3/2006**	**2/3/2006**	**2/1/2006**	**2/6/2006**	**2/1/2006**	**2/8/2006**
Duplicate:				**03MW01I-DUP**	**03MW01I**						
SEMIVOLATILES											
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**		**03MW09S**		**03MW09O**		**03MW01I**		**03MW01I-DUP**		**03MW01S**		**03MW01SI**		**03MW02I**		**03MW02S**		**03MW02SI**		**03MW03S**	
Sample Date:	**10/15/2008**		**2/17/2010**		**2/17/2010**		**2/6/2006**		**2/6/2006**		**2/3/2006**		**2/3/2006**		**2/1/2006**		**2/6/2006**		**2/1/2006**		**2/8/2006**	
Duplicate:							**03MW01I-DUP**		**03MW01I**													
Di-n-octylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	2	U	0.5	U	0.5	U	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	2	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromo-3-chloropropane	7	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromoethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	320	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	10	U	2.5	UR	10	UR	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	5	U	2.5	U	2.5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	2.5	U	2.5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	10	U	3.5	U	3.5	U	5	U	5	U	5	U	5	U	3.4	J	5	U	5	U	5	U
Benzene	1	U	0.1	B	0.13	B	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1.4	UJ	1.4	UJ	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.27	J	1	U	0.32	J	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**		**03MW09S**		**03MW09O**		**03MW01I**		**03MW01I-DUP**		**03MW01S**		**03MW01SI**		**03MW02I**		**03MW02S**		**03MW02SI**		**03MW03S**	
Sample Date:	**10/15/2008**		**2/17/2010**		**2/17/2010**		**2/6/2006**		**2/6/2006**		**2/3/2006**		**2/3/2006**		**2/1/2006**		**2/6/2006**		**2/1/2006**		**2/8/2006**	
Duplicate:							**03MW01I-DUP**		**03MW01I**													
Chlorobenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	0.42	J	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	NA		NA		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	2	U	1	U	1	U	NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	2	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Cyclohexane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	1	U	0.13	B	0.12	B	1	U	1	U	1	U	1	U	1.7	B	1	U	1.9	B	1	U
O-xylene	1	U	0.5	U	0.5	U	NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	1	U	6.8		0.35	J	0.23	J	1	U	0.9	J	4.9		2.4		1	U	1.9		14	
Toluene	1	U	0.5	U	0.16	J	0.2	J	1	U	1	U	1	U	0.5	B	1	U	0.2	B	1	U
trans-1,3-Dichloropropene	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	0.11	J	0.5	U	1	U	1	U	1	U	1	U	0.36	B	1	U	0.59	B	1	U
Trichlorofluoromethane	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	NA		NA		NA		3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
PESTICIDES/PCBS																						
4,4'-DDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08S**	**03MW09S**	**03MW09O**	**03MW01I**	**03MW01I-DUP**	**03MW01S**	**03MW01SI**	**03MW02I**	**03MW02S**	**03MW02SI**	**03MW03S**
Sample Date:	**10/15/2008**	**2/17/2010**	**2/17/2010**	**2/6/2006**	**2/6/2006**	**2/3/2006**	**2/3/2006**	**2/1/2006**	**2/6/2006**	**2/1/2006**	**2/8/2006**
Duplicate:				**03MW01I-DUP**	**03MW01I**						
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**	**03MW04I**	**03MW04S**	**03MW04S-DUP**	**03MW04SI**	**03MW05I**	**03MW05S**	**03MW06I**	**03MW06S**	**03MW06SI**	**03MW07S**
Sample Date:	**2/8/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/3/2006**	**2/3/2006**	**2/6/2006**	**2/6/2006**	**2/7/2006**	**1/31/2006**
Duplicate:			**03MW04S-DUP**	**03MW04S**							
TOTAL INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DISSOLVED INORGANICS											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MISCELLANEOUS PARAMETERS											
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**	**03MW04I**	**03MW04S**	**03MW04S-DUP**	**03MW04SI**	**03MW05I**	**03MW05S**	**03MW06I**	**03MW06S**	**03MW06SI**	**03MW07S**
Sample Date:	**2/8/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/3/2006**	**2/3/2006**	**2/6/2006**	**2/6/2006**	**2/7/2006**	**1/31/2006**
Duplicate:			**03MW04S-DUP**	**03MW04S**							
SEMIVOLATILES											
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**		**03MW04I**		**03MW04S**		**03MW04S-DUP**		**03MW04SI**		**03MW05I**		**03MW05S**		**03MW06I**		**03MW06S**		**03MW06SI**		**03MW07S**	
Sample Date:	**2/8/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/3/2006**		**2/3/2006**		**2/6/2006**		**2/6/2006**		**2/7/2006**		**1/31/2006**	
Duplicate:					**03MW04S-DUP**		**03MW04S**															
Di-n-octylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Diethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dimethylphthalate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluoranthene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexachloroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Isophorone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Naphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Nitrobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pentachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenanthrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Phenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Pyrene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.37	J
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromo-3-chloropropane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dibromoethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromoform	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Bromomethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**		**03MW04I**		**03MW04S**		**03MW04S-DUP**		**03MW04SI**		**03MW05I**		**03MW05S**		**03MW06I**		**03MW06S**		**03MW06SI**		**03MW07S**	
Sample Date:	**2/8/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/10/2006**		**2/3/2006**		**2/3/2006**		**2/6/2006**		**2/6/2006**		**2/7/2006**		**1/31/2006**	
Duplicate:					**03MW04S-DUP**		**03MW04S**															
Chlorobenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	0.4	J	0.17	J	0.32	J	1	U	1	U	1	U	1	U	1	U	1	U
Chloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cyclohexane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
M+p-xylenes	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Cyclohexane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	1	U	1	U	0.45	J	1	U	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1.1	B
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	12		0.52	J	8.8		9.1		10		0.7	J	0.67	J	0.79	J	1.3		1	U	1.4	
Toluene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.22	J	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	0.37	B
Trichlorofluoromethane	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Xylene (Total)	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
PESTICIDES/PCBS																						
4,4'-DDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDE	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDT	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Alpha-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Delta-BHC	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan I	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan II	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma-Chlordane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Toxaphene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1016	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1221	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1232	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1242	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1248	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW03SI**	**03MW04I**	**03MW04S**	**03MW04S-DUP**	**03MW04SI**	**03MW05I**	**03MW05S**	**03MW06I**	**03MW06S**	**03MW06SI**	**03MW07S**
Sample Date:	**2/8/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/10/2006**	**2/3/2006**	**2/3/2006**	**2/6/2006**	**2/6/2006**	**2/7/2006**	**1/31/2006**
Duplicate:			**03MW04S-DUP**	**03MW04S**							
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
TOTAL INORGANICS						
Aluminum	NA		NA		NA	
Antimony	NA		NA		NA	
Arsenic	NA		NA		NA	
Barium	NA		NA		NA	
Beryllium	NA		NA		NA	
Cadmium	NA		NA		NA	
Calcium	NA		NA		NA	
Chromium	NA		NA		NA	
Cobalt	NA		NA		NA	
Copper	NA		NA		NA	
Cyanide	NA		NA		NA	
Iron	NA		NA		NA	
Lead	NA		NA		NA	
Magnesium	NA		NA		NA	
Manganese	NA		NA		NA	
Mercury	NA		NA		NA	
Nickel	NA		NA		NA	
Potassium	NA		NA		NA	
Selenium	NA		NA		NA	
Silver	NA		NA		NA	
Sodium	NA		NA		NA	
Thallium	NA		NA		NA	
Vanadium	NA		NA		NA	
Zinc	NA		NA		NA	
DISSOLVED INORGANICS						
Aluminum	NA		NA		NA	
Antimony	NA		NA		NA	
Arsenic	NA		NA		NA	
Barium	NA		NA		NA	
Beryllium	NA		NA		NA	
Cadmium	NA		NA		NA	
Calcium	NA		NA		NA	
Chromium	NA		NA		NA	
Cobalt	NA		NA		NA	
Copper	NA		NA		NA	
Iron	NA		NA		NA	
Lead	NA		NA		NA	
Magnesium	NA		NA		NA	
Manganese	NA		NA		NA	
Mercury	NA		NA		NA	
Nickel	NA		NA		NA	
Potassium	NA		NA		NA	
Selenium	NA		NA		NA	
Silver	NA		NA		NA	
Sodium	NA		NA		NA	
Thallium	NA		NA		NA	
Vanadium	NA		NA		NA	
Zinc	NA		NA		NA	
MISCELLANEOUS PARAMETERS						
Hexavalent Chromium	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
SEMIVOLATILES	**ug/L**		**ug/L**		**ug/L**	
1,2,4-Trichlorobenzene	NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA	
1,4-Dioxane	NA		NA		NA	
1,1'-Biphenyl	10	U	10	U	10	U
2,2'-Oxybis(1-chloropropane)	10	U	10	U	10	U
2,4,5-Trichlorophenol	10	U	10	U	10	U
2,4,6-Trichlorophenol	10	U	10	U	10	U
2,4-Dichlorophenol	10	U	10	U	10	U
2,4-Dimethylphenol	10	U	10	U	10	U
2,4-Dinitrophenol	52	U	51	U	51	U
2,4-Dinitrotoluene	10	U	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U
2-Chlorophenol	10	U	10	U	10	U
2-Methylnaphthalene	10	U	10	U	10	U
2-Methylphenol	10	U	10	U	10	U
2-Nitroaniline	52	U	51	U	51	U
2-Nitrophenol	10	U	10	U	10	U
3,3'-Dichlorobenzidine	52	U	51	U	51	U
3-Nitroaniline	52	U	51	U	51	U
4,6-Dinitro-2-methylphenol	52	U	51	U	51	U
4-Bromophenyl Phenyl Ether	10	U	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	U	10	U
4-Chloroaniline	10	U	10	U	10	U
4-Chlorophenyl Phenyl Ether	10	U	10	U	10	U
4-Methylphenol	10	U	10	U	10	U
4-Nitroaniline	52	U	51	U	51	U
4-Nitrophenol	52	U	51	U	51	U
Acenaphthene	0.21	U	0.2	U	0.2	U
Acenaphthylene	0.21	U	0.2	U	0.2	U
Acetophenone	10	U	10	U	10	U
Anthracene	0.21	U	0.2	U	0.2	U
Atrazine	10	U	10	U	10	U
Benz(a)anthracene	0.21	U	0.2	U	0.2	U
Benzaldehyde	10	U	10	U	10	U
Benzo(a)pyrene	0.21	U	0.2	U	0.2	U
Benzo(b)fluoranthene	0.21	U	0.2	U	0.2	U
Benzo(g,h,i)perylene	0.21	U	0.2	U	0.2	U
Benzo(k)fluoranthene	0.21	U	0.2	U	0.2	U
Benzoic Acid	NA		NA		NA	
Benzyl Alcohol	NA		NA		NA	
Bis(2-chloroethoxy)methane	10	U	10	U	10	U
Bis(2-chloroethyl)ether	10	U	10	U	10	U
Bis(2-ethylhexyl)phthalate	10	U	10	U	10	U
Butylbenzylphthalate	10	U	10	U	10	U
Caprolactam	10	U	10	U	10	U
Carbazole	10	U	10	U	10	U
Chrysene	0.21	U	0.2	U	0.2	U
Di-n-butylphthalate	10	U	10	U	10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
Di-n-octylphthalate	10	U	10	U	10	U
Dibenz(a,h)anthracene	0.21	U	0.2	U	0.2	U
Dibenzofuran	10	U	10	U	10	U
Diethylphthalate	10	U	10	U	10	U
Dimethylphthalate	10	U	10	U	10	U
Fluoranthene	0.21	U	0.2	U	0.2	U
Fluorene	0.21	U	0.2	U	0.2	U
Hexachlorobenzene	10	U	10	U	10	U
Hexachlorobutadiene	10	U	10	U	10	U
Hexachlorocyclopentadiene	52	U	51	U	51	U
Hexachloroethane	10	U	10	U	10	U
Indeno(1,2,3-cd)pyrene	0.21	U	0.2	U	0.2	U
Isophorone	10	U	10	U	10	U
N-Nitroso-di-n-propylamine	10	U	10	U	10	U
N-Nitrosodiphenylamine (1)	10	U	10	U	10	U
Naphthalene	0.21	U	0.057	B	0.2	U
Nitrobenzene	10	U	10	U	10	U
Pentachlorophenol	52	U	51	U	51	U
Phenanthrene	0.11	B	0.098	B	0.15	B
Phenol	10	U	10	U	10	U
Pyrene	0.21	U	0.2	U	0.2	U
VOLATILES	**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	3		1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U
1,1-Dichloroethane	5.9		1	U	1	U
1,1-Dichloroethene	2.5		1	U	1	U
1,2,3-Trichlorobenzene	NA		NA		NA	
1,2,4-Trichlorobenzene	1	U	1	U	1	U
1,2-Dibromo-3-chloropropane	1	U	1	U	1	U
1,2-Dibromoethane	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U
1,2-Dichloroethene (cis)	0.9	J	1	U	1	U
1,2-Dichloroethene (Total)	NA		NA		NA	
1,2-Dichloroethene (trans)	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U
1,4-Dioxane	NA		NA		NA	
2-Butanone	5	U	5	U	5	U
2-Hexanone	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U
Acetone	5	U	5	U	5	U
Benzene	1	U	1	U	1	U
Bromochloromethane	NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U
Bromoform	1	U	1	U	1	U
Bromomethane	1	U	1	U	1	U
Carbon Disulfide	1	U	1	U	1	U
Carbon Tetrachloride	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
Chlorobenzene	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U
Chloroform	1	U	1	U	1	U
Chloromethane	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U
Cyclohexane	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U
Dichlorodifluoromethane	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	1	U
Isopropylbenzene	1	U	1	U	1	U
M+p-xylenes	NA		NA		NA	
Methyl Acetate	1	U	1	U	1	U
Methyl Cyclohexane	1	U	1	U	1	U
Methyl Tert-butyl Ether	1	U	1	U	1	U
Methylene Chloride	1	U	1	U	1	U
O-xylene	NA		NA		NA	
Styrene	1	U	1	U	1	U
Tetrachloroethene	0.78	J	1	U	1	U
Toluene	0.19	J	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	1	U
Trichloroethene	1.5		1	U	1	U
Trichlorofluoromethane	1	U	1	U	1	U
Vinyl Acetate	NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U
Xylene (Total)	3	U	3	U	3	U
PESTICIDES/PCBS						
4,4'-DDD	NA		NA		NA	
4,4'-DDE	NA		NA		NA	
4,4'-DDT	NA		NA		NA	
Aldrin	NA		NA		NA	
Alpha-BHC	NA		NA		NA	
Alpha-Chlordane	NA		NA		NA	
Beta-BHC	NA		NA		NA	
Delta-BHC	NA		NA		NA	
Dieldrin	NA		NA		NA	
Endosulfan I	NA		NA		NA	
Endosulfan II	NA		NA		NA	
Endosulfan Sulfate	NA		NA		NA	
Endrin	NA		NA		NA	
Endrin Aldehyde	NA		NA		NA	
Endrin Ketone	NA		NA		NA	
Gamma-BHC (Lindane)	NA		NA		NA	
Gamma-Chlordane	NA		NA		NA	
Heptachlor	NA		NA		NA	
Heptachlor Epoxide	NA		NA		NA	
Methoxychlor	NA		NA		NA	
Toxaphene	NA		NA		NA	
Aroclor-1016	NA		NA		NA	
Aroclor-1221	NA		NA		NA	
Aroclor-1232	NA		NA		NA	
Aroclor-1242	NA		NA		NA	
Aroclor-1248	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03MW08D**		**03MW08S**		**03MW08S-DUP**	
Sample Date:	**1/30/2006**		**1/30/2006**		**1/30/2006**	
Duplicate:			**03MW08S-DUP**		**03MW08S**	
Aroclor-1254	NA		NA		NA	
Aroclor-1260	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 GROUNDWATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB17-0406**		**03SB17-0608**		**03SB19-0204**		**03SB19-0408**		**03SB20-0608**		**03SB22-0406**		**03SB22-0608**		**03SB23-0406**		**03SB24-0406**		**03SB25-0608**	
Sample Date:	**8/29/1991**		**8/29/1991**								**4/16/1997**						**4/16/1997**			
Duplicate of:																				
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,2'-Oxybis(1-chloropropane)	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4,5-Trichlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4,6-Trichlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4-Dichlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4-Dimethylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,4-Dinitrophenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
2,4-Dinitrotoluene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2,6-Dinitrotoluene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Chloronaphthalene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Chlorophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Methylnaphthalene	390	U	380	U	28	J	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Methylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
2-Nitroaniline	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
2-Nitrophenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
3,3'-Dichlorobenzidine	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
3-Nitroaniline	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
4,6-Dinitro-2-methylphenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
4-Bromophenyl Phenyl Ether	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Chloro-3-methylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Chloroaniline	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Chlorophenyl Phenyl Ether	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Methylphenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
4-Nitroaniline	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
4-Nitrophenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
Acenaphthene	390	U	380	U	230	J	170	J	380	U	390	U	400	U	390	U	400	U	390	U
Acenaphthylene	390	U	380	U	110	J	120	J	380	U	390	U	400	U	390	U	400	U	390	U
Acetophenone	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Anthracene	390	U	380	U	1800		740	J	380	U	390	U	400	U	390	U	400	U	390	U
Atrazine	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Benz(a)anthracene	36	J	380	U	4200		3100		380	U	390	U	400	U	390	U	400	U	390	U
Benzaldehyde	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Benzo(a)pyrene	40	J	380	U	3200		2600		380	U	390	U	400	U	390	U	400	U	390	U
Benzo(b)fluoranthene	68	J	380	U	4200		2900		380	U	390	U	400	U	390	U	400	U	390	U
Benzo(g,h,i)perylene	33	J	380	U	2100		1900		380	U	390	U	400	U	390	U	400	U	390	U
Benzo(k)fluoranthene	17	J	380	U	1400		1300		380	U	390	U	400	U	390	U	400	U	390	U
Bis(2-chloroethoxy)methane	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Bis(2-chloroethyl) Ether	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Bis(2-ethylhexyl)phthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Butylbenzylphthalate	38	J	380	U	780	U	780	U	380	U	390	U	30	J	30	J	400	U	390	U
Caprolactam	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Carbazole	390	U	380	U	340	J	140	J	380	U	390	U	400	U	390	U	400	U	390	U
Chrysene	53	J	380	U	3400		2700		380	U	390	U	400	U	390	U	400	U	390	U
Di-n-butylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Di-n-octylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Dibenz(a,h)anthracene	390	U	380	U	580	J	500	J	380	U	390	U	400	U	390	U	400	U	390	U
Dibenzofuran	390	U	380	U	150	J	75	J	380	U	390	U	400	U	390	U	400	U	390	U
Diethylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Dimethylphthalate	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Fluoranthene	91	J	380	U	6900	E	5200		380	U	390	U	400	U	390	U	400	U	390	U
Fluorene	390	U	380	U	260	J	180	J	380	U	390	U	400	U	390	U	400	U	390	U
Hexachlorobenzene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB17-0406**		**03SB17-0608**		**03SB19-0204**		**03SB19-0408**		**03SB20-0608**		**03SB22-0406**		**03SB22-0608**		**03SB23-0406**		**03SB24-0406**		**03SB25-0608**	
Sample Date:	**8/29/1991**		**8/29/1991**								**4/16/1997**						**4/16/1997**			
Duplicate of:																				
Hexachlorobutadiene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Hexachlorocyclopentadiene	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
Hexachloroethane	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Indeno(1,2,3-cd)pyrene	28	J	380	U	2000		1700		380	U	390	U	400	U	390	U	400	U	390	U
Isophorone	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
N-Nitroso-di-n-propylamine	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
N-Nitrosodiphenylamine (1)	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Naphthalene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Nitrobenzene	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Pentachlorophenol	1900	U	1900	U	3800	U	3800	U	1900	U	1900	U	2000	U	1900	U	1900	U	1900	U
Phenanthrene	40	J	380	U	4100		2400		380	U	390	U	400	U	390	U	400	U	390	U
Phenol	390	U	380	U	780	U	780	U	380	U	390	U	400	U	390	U	400	U	390	U
Pyrene	84	J	380	U	6600		5600		380	U	390	U	400	U	390	U	400	U	390	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1,2,2-Tetrachloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1,2-Trichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1-Dichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,1-Dichloroethene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2,4-Trichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dibromo-3-chloropropane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dibromoethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloroethene (cis)	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloroethene (trans)	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,2-Dichloropropane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,3-Dichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
1,4-Dichlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
2-Butanone	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
2-Hexanone	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
4-Methyl-2-pentanone	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Acetone	26	U	24	U	21	U	21	U	21	U	22	U	20	U	23	U	20	U	19	U
Benzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Bromodichloromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Bromoform	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Bromomethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Carbon Disulfide	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Carbon Tetrachloride	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chlorobenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chloroethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chloroform	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Chloromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
cis-1,3-Dichloropropene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Cyclohexane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Dibromochloromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Dichlorodifluoromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Ethylbenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Isopropylbenzene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Methyl Acetate	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Methyl Tert-butyl Ether	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB17-0406**		**03SB17-0608**		**03SB19-0204**		**03SB19-0408**		**03SB20-0608**		**03SB22-0406**		**03SB22-0608**		**03SB23-0406**		**03SB24-0406**		**03SB25-0608**	
Sample Date:	**8/29/1991**		**8/29/1991**								**4/16/1997**						**4/16/1997**			
Duplicate of:																				
Methylcyclohexane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Methylene Chloride	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Styrene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Tetrachloroethene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Toluene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
trans-1,3-Dichloropropene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Trichloroethene	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Trichlorofluoromethane	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Vinyl Chloride	6.5	U	6	U	5.2	U	5.3	U	5.2	U	5.6	U	5.1	U	5.6	U	5	U	4.7	U
Xylene (Total)	19	U	18	U	16	U	16	U	16	U	17	U	15	U	17	U	15	U	14	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB25-0809.9**		**03SB26-0406**	
Sample Date:			**4/18/1997**	
Duplicate of:				
SEMIVOLATILES	**ug/kg**		**ug/kg**	
1,1'-Biphenyl	380	U	440	U
2,2'-Oxybis(1-chloropropane)	380	U	440	U
2,4,5-Trichlorophenol	380	U	440	U
2,4,6-Trichlorophenol	380	U	440	U
2,4-Dichlorophenol	380	U	440	U
2,4-Dimethylphenol	380	U	440	U
2,4-Dinitrophenol	1900	U	2100	U
2,4-Dinitrotoluene	380	U	440	U
2,6-Dinitrotoluene	380	U	440	U
2-Chloronaphthalene	380	U	440	U
2-Chlorophenol	380	U	440	U
2-Methylnaphthalene	380	U	440	U
2-Methylphenol	380	U	440	U
2-Nitroaniline	1900	U	2100	U
2-Nitrophenol	380	U	440	U
3,3'-Dichlorobenzidine	1900	U	2100	U
3-Nitroaniline	1900	U	2100	U
4,6-Dinitro-2-methylphenol	1900	U	2100	U
4-Bromophenyl Phenyl Ether	380	U	440	U
4-Chloro-3-methylphenol	380	U	440	U
4-Chloroaniline	380	U	440	U
4-Chlorophenyl Phenyl Ether	380	U	440	U
4-Methylphenol	380	U	440	U
4-Nitroaniline	1900	U	2100	U
4-Nitrophenol	1900	U	2100	U
Acenaphthene	380	U	440	U
Acenaphthylene	380	U	440	U
Acetophenone	380	U	440	U
Anthracene	380	U	440	U
Atrazine	380	U	440	U
Benz(a)anthracene	380	U	440	U
Benzaldehyde	380	U	440	U
Benzo(a)pyrene	380	U	440	U
Benzo(b)fluoranthene	380	U	440	U
Benzo(g,h,i)perylene	380	U	440	U
Benzo(k)fluoranthene	380	U	440	U
Bis(2-chloroethoxy)methane	380	U	440	U
Bis(2-chloroethyl) Ether	380	U	440	U
Bis(2-ethylhexyl)phthalate	380	U	440	U
Butylbenzylphthalate	380	U	36	J
Caprolactam	380	U	440	U
Carbazole	380	U	440	U
Chrysene	380	U	440	U
Di-n-butylphthalate	380	U	440	U
Di-n-octylphthalate	380	U	440	U
Dibenz(a,h)anthracene	380	U	440	U
Dibenzofuran	380	U	440	U
Diethylphthalate	380	U	440	U
Dimethylphthalate	380	U	440	U
Fluoranthene	380	U	440	U
Fluorene	380	U	440	U
Hexachlorobenzene	380	U	440	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB25-0809.9**		**03SB26-0406**	
Sample Date:			**4/18/1997**	
Duplicate of:				
Hexachlorobutadiene	380	U	440	U
Hexachlorocyclopentadiene	1900	U	2100	U
Hexachloroethane	380	U	440	U
Indeno(1,2,3-cd)pyrene	380	U	440	U
Isophorone	380	U	440	U
N-Nitroso-di-n-propylamine	380	U	440	U
N-Nitrosodiphenylamine (1)	380	U	440	U
Naphthalene	380	U	440	U
Nitrobenzene	380	U	440	U
Pentachlorophenol	1900	U	2100	U
Phenanthrene	380	U	440	U
Phenol	380	U	440	U
Pyrene	380	U	440	U
VOLATILES	**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.4	U	5.7	U
1,1,2,2-Tetrachloroethane	5.4	U	5.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.4	U	5.7	U
1,1,2-Trichloroethane	5.4	U	5.7	U
1,1-Dichloroethane	5.4	U	5.7	U
1,1-Dichloroethene	5.4	U	5.7	U
1,2,4-Trichlorobenzene	5.4	U	5.7	U
1,2-Dibromo-3-chloropropane	5.4	U	5.7	U
1,2-Dibromoethane	5.4	U	5.7	U
1,2-Dichlorobenzene	5.4	U	5.7	U
1,2-Dichloroethane	5.4	U	5.7	U
1,2-Dichloroethene (cis)	5.4	U	5.7	U
1,2-Dichloroethene (trans)	5.4	U	5.7	U
1,2-Dichloropropane	5.4	U	5.7	U
1,3-Dichlorobenzene	5.4	U	5.7	U
1,4-Dichlorobenzene	5.4	U	5.7	U
2-Butanone	5.4	U	5.7	U
2-Hexanone	5.4	U	5.7	U
4-Methyl-2-pentanone	5.4	U	5.7	U
Acetone	22	U	23	U
Benzene	5.4	U	5.7	U
Bromodichloromethane	5.4	U	5.7	U
Bromoform	5.4	U	5.7	U
Bromomethane	5.4	U	5.7	U
Carbon Disulfide	5.4	U	5.7	U
Carbon Tetrachloride	5.4	U	5.7	U
Chlorobenzene	5.4	U	5.7	U
Chloroethane	5.4	U	5.7	U
Chloroform	5.4	U	5.7	U
Chloromethane	5.4	U	5.7	U
cis-1,3-Dichloropropene	5.4	U	5.7	U
Cyclohexane	5.4	U	5.7	U
Dibromochloromethane	5.4	U	5.7	U
Dichlorodifluoromethane	5.4	U	5.7	U
Ethylbenzene	5.4	U	5.7	U
Isopropylbenzene	5.4	U	5.7	U
Methyl Acetate	5.4	U	5.7	U
Methyl Tert-butyl Ether	5.4	U	5.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB25-0809.9**		**03SB26-0406**	
Sample Date:			**4/18/1997**	
Duplicate of:				
Methylcyclohexane	5.4	U	5.7	U
Methylene Chloride	5.4	U	5.7	U
Styrene	5.4	U	5.7	U
Tetrachloroethene	5.4	U	5.7	U
Toluene	5.4	U	5.7	U
trans-1,3-Dichloropropene	5.4	U	5.7	U
Trichloroethene	5.4	U	5.7	U
Trichlorofluoromethane	5.4	U	5.7	U
Vinyl Chloride	5.4	U	5.7	U
Xylene (Total)	16	U	17	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
E -- Value exceeds the calibration range of the instrument and is considered estimated.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
U -- Value is a non-detected result as reported by the laboratory.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB18-0002**	
Sample Date:	**3/22/2006**	
Duplicate of:		
SEMIVOLATILES	**ug/kg**	
1,1'-Biphenyl	400	U
2,2'-Oxybis(1-chloropropane)	400	U
2,4,5-Trichlorophenol	400	U
2,4,6-Trichlorophenol	400	U
2,4-Dichlorophenol	400	U
2,4-Dimethylphenol	400	U
2,4-Dinitrophenol	1900	U
2,4-Dinitrotoluene	400	U
2,6-Dinitrotoluene	400	U
2-Chloronaphthalene	400	U
2-Chlorophenol	400	U
2-Methylnaphthalene	18	J
2-Methylphenol	400	U
2-Nitroaniline	1900	U
2-Nitrophenol	400	U
3,3'-Dichlorobenzidine	1900	U
3-Nitroaniline	1900	U
4,6-Dinitro-2-methylphenol	1900	U
4-Bromophenyl Phenyl Ether	400	U
4-Chloro-3-methylphenol	400	U
4-Chloroaniline	400	U
4-Chlorophenyl Phenyl Ether	400	U
4-Methylphenol	400	U
4-Nitroaniline	1900	U
4-Nitrophenol	1900	U
Acenaphthene	62	J
Acenaphthylene	96	J
Acetophenone	400	U
Anthracene	260	J
Atrazine	400	U
Benz(a)anthracene	780	
Benzaldehyde	400	U
Benzo(a)pyrene	860	
Benzo(b)fluoranthene	1100	
Benzo(g,h,i)perylene	740	
Benzo(k)fluoranthene	410	
Bis(2-chloroethoxy)methane	400	U
Bis(2-chloroethyl) Ether	400	U
Bis(2-ethylhexyl)phthalate	52	J
Butylbenzylphthalate	33	J
Caprolactam	400	U
Carbazole	120	J
Chrysene	960	
Di-n-butylphthalate	400	U
Di-n-octylphthalate	400	U
Dibenz(a,h)anthracene	180	J
Dibenzofuran	63	J
Diethylphthalate	400	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB18-0002**	
Sample Date:	**3/22/2006**	
Duplicate of:		
Dimethylphthalate	400	U
Fluoranthene	2100	
Fluorene	110	J
Hexachlorobenzene	400	U
Hexachlorobutadiene	400	U
Hexachlorocyclopentadiene	1900	U
Hexachloroethane	400	U
Indeno(1,2,3-cd)pyrene	680	
Isophorone	400	U
N-Nitroso-di-n-propylamine	400	U
N-Nitrosodiphenylamine (1)	400	U
Naphthalene	400	U
Nitrobenzene	400	U
Pentachlorophenol	1900	U
Phenanthrene	1400	
Phenol	400	U
Pyrene	1500	
VOLATILES	**ug/kg**	
1,1,1-Trichloroethane	5.7	U
1,1,2,2-Tetrachloroethane	5.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.7	U
1,1,2-Trichloroethane	5.7	U
1,1-Dichloroethane	5.7	U
1,1-Dichloroethene	5.7	U
1,2,4-Trichlorobenzene	5.7	U
1,2-Dibromo-3-chloropropane	5.7	U
1,2-Dibromoethane	5.7	U
1,2-Dichlorobenzene	5.7	U
1,2-Dichloroethane	5.7	U
1,2-Dichloroethene (cis)	5.7	U
1,2-Dichloroethene (trans)	5.7	U
1,2-Dichloropropane	5.7	U
1,3-Dichlorobenzene	5.7	U
1,4-Dichlorobenzene	5.7	U
2-Butanone	5.7	U
2-Hexanone	5.7	U
4-Methyl-2-pentanone	5.7	U
Acetone	23	U
Benzene	5.7	U
Bromodichloromethane	5.7	U
Bromoform	5.7	U
Bromomethane	5.7	U
Carbon Disulfide	5.7	U
Carbon Tetrachloride	5.7	U
Chlorobenzene	5.7	U
Chloroethane	5.7	U
Chloroform	5.7	U
Chloromethane	5.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB18-0002**	
Sample Date:	**3/22/2006**	
Duplicate of:		
cis-1,3-Dichloropropene	5.7	U
Cyclohexane	5.7	U
Dibromochloromethane	5.7	U
Dichlorodifluoromethane	5.7	U
Ethylbenzene	5.7	U
Isopropylbenzene	5.7	U
Methyl Acetate	5.7	U
Methyl Tert-butyl Ether	5.7	U
Methylcyclohexane	5.7	U
Methylene Chloride	5.7	U
Styrene	5.7	U
Tetrachloroethene	5.7	U
Toluene	5.7	U
trans-1,3-Dichloropropene	5.7	U
Trichloroethene	5.7	U
Trichlorofluoromethane	5.7	U
Vinyl Chloride	5.7	U
Xylene (Total)	17	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - HANGAR AREA
NAS JRB, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
U -- Value is a non-detected result as reported by the laboratory.

Database source file: H:\WILLOWGROVE\SITE 3 SOIL\DATA SUMMARIES\FOR DON'S APPENDIX\WGH3SS.DBF data retrieved on: 09/29/09

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01-0204**		**03SB01-0608**		**03SB01-1416**		**03SB02**		**03SB04**		**03TP01**		**03TP02-1**		**03TP02-2**		**03TP03**		**03TP04-1**		**03TP04-2**	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
INORGANICS							**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	NA		NA		NA		16200		14600		14200		20900		18200		17400		23200		28100	
Antimony	NA		NA		NA		9.7	U	12	B	10.3	U	12.3	B	14.7		10.1	U	10	U	14.8	
Arsenic	NA		NA		NA		4		4.5		1.3		4.8		5.2		3.4		5.8		1.9	
Barium	NA		NA		NA		77.6		80.2		166		121		132		171		87.5		115	
Beryllium	NA		NA		NA		1.3		1.4		0.92	B	1.2		1.1		1.1		1.1		1.1	
Cadmium	NA		NA		NA		3.2		3.8		1.8		3.9		3.8		0.9	U	1.3		0.9	U
Calcium	NA		NA		NA		1760		4200		646	B	1950		2370		314	B	554	B	450	B
Chromium	NA		NA		NA		24.9		23.7		24.5		32		30.5		18.4		17	U	18.8	
Cobalt	NA		NA		NA		8.4		10.6		10.8		9.4		9.4		12.1		6		8.5	
Copper	NA		NA		NA		19.5		19		7.1		204		141		36.6		21		22.2	
Cyanide	NA		NA		NA		1.6	U	1.1	U	2.3	U	2.3	U	2.5	U	2.2	U	2.5	U	2.2	U
Iron	NA		NA		NA		25200		25500		30200		28500		26600		20000		27900		25600	
Lead	NA		NA		NA		18		39.7		13.1		106		118		6.1		10.4		11.1	
Magnesium	NA		NA		NA		2410		3520		3260		2320		2420		1430		704		914	
Manganese	NA		NA		NA		482		496		431		617		458		1110		508		478	
Mercury	NA		NA		NA		0.1	U	0.09	U	0.09	U	0.62		0.44		0.09	U	0.11	U	0.1	U
Nickel	NA		NA		NA		13.2		13.8		16.3		16		17.7		11.4		9.6		9.9	
Potassium	NA		NA		NA		1030		1010		3010		1140		903		498		482		509	
Selenium	NA		NA		NA		0.87	U	0.85	U	0.81	U	0.97	U	0.92	U	0.88	U	0.93	U	0.9	U
Silver	NA		NA		NA		1.3	U	1.4	U	1.4	U	3.9		4.9		1.3	U	1.3	U	1.3	U
Sodium	NA		NA		NA		964	U	1000	U	1020	U	1080	U	950	U	999	U	993	U	996	U
Thallium	NA		NA		NA		0.44		0.51		0.41	U	0.48	U	0.46	U	0.44	U	0.46	U	0.45	U
Vanadium	NA		NA		NA		36.2		36.8		27.3		41.4		41.4		28.3		29.5		27.5	
Zinc	NA		NA		NA		44		52.4		47.9		173		441		30.1		40		32.5	
SEMIVOLATILES							**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
2,4,6-Trichlorophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,4-Dichlorophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,4-Dimethylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,4-Dinitrophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
2,4-Dinitrotoluene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2,6-Dinitrotoluene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Chloronaphthalene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Chlorophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Methylnaphthalene	NA		NA		NA		390	U	460	J	1100	U	410	U	55	J	380	U	330	J	980	J
2-Methylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
2-Nitroaniline	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
2-Nitrophenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
3,3'-Dichlorobenzidine	NA		NA		NA		780	U	3900	U	2300	U	820	U	790	U	770	U	820	U	2400	U
3-Nitroaniline	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
4,6-Dinitro-2-methylphenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
4-Bromophenyl Phenyl Ether	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Chloro-3-methylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Chloroaniline	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Chlorophenyl Phenyl Ether	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Methylphenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
4-Nitroaniline	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01-0204**		**03SB01-0608**		**03SB01-1416**		**03SB02**		**03SB04**		**03TP01**		**03TP02-1**		**03TP02-2**		**03TP03**		**03TP04-1**		**03TP04-2**	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
4-Nitrophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
Acenaphthene	NA		NA		NA		390	U	1400	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Acenaphthylene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	NA		NA		NA		390	U	4100		1100	U	410	U	200	J	380	U	410	U	1200	U
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	NA		NA		NA		40	J	8200		1100	U	91	J	850		380	U	410	U	1200	U
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		NA		44	J	7000		1100	U	87	J	670		380	U	410	U	1200	U
Benzo(b)fluoranthene	NA		NA		NA		390	U	7500		1100	U	88	J	890		380	U	410	U	1200	U
Benzo(g,h,i)perylene	NA		NA		NA		390	U	2200		1100	U	410	U	230	J	380	U	410	U	1200	U
Benzo(k)fluoranthene	NA		NA		NA		51	J	6200		1100	U	86	J	530		380	U	410	U	1200	U
Benzoic Acid	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
Benzyl Alcohol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Bis(2-chloroethoxy)methane	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Bis(2-chloroethyl)ether	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Bis(2-ethylhexyl)phthalate	NA		NA		NA		120	J	1900	U	1100	U	51	J	860		380	U	46	J	130	J
Butylbenzylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	NA		NA		NA		47	J	7700		1100	U	97	J	960		380	U	410	U	1200	U
Di-n-butylphthalate	NA		NA		NA		73	B	1900	U	1100	U	43	B	62	B	380	U	60	B	1200	U
Di-n-octylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Dibenz(a,h)anthracene	NA		NA		NA		390	U	320	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Dibenzofuran	NA		NA		NA		390	U	1100	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Diethylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Dimethylphthalate	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Fluoranthene	NA		NA		NA		89	J	18000		1100	U	180	J	1600		380	U	42	J	1200	U
Fluorene	NA		NA		NA		390	U	1600	J	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachlorobutadiene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachlorocyclopentadiene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Hexachloroethane	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		390	U	2900		1100	U	44	J	310	J	380	U	410	U	1200	U
Isophorone	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
N-Nitroso-di-n-propylamine	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
N-Nitrosodiphenylamine (1)	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Naphthalene	NA		NA		NA		390	U	690	J	1100	U	410	U	390	U	380	U	2000		7400	
Nitrobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Pentachlorophenol	NA		NA		NA		1900	U	9400	U	5500	U	2000	U	1900	U	1900	U	2000	U	5900	U
Phenanthrene	NA		NA		NA		65	J	17000		1100	U	100	J	820		380	U	410	U	1200	U
Phenol	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
Pyrene	NA		NA		NA		84	J	15000		1100	U	170	J	1500		380	U	410	U	1200	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1,2,2-Tetrachloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,1,2-Trichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1-Dichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,1-Dichloroethene	12	U	12	U	12	U	3	B	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01-0204**		**03SB01-0608**		**03SB01-1416**		**03SB02**		**03SB04**		**03TP01**		**03TP02-1**		**03TP02-2**		**03TP03**		**03TP04-1**		**03TP04-2**	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		45	J	1900	U	1100	U	410	U	390	U	380	U	410	U	3600	
1,2-Dichloroethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
1,3-Dichlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	1200	U
1,4-Dichlorobenzene	NA		NA		NA		390	U	1900	U	1100	U	410	U	390	U	380	U	410	U	880	J
2-Butanone	12	U	14	J	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
2-Hexanone	12	UJ	12	UJ	12	UJ	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
4-Methyl-2-pentanone	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Acetone	12	UJ	71	J	12	UJ	6	B	6	B	12	U	13	U	12	U	12	U	23	B	140	B
Benzene	12	U	12	U	12	U	3	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Bromoform	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Bromomethane	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Carbon Disulfide	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Carbon Tetrachloride	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Chlorobenzene	12	U	12	U	12	U	2	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Chloroethane	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Chloroform	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Chloromethane	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
cis-1,3-Dichloropropene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibromochloromethane	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	24	B	25	B	24	B	6	U	4	B	6	U	6	U	6	U	6	U	6	U	6	B
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Tetrachloroethene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Toluene	12	U	12	U	12	U	2	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
trans-1,3-Dichloropropene	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Trichloroethene	12	U	12	U	12	U	2	J	6	U	6	U	6	U	6	U	6	U	6	U	30	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Acetate	NA		NA		NA		11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Vinyl Chloride	12	U	12	U	12	U	11	U	12	U	12	U	13	U	12	U	12	U	13	U	60	U
Xylene (Total)	12	U	12	U	12	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	30	U
PESTICIDES/PCBS							**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
4,4'-DDE	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
4,4'-DDT	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Aldrin	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01-0204**		**03SB01-0608**		**03SB01-1416**		**03SB02**		**03SB04**		**03TP01**		**03TP02-1**		**03TP02-2**		**03TP03**		**03TP04-1**		**03TP04-2**	
Sample Date:	**5/27/1997**		**5/27/1997**		**5/27/1997**		**9/6/1991**		**9/6/1991**		**9/9/1991**		**9/10/1991**		**9/10/1991**		**9/11/1991**		**9/11/1991**		**9/11/1991**	
Duplicate:																						
Alpha-BHC	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Alpha-Chlordane	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1016	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1221	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1232	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1242	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1248	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Aroclor-1254	NA		NA		NA		190	U	190	U	180	U	490		810		190	U	200	U	200	U
Aroclor-1260	NA		NA		NA		190	U	190	U	180	U	200	U	380	U	190	U	200	U	200	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Delta-BHC	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Dieldrin	NA		NA		NA		63		230		18	U	79		38	U	19	U	20	U	20	U
Endosulfan I	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Endosulfan II	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Endosulfan Sulfate	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Endrin	NA		NA		NA		19	U	19	U	18	U	25		38	U	19	U	20	U	20	U
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		19	U	19	U	18	U	20	U	38	U	19	U	20	U	20	U
Gamma-BHC (Lindane)	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Gamma-Chlordane	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Heptachlor	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9	U	9	U
Heptachlor Epoxide	NA		NA		NA		9.3	U	9.3	U	9.1	U	10	U	19	U	9.3	U	9.9	U	9.8	U
Methoxychlor	NA		NA		NA		93	U	93	U	91	U	100	U	190	U	93	U	99	U	98	U
Toxaphene	NA		NA		NA		190	U	190	U	180	U	200	U	380	U	190	U	200	U	200	U
DIOXINS/FURANS																						
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	13500		29100		27200		26100		16000		15200		25400		21600		25600	
Antimony	9.3	U	12.7	B	7.2	L	6.9	J	2.6	J	0.58	B	28.8	L	12.9	L	113	L
Arsenic	17.9		3.7		7.4		6.3	J	3.4	J	2.6	L	10.7	L	4.1	L	8.6	L
Barium	96		330		302	J	377	J	186	J	167	J	628	J	267	J	656	J
Beryllium	1		1.2		0.79		0.77		0.94		1.1		1		0.78		0.61	
Cadmium	2.1		0.98	U	57.7	K	14.2	K	17.8	K	1.4	K	99.4	K	25.1	K	155	K
Calcium	9260		277	B	8730		4120	J	2370	J	984		26200		5550		14700	
Chromium	20.6		13.7		73.5	K	78.2	J	30	J	9.4	K	108	K	53.4	K	83.7	K
Cobalt	7.2		21.5		23.8		10.7		8		13.2		30.1		12.1		20.2	
Copper	25.7		77.3		1210	K	363	K	392	K	67.4	K	1280	K	475	K	1500	K
Cyanide	2.3	U	2.3	U	0.41	J	0.49	J	0.8	J	0.25		1		0.63		4.6	
Iron	23200		17000		44400		40100		27900		24100		113000		106000		91600	
Lead	29.9		3.7		1090	J	1100	J	6480	J	63.2	J	2170	J	1370	J	1990	J
Magnesium	6130		841		2610		2400		1760		665		8690		1720		3690	
Manganese	449		3030		975		816		959		1290		2030		1590		3070	
Mercury	0.14		0.1	U	0.46	L	1.6	L	1.6	L	0.58	L	4.8	L	3.9	L	6.7	L
Nickel	13		11.7		296	K	47.1	K	58.9	K	13.8	K	145	K	40.9	K	81.3	K
Potassium	1020		522	U	1120		887		1090		351		1590		553		790	
Selenium	0.82	U	0.96	U	0.34	UR	0.32	UR	0.33	UR	0.32	UR	3.8	UR	1.7	UR	3.7	UR
Silver	1.2	U	1.5	U	18.9		3.2		3.6		0.64		233		6		45.7	
Sodium	917	U	1090	U	578	L	77.7	L	19.5	UR	19.2	UR	987	L	100	UR	158	L
Thallium	0.41	U	0.48	U	0.59	UR	0.57	UR	0.57	UR	0.56	UR	1.3	UR	2.9	UR	1.3	UR
Vanadium	33.6		21.2		22.3		20.7		21.8		16.7		32.9		18		26.2	
Zinc	74.2		20.7		2600	K	892	K	814	K	103	K	7390	K	1230	K	4990	K
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
1,2,4,5-Tetrachlorobenzene	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,3,4,6-Tetrachlorophenol	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4,5-Trichlorophenol	5500	U	1900	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4,6-Trichlorophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4-Dichlorophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4-Dimethylphenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,4-Dinitrophenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
2,4-Dinitrotoluene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2,6-Dinitrotoluene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Chloronaphthalene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Chlorophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Methylnaphthalene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Methylphenol	290	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
2-Nitroaniline	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
2-Nitrophenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
3,3'-Dichlorobenzidine	2200	U	800	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
3-Nitroaniline	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
4,6-Dinitro-2-methylphenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
4-Bromophenyl Phenyl Ether	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Chloro-3-methylphenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Chloroaniline	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Chlorophenyl Phenyl Ether	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Methylphenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
4-Nitroaniline	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
4-Nitrophenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
Acenaphthene	130	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Acenaphthylene	280	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Acetophenone	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Anthracene	850	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Atrazine	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Benz(a)anthracene	5600		400	U	860	U	820	U	820	U	410	U	480	U	230	J	2300	U
Benzaldehyde	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Benzo(a)pyrene	5100		400	U	860	U	820	U	820	U	410	U	480	U	390	J	2300	U
Benzo(b)fluoranthene	7100		400	U	860	U	820	U	820	U	410	U	480	U	290	J	2300	U
Benzo(g,h,i)perylene	1300		400	U	860	U	820	U	820	U	410	U	63	J	2100	U	2300	U
Benzo(k)fluoranthene	3600		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Benzoic Acid	5500	U	1900	U	NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	1100	U	400	U	NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Bis(2-chloroethyl)ether	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Bis(2-ethylhexyl)phthalate	1100	U	400	U	860	U	820	U	820	U	130	J	290	J	2100	U	3300	
Butylbenzylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Caprolactam	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Carbazole	NA		NA		860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Chrysene	5000		400	U	860	U	820	U	820	U	410	U	480	U	250	J	2300	U
Di-n-butylphthalate	1000	U	45	B	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Di-n-octylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	220	J
Dibenz(a,h)anthracene	180	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Dibenzofuran	140	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Diethylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Dimethylphthalate	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Fluoranthene	8200		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Fluorene	200	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Hexachlorobenzene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Hexachlorobutadiene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Hexachlorocyclopentadiene	1100	U	400	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
Hexachloroethane	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Indeno(1,2,3-cd)pyrene	1800		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Isophorone	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
N-Nitroso-di-n-propylamine	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
N-Nitrosodiphenylamine (1)	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Naphthalene	210	J	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Nitrobenzene	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Pentachlorophenol	5500	U	1900	U	4200	U	4000	U	4000	U	2000	U	2300	U	10000	U	11000	U
Phenanthrene	3100		400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Phenol	1100	U	400	U	860	U	820	U	820	U	410	U	480	U	2100	U	2300	U
Pyrene	9300		400	U	860	U	820	U	820	U	410	U	480	U	580	J	2300	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1,2,2-Tetrachloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1,2-Trichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1-Dichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,1-Dichloroethene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2,3-Trichlorobenzene	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2,4-Trichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dibromo-3-chloropropane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
1,2-Dibromoethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloroethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloroethene (cis)	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloroethene (Total)	6	U	6	U	NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,2-Dichloropropane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,3-Dichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
1,4-Dichlorobenzene	1100	U	400	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
2-Butanone	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
2-Hexanone	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
4-Methyl-2-pentanone	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Acetone	7	B	12	U	28	U	9.5	J	21	U	20	U	33	U	24	U	30	U
Benzene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromochloromethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromodichloromethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromoform	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Bromomethane	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Carbon Disulfide	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Carbon Tetrachloride	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chlorobenzene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chloroethane	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chloroform	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Chloromethane	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
cis-1,3-Dichloropropene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Cyclohexane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Dibromochloromethane	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Dichlorodifluoromethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Ethylbenzene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Isopropylbenzene	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
M,p-xylene	NA		NA		14	U	11	U	11	U	10	U	16	U	12	U	15	U
Methyl Acetate	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Methyl Tert-butyl Ether (mtbe)	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Methylcyclohexane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Methylene Chloride	6	U	2	B	5.9	B	2.4	B	1.6	B	3.5	B	4.5	B	3.3	B	3.9	B
O-xylene	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Styrene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Tetrachloroethene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Toluene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
trans-1,3-Dichloropropene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Trichloroethene	6	U	6	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Trichlorofluoromethane	NA		NA		7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Vinyl Acetate	11	U	12	U	NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	11	U	12	U	7.1	U	5.3	U	5.3	U	5.1	U	8.1	U	6	U	7.5	U
Xylene (Total)	6	U	6	U	NA		NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	36	U	19	U	9.9	J	5.8	J	1.7	J	0.47	B	72000		24	J	57	J
4,4'-DDE	36	U	19	U	2	J	1.6	J	2.5	J	2.4		8700		13	J	11	J
4,4'-DDT	36	U	19	U	6.2	J	2.1	U	5.8	J	2.2	J	270000		2.2	U	69	J
Aldrin	18	U	9.6	U	1.7	J	3	J	5.6	J	2.1	U	2500	U	9.4	J	9.7	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP04-3**		**03TP04-4**		**03TP05-0506-01**		**03TP05-0910-02**		**03TP05-0910-02-D**		**03TP06-0304-01**		**03TP06-0607-04**		**03TP06-0708-02**		**03TP06-0809-03**	
Sample Date:	**9/11/1991**		**9/11/1991**		**4/30/2007**		**4/30/2007**		**4/30/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**		**5/1/2007**	
Duplicate:							**03TP05-0910-02-D**		**03TP05-0910-02**								**03TP06-0809-03-D**	
Alpha-BHC	18	U	9.6	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	2.4	U
Alpha-Chlordane	180	U	96	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	2.4	U
Aroclor-1016	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1221	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1232	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1242	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1248	180	U	96	U	22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1254	360	U	190	U	22	U	50		81	J	20	U	490	U	450		620	
Aroclor-1260	360	U	190	U	22	U	55		40		20	U	490	U	550		600	
Aroclor-1262	NA		NA		22	U	21	U	21	U	20	U	490	U	21	U	24	U
Aroclor-1268	NA		NA		22	U	21	U	21	U	20	U	490	U	21	U	24	U
Beta-BHC	18	U	9.6	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	2.4	U
Delta-BHC	18	U	9.6	U	0.35	J	0.43	J	2.1	U	0.96	J	2500	U	2.2	U	0.94	J
Dieldrin	36	U	19	U	200		76		83		10		10000		30		68	
Endosulfan I	18	U	9.6	U	2.2	U	2.1	U	2.1	U	2.1	U	580	J	2.2	U	1.4	J
Endosulfan II	36	U	19	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	16	J
Endosulfan Sulfate	36	U	19	U	2.2	U	2.3	J	0.91	J	2.1	U	2500	U	5.9	J	19	
Endrin	36	U	19	U	2.2	U	2.1	U	2.1	U	2.1	U	2500	U	2.2	U	17	J
Endrin Aldehyde	NA		NA		0.83	J	2.1	U	2.1	U	0.52	J	2500	U	2.2	U	2.4	U
Endrin Ketone	36	U	19	U	0.39	J	0.55	J	0.32	J	2.1	U	2500	U	5.2	J	2.4	U
Gamma-BHC (Lindane)	18	U	9.6	U	0.9	J	1.3	J	1.8	J	0.69	J	2500	U	3	J	3.4	J
Gamma-Chlordane	180	U	96	U	1.7	J	3.2	J	5.5	J	1.2	J	620	J	16	J	18	J
Heptachlor	18	U	9.6	U	2.2	U	1.8	J	2.1	U	2.1	U	2500	U	8	J	2.4	U
Heptachlor Epoxide	18	U	9.6	U	2.2	U	2.1	U	2.1	U	1.5	J	390	J	2.2	U	1.8	J
Methoxychlor	180	U	96	U	3	J	4.6	J	2.8	J	1	J	4800	U	18		24	J
Toxaphene	360	U	190	U	87	U	83	U	83	U	82	U	98000	U	86	U	95	U
DIOXINS/FURANS					**ng/kg**												**ng/kg**	
1,2,3,4,6,7,8-HpCDD	NA		NA		320		NA		NA		NA		NA		NA		380	J
1,2,3,4,6,7,8-HpCDF	NA		NA		560		NA		NA		NA		NA		NA		490	J
1,2,3,4,7,8,9-HpCDF	NA		NA		60		NA		NA		NA		NA		NA		36	J
1,2,3,4,7,8-HxCDD	NA		NA		21		NA		NA		NA		NA		NA		16	J
1,2,3,4,7,8-HxCDF	NA		NA		230		NA		NA		NA		NA		NA		270	J
1,2,3,6,7,8-HxCDD	NA		NA		45		NA		NA		NA		NA		NA		40	J
1,2,3,6,7,8-HxCDF	NA		NA		150	EMPC	NA		NA		NA		NA		NA		89	EMPC
1,2,3,7,8,9-HxCDD	NA		NA		58		NA		NA		NA		NA		NA		49	J
1,2,3,7,8,9-HxCDF	NA		NA		17		NA		NA		NA		NA		NA		3.2	J
1,2,3,7,8-PeCDD	NA		NA		28	EMPC	NA		NA		NA		NA		NA		16	EMPC
1,2,3,7,8-PeCDF	NA		NA		240	EMPC	NA		NA		NA		NA		NA		52	EMPC
2,3,4,6,7,8-HxCDF	NA		NA		170		NA		NA		NA		NA		NA		150	J
2,3,4,7,8-PeCDF	NA		NA		210	EMPC	NA		NA		NA		NA		NA		110	J
2,3,7,8-TCDD	NA		NA		9.6		NA		NA		NA		NA		NA		17	
2,3,7,8-TCDF	NA		NA		230	EMPC	NA		NA		NA		NA		NA		59	EMPC
OCDD	NA		NA		2100		NA		NA		NA		NA		NA		1700	
OCDF	NA		NA		190		NA		NA		NA		NA		NA		190	J
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
INORGANICS			**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**
Aluminum	NA		24700		21700		18000		18700		29600		20700		17800		14300
Antimony	NA		0.39	UL	0.39	UL	29.7	L	0.38	UL	41.9	L	0.4	UL	0.4	UL	0.39
Arsenic	NA		2.8		4.1		6.3		2.2		9.9		2.5		2.8	L	2
Barium	NA		128		69.5		518		149		735		61.3		46.1		129
Beryllium	NA		0.97		0.74		0.86		1		0.84		0.67		0.92		1.3
Cadmium	NA		0.085	U	0.084	U	24.2		0.084	U	51.5		0.087	U	0.088	U	0.084
Calcium	NA		253		624		17900		365		6740		485		402		379
Chromium	NA		7.7	K	16.4	K	49.5	K	4.2	K	133	K	18	K	6.3	K	5.7
Cobalt	NA		10		10.5		18.3		6.1		11.2		2.5		3.8		11.4
Copper	NA		44.9		28.6		734		93.1		932		25.1		60.8		148
Cyanide	NA		0.18		0.6	U	0.18		0.2		2.2		0.63	U	0.63	U	0.6
Iron	NA		15400		21000		27200		10600		60400		9660		19900		17500
Lead	NA		4.3		7.4		2010		2.2		4640		7.6		4.5		4.2
Magnesium	NA		660		1370		8650		408		2340		798		1020		451
Manganese	NA		936		606		712		879		1520		41.6		52		1140
Mercury	NA		0.057		0.057		0.73		0.067		0.35		0.023	L	0.027	L	0.024
Nickel	NA		11.5		12.2		150		7.8		84.6		9		5.8		12.7
Potassium	NA		272		503		1000		191		1070		388		240		168
Selenium	NA		0.32	UL	0.32	UL	0.55	L	0.31	UL	0.36	UR	0.33	UL	0.33	UL	0.32
Silver	NA		0.036	U	0.052	B	8		0.036	U	34		0.037	U	0.038	U	0.036
Sodium	NA		19.1	UR	18.9	UR	529		18.8	UL	1200		19.6	UL	28.1	L	38.7
Thallium	NA		0.56	UL	0.55	UL	0.64	UR	0.55	UL	0.62	UR	0.57	UL	0.57	UR	0.55
Vanadium	NA		17.7		30.4		28.2		11.8		21.7		32.5		19.2		15.4
Zinc	NA		18		25.8		2260		10.6		2560		12.1		30		20.4
SEMIVOLATILES			**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
1,1'-Biphenyl	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
1,2,4,5-Tetrachlorobenzene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA
2,2'-Oxybis(1-chloropropane)	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,3,4,6-Tetrachlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4,5-Trichlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4,6-Trichlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4-Dichlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4-Dimethylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,4-Dinitrophenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
2,4-Dinitrotoluene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2,6-Dinitrotoluene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Chloronaphthalene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Chlorophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Methylnaphthalene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Methylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
2-Nitroaniline	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
2-Nitrophenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
3,3'-Dichlorobenzidine	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
3-Nitroaniline	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
4,6-Dinitro-2-methylphenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
4-Bromophenyl Phenyl Ether	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Chloro-3-methylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Chloroaniline	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Chlorophenyl Phenyl Ether	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Methylphenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
4-Nitroaniline	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
4-Nitrophenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
Acenaphthene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Acenaphthylene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Acetophenone	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Anthracene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Atrazine	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Benz(a)anthracene	NA		400	U	400	U	930	U	400	U	93	J	410	U	420	U	400
Benzaldehyde	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Benzo(a)pyrene	NA		400	U	400	U	930	U	400	U	62	J	410	U	420	U	400
Benzo(b)fluoranthene	NA		400	U	400	U	930	U	400	U	61	J	410	U	420	U	400
Benzo(g,h,i)perylene	NA		400	U	400	U	930	U	400	U	59	J	410	U	420	U	400
Benzo(k)fluoranthene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA		NA
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA		NA
Bis(2-chloroethoxy)methane	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Bis(2-chloroethyl)ether	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Bis(2-ethylhexyl)phthalate	NA		400	U	400	U	390	J	400	U	450	U	410	U	420	U	400
Butylbenzylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Caprolactam	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Carbazole	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Chrysene	NA		400	U	400	U	930	U	400	U	100	J	410	U	420	U	400
Di-n-butylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Di-n-octylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Dibenz(a,h)anthracene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Dibenzofuran	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Diethylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Dimethylphthalate	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Fluoranthene	NA		400	U	400	U	930	U	400	U	160	J	410	U	420	U	400
Fluorene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Hexachlorobenzene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Hexachlorobutadiene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Hexachlorocyclopentadiene	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
Hexachloroethane	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Indeno(1,2,3-cd)pyrene	NA		400	U	400	U	930	U	400	U	62	J	410	U	420	U	400
Isophorone	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
N-Nitroso-di-n-propylamine	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
N-Nitrosodiphenylamine (1)	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Naphthalene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Nitrobenzene	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Pentachlorophenol	NA		1900	U	1900	U	4500	U	1900	U	2200	U	2000	U	2000	U	1900
Phenanthrene	NA		400	U	400	U	930	U	400	U	180	J	410	U	420	U	400
Phenol	NA		400	U	400	U	930	U	400	U	450	U	410	U	420	U	400
Pyrene	NA		400	U	400	U	930	U	400	U	160	J	410	U	420	U	400
VOLATILES			**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
1,1,1-Trichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1,2,2-Tetrachloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1,2-Trichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1-Dichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,1-Dichloroethene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2,3-Trichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2,4-Trichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dibromo-3-chloropropane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
1,2-Dibromoethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloroethene (cis)	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dichloroethene (trans)	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,2-Dichloropropane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,3-Dichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
1,4-Dichlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
2-Butanone	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
2-Hexanone	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
4-Methyl-2-pentanone	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Acetone	NA		20	U	20	U	30	U	21	U	25	U	23	U	24	U	25
Benzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromochloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromodichloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromoform	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Bromomethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Carbon Disulfide	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Carbon Tetrachloride	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chlorobenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chloroethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chloroform	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Chloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
cis-1,3-Dichloropropene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Cyclohexane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Dibromochloromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Dichlorodifluoromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Ethylbenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Isopropylbenzene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
M,p-xylene	NA		10	U	10	U	15	U	11	U	12	U	11	U	12	U	13
Methyl Acetate	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Methyl Tert-butyl Ether (mtbe)	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Methylcyclohexane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Methylene Chloride	NA		1.9	B	1.9	B	2.6	B	2.8	B	2.7	B	3.4	B	6.1	B	3.4
O-xylene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Styrene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Tetrachloroethene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Toluene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
trans-1,3-Dichloropropene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Trichloroethene	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Trichlorofluoromethane	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA
Vinyl Chloride	NA		5.1	U	5.1	U	7.5	U	5.4	U	6.1	U	5.7	U	5.9	U	6.3
Xylene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA
PESTICIDES/PCBS			**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
4,4'-DDD	NA		2.1	U	2.1	U	1.4	J	2	U	1.4	J	2.1	U	2.1	U	2.1
4,4'-DDE	NA		2.1	U	2.1	U	6.6		2	U	3.8		2.1	U	2.1	U	2.1
4,4'-DDT	NA		2.1	U	2.1	U	15		2	U	8.6		2.1	U	2.1	U	2.1
Aldrin	NA		2.1	U	2.1	U	2.3	J	2	U	0.61	J	2.1	U	2.1	U	2.1

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP06-0809-03-D**		**03TP07-0203-02**		**03TP07-0304-01**		**03TP08-0203-03**		**03TP08-0304-02**		**03TP08-0405-01**		**03TP09-0506-01**		**03TP09-0506-02**		**03TP10-0304-02**
Sample Date:	**5/1/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/2/2007**		**5/3/2007**		**5/3/2007**		**5/3/2007**
Duplicate:	**03TP06-0809-03**																
Alpha-BHC	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Alpha-Chlordane	NA		2.1	U	2.1	U	3.1		2	U	1.3	J	2.1	U	2.1	U	0.39
Aroclor-1016	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1221	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1232	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1242	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1248	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1254	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1260	NA		20	U	20	U	46		20	U	23	U	21	U	21	U	20
Aroclor-1262	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Aroclor-1268	NA		20	U	20	U	24	U	20	U	23	U	21	U	21	U	20
Beta-BHC	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Delta-BHC	NA		2.1	U	2.1	U	0.55	J	2	U	2.3	U	2.1	U	2.1	U	2.1
Dieldrin	NA		2.1	U	2.1	U	330		2	U	120		2.1	U	2.1	U	2.1
Endosulfan I	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Endosulfan II	NA		2.1	U	0.71	J	0.63	J	2	U	2.3	U	2.1	U	2.1	U	2.1
Endosulfan Sulfate	NA		2.1	U	2.1	U	2.2	J	2	U	0.61	J	2.1	U	2.1	U	2.1
Endrin	NA		2.1	U	2.1	U	4.5	J	2	U	1.8	J	2.1	U	2.1	U	2.1
Endrin Aldehyde	NA		2.1	U	2.1	U	1.6	J	2	U	1	J	2.1	U	2.1	U	2.1
Endrin Ketone	NA		2.1	U	2.1	U	2.7	J	2	U	0.94	J	2.1	U	2.1	U	2.1
Gamma-BHC (Lindane)	NA		2.1	U	2.1	U	0.99	J	2	U	0.81	J	2.1	U	2.1	U	2.1
Gamma-Chlordane	NA		2.1	U	2.1	U	4.2	J	2	U	2.3	J	2.1	U	2.1	U	2.1
Heptachlor	NA		2.1	U	2.1	U	0.52	J	2	U	2.3	U	2.1	U	2.1	U	2.1
Heptachlor Epoxide	NA		2.1	U	2.1	U	2.4	U	2	U	2.3	U	2.1	U	2.1	U	2.1
Methoxychlor	NA		4	U	4	U	2.2	J	4	U	2.5	J	4.1	U	4.2	U	4
Toxaphene	NA		82	U	81	U	95	U	81	U	91	U	84	U	84	U	81
DIOXINS/FURANS	**ng/kg**																
1,2,3,4,6,7,8-HpCDD	650	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,6,7,8-HpCDF	1100	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,7,8,9-HpCDF	88	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,7,8-HxCDD	39	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,4,7,8-HxCDF	690	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,6,7,8-HxCDD	94	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,6,7,8-HxCDF	230	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8,9-HxCDD	120	J	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8,9-HxCDF	14		NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8-PeCDD	43	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
1,2,3,7,8-PeCDF	130	J	NA		NA		NA		NA		NA		NA		NA		NA
2,3,4,6,7,8-HxCDF	350	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
2,3,4,7,8-PeCDF	300	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
2,3,7,8-TCDD	17	J	NA		NA		NA		NA		NA		NA		NA		NA
2,3,7,8-TCDF	130	EMPC	NA		NA		NA		NA		NA		NA		NA		NA
OCDD	2200		NA		NA		NA		NA		NA		NA		NA		NA
OCDF	420	J	NA		NA		NA		NA		NA		NA		NA		NA
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
INORGANICS		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum		20800		12800		12400		10400		12000		13900		11100		19200	
Antimony	UL	0.39	UL	0.38	UL	0.38	UL	0.4	UL	1	B	0.38	UL	0.4	UL	0.39	UL
Arsenic	L	7		4.6		4.1		4.6		5.3		2.3		6.7		2.8	
Barium		287		58		48.4		117		83.9		77.1		90.9		176	
Beryllium		1.7		0.77		0.78		1.1		0.94		0.67		1.2		0.98	
Cadmium	U	0.085	U	0.083	U	0.083	U	0.086	U	2.7		0.082	U	0.088	U	0.085	UR
Calcium		704		1310		641		1230		1220		396		1420		329	
Chromium	K	22.5	K	18.6	K	18.7	K	14.2	K	21.5	K	6.9	K	18.1	K	8.1	
Cobalt		82.8		7.1		8.1		6.6		8.4		4.1		5.7		9.6	
Copper		43		12.9		16.3		11.3		34.6		21.9		9.3		34.1	K
Cyanide	U	0.14		0.6	U	0.6	U	0.62	U	0.17		0.59	U	0.13		0.61	U
Iron		23000		21200		19800		13800		21600		9570		13200		14100	
Lead		35.7		11.6		7.6		30.2		104		3.3		23.4		4.9	
Magnesium		868		2420		1840		1540		1620		809		1470		979	
Manganese		20000		412		541		947		774		221		321		910	
Mercury	L	0.074	L	0.036	L	0.027	L	0.06	L	0.18	L	0.034	L	0.09	L	0.029	
Nickel		15.6		10.4		10		9.2		10.8		7.4		9.3		15.4	
Potassium		286		605		527		356	B	365	B	350	B	336	B	469	
Selenium	UL	8	U	0.31	UL	0.31	UL	0.32	UL	0.32	UL	0.31	UL	0.33	UL	0.32	U
Silver	U	3.6		0.075	B	0.036	U	0.17	B	0.31		0.035	U	0.038	U	0.036	U
Sodium	L	19.1	UR	26.4	L	19.1	L	19.4	UR	18.9	UR	32.8	L	19.7	UR	19.1	UR
Thallium	UR	13.9	U	0.54	UR	0.55	UR	0.56	UL	0.55	UR	0.54	UL	0.57	UL	0.56	UR
Vanadium		34.9		32.6		30.5		22.3		28.1		13.2		25.4		17.6	
Zinc		28.3		29.1		22.9		37.3		141		14.7		37.9		26.9	
SEMIVOLATILES		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
1,2,4,5-Tetrachlorobenzene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
1-Methylnaphthalene		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,3,4,6-Tetrachlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4,5-Trichlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4,6-Trichlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4-Dichlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4-Dimethylphenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,4-Dinitrophenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
2,4-Dinitrotoluene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2,6-Dinitrotoluene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Chloronaphthalene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Chlorophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Methylnaphthalene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
2-Methylphenol	U	400	U	390	U	390	U	820	U	190	J	390	U	420	U	400	U
2-Nitroaniline	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
2-Nitrophenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
3,3'-Dichlorobenzidine	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
3-Nitroaniline	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
4,6-Dinitro-2-methylphenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
4-Bromophenyl Phenyl Ether	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Chloro-3-methylphenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Chloroaniline	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Chlorophenyl Phenyl Ether	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Methylphenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
4-Nitroaniline	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
4-Nitrophenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
Acenaphthene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Acenaphthylene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Acetophenone	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Anthracene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Atrazine	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benz(a)anthracene	U	400	U	390	U	390	U	110	J	800	U	390	U	71	J	400	U
Benzaldehyde	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benzo(a)pyrene	U	400	U	390	U	390	U	100	J	800	U	390	U	70	J	400	U
Benzo(b)fluoranthene	U	400	U	390	U	390	U	110	J	800	U	390	U	84	J	400	U
Benzo(g,h,i)perylene	U	400	U	390	U	390	U	100	J	800	U	390	U	73	J	400	U
Benzo(k)fluoranthene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Benzoic Acid		NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol		NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Bis(2-chloroethyl)ether	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Bis(2-ethylhexyl)phthalate	U	400	U	390	U	390	U	820	U	140	J	390	U	420	U	400	U
Butylbenzylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Caprolactam	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Carbazole	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Chrysene	U	400	U	390	U	390	U	180	J	800	U	390	U	150	J	400	U
Di-n-butylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Di-n-octylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dibenz(a,h)anthracene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dibenzofuran	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Diethylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Dimethylphthalate	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Fluoranthene	U	400	U	390	U	390	U	280	J	89	J	390	U	240	J	400	U
Fluorene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Hexachlorobenzene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Hexachlorobutadiene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Hexachlorocyclopentadiene	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
Hexachloroethane	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Indeno(1,2,3-cd)pyrene	U	400	U	390	U	390	U	110	J	800	U	390	U	69	J	400	U
Isophorone	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
N-Nitroso-di-n-propylamine	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
N-Nitrosodiphenylamine (1)	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Naphthalene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Nitrobenzene	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Pentachlorophenol	U	2000	U	1900	U	1900	U	4000	U	3900	U	1900	U	2000	U	1900	U
Phenanthrene	U	400	U	42	J	390	U	260	J	80	J	390	U	250	J	400	U
Phenol	U	400	U	390	U	390	U	820	U	800	U	390	U	420	U	400	U
Pyrene	U	400	U	390	U	390	U	280	J	92	J	390	U	240	J	400	U
VOLATILES		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1,2,2-Tetrachloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1,2-Trichloro-1,2,2-trifluoroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1,2-Trichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1-Dichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,1-Dichloroethene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2,3-Trichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2,4-Trichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dibromo-3-chloropropane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
1,2-Dibromoethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloroethene (cis)	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloroethene (Total)		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,2-Dichloropropane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,3-Dichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
1,4-Dichlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
2-Butanone	U	5.6	U	5	U	5.3	U	5.6	U	5.5		4.9	U	6.2	UJ	5.2	U
2-Hexanone	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
4-Methyl-2-pentanone	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Acetone	U	22	U	20	U	21	U	16	J	33		6.1	J	25	UJ	21	U
Benzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromochloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromodichloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromoform	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Bromomethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Carbon Disulfide	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Carbon Tetrachloride	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chlorobenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chloroethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chloroform	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Chloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
cis-1,3-Dichloropropene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Cyclohexane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Dibromochloromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Dichlorodifluoromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Ethylbenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Isopropylbenzene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
M,p-xylene	U	11	U	10	U	11	U	11	U	11	U	9.9	U	12	UJ	10	U
Methyl Acetate	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methyl Tert-butyl Ether (mtbe)	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methylcyclohexane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Methylene Chloride	B	2.4	B	5.1	B	7.2	B	3.3	B	3.5	B	5.5	B	4	B	6.8	B
O-xylene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Styrene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Tetrachloroethene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Toluene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
trans-1,3-Dichloropropene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Trichloroethene	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Trichlorofluoromethane	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Vinyl Acetate		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	U	5.6	U	5	U	5.3	U	5.6	U	5.4	U	4.9	U	6.2	UJ	5.2	U
Xylene (Total)		NA		NA		NA		NA		NA		NA		NA		NA	
PESTICIDES/PCBS		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	U	2.1	U	2	U	2	U	4.1		5.5	J	2	U	11	U	2.1	U
4,4'-DDE	U	2.1	U	2	U	2	U	15		18		0.72	J	11	U	2.1	U
4,4'-DDT	U	2.1	U	2	U	2	U	1.5	J	2.1	U	0.39	J	20		2.1	U
Aldrin	U	2.1	U	2	U	2	U	1.9	J	6.5	J	2	U	11	U	2.1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:		**03TP10-0405-01**		**03TP11-0304-01**		**03TP11-0405-02**		**03TP12-0304-02**		**03TP12-0405-01**		**03TP13-0203-01**		**03TP14-0203-01**		**03TP15-0405-01**	
Sample Date:		**5/3/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/4/2007**		**5/7/2007**	
Duplicate:																	
Alpha-BHC	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Alpha-Chlordane	J	0.26	J	1.4	J	2	U	24		91		2	U	330	J	2.1	U
Aroclor-1016	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1221	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1232	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1242	U	20	U	20	U	20	U	37		110		20	U	21	U	20	U
Aroclor-1248	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1254	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1260	U	20	U	20	U	20	U	21	U	53		20	U	21	U	20	U
Aroclor-1262	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Aroclor-1268	U	20	U	20	U	20	U	21	U	20	U	20	U	21	U	20	U
Beta-BHC	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Delta-BHC	U	2.1	U	2	U	2	U	1.4	J	2.7		2	U	11	U	2.1	U
Dieldrin	U	2.1	U	0.58	J	2	U	15		140		0.24	J	400		0.28	J
Endosulfan I	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	1.1	J
Endosulfan II	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	0.7	J
Endosulfan Sulfate	U	2.1	U	2	U	2	U	2.1	U	0.62	J	2	U	11	U	2.1	U
Endrin	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Endrin Aldehyde	U	2.1	U	2	U	2	U	2.1	U	2	J	2	U	11	U	2.1	U
Endrin Ketone	U	2.1	U	2	U	2	U	2.1	U	2.1	U	2	U	11	U	2.1	U
Gamma-BHC (Lindane)	U	2.1	U	2	U	2	U	6.9		2.8		2	U	4.5	J	2.1	U
Gamma-Chlordane	U	2.1	U	1.1	J	2	U	20	J	57	J	2	U	230		2.1	U
Heptachlor	U	2.1	U	2	U	2	U	0.53	J	2.8	J	2	U	11	U	2.1	U
Heptachlor Epoxide	U	2.1	U	2	U	2	U	3.7	J	5.4	J	2	U	12	J	2.1	U
Methoxychlor	U	4	U	3.9	U	3.9	U	4.1	U	2.1	J	3.9	U	21	U	4	U
Toxaphene	U	82	U	80	U	80	U	83	U	81	U	79	U	420	U	82	U
DIOXINS/FURANS																	
1,2,3,4,6,7,8-HpCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP17-0304-01**		**03TP18-0203-01**		**03TP18-0203-01-D**		**03TP19-0304-02**		**03TP19-0607-01**		**03TP20-0708-01**		**03TP23-0304-01**		**03TP24-0304-01**	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	23100		25200		28300		74700		23800		24700		20000		33900	
Antimony	0.39	UL	0.39	UJ	4	J	70.6	L	31	L	10.7	J	1.3	B	19.2	J
Arsenic	3.9		3.8		2	L	17.1		8.4		6.5		5.7		8.7	
Barium	88.9		162		155		859		475		346		115		347	
Beryllium	0.94		0.98	L	0.67	L	0.71	B	0.81	B	1.4	K	0.8	B	0.89	B
Cadmium	0.084	UR	2.7	J	13.7	J	237		300		48.7		0.08	UR	24.3	L
Calcium	519		777	J	1300	J	27300		16500		12200		953		6240	
Chromium	10.8		14.7	J	25.2	J	148	J	71.4	J	56.3	J	21.9	J	84.9	J
Cobalt	9.7		9.1		8.4		20		13.7		10.3		7		8.3	
Copper	21.5	K	90.5	J	421	J	6340		1380		567		23.2		415	
Cyanide	0.6	U	0.61	U	0.62	U	1.2		0.64		0.45		0.1	U	2.4	
Iron	16000		21500	J	87100	J	193000		40200		40700		26000		49300	
Lead	8.7		688		450		2570	J	2380	J	1210	J	10.8	J	555	J
Magnesium	973		877		767		5560	J	3190	J	2830	J	2120	J	2390	J
Manganese	701		738		926		2610		1680		817		388		765	
Mercury	0.049		0.078	J	0.19	J	1.8		0.081		7.1		0.054		0.4	
Nickel	11.1		20.1	J	33.8	J	161	J	144	J	85.4	J	15.5	J	67.8	J
Potassium	337		368		249		1740		1700		1230		825		840	
Selenium	0.32	U	0.32	UL	0.65	UR	0.35	UR	0.26	UR	0.24	UR	0.26	UR	0.3	UR
Silver	0.036	U	1.1	J	3.7	J	23.5		33.3		60.2		0.07	U	29.8	
Sodium	18.9	UR	26.2	L	39	UR	734	K	1020	K	411	R	148	R	292	R
Thallium	0.55	UR	0.55	UR	1.1	UR	48.5	K	9.7	K	9.2	K	4.9	R	9.8	R
Vanadium	22.4		19.5		17.9		43.4		31.7		37.7		38.7		44.3	
Zinc	22.3		151	J	954	J	4610		2350		1710		127		1750	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
1,2,4,5-Tetrachlorobenzene	400	U	400	U	410	U	290	U	36	J	190	U	200	U	240	U
1-Methylnaphthalene	NA		NA		NA		6	J	8.1	J	14000	U	0.84	J	5	J
2,2'-Oxybis(1-chloropropane)	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
2,3,4,6-Tetrachlorophenol	400	U	400	U	410	U	290	U	200	U	190	U	200	U	240	U
2,4,5-Trichlorophenol	400	U	400	U	410	U	410	U	290	U	1300	U	290	U	340	U
2,4,6-Trichlorophenol	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
2,4-Dichlorophenol	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
2,4-Dimethylphenol	400	U	400	U	410	U	310	U	220	U	1000	U	220	U	250	U
2,4-Dinitrophenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
2,4-Dinitrotoluene	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
2,6-Dinitrotoluene	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
2-Chloronaphthalene	400	U	400	U	410	U	470	U	340	U	1600	U	340	U	390	U
2-Chlorophenol	400	U	400	U	410	U	560	U	400	U	1800	U	400	U	460	U
2-Methylnaphthalene	400	U	400	U	410	U	15		16		1100	J	1.3	J	6.1	J
2-Methylphenol	400	U	400	U	410	U	490	U	350	U	1600	U	350	U	410	U
2-Nitroaniline	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
2-Nitrophenol	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
3,3'-Dichlorobenzidine	1900	U	1900	U	2000	UJ	420	U	300	U	1400	U	300	U	350	U
3-Nitroaniline	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
4,6-Dinitro-2-methylphenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
4-Bromophenyl Phenyl Ether	400	U	400	U	410	U	320	U	230	U	1100	U	230	U	270	U
4-Chloro-3-methylphenol	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
4-Chloroaniline	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
4-Chlorophenyl Phenyl Ether	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
4-Methylphenol	400	U	400	U	410	U	560	U	400	U	1800	U	400	U	460	U
4-Nitroaniline	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP17-0304-01**		**03TP18-0203-01**		**03TP18-0203-01-D**		**03TP19-0304-02**		**03TP19-0607-01**		**03TP20-0708-01**		**03TP23-0304-01**		**03TP24-0304-01**	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
4-Nitrophenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
Acenaphthene	400	U	400	U	410	U	10	J	3.7	J	6400	J	10	U	22	
Acenaphthylene	400	U	400	U	410	U	4.2	J	1.9	J	27	J	0.64	J	12	
Acetophenone	400	U	400	U	410	U	420	U	300	U	1400	U	300	U	350	U
Anthracene	400	U	400	U	410	U	83		12		19000		1.2	J	230	J
Atrazine	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
Benz(a)anthracene	400	U	400	U	410	UJ	790		47		15000		6.5	J	2100	
Benzaldehyde	400	U	400	U	410	U	63	J	48	J	940	U	200	U	38	J
Benzo(a)pyrene	400	U	400	U	410	U	760		33		7900	J	6.4	J	2200	
Benzo(b)fluoranthene	400	U	400	U	410	U	1000		76		9900	J	8.8	J	2800	
Benzo(g,h,i)perylene	400	U	400	U	410	U	510		44		2900	J	4.4	J	1400	
Benzo(k)fluoranthene	400	U	400	U	410	U	630		51		6600	J	5	J	1700	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	400	U	400	U	410	U	410	U	290	U	1300	U	290	U	340	U
Bis(2-chloroethyl)ether	400	U	400	U	410	U	470	U	340	U	1600	U	340	U	390	U
Bis(2-ethylhexyl)phthalate	400	U	400	U	410	UJ	400		280	U	570	J	790		270	J
Butylbenzylphthalate	400	U	400	U	410	UJ	290	U	200	U	940	U	200	U	240	U
Caprolactam	400	U	400	U	410	U	290	UL	200	UL	940	UL	200	UL	240	UL
Carbazole	400	U	400	U	410	U	330		200	U	11000		200	U	240	U
Chrysene	400	U	400	U	410	UJ	780		74		23000		8.2	J	2300	
Di-n-butylphthalate	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
Di-n-octylphthalate	400	U	400	U	410	U	370	U	270	U	1200	U	270	U	310	U
Dibenz(a,h)anthracene	400	U	400	U	410	U	170	J	12		1100	J	1.3	J	450	J
Dibenzofuran	400	U	400	U	410	U	420	U	300	U	8200		300	U	350	U
Diethylphthalate	400	U	400	U	410	U	390	U	280	U	1300	U	280	U	320	U
Dimethylphthalate	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
Fluoranthene	400	U	400	U	410	U	1300		58		56000		14		3500	
Fluorene	400	U	400	U	410	U	10	J	4.7	J	8200	J	10	U	26	J
Hexachlorobenzene	400	U	400	U	410	U	370	U	270	U	1200	U	270	U	310	U
Hexachlorobutadiene	400	U	400	U	410	U	490	U	350	U	1600	U	350	U	410	U
Hexachlorocyclopentadiene	1900	U	1900	U	2000	U	370	U	270	U	1200	U	270	U	310	U
Hexachloroethane	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
Indeno(1,2,3-cd)pyrene	400	U	400	U	410	U	650		42		3600	J	4.9	J	1800	
Isophorone	400	U	400	U	410	U	460	U	330	U	1500	U	330	U	380	U
N-Nitroso-di-n-propylamine	400	U	400	U	410	U	440	U	310	U	1400	U	310	U	370	U
N-Nitrosodiphenylamine (1)	400	U	400	U	410	U	360	U	250	U	1200	U	250	U	300	U
Naphthalene	400	U	400	U	410	U	50		27		14000		1.1	B	9.2	J
Nitrobenzene	400	U	400	U	410	U	410	U	290	U	1300	U	290	U	340	U
Pentachlorophenol	1900	U	1900	U	2000	U	560	U	400	U	1800	U	400	U	460	U
Phenanthrene	400	U	400	U	410	U	320	D	54		62000		5.8	J	1100	
Phenol	400	U	400	U	410	U	290	U	200	U	940	U	200	U	240	U
Pyrene	50	J	400	U	410	UJ	1000		67		38000		12		3000	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1,2,2-Tetrachloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1,2-Trichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1-Dichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,1-Dichloroethene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2,3-Trichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	71	J	7.1	U	8.7	U
1,2,4-Trichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	250	J	7.1	U	8.7	U
1,2-Dibromo-3-chloropropane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP17-0304-01**		**03TP18-0203-01**		**03TP18-0203-01-D**		**03TP19-0304-02**		**03TP19-0607-01**		**03TP20-0708-01**		**03TP23-0304-01**		**03TP24-0304-01**	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
1,2-Dibromoethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloroethene (cis)	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,2-Dichloropropane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,3-Dichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
1,4-Dichlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
2-Butanone	5.4	U	5.5	U	5.5	UJ	26	U	24		680	U	22		22	U
2-Hexanone	5.4	U	5.5	U	5.5	UJ	26	U	13	U	680	U	18	U	22	U
4-Methyl-2-pentanone	5.4	U	5.5	U	5.5	UJ	26	U	13	U	680	U	18	U	22	U
Acetone	22	U	22	U	22	UJ	49	J	120	J	680	UR	160	J	140	J
Benzene	5.4	U	5.5	U	5.5	UJ	4.2	J	15		270	U	7.1	U	46	
Bromochloromethane	5.4	U	5.5	U	5.5	UJ	NA		NA		NA		NA		NA	
Bromodichloromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Bromoform	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Bromomethane	5.4	U	5.5	U	5.5	UJ	10	U	8.2		270	U	7.1	U	8.7	U
Carbon Disulfide	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	2.9	J
Carbon Tetrachloride	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chlorobenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chloroethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chloroform	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Chloromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
cis-1,3-Dichloropropene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Cyclohexane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Dibromochloromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Dichlorodifluoromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	4.8	J
Ethylbenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	880		7.1	U	8.7	U
Isopropylbenzene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
M,p-xylene	11	U	11	U	11	UJ	21	U	11	U	6100		14	U	17	U
Methyl Acetate	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Methyl Tert-butyl Ether (mtbe)	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Methylcyclohexane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Methylene Chloride	3.4	B	2.4	B	2.1	B	10	U	5.3	U	270	U	7.1	U	8.7	U
O-xylene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	4000		7.1	U	8.7	U
Styrene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	3300		7.1	U	8.7	U
Tetrachloroethene	5.4	U	5.5	U	5.5	UJ	9.2	J	4.8	J	270	U	7.1	U	32	
Toluene	5.4	U	5.5	U	5.5	UJ	3.8	B	5.6	B	590		1.4	B	17	
trans-1,3-Dichloropropene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Trichloroethene	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	2.7	J
Trichlorofluoromethane	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5.4	U	5.5	U	5.5	UJ	10	U	5.3	U	270	U	7.1	U	8.7	U
Xylene (Total)	NA		NA		NA		10	U	5.3	U	10000		7.1	U	8.7	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	2	U	0.85	J	2.1	U	29	J	20	U	8.6	J	0.83	J	93	U
4,4'-DDE	2	U	0.39	J	0.47	J	49	B	20	U	29	B	1.5	B	93	U
4,4'-DDT	2	U	2.1	U	2.1	U	110		20	U	25	J	1.9	J	93	U
Aldrin	2	U	2.1	U	2.1	U	14	U	19	R	19	U	2	U	48	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP17-0304-01**		**03TP18-0203-01**		**03TP18-0203-01-D**		**03TP19-0304-02**		**03TP19-0607-01**		**03TP20-0708-01**		**03TP23-0304-01**		**03TP24-0304-01**	
Sample Date:	**5/7/2007**		**5/8/2007**		**5/8/2007**		**1/12/2009**		**1/12/2009**		**1/12/2009**		**1/13/2009**		**1/13/2009**	
Duplicate:			**03TP18-0203-01-D**		**03TP18-0203-01**											
Alpha-BHC	2	U	2.1	U	0.7	J	7	J	10	U	19	U	2	U	48	U
Alpha-Chlordane	2	U	1.5	J	2.1		8.6	J	10	U	19	U	1.1	J	48	U
Aroclor-1016	20	U	20	U	21	U	200	U	140	U	270	U	29	U	680	U
Aroclor-1221	20	U	20	U	21	U	290	U	200	U	380	U	41	U	960	U
Aroclor-1232	20	U	20	U	21	U	140	U	100	U	190	U	20	U	480	U
Aroclor-1242	20	U	20	U	21	U	140	U	100	U	190	U	20	U	480	U
Aroclor-1248	20	U	20	U	21	U	140	U	100	U	190	U	20	U	480	U
Aroclor-1254	20	U	20	U	21	U	140	U	100	U	190	U	20	U	4000	
Aroclor-1260	20	U	20		21		140	U	100	U	340		20	U	480	U
Aroclor-1262	20	U	20	U	21	U	NA		NA		NA		NA		NA	
Aroclor-1268	20	U	20	U	21	U	NA		NA		NA		NA		NA	
Beta-BHC	2	U	2.1	U	2.1	U	51	R	5.1	U	9.5	U	1	U	24	U
Delta-BHC	2	U	2.1	U	2.1	U	14	U	10	U	19	U	2	U	48	U
Dieldrin	4		41		35		35		20	U	86		12		93	U
Endosulfan I	2	U	2.1	U	2.1	U	14	U	9.9	J	4.7	J	2	U	48	U
Endosulfan II	2	U	2.1	U	2.1	U	28	U	20	U	37	U	4	U	93	U
Endosulfan Sulfate	2	U	0.76	J	0.67	J	28	U	20	U	37	U	4	U	93	U
Endrin	2	U	2.1	U	2.1	U	4.6	J	20	U	37	U	4	U	93	U
Endrin Aldehyde	2	U	2.1	U	0.64	J	17	R	25	J	37	U	4	U	93	U
Endrin Ketone	2	U	2.1	U	0.56	J	30	R	20	U	37	U	4	U	93	U
Gamma-BHC (Lindane)	2	U	2.1	U	2.1	U	14	U	10	U	19	U	2	U	48	U
Gamma-Chlordane	2	U	1.6	J	2	J	8.6	J	69	R	12	J	1.2	J	48	U
Heptachlor	2	U	2.1	U	2.1	U	7.1	R	6.2	J	5.9	J	2	U	48	U
Heptachlor Epoxide	2	U	2.1	U	2.1	U	5.4	J	10	U	15	J	0.85	J	48	U
Methoxychlor	4	U	4	U	4.1	U	140	U	130	J	190	U	20	U	480	U
Toxaphene	81	U	81	U	83	U	700	U	500	U	920	U	100	U	2300	U
DIOXINS/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	32100		25000		23900		31300		38700		33800		45600		23800	
Antimony	2	J	11.9	L	12.3	J	19.4	J	220	L	281	L	121	L	1.2	B
Arsenic	3.6		5.7		5.9		9.4		49.9	J	14.9	J	11.7		5.2	
Barium	232		385		476		350		539		492		624		88.7	
Beryllium	1.7	K	0.77	B	0.83	B	1.7	K	1.1	B	0.92	B	0.9	B	0.96	K
Cadmium	0.08	UR	4.7	L	5.6	L	31.3	L	133		150		66.5		0.08	UR
Calcium	909		6020		7890		4510		55600		71900		19200		962	
Chromium	16.2	J	24.3	J	33.5	J	68.5	J	295	J	215	J	137	J	41.9	J
Cobalt	11.1		7.9		8.6		11.1		28.5	J	121	J	12.6		7.9	
Copper	63.2		8800		9660		872		4730	J	2820	J	2170		29.2	
Cyanide	0.69		0.39		0.25		0.98		2.3	J	3.9	J	1		0.09	U
Iron	22300		26600		33800		63500		129000	J	236000	J	127000		24400	
Lead	38.2	J	1530	J	1510	J	625	J	2780	J	4410	J	2120	J	13.4	J
Magnesium	899	J	3010	J	3720	J	1910	J	3740	J	3990	J	7840	J	1400	J
Manganese	1340		1380	J	718	J	1180		1410		1650		2130		646	
Mercury	0.028		0.14		0.14		3.1		0.77		0.87		6.7		0.069	
Nickel	20.2	J	19.6	J	51.8	J	83.1	J	183	J	295	J	281	J	13.4	J
Potassium	507		741		1060		940		2250		1860		1020		654	
Selenium	0.26	UR	0.26	UR	0.28	UR	0.28	UR	0.39	UR	0.37	UR	0.33	UR	0.26	UR
Silver	0.07	U	2.3		3.6		19.6		16.2		12.4		34.7		0.07	U
Sodium	319	K	277	R	373	R	491	R	1830		1390	K	679	K	165	R
Thallium	4.5	K	5.5	K	7	K	13.1	K	29.8	J	61.1	J	30.3	K	4.9	K
Vanadium	26.7		33.7		37.8		87.4		752	J	366	J	33.7		34.7	
Zinc	336		1050	J	1770	J	1580		13700	J	6570	J	5450		37	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
1,2,4,5-Tetrachlorobenzene	210	U	220	U	220	U	220	U	310	U	310	U	260	U	200	U
1-Methylnaphthalene	8.6	J	450		560		3	B	3.8	B	4.2	B	3.4	B	9.8	U
2,2'-Oxybis(1-chloropropane)	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
2,3,4,6-Tetrachlorophenol	210	U	220	U	220	U	220	U	310	U	310	U	260	U	200	U
2,4,5-Trichlorophenol	300	U	310	U	1200	U	320	U	440	U	440	U	360	U	280	U
2,4,6-Trichlorophenol	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
2,4-Dichlorophenol	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
2,4-Dimethylphenol	230	U	230	U	920	U	240	U	330	U	330	U	270	U	210	U
2,4-Dinitrophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
2,4-Dinitrotoluene	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
2,6-Dinitrotoluene	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
2-Chloronaphthalene	350	U	360	U	1400	U	370	U	520	U	520	U	420	U	330	U
2-Chlorophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
2-Methylnaphthalene	23		170		320		5.8	B	9.3	B	8.8	B	6.7	B	0.74	B
2-Methylphenol	360	U	370	U	1500	U	380	U	540	U	540	U	440	U	340	U
2-Nitroaniline	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
2-Nitrophenol	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
3,3'-Dichlorobenzidine	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
3-Nitroaniline	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
4,6-Dinitro-2-methylphenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
4-Bromophenyl Phenyl Ether	240	U	240	U	970	U	250	U	350	U	350	U	290	U	220	U
4-Chloro-3-methylphenol	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
4-Chloroaniline	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
4-Chlorophenyl Phenyl Ether	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
4-Methylphenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
4-Nitroaniline	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
4-Nitrophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
Acenaphthene	10	U	17		24		3.6	B	15	U	15	U	0.99	B	1.1	B
Acenaphthylene	0.67	J	10	J	16		3.3	B	1.3	B	1.8	B	1.8	B	1.8	B
Acetophenone	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
Anthracene	0.82	J	4.1	J	5.7	J	5.3	B	1.8	B	2.9	B	2.7	B	3.9	B
Atrazine	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Benz(a)anthracene	4.3	J	19		23		40		12	B	11	B	13	B	9.1	B
Benzaldehyde	210	U	220	U	870	U	58	J	83	J	82	J	75	J	200	U
Benzo(a)pyrene	6.2	J	15		11	U	41		8.3	B	7.5	B	14	B	16	B
Benzo(b)fluoranthene	7.4	J	18		11	U	52		18	B	14	B	26	B	21	
Benzo(g,h,i)perylene	15		23		28		38		17	B	17	B	15	B	22	
Benzo(k)fluoranthene	5	J	17		11	U	41		16	B	9.9	B	13	B	15	B
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	300	U	310	U	1200	U	320	U	440	U	440	U	360	U	280	U
Bis(2-chloroethyl)ether	350	U	360	U	1400	U	370	U	520	U	520	U	420	U	330	U
Bis(2-ethylhexyl)phthalate	12000		1400	J	3000	J	150	J	680		660		210	J	270	U
Butylbenzylphthalate	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Caprolactam	210	UL	220	UL	870	UL	220	UL	310	UL	310	UL	260	UL	200	UL
Carbazole	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Chrysene	13		28		32		50		55		22	B	23	B	17	B
Di-n-butylphthalate	170	J	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
Di-n-octylphthalate	280	U	280	U	1100	U	290	U	410	U	410	U	330	U	260	U
Dibenz(a,h)anthracene	1.8	J	4.2	J	11	U	9.2	B	3.8	B	3.2	B	4.5	B	4.2	B
Dibenzofuran	310	U	320	U	1300	U	330	U	460	U	460	U	380	U	290	U
Diethylphthalate	290	U	290	U	1200	U	300	U	430	U	430	U	350	U	270	U
Dimethylphthalate	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
Fluoranthene	12		37		48		120		13	B	16	B	33	B	46	
Fluorene	10	U	20	J	32		1.7	B	15	U	15	U	1.5	B	1.9	B
Hexachlorobenzene	280	U	280	U	1100	U	290	U	410	U	410	U	330	U	260	U
Hexachlorobutadiene	360	U	370	U	1500	U	380	U	540	U	540	U	440	U	340	U
Hexachlorocyclopentadiene	280	U	280	U	1100	U	290	U	410	U	410	U	330	U	260	U
Hexachloroethane	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Indeno(1,2,3-cd)pyrene	6.3	J	16		18		40		8.9	B	8.5	B	16	B	20	
Isophorone	340	U	350	U	1400	U	360	U	500	U	500	U	410	U	320	U
N-Nitroso-di-n-propylamine	330	U	330	U	1300	U	340	U	480	U	480	U	390	U	310	U
N-Nitrosodiphenylamine (1)	260	U	270	U	1100	U	280	U	390	U	390	U	320	U	250	U
Naphthalene	86		320		450		5	B	7.3	B	8.8	B	8.3	B	0.72	B
Nitrobenzene	300	U	310	U	1200	U	320	U	440	U	440	U	360	U	280	U
Pentachlorophenol	410	U	420	U	1700	U	430	U	610	U	610	U	500	U	390	U
Phenanthrene	7.5	J	34		48		23	B	19	B	18	B	26	B	15	B
Phenol	210	U	220	U	870	U	220	U	310	U	310	U	260	U	200	U
Pyrene	19		59		100	J	90		20	B	17	B	25	B	32	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1,2,2-Tetrachloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1,2-Trichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1-Dichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,1-Dichloroethene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2,3-Trichlorobenzene	5700		320	U	310	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2,4-Trichlorobenzene	5700	U	320	U	310	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dibromo-3-chloropropane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
1,2-Dibromoethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloroethene (cis)	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,2-Dichloropropane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,3-Dichlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
1,4-Dichlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
2-Butanone	14000	U	810	U	760	U	15	U	24	U	24	U	21	U	12	U
2-Hexanone	14000	U	810	U	760	U	15	U	24	U	24	U	21	U	12	U
4-Methyl-2-pentanone	14000	U	810	U	760	U	15	U	24	U	24	U	21	U	12	U
Acetone	14000	UR	540	J	760	UR	37	J	100	J	110	J	130	J	55	J
Benzene	5700	U	78	J	76	J	22		12		7.3	J	2.2	J	4.7	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Bromoform	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Bromomethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Carbon Disulfide	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Carbon Tetrachloride	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chlorobenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chloroethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chloroform	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Chloromethane	5700	U	320	U	310	U	16		9.7	U	9.7	U	8.3	U	4.7	U
cis-1,3-Dichloropropene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Cyclohexane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Dibromochloromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Dichlorodifluoromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Ethylbenzene	7000		550		380		6	U	9.7	U	9.7	U	8.3	U	4.7	U
Isopropylbenzene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
M,p-xylene	18000		1600		960		12	U	19	U	19	U	17	U	9.5	U
Methyl Acetate	5700	U	320	U	450	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Methyl Tert-butyl Ether (mtbe)	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Methylcyclohexane	3500	J	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Methylene Chloride	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
O-xylene	2200	J	350		260	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Styrene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Tetrachloroethene	5700	U	210	J	130	J	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Toluene	150000		4300		2700		8.9	B	10	B	4.4	B	2.7	B	4.7	U
trans-1,3-Dichloropropene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Trichloroethene	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Trichlorofluoromethane	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5700	U	320	U	310	U	6	U	9.7	U	9.7	U	8.3	U	4.7	U
Xylene (Total)	20000		2000		1200		6	U	9.7	U	9.7	U	8.3	U	4.7	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4.1	U	21	U	21	U	7.2	J	12	J	13	J	16	J	3.9	U
4,4'-DDE	1.5	B	4.4	B	21	U	13	B	15	J	11	B	8	B	1.1	B
4,4'-DDT	1.3	J	7.7	J	21	U	220		21		23	J	21	J	4.9	
Aldrin	0.53	J	1.5	J	11	U	22	U	3.1	J	3.7	J	1.4	J	2	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP25-0506-01**		**03TP25-0607-02**		**03TP25-0607-02-D**		**03TP26-0506-01**		**03TP27-0304-01**		**03TP27-0304-01-D**		**03TP27-0304-02**		**03TP28-0203-01**	
Sample Date:	**1/13/2009**		**1/13/2009**		**1/13/2009**		**1/14/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**		**1/15/2009**	
Duplicate:			**03TP25-0607-02-D**		**03TP25-0607-02**				**03TP27-0304-01-D**		**03TP27-0304-01**					
Alpha-BHC	0.8	J	16		5.9	J	22	U	3.1	U	3.1	U	6.4	R	2	U
Alpha-Chlordane	0.61	J	11	U	11	U	22	U	12	J	13	J	12	R	2	U
Aroclor-1016	30	U	150	U	150	U	320	U	44	U	44	U	36	U	28	U
Aroclor-1221	43	U	220	U	220	U	450	U	63	U	63	U	52	U	40	U
Aroclor-1232	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1242	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1248	21	U	110	U	110	U	560		31	U	31	U	26	U	92	
Aroclor-1254	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1260	21	U	110	U	110	U	220	U	31	U	31	U	26	U	20	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	1.8	J	21	R	14	J	11	U	12	R	1.6	U	8.2	R	1	U
Delta-BHC	2.1	U	9.1	R	11	U	22	U	3.1	U	3.1	U	2.6	U	2	U
Dieldrin	10		59		46		120		31	J	36	J	21	J	18	J
Endosulfan I	2.1	U	11	U	11	U	22	U	3.1	U	1.5	J	0.69	J	2	U
Endosulfan II	4.1	U	21	U	21	U	43	U	6.1	U	6.1	U	2.3	R	3.9	U
Endosulfan Sulfate	4.1	U	21	U	21	U	43	U	12	R	6.1	U	7.8	R	3.9	U
Endrin	4.1	U	21	U	21	U	43	U	6.1	U	6.2	J	2.3	J	3.9	U
Endrin Aldehyde	4.1	U	21	U	4.1	J	7.2	J	17	R	9.3	J	12	R	3.9	U
Endrin Ketone	4.1	U	21	U	21	U	43	U	24	J	14	R	5.6	J	3.9	U
Gamma-BHC (Lindane)	2.1	U	11	U	11	U	22	U	3.1	U	3.1	U	2.6	U	2	U
Gamma-Chlordane	0.36	J	11	U	3.8	J	22	U	23	R	25	R	20	R	2	U
Heptachlor	2.1	U	6	J	2.3	J	22	U	12	R	7.1	R	4.2	R	2	U
Heptachlor Epoxide	2.1	U	11	U	11	U	22	U	4.2	J	6.1	J	4.5	J	2	U
Methoxychlor	21	U	110	U	110	U	220	U	15	J	31	U	15	J	20	U
Toxaphene	100	U	530	U	530	U	1100	U	150	U	150	U	130	U	98	U
DIOXINS/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**
INORGANICS	**mg/kg**		**mg/kg**		
Aluminum	17100		23600		NA
Antimony	1.4	B	36.3	L	NA
Arsenic	4.7		9.6		NA
Barium	45.2		503		NA
Beryllium	0.76	B	0.78	B	NA
Cadmium	0.08	UR	41.3		NA
Calcium	632		31700		NA
Chromium	19	J	348	J	NA
Cobalt	15.8		11.9		NA
Copper	24.9		785		NA
Cyanide	0.1	U	1.1		NA
Iron	21700		57100		NA
Lead	11.9	J	1500	J	NA
Magnesium	1770	J	4470	J	NA
Manganese	1030		1170		NA
Mercury	0.017	U	0.27		NA
Nickel	12.4	J	60.5	J	NA
Potassium	897		1360		NA
Selenium	0.26	UR	0.29	UR	NA
Silver	0.07	U	16.5		NA
Sodium	158	R	522	R	NA
Thallium	4.2	R	13.3	K	NA
Vanadium	33.9		34.9		NA
Zinc	28.4		2140		NA
SEMIVOLATILES	**ug/kg**		**ug/kg**		
1,1'-Biphenyl	200	U	240	U	NA
1,2,4,5-Tetrachlorobenzene	200	U	240	U	NA
1-Methylnaphthalene	9.9	U	5.7	B	NA
2,2'-Oxybis(1-chloropropane)	310	U	360	U	NA
2,3,4,6-Tetrachlorophenol	200	U	240	U	NA
2,4,5-Trichlorophenol	290	U	330	U	NA
2,4,6-Trichlorophenol	300	U	350	U	NA
2,4-Dichlorophenol	300	U	350	U	NA
2,4-Dimethylphenol	210	U	250	U	NA
2,4-Dinitrophenol	390	U	460	U	NA
2,4-Dinitrotoluene	310	U	360	U	NA
2,6-Dinitrotoluene	270	U	320	U	NA
2-Chloronaphthalene	330	U	390	U	NA
2-Chlorophenol	390	U	460	U	NA
2-Methylnaphthalene	9.9	U	13	B	NA
2-Methylphenol	350	U	400	U	NA
2-Nitroaniline	390	U	460	U	NA
2-Nitrophenol	270	U	320	U	NA
3,3'-Dichlorobenzidine	300	U	350	U	NA
3-Nitroaniline	390	U	460	U	NA
4,6-Dinitro-2-methylphenol	390	U	460	U	NA
4-Bromophenyl Phenyl Ether	230	U	260	U	NA
4-Chloro-3-methylphenol	300	U	350	U	NA
4-Chloroaniline	310	U	360	U	NA
4-Chlorophenyl Phenyl Ether	270	U	320	U	NA
4-Methylphenol	390	U	460	U	NA
4-Nitroaniline	390	U	460	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**	
4-Nitrophenol	390	U	460	U	NA	
Acenaphthene	9.9	U	1.2	B	NA	
Acenaphthylene	9.9	U	3.7	B	NA	
Acetophenone	300	U	350	U	NA	
Anthracene	9.9	U	6.4	B	NA	
Atrazine	200	U	240	U	NA	
Benz(a)anthracene	9.9	U	25	B	NA	
Benzaldehyde	200	U	43	J	NA	
Benzo(a)pyrene	9.9	U	24		NA	
Benzo(b)fluoranthene	9.9	U	36		NA	
Benzo(g,h,i)perylene	9.9	U	23		NA	
Benzo(k)fluoranthene	9.9	U	21	B	NA	
Benzoic Acid	NA		NA		NA	
Benzyl Alcohol	NA		NA		NA	
Bis(2-chloroethoxy)methane	290	U	330	U	NA	
Bis(2-chloroethyl)ether	330	U	390	U	NA	
Bis(2-ethylhexyl)phthalate	270	U	250	J	NA	
Butylbenzylphthalate	200	U	240	U	NA	
Caprolactam	200	UL	240	UL	NA	
Carbazole	200	U	240	U	NA	
Chrysene	9.9	U	37		NA	
Di-n-butylphthalate	270	U	320	U	NA	
Di-n-octylphthalate	260	U	310	U	NA	
Dibenz(a,h)anthracene	9.9	U	7.7	B	NA	
Dibenzofuran	300	U	350	U	NA	
Diethylphthalate	270	U	320	U	NA	
Dimethylphthalate	310	U	360	U	NA	
Fluoranthene	9.9	U	53		NA	
Fluorene	9.9	U	1.2	B	NA	
Hexachlorobenzene	260	U	310	U	NA	
Hexachlorobutadiene	350	U	400	U	NA	
Hexachlorocyclopentadiene	260	U	310	U	NA	
Hexachloroethane	200	U	240	U	NA	
Indeno(1,2,3-cd)pyrene	9.9	U	25		NA	
Isophorone	320	U	380	U	NA	
N-Nitroso-di-n-propylamine	310	U	360	U	NA	
N-Nitrosodiphenylamine (1)	250	U	290	U	NA	
Naphthalene	0.34	B	15		NA	
Nitrobenzene	290	U	330	U	NA	
Pentachlorophenol	390	U	460	U	NA	
Phenanthrene	9.9	U	33		NA	
Phenol	200	U	240	U	NA	
Pyrene	9.9	U	42		NA	
VOLATILES	**ug/kg**		**ug/kg**			
1,1,1-Trichloroethane	4.9	U	6.7	U	NA	
1,1,2,2-Tetrachloroethane	4.9	U	6.7	U	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	4.9	U	6.7	U	NA	
1,1,2-Trichloroethane	4.9	U	6.7	U	NA	
1,1-Dichloroethane	4.9	U	6.7	U	NA	
1,1-Dichloroethene	4.9	U	6.7	U	NA	
1,2,3-Trichlorobenzene	4.9	U	5.5	B	NA	
1,2,4-Trichlorobenzene	4.9	U	6.7	U	NA	
1,2-Dibromo-3-chloropropane	4.9	U	6.7	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**	
1,2-Dibromoethane	4.9	U	6.7	U	NA	
1,2-Dichlorobenzene	4.9	U	6.7	U	NA	
1,2-Dichloroethane	4.9	U	6.7	U	NA	
1,2-Dichloroethene (cis)	4.9	U	6.7	U	NA	
1,2-Dichloroethene (Total)	NA		NA		NA	
1,2-Dichloroethene (trans)	4.9	U	6.7	U	NA	
1,2-Dichloropropane	4.9	U	6.7	U	NA	
1,3-Dichlorobenzene	4.9	U	6.7	U	NA	
1,4-Dichlorobenzene	4.9	U	6.7	U	NA	
2-Butanone	12	U	17	U	NA	
2-Hexanone	12	U	17	U	NA	
4-Methyl-2-pentanone	12	U	17	U	NA	
Acetone	24	J	28	J	NA	
Benzene	4.9	U	2.3	J	NA	
Bromochloromethane	NA		NA		NA	
Bromodichloromethane	4.9	U	6.7	U	NA	
Bromoform	4.9	U	6.7	U	NA	
Bromomethane	4.9	U	6.7	U	NA	
Carbon Disulfide	4.9	U	6.7	U	NA	
Carbon Tetrachloride	4.9	U	6.7	U	NA	
Chlorobenzene	4.9	U	6.7	U	NA	
Chloroethane	4.9	U	6.7	U	NA	
Chloroform	4.9	U	6.7	U	NA	
Chloromethane	4.9	U	6.7	U	NA	
cis-1,3-Dichloropropene	4.9	U	6.7	U	NA	
Cyclohexane	4.9	U	6.7	U	NA	
Dibromochloromethane	4.9	U	6.7	U	NA	
Dichlorodifluoromethane	4.9	U	6.7	U	NA	
Ethylbenzene	4.9	U	6.7	U	NA	
Isopropylbenzene	4.9	U	6.7	U	NA	
M,p-xylene	9.7	U	13	U	NA	
Methyl Acetate	4.9	U	6.7	U	NA	
Methyl Tert-butyl Ether (mtbe)	4.9	U	6.7	U	NA	
Methylcyclohexane	4.9	U	6.7	U	NA	
Methylene Chloride	4.9	U	6.7	U	NA	
O-xylene	4.9	U	6.7	U	NA	
Styrene	4.9	U	6.7	U	NA	
Tetrachloroethene	4.9	U	6.7	U	NA	
Toluene	4.9	U	2.3	B	NA	
trans-1,3-Dichloropropene	4.9	U	6.7	U	NA	
Trichloroethene	4.9	U	6.7	U	NA	
Trichlorofluoromethane	4.9	U	6.7	U	NA	
Vinyl Acetate	NA		NA		NA	
Vinyl Chloride	4.9	U	6.7	U	NA	
Xylene (Total)	4.9	U	6.7	U	NA	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**			
4,4'-DDD	3.9	U	4.8	J	NA	
4,4'-DDE	3.9	U	10	B	NA	
4,4'-DDT	3.9	U	12	J	NA	
Aldrin	2	U	12	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS -LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP29-0304-01**		**03TP30-0506-01**		**03TP30-0506-01-D**	
Sample Date:	**1/14/2009**		**1/14/2009**		**1/14/2009**	
Duplicate:			**03TP30-0506-01-D**		**03TP30-0506-01**	
Alpha-BHC	2	U	12	U	NA	
Alpha-Chlordane	2.9	R	11	J	NA	
Aroclor-1016	29	U	170	U	NA	
Aroclor-1221	40	U	240	U	NA	
Aroclor-1232	20	U	120	U	NA	
Aroclor-1242	20	U	120	U	NA	
Aroclor-1248	20	U	120	U	NA	
Aroclor-1254	20	U	120	U	NA	
Aroclor-1260	20	U	96	J	NA	
Aroclor-1262	NA		NA		NA	
Aroclor-1268	NA		NA		NA	
Beta-BHC	1	U	5.9	U	NA	
Delta-BHC	2	U	12	U	NA	
Dieldrin	3.9	U	100		NA	
Endosulfan I	2	U	1.2	J	NA	
Endosulfan II	3.9	U	23	U	NA	
Endosulfan Sulfate	3.9	U	23	U	NA	
Endrin	3.9	U	23	U	NA	
Endrin Aldehyde	3.9	U	23	U	NA	
Endrin Ketone	3.9	U	23	U	NA	
Gamma-BHC (Lindane)	2	U	12	U	NA	
Gamma-Chlordane	1.7	J	9.4	J	NA	
Heptachlor	2	U	12	U	NA	
Heptachlor Epoxide	2	U	3	J	NA	
Methoxychlor	20	U	120	U	NA	
Toxaphene	99	U	580	U	NA	
DIOXINS/FURANS			**ng/kg**		**ng/kg**	
1,2,3,4,6,7,8-HpCDD	NA		651		424	
1,2,3,4,6,7,8-HpCDF	NA		840		674	
1,2,3,4,7,8,9-HpCDF	NA		60.8		63.7	
1,2,3,4,7,8-HxCDD	NA		38.2		24.9	
1,2,3,4,7,8-HxCDF	NA		246	IEMP	216	IEMP
1,2,3,6,7,8-HxCDD	NA		67.8		46.3	
1,2,3,6,7,8-HxCDF	NA		214	IEMP	156	IEMP
1,2,3,7,8,9-HxCDD	NA		55.3		39.2	
1,2,3,7,8,9-HxCDF	NA		53.6		37.7	
1,2,3,7,8-PeCDD	NA		42.8		34.8	
1,2,3,7,8-PeCDF	NA		139	IEMP	98.2	IEMP
2,3,4,6,7,8-HxCDF	NA		293		193	
2,3,4,7,8-PeCDF	NA		256		188	
2,3,7,8-TCDD	NA		17.5		15.2	
2,3,7,8-TCDF	NA		146		104	
OCDD	NA		5490	J	4130	
OCDF	NA		393	J	1660	J
Total 2,3,7,8-TCDD Equiv.	NA		270		204	
Total HpCDD	NA		1350		871	
Total HpCDF	NA		1210		967	
Total HxCDD	NA		1310		804	
Total HxCDF	NA		2320	IEMP	1570	IEMP
Total PeCDD	NA		1000	J	665	J
Total PeCDF	NA		2990	IEMP	2020	IEMP
Total TCDD	NA		838		612	
Total TCDF	NA		4250	IEMP	2790	J

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SUBSURFACE SOILS
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
D -- Result is reported from a diluted result.
EMPC -- Estimated Maximum Positive Concentration.
IEMPC -- Interference Estimated Maximum Positive Concentration.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	7810		5110		10200		7440		10700		8040		16400	
Antimony	1.2	B	0.93	B	1.3	B	0.9	B	1	B	0.64	B	2.3	B
Arsenic	5		0.9	B	3.1		1.2	B	1.8	B	1.9	B	11.1	
Barium	88		49.6		91		89.1		127		59.6		121	
Beryllium	0.77	K	0.5	B	0.84	K	0.6	B	0.81		0.72	K	1.9	K
Cadmium	0.48	L	0.06	U	0.29	L	0.41		0.34		0.05	UR	0.1	UR
Calcium	1820		1080		1100		889		950		946		2290	
Chromium	12.5		8.9		16.2		10.7		15.6		12		34.8	
Cobalt	3		2.5		4.1		2.8		4.4		4.3		11.3	
Copper	17.2		8.4		15.5		14.9		19		11.9		30.5	
Cyanide	0.17	U	0.16	U	0.15	U	0.16	U	0.17	U	0.12	U	0.26	U
Iron	14700		7090		12400		6470		8460		10000		37600	
Lead	27.4	J	12	J	37.7	J	21.3	J	29.6	J	12.4	J	95.6	J
Magnesium	1030		676		1360		838		1200		1730		2990	
Manganese	183	J	411	J	152	J	52.7	J	71.9	J	87.7	J	631	J
Mercury	0.048		0.026	U	0.061		0.062		0.052		0.038		0.052	
Nickel	7.1		5		9.8		6.6		9		7.7		18.5	
Potassium	337	J	305	J	469	J	347	J	414	J	810	J	1500	J
Selenium	1.1	K	1	K	0.69	U	1.2	K	0.92	K	0.58	U	1.2	U
Silver	0.11	U	0.1	U	0.09	U	0.1	U	0.1	U	0.08	U	0.16	U
Sodium	484	K	459	K	416	K	455	K	455	K	366	K	719	K
Thallium	0.84	UL	0.78	UL	0.73	UL	0.8	UL	0.79	UL	0.62	UL	1.3	UL
Vanadium	19.6		11.9		23.8		15.5		21.4		19		62.1	
Zinc	64.3		29		52.8		25.7		35.6		25.6		134	
MISCELLANEOUS PARAMETERS														
Total Organic Carbon	NA		NA		NA		NA		NA		NA		NA	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-Biphenyl	290	U	280	U	270	U	280	U	290	U	220	U	460	U
1,2,4,5-Tetrachlorobenzene	290	U	280	U	270	U	280	U	290	U	220	U	460	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	440	U	430	U	410	U	430	U	450	U	330	U	700	U
2,3,4,6-Tetrachlorophenol	290	U	280	U	270	U	280	U	290	U	220	U	460	U
2,4,5-Trichlorophenol	410	U	400	U	380	U	400	U	410	U	310	U	650	U
2,4,6-Trichlorophenol	420	U	420	U	400	U	420	U	430	U	320	U	680	U
2,4-Dichlorophenol	420	U	420	U	400	U	420	U	430	U	320	U	680	U
2,4-Dimethylphenol	310	U	300	U	290	U	300	U	310	U	230	U	490	U
2,4-Dinitrophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
2,4-Dinitrotoluene	440	U	430	U	410	U	430	U	450	U	330	U	700	U
2,6-Dinitrotoluene	390	U	380	U	370	U	380	U	400	U	290	U	620	U
2-Chloronaphthalene	470	U	470	U	440	U	470	U	480	U	360	U	760	U
2-Chlorophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
2-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA	
2-Methylphenol	490	U	480	U	460	U	480	U	500	U	370	U	780	U
2-Nitroaniline	560	U	550	U	520	U	550	U	570	U	420	U	890	U
2-Nitrophenol	390	U	380	U	370	U	380	U	400	U	290	U	620	U
3,3'-Dichlorobenzidine	420	U	420	U	400	U	420	U	430	U	320	U	680	U
3-Nitroaniline	560	U	550	U	520	U	550	U	570	U	420	U	890	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
4,6-Dinitro-2-methylphenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
4-Bromophenyl Phenyl Ether	320	U	320	U	300	U	320	U	330	U	240	U	510	U
4-Chloro-3-methylphenol	420	U	420	U	400	U	420	U	430	U	320	U	680	U
4-Chloroaniline	440	U	430	U	410	U	430	U	450	U	330	U	700	U
4-Chlorophenyl Phenyl Ether	390	U	380	U	370	U	380	U	400	U	290	U	620	U
4-Methylphenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
4-Nitroaniline	560	U	550	U	520	U	550	U	570	U	420	U	890	U
4-Nitrophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
Acenaphthene	NA		NA		NA		NA		NA		NA		NA	
Acenaphthylene	NA		NA		NA		NA		NA		NA		NA	
Acetophenone	420	U	420	U	400	U	420	U	430	U	320	U	680	U
Anthracene	NA		NA		NA		NA		NA		NA		NA	
Atrazine	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Benz(a)anthracene	NA		NA		NA		NA		NA		NA		NA	
Benzaldehyde	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Benzo(a)pyrene	NA		NA		NA		NA		NA		NA		NA	
Benzo(b)fluoranthene	NA		NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	NA		NA		NA		NA		NA		NA		NA	
Benzo(k)fluoranthene	NA		NA		NA		NA		NA		NA		NA	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	410	U	400	U	380	U	400	U	410	U	310	U	650	U
Bis(2-chloroethyl)ether	470	U	470	U	440	U	470	U	480	U	360	U	760	U
Bis(2-ethylhexyl)phthalate	390	U	380	U	370	U	380	U	400	U	290	U	620	U
Butylbenzylphthalate	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Caprolactam	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Carbazole	230	J	79	J	240	J	280	U	290	U	220	U	460	U
Chrysene	NA		NA		NA		NA		NA		NA		NA	
Di-n-butylphthalate	390	U	380	U	370	U	380	U	400	U	290	U	620	U
Di-n-octylphthalate	370	U	370	U	350	U	370	U	380	U	280	U	590	U
Dibenz(a,h)anthracene	NA		NA		NA		NA		NA		NA		NA	
Dibenzofuran	420	U	420	U	400	U	420	U	430	U	320	U	680	U
Diethylphthalate	390	U	380	U	370	U	380	U	400	U	290	U	620	U
Dimethylphthalate	440	U	430	U	410	U	430	U	450	U	330	U	700	U
Fluoranthene	NA		NA		NA		NA		NA		NA		NA	
Fluorene	NA		NA		NA		NA		NA		NA		NA	
Hexachlorobenzene	370	U	370	U	350	U	370	U	380	U	280	U	590	U
Hexachlorobutadiene	490	U	480	U	460	U	480	U	500	U	370	U	780	U
Hexachlorocyclopentadiene	370	UL	370	UL	350	UL	370	UL	380	UL	280	UL	590	UL
Hexachloroethane	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		NA		NA		NA	
Isophorone	460	U	450	U	430	U	450	U	470	U	350	U	730	U
N-Nitroso-di-n-propylamine	440	U	430	U	410	U	430	U	450	U	330	U	700	U
N-Nitrosodiphenylamine (1)	360	U	350	U	330	U	350	U	360	U	270	U	570	U
Naphthalene	NA		NA		NA		NA		NA		NA		NA	
Nitrobenzene	410	U	400	U	380	U	400	U	410	U	310	U	650	U
Pentachlorophenol	560	U	550	U	520	U	550	U	570	U	420	U	890	U
Phenanthrene	NA		NA		NA		NA		NA		NA		NA	
Phenol	290	U	280	U	270	U	280	U	290	U	220	U	460	U
Pyrene	NA		NA		NA		NA		NA		NA		NA	
PAHs (SIM)	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1-Methylnaphthalene	39		9.9	B	75		3.8	B	4.5	B	2.6	B	9.7	B

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
2-Methylnaphthalene	37		10	B	65		4.1	B	4.6	B	3.7	B	18	B
Acenaphthene	97		16	B	200	J	12	B	9.7	B	8.4	B	10	B
Acenaphthylene	190	J	52		280	J	33		29	B	16	B	100	
Anthracene	490	J	79		700	J	70		51		30		120	
Benz(a)anthracene	910	J	170	J	1200	J	250	J	140	J	61		200	J
Benzo(a)pyrene	990	J	250	J	1400	J	270	J	190	J	75		310	J
Benzo(b)fluoranthene	2500		320	J	2000	J	340	J	230	J	80		320	
Benzo(g,h,i)perylene	570	J	180	J	970	J	170	J	130	J	52		250	J
Benzo(k)fluoranthene	800	J	230	J	1400	J	250	J	190	J	89	J	330	J
Chrysene	2300		280	J	1800	J	310	J	200	J	89	J	290	J
Dibenz(a,h)anthracene	260	J	63		380	J	50		35	B	14	B	76	
Fluoranthene	6400		630		9600		640		530		210		420	
Fluorene	170	J	29		290	J	20	B	17	B	13	B	11	B
Indeno(1,2,3-cd)pyrene	780	J	220	J	1300	J	220	J	160	J	64		290	J
Naphthalene	47		13	B	89		4.7	B	5.6	B	3	B	12	B
Phenanthrene	4300		400		7200		320	J	260	J	130	J	180	
Pyrene	4700		470		6800		480		390		150		420	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1,2,2-Tetrachloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1,2-Trichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1,2-Trichlorotrifluoroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1-Dichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,1-Dichloroethene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2,3-Trichlorobenzene	9.3	B	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2,4-Trichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dibromo-3-chloropropane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dibromoethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloroethene (cis)	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,2-Dichloropropane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,3-Dichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
1,4-Dichlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
2-Butanone	30	U	15	J	13	J	31		22	U	14	U	20	J
2-Hexanone	30	U	26	U	23	U	23	U	22	U	14	U	29	U
4-Methyl-2-pentanone	30	U	26	U	23	U	23	U	22	U	14	U	29	U
Acetone	120		140		60		110	J	36	J	26		180	
Benzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Bromodichloromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Bromoform	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Bromomethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Carbon Disulfide	12	U	6.2	J	9.4	U	9.1	U	2.6	J	2	J	11	U
Carbon Tetrachloride	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chlorobenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chloroethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chloroform	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Chloromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
cis-1,3-Dichloropropene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Cyclohexane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SD-12**		**03-SD-13**		**03-SD-14**		**03-SD-15**		**03-SD-15-D**		**03-SD-16**		**03-SD-17**	
Sample Date:	**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:														
Dibromochloromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Dichlorodifluoromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Ethylbenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Isopropylbenzene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
M+p-xylenes	24	U	20	U	19	U	18	U	18	U	12	U	23	U
Methyl Acetate	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Methyl Cyclohexane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Methyl Tert-butyl Ether	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Methylene Chloride	3	B	2.4	B	2.6	B	2.2	B	8.8	U	1.7	B	3.1	B
O-xylene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Styrene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Tetrachloroethene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Toluene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
trans-1,3-Dichloropropene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Trichloroethene	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Trichlorofluoromethane	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
Xylene (Total)	12	U	10	U	9.4	U	9.1	U	8.8	U	5.8	U	11	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	2.2	J	5.5	UJ	26	U	28	U	28	U	4.2	U	8.9	UJ
4,4'-DDE	15	R	3.3	J	29	J	28	U	28	U	4.2	U	6.8	J
4,4'-DDT	6.5		2.4	J	11	J	28	U	28	U	4.2	U	7.4	J
Aldrin	2.1	J	2.1	J	3.8	J	8.1	J	8.1	J	0.85	J	4.6	UJ
Alpha-BHC	2.9	U	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Alpha-Chlordane	8.4	J	3.8	B	7.2	B	4.6	B	6.1	B	4.6	J	6.6	B
Beta-BHC	1.4	U	1.4	UJ	6.8	U	7.1	U	7.3	U	9.8	R	2.3	UJ
Delta-BHC	0.38	J	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Dieldrin	36		17	J	43		46		47		4.4		24	J
Endosulfan I	2.4	R	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Endosulfan II	5.6	U	5.5	UJ	26	U	28	U	15	J	4.2	U	8.9	UJ
Endosulfan Sulfate	5.6	U	5.5	UJ	26	U	28	U	28	U	4.2	U	8.9	UJ
Endrin	5.6	U	5.5	UJ	26	U	28	U	28	U	4.2	U	8.9	UJ
Endrin Aldehyde	8.9	J	5.1	R	26	R	28	U	28	U	0.94	J	3.5	J
Endrin Ketone	3.6	J	2.8	J	26	U	28	U	28	U	4.2	U	6.4	J
Gamma-BHC (Lindane)	2.9	U	2.8	UJ	13	U	14	U	15	U	2.2	U	4.6	UJ
Gamma-Chlordane	5.9	R	1.3	J	3.6	J	5.2	J	5.7	J	1.4	J	8.3	R
Heptachlor	2.9	U	0.81	J	13	U	14	U	15	U	2.2	U	0.98	J
Heptachlor Epoxide	6.1	R	2.8	UJ	13	U	14	U	15	U	1.4	R	2.9	J
Methoxychlor	11	J	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Toxaphene	140	U	140	UJ	660	U	690	U	720	U	110	U	220	UJ
Aroclor-1016	41	U	40	UJ	190	U	200	U	210	U	31	U	65	UJ
Aroclor-1221	58	U	57	UJ	270	U	280	U	290	U	44	U	92	UJ
Aroclor-1232	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1242	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1248	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1254	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ
Aroclor-1260	29	U	28	UJ	130	U	140	U	150	U	22	U	46	UJ

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SEDIMENT
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	13600		15500		14200		9010		11400		15000		15200		14800		15700		16200		19400	
Antimony	10.4		9.3	U	10.1	U	9.8	U	9.9	U	9.7	U	9.6	U	9.8	U	10	U	8.9	U	8.9	U
Arsenic	5.9		3.9		5.2		4.6		4.9		4		4.9		4		13		4.4		4	
Barium	103		77.9		74.9		47.6		69.9		96.8		79.4		76.8		78.5		84.6		139	
Beryllium	1.4		1.2		1.3		1.1		1.1		1.3		1.3		1.3		1.3		1.2		1.2	
Cadmium	3.6		2.7		3.1		1.7		2.9		2.6		2.6		2.2		2.9		2.6		2.4	
Calcium	11100		4840		2370		86400		22500		3760		1790		1750		4760		3240		24400	
Chromium	25.6		23.3		25.6		15.7		21.6		25		24.6		24.9		25.1		26.6		21.7	
Cobalt	7.7		9.3		8.3		5.2		7.7		9.5		10.1		9.8		10		8.3		8.1	
Copper	37.6		17.6		18		10.7		13.9		26		14.8		15.1		14.7		15.1		11.2	
Cyanide	2.4	U	1.6	U	2.5	U	1.4	U	1.9	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	2.3	U
Iron	24400		23900		23100		14000		18500		24000		24700		23100		25100		24900		21000	
Lead	59.6		35.7		44.5		22.8		29.1		61.7		18.6		21.5		39.2		24.9		14.9	
Magnesium	6980		3790		2340		50200		12800		2730		2330		2160		3570		2530		5870	
Manganese	432		437		360		318		425		518		499		425		412		566		955	
Mercury	0.1		0.11	U	0.1	U	0.09	U	0.1	U	0.11	U	0.1	U	0.1	U	0.09	U	0.09	U	0.1	U
Nickel	13.4		12.5		11.7		29.9		39		12.3		10.9		11.6		12.7		12.5		10.1	
Potassium	823		883		845		570		658		923		952		779		1010		942		1130	
Selenium	0.82	U	0.76	U	0.87	U	0.77	U	0.8	U	0.87	U	0.9	U	0.93	U	0.83	U	0.88	U	0.78	U
Silver	1.4	U	1.2	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.2	U	1.2	U
Sodium	1010	U	924	U	1000	U	973	U	981	U	957	U	953	U	971	U	989	U	882	U	884	
Thallium	0.45		0.41		0.55		0.57		0.53		0.66		0.47		0.56		0.59		0.58		0.42	
Vanadium	34.9		34.9		32.8		18.6		24		34.9		33.6		35.1		36.7		37.5		30.8	
Zinc	78		48		49.9		35.2		37.5		49.5		40.5		46.9		41.4		42.6		33.9	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	390	U	3000	U	370	U	19000	U	7500	U	150	J	370	U	390	U	380	U	560	U	370	U
1,2-Dichlorobenzene	170	J	3000	U	41	J	19000	U	7500	U	330	J	39	J	390	U	380	U	82	J	370	U
1,3-Dichlorobenzene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
1,4-Dichlorobenzene	160	J	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
2,4,6-Trichlorophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,4-Dichlorophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,4-Dimethylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,4-Dinitrophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
2,4-Dinitrotoluene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2,6-Dinitrotoluene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Chloronaphthalene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Chlorophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Methylnaphthalene	390	U	630	J	370	U	9500	J	4300	J	740	U	370	U	390	U	380	U	560	U	370	U
2-Methylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
2-Nitroaniline	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
2-Nitrophenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
3,3'-Dichlorobenzidine	780	U	6000	U	750	U	38000	U	15000	U	1500	U	740	U	780	U	770	U	1100	U	740	U
3-Nitroaniline	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
4,6-Dinitro-2-methylphenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
4-Bromophenyl Phenyl Ether	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
4-Chloro-3-methylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Chloroaniline	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Chlorophenyl Phenyl Ether	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Methylphenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
4-Nitroaniline	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
4-Nitrophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
Acenaphthene	95	J	3200		110	J	33000		13000		740	U	370	U	390	U	380	U	560	U	370	U
Acenaphthylene	160	J	3000	U	38	J	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	340	J	8300		440		66000		27000		740	U	370	U	390	U	380	U	150	J	370	U
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	1600		12000		1100		65000		24000		280	J	110	J	99	J	100	J	450	J	120	J
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	1400		9300		870		48000		20000		310	J	120	J	120	J	100	J	400	J	130	J
Benzo(b)fluoranthene	1600		11000		890		58000		17000		330	J	370	U	120	J	120	J	430	J	140	J
Benzo(g,h,i)perylene	390		2400	J	280	J	13000	J	6400	J	98	J	50	J	46	J	47	J	110	J	43	J
Benzo(k)fluoranthene	1100		7400		780		31000		18000		320	J	370	U	100	J	90	J	400	J	110	J
Benzoic Acid	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
Benzyl Alcohol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Bis(2-chloroethoxy)methane	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Bis(2-chloroethyl)ether	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Bis(2-ethylhexyl)phthalate	84	J	3000	U	87	J	19000	U	7500	U	740	U	38	J	68	J	56	J	79	J	370	U
Butylbenzylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Chrysene	1500		11000		1000		52000		21000		300	J	110	J	120	J	120	J	450	J	130	J
Di-n-butylphthalate	70	B	3000	U	89	B	19000	U	7500	U	740	U	88	B	85	B	82	B	560	U	45	B
Di-n-octylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Dibenz(a,h)anthracene	49	J	420	J	93	J	4800	J	810	J	740	U	370	U	390	U	380	U	560	U	370	U
Dibenzofuran	140	J	3000	U	73	J	29000		11000		740	U	370	U	390	U	380	U	560	U	370	U
Diethylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Dimethylphthalate	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Fluoranthene	3000		28000		2000		150000		62000		440	J	220	J	240	J	240	J	880		290	J
Fluorene	290	J	4900		150	J	41000		16000		740	U	370	U	390	U	380	U	560	U	370	U
Hexachlorobenzene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Hexachlorobutadiene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Hexachlorocyclopentadiene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Hexachloroethane	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Indeno(1,2,3-cd)pyrene	520		3500		370	U	19000		8600		740	U	59	J	58	J	55	J	140	J	53	J
Isophorone	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
N-Nitroso-di-n-propylamine	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
N-Nitrosodiphenylamine (1)	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Naphthalene	99	J	3000	U	370	U	13000	J	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Nitrobenzene	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Pentachlorophenol	1900	U	15000	U	1800	U	92000	U	36000	U	3600	U	1800	U	1900	U	1900	U	2700	U	1800	U
Phenanthrene	2600		34000		1700		210000		92000		190	J	140	J	150	J	170	J	600		160	J
Phenol	390	U	3000	U	370	U	19000	U	7500	U	740	U	370	U	390	U	380	U	560	U	370	U
Pyrene	3200		25000		2300		140000		48000		490	J	210	J	220	J	270	J	1000		270	J
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	2	B	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	3	B	6	U
1,1,2,2-Tetrachloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
1,1,2-Trichloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethene	6	U	6	U	2	B	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	12	U	12	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
2-Hexanone	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
4-Methyl-2-pentanone	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Acetone	2	B	5	B	5	B	12	B	6	B	5	B	8	B	12	U	7	B	11	U	11	U
Benzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Bromoform	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Bromomethane	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Carbon Disulfide	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Carbon Tetrachloride	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Chlorobenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Chloroethane	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Chloroform	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Chloromethane	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
cis-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibromochloromethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	5	B	3	B	2	B	2	B	6	U	2	B	2	B	1	B	1	B	6	U	6	U
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Tetrachloroethene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Toluene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
trans-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Trichloroethene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Acetate	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Vinyl Chloride	12	U	11	U	11	U	11	U	11	U	11	U	12	U	12	U	12	U	11	U	11	U
Xylene (Total)	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**		**03SB03**		**03SB05**		**03SB06**		**03SB06-D**		**03SB07**		**03SB08**		**03SB09**		**03SB10**		**03SB11**		**03SB12**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**	
Duplicate:							**03SB06-D**		**03SB06**													
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
4,4'-DDE	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
4,4'-DDT	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Aldrin	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Alpha-BHC	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Alpha-Chlordane	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1016	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1221	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1232	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1242	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1248	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Aroclor-1254	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U	180	U	180	U	180	U
Aroclor-1260	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U	180	U	180	U	180	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Delta-BHC	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Dieldrin	580		210		140		260		220		290		91		120		95		120		27	
Endosulfan I	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	23		9	U
Endosulfan II	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Endosulfan Sulfate	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Endrin	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	190	U	18	U	18	U	180	U	180	U	89	U	18	U	19	U	18	U	18	U	18	U
Gamma-BHC (Lindane)	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Gamma-Chlordane	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Heptachlor	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Heptachlor Epoxide	94	U	9	U	9	U	91	U	90	U	45	U	8.9	U	9.3	U	9.2	U	9	U	9	U
Methoxychlor	940	U	90	U	90	U	910	U	900	U	450	U	89	U	93	U	92	U	90	U	90	U
Toxaphene	1900	U	180	U	180	U	1800	U	1800	U	890	U	180	U	190	U	180	U	180	U	180	U
DIOXIN/FURANS																						
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB01**	**03SB03**	**03SB05**	**03SB06**	**03SB06-D**	**03SB07**	**03SB08**	**03SB09**	**03SB10**	**03SB11**	**03SB12**
Sample Date:	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**
Duplicate:				**03SB06-D**	**03SB06**						
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**		**03SB14**		**03SB14-D**		**03SB15**		**03SB16**		**03SS01**		**03SS01**		**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:			**03SB14-D**		**03SB14**																					
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	15100		14500		14100		16000		13900		12700		16100		14500		8200		12600		21400		14500		15200	
Antimony	8.9	U	9.1	U	9.5	U	10	U	9.6	U	7.4	B	6.5	R	6.8	UL	5.2	UJ	8.3	B	4.8	UJ	9.8	B	8.6	R
Arsenic	4.3		3.8		3.6		3.2		3.3		3.8	J	5.7		7	J	5.6		7.1	J	4.6	J	8.3	J	3	J
Barium	81.3		81.3		79.4		78.4		68.7		66		85.7		95.7		88.3		113		133		100		86.1	
Beryllium	1.2		1.2		1.3		1.3		1.3		0.71	B	0.71		0.85	B	0.73		0.67	B	0.76		0.82	B	0.75	
Cadmium	2.4		3.2		1.9		3.3		1.7		1.2	B	1.2	U	0.85	U	1.3	U	0.67	U	1.2	U	0.65	U	1.2	U
Calcium	2840		2080		2940		2270		2640		3260		624		1180		870		989		492		1080		707	
Chromium	23.8		24.3		21.1		26.3		19.9		24.4		14.5		19.7		12.5		15.8		12.6		20.3		19.9	
Cobalt	7.9		8.3		8.7		12.2		6.2		8.3		9.1		7.4		5.6		7.5		10.6		8.2		8.8	
Copper	13.8		23.5		15.2		11.1		12.4		17.3		20		12.5		10		11.6		26.2		14.2		19.1	
Cyanide	2.2	U	2.1	U	2.2	U	2	U	2.2	U	2.4	U	0.61	U	2	U	0.65	U	2	U	0.59	U	2.1	U	0.6	U
Iron	22700		23100		20700		29700		18400		21800		19400		16400		14300		15100		20100		17000		24200	
Lead	27.7		33.1		22		16.2		12		16.5		10.2		22.1		25.2		40.5		8.9		28.4		16.8	
Magnesium	2420		2260		2330		2820		1860		2400		1310		1760		1060		1550		1030		1750		1910	
Manganese	334		473		467		444		394		423	J	550		589	J	424		793	J	767		754	J	474	
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.11	U	0.12		0.12	U	0.1		0.13	U	0.09	U	0.12	U	0.09	U	0.12	U
Nickel	10.6		12.2		10.4		13.4		9.4		10.3		11		12.1		6.3		10.5		12.6		10.8		13.3	
Potassium	861		823		804		1570		593		821		454		650		390	U	536		484		593		717	
Selenium	0.85	U	0.87	U	0.86	U	0.81	U	0.81	U	1.1	U	1.2	UR	1.1	U	0.26	UR	0.81	U	1.2	UR	1	U	0.24	UR
Silver	1.2	U	1.2	U	1.3	U	1.3	U	1.3	U	1.2	UL	1.2	U	1.5	UL	1.3	U	1.2	UL	1.2	U	1.1	UL	1.2	U
Sodium	876	U	902	U	940	U	991	U	935	U	649		97.7	U	459		104	U	412		95.2	U	437		104	
Thallium	0.45		0.49		0.43	U	0.52		0.5		0.22	U	0.35	L	0.21	U	0.28	L	0.16	U	0.26	L	0.2	U	0.28	L
Vanadium	33.3		33.2		30.2		38.1		27.8		32.6		27.1		27.4		22.8		23.6		26.4		28.1		33.8	
Zinc	44.1		41.5		40.6		40.1		30		48.3	J	29.1		44.5	J	36.3		42.1	J	24.5		44.8	J	43.7	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
1,2-Dichlorobenzene	380	U	290	J	320	J	360	U	370	U	64	J	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
1,3-Dichlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
1,4-Dichlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	40	J	390	UJ	380	U	400	UJ
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
2,4,6-Trichlorophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,4-Dichlorophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,4-Dimethylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,4-Dinitrophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	UJ	1000	UJ
2,4-Dinitrotoluene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2,6-Dinitrotoluene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Chloronaphthalene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Chlorophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Methylnaphthalene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Methylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
2-Nitroaniline	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
2-Nitrophenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
3,3'-Dichlorobenzidine	770	U	1500	U	1500	U	730	U	740	U	760	U	400	UJ	740	U	430	UJ	740	U	390	UJ	760	U	400	UJ
3-Nitroaniline	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
4,6-Dinitro-2-methylphenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
4-Bromophenyl Phenyl Ether	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**		**03SB14**		**03SB14-D**		**03SB15**		**03SB16**		**03SS01**		**03SS01**		**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:			**03SB14-D**		**03SB14**																					
4-Chloro-3-methylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Chloroaniline	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Chlorophenyl Phenyl Ether	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Methylphenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
4-Nitroaniline	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
4-Nitrophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
Acenaphthene	380	U	740	U	130	J	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Acenaphthylene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	380	U	200		450	J	360	U	370	U	100	J	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	120	J	1200		1100		150	J	120	J	410		400	UJ	49	J	46	J	48	J	390	UJ	46	J	400	UJ
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	120	J	1700		880		170	J	120	J	450		400	UJ	54	J	50	J	62	J	390	UJ	59	J	400	UJ
Benzo(b)fluoranthene	130	J	1700		880		180	J	150	J	420		400	UJ	76	J	430	UJ	82	J	390	UJ	84	J	400	UJ
Benzo(g,h,i)perylene	54	J	840		390	J	79	J	370	U	180	J	400	UJ	370	U	430	UJ	39	J	390	UJ	380	U	400	UJ
Benzo(k)fluoranthene	100	J	1200		810		130	J	130	J	520	J	400	UJ	44	J	430	UJ	65	J	390	UJ	44	J	400	UJ
Benzoic Acid	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	NA		1800	U	NA		1800	U	NA		1800	U	NA	
Benzyl Alcohol	380	U	740	U	760	U	360	U	370	U	380	U	NA		370	U	NA		370	U	NA		380	U	NA	
Bis(2-chloroethoxy)methane	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Bis(2-chloroethyl)ether	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Bis(2-ethylhexyl)phthalate	52	J	740	U	760	U	360	U	360	J	110	J	120	B	42	J	180	B	48	J	120	B	380	U	160	B
Butylbenzylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		NA		NA		400	UJ	NA		430	UJ	NA		390	UJ	NA		400	UJ
Chrysene	140	J	1300		1000		150	J	140	J	490		400	UJ	68	J	65	J	84	J	390	UJ	85	J	400	UJ
Di-n-butylphthalate	45	B	740	U	760	U	55	B	72	B	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Di-n-octylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Dibenz(a,h)anthracene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Dibenzofuran	380	U	740	U	120	J	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Diethylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Dimethylphthalate	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Fluoranthene	250	J	2200		2300		270	J	230	J	910		400	UJ	150	J	120	J	190	J	390	UJ	200	J	48	J
Fluorene	380	U	87	J	240	J	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachlorobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachlorobutadiene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachlorocyclopentadiene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	UJ	430	UJ	370	U	390	UJ	380	U	400	UJ
Hexachloroethane	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Indeno(1,2,3-cd)pyrene	68	J	930		490	U	94	J	46	J	210	J	400	UJ	370	U	430	UJ	45	J	390	UJ	380	U	400	UJ
Isophorone	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
N-Nitroso-di-n-propylamine	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
N-Nitrosodiphenylamine (1)	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Naphthalene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Nitrobenzene	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Pentachlorophenol	1900	U	3600	U	3700	U	1800	U	1800	U	1800	U	1000	UJ	1800	U	1100	UJ	1800	U	990	UJ	1800	U	1000	UJ
Phenanthrene	150	J	1100		2300		130	J	130	J	490		400	UJ	82	J	71	J	120	J	390	UJ	150	J	400	UJ
Phenol	380	U	740	U	760	U	360	U	370	U	380	U	400	UJ	370	U	430	UJ	370	U	390	UJ	380	U	400	UJ
Pyrene	240	J	2300		2400		330	J	240	J	930		400	UJ	110	J	100	J	130	J	390	UJ	140	J	44	J
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**				**ug/kg**				**ug/kg**				**ug/kg**			
1,1,1-Trichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,1,2,2-Tetrachloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**		**03SB14**		**03SB14-D**		**03SB15**		**03SB16**		**03SS01**		**03SS01**		**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**
Duplicate:			**03SB14-D**		**03SB14**																				
1,1,2-Trichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
1,1-Dichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
1,1-Dichloroethene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dichloroethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dichloroethene (Total)	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,2-Dichloropropane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
2-Butanone	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
2-Hexanone	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
4-Methyl-2-pentanone	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
Acetone	11	U	11	U	11	U	6	B	11	U	11	U	NA		4	B	NA		11	U	NA		4	B	NA
Benzene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Bromodichloromethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Bromoform	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Bromomethane	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
Carbon Disulfide	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Carbon Tetrachloride	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Chlorobenzene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Chloroethane	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
Chloroform	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Chloromethane	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
cis-1,3-Dichloropropene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Dibromochloromethane	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Ethylbenzene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Methylene Chloride	6	U	5	U	6	U	5	U	2	B	2	B	NA		2	B	NA		2	B	NA		2	B	NA
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Styrene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Tetrachloroethene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Toluene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
trans-1,3-Dichloropropene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Trichloroethene	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Vinyl Acetate	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
Vinyl Chloride	11	U	11	U	11	U	11	U	11	U	11	U	NA		11	U	NA		11	U	NA		11	U	NA
Xylene (Total)	6	U	5	U	6	U	5	U	6	U	6	U	NA		6	U	NA		6	U	NA		6	U	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**		**03SB14**		**03SB14-D**		**03SB15**		**03SB16**		**03SS01**		**03SS01**		**03SS02**		**03SS02**		**03SS03**		**03SS03**		**03SS04**		**03SS04**	
Sample Date:	**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/6/1991**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:			**03SB14-D**		**03SB14**																					
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	18	U	89	U	18	U	17	U	19	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
4,4'-DDE	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	3.3	J
4,4'-DDT	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4.1	J
Aldrin	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Alpha-BHC	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Alpha-Chlordane	92	U	440	U	91	U	87	U	89	U	91	U	2.1	UJ	90	U	2.2	UJ	90	U	2	UJ	92	U	2	UJ
Aroclor-1016	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1221	92	U	440	U	91	U	87	U	89	U	91	U	82	UJ	90	U	87	UJ	90	U	80	UJ	92	U	81	UJ
Aroclor-1232	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1242	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1248	92	U	440	U	91	U	87	U	89	U	91	U	40	UJ	90	U	43	UJ	90	U	39	UJ	92	U	40	UJ
Aroclor-1254	180	U	890	U	180	U	170	U	180	U	180	U	40	UJ	180	U	43	UJ	180	U	39	UJ	180	U	13	J
Aroclor-1260	180	U	890	U	180	U	170	U	180	U	180	U	40	UJ	180	U	43	UJ	180	U	39	UJ	180	U	40	UJ
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Delta-BHC	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Dieldrin	130		290		150		17	U	18	U	68		4.5	J	37		18	J	140		3.9	UJ	75		5.1	J
Endosulfan I	30		44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Endosulfan II	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Endosulfan Sulfate	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Endrin	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Endrin Aldehyde	NA		NA		NA		NA		NA		NA		4	UJ	NA		4.3	UJ	NA		3.9	UJ	NA		4	UJ
Endrin Ketone	18	U	89	U	18	U	17	U	18	U	18	U	4	UJ	18	U	4.3	UJ	18	U	3.9	UJ	18	U	4	UJ
Gamma-BHC (Lindane)	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Gamma-Chlordane	92	U	490	U	91	U	87	U	89	U	91	U	2.1	UJ	90	U	2.2	UJ	90	U	2	UJ	92	U	2	UJ
Heptachlor	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	9	U	2	UJ	9.2	U	2	UJ
Heptachlor Epoxide	9.2	U	44	U	9.1	U	8.7	U	8.9	U	9.1	U	2.1	UJ	9	U	2.2	UJ	12		2	UJ	9.2	U	2	UJ
Methoxychlor	92	U	440	U	91	U	87	U	89	U	91	U	21	UJ	90	U	22	UJ	90	U	20	UJ	92	U	20	UJ
Toxaphene	180	U	890	U	180	U	170	U	180	U	180	U	210	UJ	180	U	220	UJ	180	U	200	UJ	180	U	200	UJ
DIOXIN/FURANS																									**ng/kg**	
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		86.8	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		13.1	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		1.3	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		1.4	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		8.3	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		1.8	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		2.4	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		3.1	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.3	U
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.91	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		5.2	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		3.5	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		5.2	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		0.3	U
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		20.9	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		15890	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		16.4	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		10.7	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		10.5	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SB13**	**03SB14**	**03SB14-D**	**03SB15**	**03SB16**	**03SS01**	**03SS01**	**03SS02**	**03SS02**	**03SS03**	**03SS03**	**03SS04**	**03SS04**
Sample Date:	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/6/1991**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**
Duplicate:		**03SB14-D**	**03SB14**										
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	184
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21.4
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	32.8
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	27.3
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.1
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	53.1
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.6
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	153

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	14800		11000		14700		12800		10700		14300		12100		14600		9630		14000		11700		13900		13500	
Antimony	5.5	UL	5.2	UJ	5.7	UL	5.2	UJ	5.9	R	9	B	5.6	R	9.5	B	5	UJ	9.3	B	8.2	R	7.2	B	5.4	UJ
Arsenic		R	3.9	J		R	0.96	J	5.2		6.8	J	0.74	J		R	0.37	J	7.6	J	4.8	J		R	6.6	
Barium	107		78.7		100		91.5		81.6		106		75.8		98.4		84.2		103		72.6		104		92.5	
Beryllium	0.69	B	0.62		0.71	B	0.75		0.72		0.71	B	0.73		0.66	B	0.88		0.68	B	0.65		0.67	B	0.97	
Cadmium	0.69	U	1.3	U	0.71	U	1.3	U	1.3	U	0.71	U	1.4	U	0.89	U	1.3	U	0.91	U	18.4		0.9	U	1.4	U
Calcium	1210		763		12500		856		872		980		1020		1080		913		1090		1080		1060		372	
Chromium	19		13.6		18.9		17.8		16.2		18.1		18.3		19.3		13.7		18.8		20.9		18.8		17.6	
Cobalt	7.8		8.6		8.8		8.2		7.3		8.2		9.3		8.2		7		8.1		9.9		8.5		9.8	
Copper	13		24.3		12.9		19.2		15.8		10.8		13.8		11.7		11.8		12.2		81.3		12.1		24.6	
Cyanide	2.1	U	0.65	U	2.2	U	0.64	U	0.64	U	2.4	U	0.68	U	2.1	U	0.62	U	2.3	U	2.3		2.2	U	0.66	U
Iron	17300		16400		17300		20900		19000		15800		20100		16100		14600		16500		23400		16500		18200	
Lead	27.8		70.5		21.8		28.5		23.7		25.4		35		24.6		28.8		22.2		74.8		24.4		90.5	
Magnesium	1760		1080		1980		1580		1420		1660		1710		1710		1230		1670		1450		1710		1420	
Manganese	742	J	494		670	J	563		474		749	J	485		782	J	648		710	J	509		679	J	768	
Mercury	0.11	U	0.13	U	0.09	U	0.13	U	0.13	U	0.1	U	0.14	U	0.11	U	0.13	U	0.1	U	0.12	U	0.11	U	0.14	U
Nickel	12.4		10.6		11.7		10.7		8.8		11.5		10.9		11.1		9.7		12.7		17.3		11.4		10.8	
Potassium	545		460		553		505		524		538		550		613		515		473		387		564		530	
Selenium	0.77	U	0.26	UR	0.88	UL	0.26	UR	0.26	UR	0.85	U	0.27	UR	0.86	U	1.3	UR	0.86	UL	0.24	UR	0.99	U	0.27	UR
Silver	1.2	UL	1.3	U	1.2	UL	1.3	U	1.3	U	1.2	UL	1.4	U	1.6	UL	1.3	U	1.6	UL	1.2	U	1.6	UL	1.4	U
Sodium	426		104	U	399		104	U	103	U	353		109	U	374		101	U	379		121		365		108	U
Thallium	0.15	U	0.26	UL	0.18	U	0.33	L	0.26	L	0.17	U	0.27	L	0.17	U	0.28	L	0.17	U	0.24	UL	0.2	U	0.27	UL
Vanadium	27.5		25.4		27.8		29.4		29		24.8		33.4		26.4		24		26.9		29.1		26.7		29.8	
Zinc	44.4	J	50.6		42.6	J	50.1		44.3		41.3	J	50.3		43.9	J	36.7		43.7	J	136		46.8	J	42.6	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
1,2-Dichlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
1,3-Dichlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
1,4-Dichlorobenzene	43	J	430	UJ	46	J	430	UJ	430	UJ	380	U	450	UJ	39	J	420	UJ	350	U	400	UJ	40	J	450	UJ
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
2,4,6-Trichlorophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,4-Dichlorophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,4-Dimethylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,4-Dinitrophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	UJ	1000	UJ	1700	UJ	1000	UJ	1900	U	1100	UJ
2,4-Dinitrotoluene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2,6-Dinitrotoluene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Chloronaphthalene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Chlorophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Methylnaphthalene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Methylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
2-Nitroaniline	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
2-Nitrophenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
3,3'-Dichlorobenzidine	770	U	430	UJ	730	U	430	UJ	430	UJ	760	U	450	UJ	750	U	420	UJ	700	U	400	UJ	770	U	450	UJ
3-Nitroaniline	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
4,6-Dinitro-2-methylphenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
4-Bromophenyl Phenyl Ether	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
4-Chloro-3-methylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Chloroaniline	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Chlorophenyl Phenyl Ether	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Methylphenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
4-Nitroaniline	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
4-Nitrophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
Acenaphthene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Acenaphthylene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	42	J	450	UJ
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	380	U	430	UJ	50	J	53	J	160	J	380	U	44	J	370	U	420	UJ	42	J	100	J	93	J	33	J
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	380	U	430	UJ	57	J	64	J	180	J	380	U	52	J	370	U	420	UJ	47	J	130	J	97	J	52	J
Benzo(b)fluoranthene	46	J	430	UJ	77	J	150	J	210	J	45	J	120	J	53	J	81	J	59	J	170	J	110	J	73	J
Benzo(g,h,i)perylene	380	U	430	UJ	360	U	430	UJ	82	J	380	U	450	UJ	370	U	420	UJ	350	U	72	J	54	J	450	UJ
Benzo(k)fluoranthene	380	U	430	UJ	53	J	430	UJ	140	J	40	J	450	UJ	370	U	420	UJ	55	J	110	J	94	J	450	UJ
Benzoic Acid	1900	U	NA		1800	U	NA		NA		1800	U	NA		1800	U	NA		1700	U	NA		1900	U	NA	
Benzyl Alcohol	380	U	NA		360	U	NA		NA		380	U	NA		370	U	NA		350	U	NA		380	U	NA	
Bis(2-chloroethoxy)methane	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Bis(2-chloroethyl)ether	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Bis(2-ethylhexyl)phthalate	380	U	210	B	360	U	170	B	210	B	380	U	210	B	370	U	170	B	350	U	760	B	380	U	160	B
Butylbenzylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	330	J	380	U	450	UJ
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		430	UJ	NA		430	UJ	430	UJ	NA		450	UJ	NA		420	UJ	NA		400	UJ	NA		450	UJ
Chrysene	47	J	50	J	77	J	85	J	230	J	49	J	73	J	53	J	46	J	66	J	150	J	120	J	65	J
Di-n-butylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	370	J	450	UJ	370	U	420	UJ	350	U	60	J	380	U	450	UJ
Di-n-octylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Dibenz(a,h)anthracene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Dibenzofuran	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Diethylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Dimethylphthalate	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Fluoranthene	85	J	77	J	190	J	140	J	380	J	100	J	130	J	120	J	85	J	150	J	230	J	320	J	120	J
Fluorene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachlorobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachlorobutadiene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachlorocyclopentadiene	380	UJ	430	UJ	360	UJ	430	UJ	430	UJ	380	UJ	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Hexachloroethane	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Indeno(1,2,3-cd)pyrene	380	U	430	UJ	39	J	430	UJ	120	J	380	U	450	UJ	370	U	420	UJ	350	U	79	J	63	J	450	UJ
Isophorone	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
N-Nitroso-di-n-propylamine	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
N-Nitrosodiphenylamine (1)	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Naphthalene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Nitrobenzene	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Pentachlorophenol	1900	U	1100	UJ	1800	U	1100	UJ	1100	UJ	1800	U	1100	UJ	1800	U	1000	UJ	1700	U	1000	UJ	1900	U	1100	UJ
Phenanthrene	60	J	50	J	150	J	79	J	220	J	68	J	76	J	75	J	59	J	83	J	110	J	230	J	90	J
Phenol	380	U	430	UJ	360	U	430	UJ	430	UJ	380	U	450	UJ	370	U	420	UJ	350	U	400	UJ	380	U	450	UJ
Pyrene	87	J	72	J	130	J	130	J	350	J	75	J	100	J	77	J	74	J	100	J	210	J	210	J	97	J
VOLATILES	**ug/kg**				**ug/kg**						**ug/kg**				**ug/kg**				**ug/kg**				**ug/kg**			
1,1,1-Trichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1,2,2-Tetrachloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
1,1,2-Trichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1-Dichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,1-Dichloroethene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (Total)	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloropropane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
2-Hexanone	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
4-Methyl-2-pentanone	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Acetone	15	B	NA		4	B	NA		NA		12	B	NA		6	B	NA		11	U	NA		11	U	NA	
Benzene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Bromoform	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Bromomethane	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Carbon Disulfide	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Carbon Tetrachloride	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Chlorobenzene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Chloroethane	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Chloroform	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Chloromethane	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
cis-1,3-Dichloropropene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dibromochloromethane	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Ethylbenzene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	6	U	NA		6	U	NA		NA		3	B	NA		6	U	NA		5	U	NA		6	U	NA	
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Styrene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Tetrachloroethene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Toluene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
trans-1,3-Dichloropropene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Trichloroethene	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Acetate	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Vinyl Chloride	11	U	NA		11	U	NA		NA		11	U	NA		11	U	NA		11	U	NA		11	U	NA	
Xylene (Total)	6	U	NA		6	U	NA		NA		6	U	NA		6	U	NA		5	U	NA		6	U	NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
4,4'-DDE	18	U	4.3	UJ	18	U	9	J	11	J	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
4,4'-DDT	18	U	4.3	UJ	18	U	11	J	9.5	J	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Aldrin	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Alpha-BHC	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Alpha-Chlordane	92	U	2.2	UJ	88	U	2.2	UJ	2.2	UJ	91	U	2.3	UJ	90	U	2.1	UJ	85	U	2.1	UJ	93	U	2.3	UJ
Aroclor-1016	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1221	92	U	87	UJ	88	U	87	UJ	87	UJ	91	U	91	UJ	90	U	84	UJ	85	U	82	UJ	93	U	91	UJ
Aroclor-1232	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1242	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1248	92	U	43	UJ	88	U	43	UJ	43	UJ	91	U	45	UJ	90	U	41	UJ	85	U	40	UJ	93	U	45	UJ
Aroclor-1254	180	U	43	UJ	180	U	22	J	20	J	180	U	45	UJ	180	U	41	UJ	170	U	84	J	190	U	45	UJ
Aroclor-1260	180	U	43	UJ	180	U	43	UJ	43	UJ	180	U	45	UJ	180	U	41	UJ	170	U	40	UJ	190	U	45	UJ
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Delta-BHC	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Dieldrin	47		11	J	28		6.3	J	11	J	42		76	J	160		8.3	J	31		45	J	41		1100	R
Endosulfan I	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Endosulfan II	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Endosulfan Sulfate	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Endrin	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Endrin Aldehyde	NA		4.3	UJ	NA		4.3	UJ	4.3	UJ	NA		4.5	UJ	NA		4.1	UJ	NA		4	UJ	NA		4.5	UJ
Endrin Ketone	18	U	4.3	UJ	18	U	4.3	UJ	4.3	UJ	18	U	4.5	UJ	18	U	4.1	UJ	17	U	4	UJ	19	U	4.5	UJ
Gamma-BHC (Lindane)	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Gamma-Chlordane	92	U	2.2	UJ	88	U	2.2	UJ	2.2	UJ	91	U	2.3	UJ	90	U	2.1	UJ	85	U	2.1	UJ	93	U	2.3	UJ
Heptachlor	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	9	U	2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Heptachlor Epoxide	9.2	U	2.2	UJ	8.8	U	2.2	UJ	2.2	UJ	9.1	U	2.3	UJ	15		2.1	UJ	8.5	U	2.1	UJ	9.3	U	2.3	UJ
Methoxychlor	92	U	22	UJ	88	U	22	UJ	22	UJ	91	U	23	UJ	90	U	21	UJ	85	U	21	UJ	93	U	23	UJ
Toxaphene	180	U	220	UJ	180	U	220	UJ	220	UJ	180	U	230	UJ	180	U	210	UJ	170	U	210	UJ	190	U	230	UJ
DIOXIN/FURANS																	**ng/kg**									
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		93		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		6.8		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.6	U	NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		2.1	U	NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		2.8		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		2.4		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		0.88		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		3.5		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.1	U	NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		0.9	U	NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		0.6	U	NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.6	B	NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.2	U	NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		0.6	U	NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		1.2	U	NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		8510		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		8.9	U	NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		4.18		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		2.81		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS05**		**03SS05**		**03SS06**		**03SS06**		**03SS06-D**		**03SS07**		**03SS07**		**03SS08**		**03SS08**		**03SS09**		**03SS09**		**03SS10**		**03SS10**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**	
Duplicate:							**03SS06-D**		**03SS06**																	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		243		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		8.8		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		33.9		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		9.2		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		2.9	U	NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		7.6		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		0.88	B	NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		8.3		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**		**03SS11**		**03SS12**		**03SS12**		**03SS13**		**03SS14**		**03SS15**		**03SS16**		**03SS16-D**		**03-SS-17**		**03-SS-18**		**03-SS-19**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	13900		10400		16100		11400		13700		14100		13200		12500		14800		15000		14600		16900	
Antimony	7.2	B	9.7	R	12.8	B	5.5	UJ	11.6	B	7.1	B	8.3	B	5.7	UL	8	B	0.79	L	0.9	L	0.98	L
Arsenic	7.3	J	2.8	J	7.9	J	6.4			R		R	8.6	J		R		R	6.3		6.6		5.2	
Barium	176		114		117		95.9		95.9		112		98.5		101		113		104		110		103	
Beryllium	0.85	B	0.94		0.93	B	0.94		0.79	B	0.84	B	0.7	B	0.71	B	0.89	B	1.1	B	1.2	B	1.1	B
Cadmium	0.85	U	1.3	U	0.93	U	1.9		0.79	B	0.84	U	0.7	U	0.71	U	0.89	U	0.06	UR	0.05	UR	0.06	UR
Calcium	889		906		1750		1500		1110		927		826		1080		1140		978		1130		1370	
Chromium	22.2		20.2		24.3		19		22		18.3		17.2		16.6		19.9		21.8	J	19	J	21.7	J
Cobalt	10.6		12		9.3		7.8		8.5		8.4		7.4		7.7		7.8		7.6		6.9		7.9	
Copper	10.6		14		12.1		12.7		13.4		9.9		9.9		10.1		10.6		17.8		13.7		27.4	
Cyanide	2.2		0.66	U	2.9	U	0.69	U	2.3	U	2	U	2.5	U	2.6	U	2.4	U	0.15	U	0.23		0.14	U
Iron	17800	J	27200		19800		15000		22400		15700		14800		14500		16400		17300		16200		22000	
Lead	19.4		30.6		24.7		54.3		22.7		20.5		20		21.5		21.9		23.6		23.9		30.2	
Magnesium	1620		2560		1990		1380		1720		1660		1550		15600		1780		1790		1700		1930	
Manganese	1780		510		834	J	683		678	J	688	J	686	J	678	J	854	J	662	L	665	L	563	L
Mercury	0.09	U	0.13	U	0.1	U	0.14	U	0.11	U	0.1	U	0.11	U	0.11	U	0.09	U	0.11		0.14		0.13	
Nickel	11.2		11.7		13.1		10.2		13.2		11.1		9.9		8.9		11.3		11.1		11.1		12.2	
Potassium	426		2130		603		416	U	637		462		436		463		581		795	J	756	J	909	J
Selenium	0.8	U	0.27	UR	1.2	U	0.28	UR	0.87	U	0.79	U	0.93	U	0.96	U	1	U	0.69	UR	0.62	UR	0.69	UR
Silver	1.5	UL	1.3	U	1.6	UL	1.4	U	1.4	UL	1.5	UL	1.2	UL	1.2	UL	1.6	UL	0.09	U	0.08	U	0.5	K
Sodium	370		131		441		117		476		350		309		306		355		359	K	301	K	357	K
Thallium	0.16	U	0.3	L	0.24	U	0.28	UL	0.17	U	0.16	U	0.19	U	0.19	U	0.2	U	0.73	U	0.71	R	0.73	U
Vanadium	28.1		32.1		33.6		25.5		30.1		24.8		24.1		24.2		27		31.4		29.5		35.1	
Zinc	40	J	46.1		47.6	J	174		52.1	J	42.5	J	34.5	J	39.3	J	44.5	J	41.6		43.8		56.5	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
1,2,4-Trichlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
1,2-Dichlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
1,3-Dichlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
1,4-Dichlorobenzene	45	J	440	UJ	56	J	460	UJ	57	J	56	J	59	J	68	J	380	UJ	NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		13	U	0.74	J	13	U
2,2'-Oxybis(1-chloropropane)	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
2,4,5-Trichlorophenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	360	U	340	U	380	U
2,4,6-Trichlorophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
2,4-Dichlorophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
2,4-Dimethylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	270	U	260	U	290	U
2,4-Dinitrophenol	1800	U	1100	UJ	1800	UJ	1100	UJ	1800	UJ	1800	UJ	1800	UJ	1900	U	1900	U	500	U	470	U	520	U
2,4-Dinitrotoluene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
2,6-Dinitrotoluene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
2-Chloronaphthalene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	420	U	400	U	440	U
2-Chlorophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	500	U	470	U	520	U
2-Methylnaphthalene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	13	U	1	J	13	U
2-Methylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	440	U	410	U	460	U
2-Nitroaniline	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
2-Nitrophenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
3,3'-Dichlorobenzidine	740	U	440	UJ	750	U	460	UJ	750	U	740	U	730	U	780	U	770	U	380	U	360	U	400	U
3-Nitroaniline	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
4,6-Dinitro-2-methylphenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
4-Bromophenyl Phenyl Ether	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	290	U	270	U	300	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**		**03SS11**		**03SS12**		**03SS12**		**03SS13**		**03SS14**		**03SS15**		**03SS16**		**03SS16-D**		**03-SS-17**		**03-SS-18**		**03-SS-19**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
4-Chloro-3-methylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
4-Chloroaniline	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
4-Chlorophenyl Phenyl Ether	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
4-Methylphenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	500	U	470	U	520	U
4-Nitroaniline	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
4-Nitrophenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
Acenaphthene	370	U	78	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	13	U	1.1	J	13	U
Acenaphthylene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	3.2	J	3.2	J	2.2	J
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		380	U	360	U	400	U
Anthracene	370	U	110	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	3.9	J	5	J	3.1	J
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
Benz(a)anthracene	370	U	750	J	370	U	100	J	39	J	370	U	48	J	390	U	380	U	17		22		16	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
Benzo(a)pyrene	370	U	1100	J	370	U	150	J	49	J	370	U	43	J	390	U	380	U	19		26		18	
Benzo(b)fluoranthene	370	U	1400	J	49	J	170	J	68	J	370	U	54	J	45	J	380	UJ	22		36		20	
Benzo(g,h,i)perylene	370	U	540	J	370	U	76	J	370	U	370	U	370	U	390	U	380	U	13		18		12	J
Benzo(k)fluoranthene	370	U	490	J	39	J	140	J	56	J	370	U	47	J	390	U	380	U	19		24		21	
Benzoic Acid	1800	U	NA		1800	U	NA		1800	U	1800	U	1800	U	1900	U	1900	U	NA		NA		NA	
Benzyl Alcohol	370	U	NA		370	U	NA		370	U	370	U	370	U	390	U	380	U	NA		NA		NA	
Bis(2-chloroethoxy)methane	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	360	U	340	U	380	U
Bis(2-chloroethyl)ether	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	420	U	400	U	440	U
Bis(2-ethylhexyl)phthalate	370	U	170	B	370	U	220	B	44	J	370	U	370	U	47	J	41	J	350	U	330	U	370	U
Butylbenzylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	260	U	240	U	270	U
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		260	U	240	U	270	U
Carbazole	NA		79	J	NA		460	UJ	NA		NA		NA		NA		NA		210	J	240	U	270	U
Chrysene	370	U	920	J	49	J	180	J	68	J	370	U	65	J	43	J	380	UJ	22		29		21	
Di-n-butylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
Di-n-octylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	330	U	310	U	350	U
Dibenz(a,h)anthracene	370	U	150	J	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	3.6	J	5.7	J	3.6	J
Dibenzofuran	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	380	U	360	U	400	U
Diethylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	350	U	330	U	370	U
Dimethylphthalate	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
Fluoranthene	65	J	840	J	110	J	370	J	160	J	70	J	140	J	95	J	70	J	50		67		47	
Fluorene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	1.1	J	1.5	J	1.2	J
Hexachlorobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	330	U	310	U	350	U
Hexachlorobutadiene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	440	U	410	U	460	U
Hexachlorocyclopentadiene	370	UJ	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	330	U	310	U	350	U
Hexachloroethane	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	260	U	240	U	270	U
Indeno(1,2,3-cd)pyrene	370	U	600	J	370	U	88	J	370	U	370	U	370	U	390	U	380	U	16		22		15	
Isophorone	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	410	U	390	U	430	U
N-Nitroso-di-n-propylamine	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	390	U	370	U	410	U
N-Nitrosodiphenylamine (1)	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	320	U	300	U	330	U
Naphthalene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	0.87	B	1.1	B	1.1	B
Nitrobenzene	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	360	U	340	U	380	U
Pentachlorophenol	1800	U	1100	UJ	1800	U	1100	UJ	1800	U	1800	U	1800	U	1900	U	1900	U	500	U	470	U	520	U
Phenanthrene	38	J	430	J	68	J	280	J	110	J	42	J	44	J	58	J	44	J	20		28		22	
Phenol	370	U	440	UJ	370	U	460	UJ	370	U	370	U	370	U	390	U	380	U	260	U	240	U	270	U
Pyrene	47	J	820	J	75	J	300	J	110	J	48	J	99	J	65	J	50	J	39		52		37	
VOLATILES	**ug/kg**				**ug/kg**				**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1,2,2-Tetrachloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**		**03SS11**		**03SS12**		**03SS12**		**03SS13**		**03SS14**		**03SS15**		**03SS16**		**03SS16-D**		**03-SS-17**		**03-SS-18**		**03-SS-19**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
1,1,2-Trichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1-Dichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,1-Dichloroethene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichloroethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichloroethene (Total)	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	NA		NA		NA	
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,2-Dichloropropane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
2-Butanone	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	19	U	12	J	7.3	J
2-Hexanone	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	19	U	19	U	20	U
4-Methyl-2-pentanone	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	19	U	19	U	20	U
Acetone	11	U	NA		11	U	NA		11	U	11	U	11	U	10	B	8	B	100		120		170	
Benzene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Bromoform	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Bromomethane	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
Carbon Disulfide	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Carbon Tetrachloride	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Chlorobenzene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Chloroethane	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
Chloroform	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Chloromethane	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
cis-1,3-Dichloropropene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Dibromochloromethane	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Ethylbenzene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
M,p-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		15	U	16	U	16	U
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Methyl Tert-butyl Ether (mtbe)	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Methylene Chloride	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	2.1	B	1.7	B	2.5	B
O-xylene	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Styrene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Tetrachloroethene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Toluene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	15		2.8	J
trans-1,3-Dichloropropene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Trichloroethene	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		7.6	U	7.8	U	7.9	U
Vinyl Acetate	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	NA		NA		NA	
Vinyl Chloride	11	U	NA		11	U	NA		11	U	11	U	11	U	12	U	11	U	7.6	U	7.8	U	7.9	U
Xylene (Total)	6	U	NA		5	U	NA		6	U	6	U	5	U	6	U	6	U	7.6	U	7.8	U	7.9	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**		**03SS11**		**03SS12**		**03SS12**		**03SS13**		**03SS14**		**03SS15**		**03SS16**		**03SS16-D**		**03-SS-17**		**03-SS-18**		**03-SS-19**	
Sample Date:	**9/5/1991**		**4/8/1997**		**9/5/1991**		**4/8/1997**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**9/5/1991**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:															**03SS16-D**		**03SS16**							
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	45		13	L
4,4'-DDE	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	2.5	J
4,4'-DDT	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	2.7	J	24	U	8.1	L
Aldrin	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Alpha-BHC	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Alpha-Chlordane	90	U	2.3	UJ	90	U	2.4	UJ	91	U	89	U	89	U	94	U	93	U	2.1	B	2.9	J	0.96	B
Aroclor-1016	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	36	UL	170	U	38	UL
Aroclor-1221	90	U	89	UJ	90	U	93	UJ	91	U	89	U	89	U	94	U	93	U	52	UL	240	U	54	UL
Aroclor-1232	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Aroclor-1242	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Aroclor-1248	90	U	44	UJ	90	U	46	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Aroclor-1254	180	U	44	UJ	180	U	46	UJ	180	U	180	U	180	U	190	U	190	U	26	UL	120	U	27	UL
Aroclor-1260	180	U	44	UJ	180	U	46	UJ	180	U	180	U	180	U	190	U	190	U	26	UL	120	U	27	UL
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	1.3	UL	6.1	U	2.8	R
Delta-BHC	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Dieldrin	18	U	230	J	25		620	J	73		18	U	18	U	19	U	19	U	1.6	J	6.9	J	6	L
Endosulfan I	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	7	J	2.7	UL
Endosulfan II	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Endosulfan Sulfate	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Endrin	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Endrin Aldehyde	NA		4.4	UJ	NA		4.6	UJ	NA		NA		NA		NA		NA		0.7	J	24	U	5.2	UL
Endrin Ketone	18	U	4.4	UJ	18	U	4.6	UJ	18	U	18	U	18	U	19	U	19	U	5	UL	24	U	5.2	UL
Gamma-BHC (Lindane)	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Gamma-Chlordane	90	U	2.3	UJ	90	U	2.4	UJ	91	U	89	U	89	U	94	U	93	U	2.6	UL	2.2	B	1.3	B
Heptachlor	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	12	U	2.7	UL
Heptachlor Epoxide	9	U	2.3	UJ	9	U	2.4	UJ	9.1	U	8.9	U	8.9	U	9.4	U	9.3	U	2.6	UL	1.5	J	2.5	J
Methoxychlor	90	U	23	UJ	90	U	24	UJ	91	U	89	U	89	U	94	U	93	U	26	UL	120	U	27	UL
Toxaphene	180	U	230	UJ	180	U	240	UJ	180	U	180	U	180	U	190	U	190	U	130	UL	590	U	130	UL
DIOXIN/FURANS																								
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS11**	**03SS11**	**03SS12**	**03SS12**	**03SS13**	**03SS14**	**03SS15**	**03SS16**	**03SS16-D**	**03-SS-17**	**03-SS-18**	**03-SS-19**
Sample Date:	**9/5/1991**	**4/8/1997**	**9/5/1991**	**4/8/1997**	**9/5/1991**	**9/5/1991**	**9/5/1991**	**9/5/1991**	**9/5/1991**	**12/17/2008**	**12/17/2008**	**12/17/2008**
Duplicate:								**03SS16-D**	**03SS16**			
Total HpCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	16900		17200		15100		19700		18100		17200		17400		24200		16000		17700		17500	
Antimony	1.2	L	1.3	L	1.1	L	0.98	L	1.7	L	0.87	L	0.64	L	0.78	L	0.99	L	1.5	L	0.9	L
Arsenic	4.4		5.1		4.4		6.6		1.7		2.3		2.3		5.8		3.1		4		6.9	
Barium	110		121		113		120		232		161		169		87.1		138		122		102	
Beryllium	1	B	0.95	B	0.94	B	1.2	B	2	K	1	B	1.2	K	0.97	B	1.1	B	0.89	B	1.2	B
Cadmium	0.05	UR	1.8	L	1.4	L	0.06	UR	0.91	L	0.51	J	0.22	J	0.05	UR	0.05	UR	0.05	UR	0.06	UR
Calcium	1090		1770		1790		1870		1180		922		944		635		1340		1020		1120	
Chromium	20.5	J	26.8	J	21.7	J	24.8	J	11.4	J	14.2	J	12.5	J	24.7	J	13.6	J	16.5	J	22.4	J
Cobalt	8.6		8.8		7.8		8.8		10.7		9		9.4		9.4		8.7		8.9		8	
Copper	33.9		69.9		57.8		15.8		87.2		51.3		55.4		22.2		43.6		170		18.5	
Cyanide	0.15	U	0.19		0.13	U	0.16	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.14	U	0.44	
Iron	22400		24100		22000		26600		19500		15700		16700		28100		17100		18900		22400	
Lead	34.1		76.9		71		21.8		54.6		29.2		26.6		14.7		34.6		49.3		40.7	
Magnesium	1880		2020		1820		2670		966		814		1110		2100		1100		1230		2170	
Manganese	591	L	528	L	501	L	674	L	1260	L	1140	L	1200	L	409	L	974	L	715	L	602	L
Mercury	0.18		0.34		0.31		0.038		0.77		0.16		0.15		0.049		0.16		0.19		0.13	
Nickel	13.1		18.7		15.4		13.5		15.8		11.4		12.2		14.3		11.4		12.2		13.3	
Potassium	1010	J	966	J	919	J	867	J	409	J	695	J	1060	J	845	J	565	J	646	J	842	J
Selenium	0.63	UR	0.64	UR	0.62	UR	0.76	UR	0.59	UR	0.61	UR	0.61	UR	0.59	UR	0.62	UR	0.61	UR	0.66	UR
Silver	1.5	K	1.4	K	1.3	K	0.1	U	0.46	K	0.08	U	0.36	K	0.08	U	0.08	U	1.1		0.09	U
Sodium	314	K	320	K	306	K	403	K	412	K	319	K	313	K	269	K	319	K	326	K	316	K
Thallium	1.8	J	0.68	U	0.66	U	1.8	R	0.83	R	0.81	R	0.65	U	1.8	R	1	R	1.8	J	0.76	R
Vanadium	35.6		36.4		33.1		43.3		18.4		21.8		21.4		45.7		23.8		29.1		40.4	
Zinc	58.6		163		144		45.9		466		45.6		45.5		31.4		55		74		55.8	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
1,2,4,5-Tetrachlorobenzene	230	U	270	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	1.7	J	3.2	J	2.3	J	13	U	1.5	J	11	U	0.8	J	11	U	1.6	J	3.5	J	2.9	J
2,2'-Oxybis(1-chloropropane)	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
2,3,4,6-Tetrachlorophenol	230	U	270	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
2,4,5-Trichlorophenol	320	U	330	U	320	U	390	U	320	U	320	U	310	U	310	U	330	U	330	U	360	U
2,4,6-Trichlorophenol	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
2,4-Dichlorophenol	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
2,4-Dimethylphenol	240	U	250	U	240	U	290	U	240	U	240	U	230	U	230	U	250	U	250	U	270	U
2,4-Dinitrophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
2,4-Dinitrotoluene	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
2,6-Dinitrotoluene	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
2-Chloronaphthalene	380	U	390	U	370	U	450	U	370	U	380	U	360	U	360	U	380	U	390	U	420	U
2-Chlorophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
2-Methylnaphthalene	3.2	J	5.3	J	3.2	J	13	U	2.8	J	1.1	J	1.6	J	11	U	2.8	J	8.3	J	4.5	J
2-Methylphenol	390	U	400	U	380	U	470	U	380	U	390	U	380	U	380	U	400	U	400	U	440	U
2-Nitroaniline	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
2-Nitrophenol	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
3,3'-Dichlorobenzidine	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
3-Nitroaniline	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4,6-Dinitro-2-methylphenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4-Bromophenyl Phenyl Ether	260	U	260	U	250	U	310	U	250	U	260	U	250	U	250	U	260	U	260	U	290	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
4-Chloro-3-methylphenol	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
4-Chloroaniline	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
4-Chlorophenyl Phenyl Ether	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
4-Methylphenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4-Nitroaniline	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
4-Nitrophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
Acenaphthene	0.99	J	13		4	J	13	U	1.6	J	11	U	11	U	11	U	11	U	1.4	J	2.2	J
Acenaphthylene	2.3	J	5.8	J	3.5	J	1.4	J	1.3	J	1	J	0.97	J	1	J	2.5	J	3.9	J	6.4	J
Acetophenone	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
Anthracene	3.9	J	39		13		1.7	J	6.1	J	1.2	J	1.3	J	1.1	J	4.1	J	6.2	J	9.1	J
Atrazine	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Benz(a)anthracene	20		110		67		8.8	J	22		5.6	J	6.3	J	4.2	J	21		26		41	
Benzaldehyde	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Benzo(a)pyrene	25		100		74		12	J	22		6.7	J	7.9	J	5.1	J	23		30		51	
Benzo(b)fluoranthene	37		110		87		15		31		10	J	10	J	7.2	J	31		46		79	
Benzo(g,h,i)perylene	19		56		54		8.3	J	16		5.6	J	6.8	J	3.7	J	17		22	J	39	
Benzo(k)fluoranthene	22		92		67		12	J	20		6.1	J	9	J	5.2	J	22		26		49	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	320	U	330	U	320	U	390	U	320	U	320	U	310	U	310	U	330	U	330	U	360	U
Bis(2-chloroethyl)ether	380	U	390	U	370	U	450	U	370	U	380	U	360	U	360	U	380	U	390	U	420	U
Bis(2-ethylhexyl)phthalate	310	U	320	U	270	J	370	U	300	U	310	U	120	J	300	U	320	U	540		350	U
Butylbenzylphthalate	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Caprolactam	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Carbazole	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Chrysene	31		120		86		13	J	27		8.4	J	9.7	J	6.6	J	28		41		63	
Di-n-butylphthalate	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
Di-n-octylphthalate	300	U	310	U	290	U	350	U	290	U	300	U	290	U	290	U	300	U	310	U	330	U
Dibenz(a,h)anthracene	5.9	J	20		17		2.2	B	5.4	J	1.7	B	1.8	B	1.1	B	4.7	J	7	J	11	J
Dibenzofuran	340	U	350	U	330	U	400	U	330	U	340	U	320	U	320	U	340	U	350	U	380	U
Diethylphthalate	310	U	320	U	300	U	370	U	300	U	310	U	300	U	300	U	320	U	320	U	350	U
Dimethylphthalate	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
Fluoranthene	55		270		200		26		52		15		17		15		52		68		170	
Fluorene	1.2	J	14	J	4.4	J	13	U	2	J	11	U	11	U	11	U	1	J	1.5	J	3	J
Hexachlorobenzene	300	U	310	U	290	U	350	U	290	U	300	U	290	U	290	U	300	U	310	U	330	U
Hexachlorobutadiene	390	U	400	U	380	U	470	U	380	U	390	U	380	U	380	U	400	U	400	U	440	U
Hexachlorocyclopentadiene	300	U	310	U	290	U	350	U	290	U	300	U	290	U	290	U	300	U	310	U	330	U
Hexachloroethane	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Indeno(1,2,3-cd)pyrene	22		70		62		9.8	J	18		6.4	J	7.5	J	4.4	J	20		25		44	
Isophorone	360	U	380	U	360	U	440	U	360	U	360	U	350	U	350	U	370	U	380	U	410	U
N-Nitroso-di-n-propylamine	350	U	360	U	340	U	420	U	340	U	350	U	340	U	340	U	360	U	360	U	390	U
N-Nitrosodiphenylamine (1)	280	U	290	U	280	U	340	U	280	U	280	U	270	U	270	U	290	U	290	U	320	U
Naphthalene	2.1	B	5.2	J	3.1	J	0.74	B	2.3	B	1.2	B	1.8	B	0.74	B	2.6	B	5.3	J	3.8	B
Nitrobenzene	320	U	330	U	320	U	390	U	320	U	320	U	310	U	310	U	330	U	330	U	360	U
Pentachlorophenol	450	U	460	U	430	U	530	U	430	U	450	U	430	U	430	U	450	U	460	U	500	U
Phenanthrene	22		200	J	80	J	9.8	J	28		5.6	J	6.5	J	7.1	J	16		29		61	
Phenol	230	U	240	U	220	U	270	U	220	U	230	U	220	U	220	U	230	U	240	U	260	U
Pyrene	44		210		160		21		39		12		14		11		41		54		130	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1,2,2-Tetrachloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1,2-Trichloro-1,2,2-trifluoroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
1,1,2-Trichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1-Dichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,1-Dichloroethene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2,3-Trichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2,4-Trichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dibromo-3-chloropropane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dibromoethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloroethene (cis)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,2-Dichloropropane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,3-Dichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
1,4-Dichlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
2-Butanone	9	J	13	J	6.6	J	9.9	J	9.2	J	17	U	14	U	4	J	14	J	15	J	14	J
2-Hexanone	16	U	17	U	16	U	20	U	16	U	17	U	14	U	15	U	19	U	17	U	19	U
4-Methyl-2-pentanone	16	U	17	U	16	U	20	U	16	U	17	U	14	U	15	U	19	U	17	U	19	U
Acetone	120		200		180		170		120		190		190		89		270		170		160	
Benzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Bromoform	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Bromomethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Carbon Disulfide	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Carbon Tetrachloride	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chlorobenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chloroethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chloroform	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Chloromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
cis-1,3-Dichloropropene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Cyclohexane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Dibromochloromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Dichlorodifluoromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Ethylbenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Isopropylbenzene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
M,p-xylene	13	U	14	U	13	U	16	U	13	U	14	U	11	U	12	U	15	U	13	U	16	U
Methyl Acetate	6.5	U	5.5	J	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Methyl Tert-butyl Ether (mtbe)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Methylcyclohexane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Methylene Chloride	1.7	B	1.5	B	1.5	B	2.1	B	1.6	B	1.7	B	1.6	B	1.7	B	1.7	B	6.7	U	1.9	B
O-xylene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Styrene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Tetrachloroethene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Toluene	3.1	J	4.2	J	6.5	U	1.7	J	4.1	J	6.8	U	5.7	U	5.9	U	2.5	J	3.9	J	7.8	U
trans-1,3-Dichloropropene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Trichloroethene	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Trichlorofluoromethane	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U
Xylene (Total)	6.5	U	6.9	U	6.5	U	8	U	6.5	U	6.8	U	5.7	U	5.9	U	7.4	U	6.7	U	7.8	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4.5	J	4.2	J	6.4	J	16	L	30	J	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
4,4'-DDE	47		100		100		5.3	UL	17	J	4.4	UJ	4.3	U	4.3	UJ	0.57	J	3	J	49	U
4,4'-DDT	37		110	J	230	J	5.3	UL	140		4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.3	J	49	U
Aldrin	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Alpha-BHC	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	7.5	R	2.2	UJ	2.3	UL	2.4	UL	25	U
Alpha-Chlordane	11	U	12	U	22	U	1.2	B	22	U	0.65	B	1.8	B	1.5	B	2.7	R	4.6	J	25	U
Aroclor-1016	160	U	170	U	320	U	39	UL	320	U	32	UJ	31	U	31	UJ	33	UL	33	UL	360	U
Aroclor-1221	230	U	240	U	450	U	55	UL	450	U	45	UJ	44	U	44	UJ	47	UL	47	UL	510	U
Aroclor-1232	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1242	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1248	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1254	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Aroclor-1260	110	U	120	U	220	U	27	UL	220	U	12	J	14	J	22	UJ	36	L	24	UL	250	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	5.8	U	5.9	U	11	U	1.4	UL	11	U	0.98	J	4.5	R	1.1	UJ	0.8	J	12	R	13	U
Delta-BHC	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Dieldrin	8	J	22	J	20	J	5.3	J	43	U	2.9	J	3.6	J	24	J	2.8	J	22		280	
Endosulfan I	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	0.25	J	0.58	J	25	U
Endosulfan II	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	0.8	J	49	U
Endosulfan Sulfate	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
Endrin	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
Endrin Aldehyde	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	2.3	J	49	U
Endrin Ketone	22	U	23	U	43	U	5.3	UL	43	U	4.4	UJ	4.3	U	4.3	UJ	4.5	UL	4.6	UL	49	U
Gamma-BHC (Lindane)	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Gamma-Chlordane	11	U	12	U	2.3	B	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	1.3	B	2.6	B	25	U
Heptachlor	11	U	12	U	22	U	2.7	UL	22	U	2.3	UJ	2.2	U	2.2	UJ	2.3	UL	2.4	UL	25	U
Heptachlor Epoxide	11	U	12	U	1.6	J	2.7	UL	22	U	2.3	UJ	0.55	J	2.2	UJ	2.3	UL	1.7	R	25	U
Methoxychlor	110	U	120	U	220	U	27	UL	220	U	23	UJ	22	U	22	UJ	23	UL	24	UL	250	U
Toxaphene	560	U	580	U	1100	U	130	UL	1100	U	110	UJ	110	U	110	UJ	110	UL	120	UL	1200	U
DIOXIN/FURANS																						
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03-SS-20**		**03-SS-21**		**03-SS-21-D**		**03-SS-22**		**03-SS-23**		**03-SS-24**		**03-SS-24-D**		**03-SS-25**		**03-SS-26**		**03-SS-27**		**03-SS-28**	
Sample Date:	**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**		**12/17/2008**	
Duplicate:			**03-SS-21-D**		**03-SS-21**						**03-SS-24-D**		**03-SS-24**									
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	11100		24500		24000		24000		15700		16400		19600		18000	
Antimony	0.38	UL	0.38	UL	0.37	UL	0.37	UL	1	L	1.6	L	0.2	UL	0.26	L
Arsenic	4.1		2.9		2.5		2.5		5.1	L	5.8	L	4.7	L	4.4	L
Barium	74.9		124		102		102		117		142		88.9		128	
Beryllium	1		0.79		0.74		0.74		0.94	K	0.96	K	0.83	K	0.91	K
Cadmium	0.083	U	0.082	UR	0.081	UR	0.081	UR	1.8	L	7.4		0.03	UR	0.11	B
Calcium	2050		433		434		434		5340	J	3770	J	868	J	1060	J
Chromium	14.4	K	6.4		6.8		6.8		27.9		26.1		28.5		20.7	
Cobalt	6.1		9		7.8		7.8		6.9	J	7.5	J	7.7	J	8.1	J
Copper	13.8		35.3	K	36.8	K	36.8	K	67.4	K	120	K	19.7	K	51.7	K
Cyanide	0.6	U	0.11		0.2		0.2		0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ
Iron	14600		14500		13800		13800		20400	J	22700	J	24400	J	22900	J
Lead	19		3.2		3.5		3.5		74.9	J	111	J	20.7	J	57.7	J
Magnesium	1860		553		564		564		3020	J	2570	J	1890	J	1700	J
Manganese	383		941		819		819		534		631		394		525	
Mercury	0.097	L	0.038		0.039		0.039		0.22	K	0.14	K	0.053	K	0.15	K
Nickel	9.2		11.1		10		10		14	J	27.2	J	12.7	J	14.2	J
Potassium	497		245		261		261		955		979		982		1080	
Selenium	0.31	UL	0.31	U	0.3	U	0.3	U	0.34	UR	0.36	L	0.33	UR	0.33	UR
Silver	0.11	B	0.035	U	0.035	U	0.035	U	1.1		2.8		0.49		1.8	
Sodium	34	L	18.4	UR	26.2	L	26.2	L	170	B	224	K	156	B	168	R
Thallium	0.55	UL	0.54	UR	0.53	UR	0.53	UR	0.44	UL	0.45	UL	0.42	UL	0.42	UL
Vanadium	23.6		16.7		16.5		16.5		32		31.7		40.9		34	
Zinc	34.6		17.8		16.9		16.9		120		297		42		59	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
1,2,4,5-Tetrachlorobenzene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,3,4,6-Tetrachlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4,5-Trichlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4,6-Trichlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4-Dichlorophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4-Dimethylphenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,4-Dinitrophenol	96000	U	1900	U	1900	U	1900	U	830	U	850	U	800	U	800	U
2,4-Dinitrotoluene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2,6-Dinitrotoluene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2-Chloronaphthalene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2-Chlorophenol	20000	U	390	U	380	U	380	U	410	U	420	U	400	U	400	U
2-Methylnaphthalene	20000	U	390	U	380	U	380	U	260	U	4.3	J	10	U	8.2	J
2-Methylphenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
2-Nitroaniline	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
2-Nitrophenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
3,3'-Dichlorobenzidine	96000	U	1900	U	1900	U	1900	U	210	U	220	U	210	U	210	U
3-Nitroaniline	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
4,6-Dinitro-2-methylphenol	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
4-Bromophenyl Phenyl Ether	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
4-Chloro-3-methylphenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
4-Chloroaniline	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
4-Chlorophenyl Phenyl Ether	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
4-Methylphenol	20000	U	390	U	380	U	380	U	410	U	420	U	400	U	400	U
4-Nitroaniline	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
4-Nitrophenol	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
Acenaphthene	2200	J	390	U	380	U	380	U	29	J	7.9	J	1.2	J	7	J
Acenaphthylene	20000	U	390	U	380	U	380	U	30	J	5.4	J	3.1	J	5.4	J
Acetophenone	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Anthracene	11000	J	390	U	380	U	380	U	61	J	43		4.3	J	23	
Atrazine	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Benz(a)anthracene	15000	J	390	U	380	U	380	U	260		110		19		78	J
Benzaldehyde	20000	U	390	U	380	U	380	U	29	J	220	U	210	U	210	U
Benzo(a)pyrene	8800	J	390	U	380	U	380	U	260		110		23		16	
Benzo(b)fluoranthene	8600	J	390	U	380	U	380	U	260		100	J	27		100	J
Benzo(g,h,i)perylene	6800	J	390	U	380	U	380	U	170	J	57	J	17		67	
Benzo(k)fluoranthene	4400	J	390	U	380	U	380	U	250	J	110		26		89	J
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Bis(2-chloroethyl)ether	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Bis(2-ethylhexyl)phthalate	20000	U	390	U	380	U	380	U	170	J	220	U	210	U	210	U
Butylbenzylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Caprolactam	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Carbazole	3200	J	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Chrysene	13000	J	390	U	380	U	380	U	280		110		26		110	
Di-n-butylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Di-n-octylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Dibenz(a,h)anthracene	20000	U	390	U	380	U	380	U	46	J	31		4.5	J	26	
Dibenzofuran	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Diethylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Dimethylphthalate	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Fluoranthene	31000		390	U	380	U	380	U	560		190		64		220	
Fluorene	2600	J	390	U	380	U	380	U	34	J	13		2.6	J	11	
Hexachlorobenzene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Hexachlorobutadiene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Hexachlorocyclopentadiene	96000	U	1900	U	1900	U	1900	U	210	U	220	U	210	U	210	U
Hexachloroethane	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Indeno(1,2,3-cd)pyrene	7400	J	390	U	380	U	380	U	190	J	75	J	21		61	J
Isophorone	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
N-Nitroso-di-n-propylamine	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
N-Nitrosodiphenylamine (1)	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Naphthalene	20000	U	390	U	380	U	380	U	260	U	9.4	B	1.6	B	8.4	B
Nitrobenzene	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Pentachlorophenol	96000	U	1900	U	1900	U	1900	U	410	U	420	U	400	U	400	U
Phenanthrene	37000		390	U	380	U	380	U	310		160		36		140	
Phenol	20000	U	390	U	380	U	380	U	210	U	220	U	210	U	210	U
Pyrene	33000		390	U	380	U	380	U	560		160		49		170	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1,2,2-Tetrachloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
1,1,2-Trichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1-Dichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,1-Dichloroethene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2,3-Trichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2,4-Trichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dibromo-3-chloropropane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dibromoethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloroethene (cis)	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,2-Dichloropropane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,3-Dichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
1,4-Dichlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
2-Butanone	5	U	5.2	U	5.6	U	5.6	U	6.2	B	8	B	4.6	B	5.8	B
2-Hexanone	5	U	5.2	U	5.6	U	5.6	U	15	U	16	U	14	U	14	U
4-Methyl-2-pentanone	5	U	5.2	U	5.6	U	5.6	U	15	U	16	U	14	U	14	U
Acetone	20	U	21	U	22	U	22	U	77	B	130	J	68	B	70	B
Benzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	1.4	J	5.5	U	5.5	U
Bromochloromethane	5	U	5.2	U	5.6	U	5.6	U	NA		NA		NA		NA	
Bromodichloromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Bromoform	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Bromomethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Carbon Disulfide	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Carbon Tetrachloride	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chlorobenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chloroethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chloroform	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Chloromethane	5	U	5.2	U	5.6	U	5.6	U	2.1	J	3.6	J	5.5	U	5.5	U
cis-1,3-Dichloropropene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Cyclohexane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Dibromochloromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Dichlorodifluoromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Ethylbenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Isopropylbenzene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
M,p-xylene	9.9	U	10	U	11	U	11	U	12	U	13	U	11	U	11	U
Methyl Acetate	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Methyl Tert-butyl Ether (mtbe)	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Methylcyclohexane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Methylene Chloride	3.5	B	3	B	4	B	4	B	5.8	U	6.4	U	5.5	U	5.5	U
O-xylene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Styrene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Tetrachloroethene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Toluene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
trans-1,3-Dichloropropene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Trichloroethene	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Trichlorofluoromethane	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5	U	5.2	U	5.6	U	5.6	U	5.8	U	6.4	U	5.5	U	5.5	U
Xylene (Total)	NA		NA		NA		NA		5.8	U	6.4	U	5.5	U	5.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	2	U	2	U	2	U	2	U	2.2	J	30		4	U	14	J
4,4'-DDE	0.68	J	2	U	2	U	2	U	14		11	J	2.2	J	130	
4,4'-DDT	1.1	J	2	U	2	U	2	U	30	J	22		2.2	J	110	J
Aldrin	0.69	J	0.27	J	0.69	J	0.69	J	2.1	U	2.2	U	2.1	U	1.6	J
Alpha-BHC	2	U	2	U	2	U	2	U	0.98	J	2.2	U	2.1	U	0.86	J
Alpha-Chlordane	23	J	2	U	2	U	2	U	11	J	5.1	J	0.53	J	1.2	J
Aroclor-1016	20	U	20	U	19	U	19	U	30	U	31	U	29	U	29	U
Aroclor-1221	20	U	20	U	19	U	19	U	43	U	44	U	41	U	41	U
Aroclor-1232	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1242	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1248	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1254	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1260	20	U	20	U	19	U	19	U	21	U	22	U	21	U	21	U
Aroclor-1262	20	U	20	U	19	U	19	U	NA		NA		NA		NA	
Aroclor-1268	20	U	20	U	19	U	19	U	NA		NA		NA		NA	
Beta-BHC	2	U	2	U	2	U	2	U	5.3	U	1.1	U	1	U	1	U
Delta-BHC	2	U	2	U	2	U	2	U	2.1	U	2.2	U	2.1	U	2.1	U
Dieldrin	100		25	J	5.6	J	5.6	J	34		25		8.2		32	
Endosulfan I	2	U	2	U	2	U	2	U	2.1	U	2.2	U	2.1	U	2.1	U
Endosulfan II	2	U	0.49	J	2	U	2	U	21	U	1.6	J	4	U	4	U
Endosulfan Sulfate	2	U	2	U	2	U	2	U	4.1	U	4.2	U	4	U	3.2	J
Endrin	2	U	2	U	2	U	2	U	4.1	U	31	R	4	U	20	U
Endrin Aldehyde	2	U	2	U	2	U	2	U	7.1	J	8	J	1	J	6.3	J
Endrin Ketone	0.29	J	2	U	2	U	2	U	4.6	J	0.93	J	4	U	4.4	J
Gamma-BHC (Lindane)	1.1	J	2	U	2	U	2	U	2.1	U	2.2	U	2.1	U	2.1	U
Gamma-Chlordane	16	J	2	U	2	U	2	U	15		6.6	J	2.1	U	1.3	J
Heptachlor	2	U	2	U	2	U	2	U	3.9		2.2	U	2.1	U	0.71	J
Heptachlor Epoxide	1.4	J	2	U	2	U	2	U	13		4.1	J	2.1	U	1.9	J
Methoxychlor	3.9	U	3.9	U	3.8	U	3.8	U	21	U	5	J	21	U	21	U
Toxaphene	80	U	79	U	78	U	78	U	100	U	110	U	100	U	100	U
DIOXIN/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03TP12-0102-03**		**03TP16-0102-01**		**03TP16-0102-01-D**		**03TP16-0102-01-D**		**03SS31**		**03SS32**		**03SS33**		**03SS34**	
Sample Date:	**5/4/2007**		**5/7/2007**		**5/7/2007**		**5/7/2007**		**8/25/2009**		**8/25/2009**		**8/26/2009**		**8/26/2009**	
Duplicate:			**03TP16-0102-01-D**		**03TP16-0102-01**		**03TP16-0102-01**									
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	19700		20800		17600		22500		15200		24000		20200		24600	
Antimony	1	L	0.87	L	0.22	UL	1.4	L	0.31	L	0.21	UL	0.23	L	0.21	UL
Arsenic	6.2	L	5.7	L	4.2	L	5	L	3.8	L	4.2	L	3.4	L	4.2	L
Barium	135		125		124		246		113		77.7		137		99.4	
Beryllium	0.76	R	0.78	K	1	K	0.78	K	0.85	K	0.77	K	0.99	K	0.82	K
Cadmium	5.3	L	3.8	L	0.03	UR	3.9	L	0.19	B	0.03	UR	0.03	U	0.03	UR
Calcium	2710	J	2600	J	885	J	12300	J	1240	J	518	J	1020	J	508	J
Chromium	35.8		30.7		20		28.8		19.6		19.4		18		20.1	
Cobalt	10.4	J	9.2	J	6.5	J	9.6	J	8	J	7.9	J	9.3	J	10	J
Copper	151	K	163	K	11.4	K	182	K	33	K	24.4	K	51	K	33.1	K
Cyanide	0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ	0.22	UJ	0.2	UJ	0.22	UJ	0.21	UJ
Iron	70900	J	40200	J	18600	J	26700	J	18200	J	19800	J	18200	J	21800	J
Lead	379	J	228	J	12.8	J	128	J	43.8	J	13.1	J	40.3	J	18.5	J
Magnesium	2110	J	2060	J	1700	J	2120	J	1640	J	1360	J	1240	J	1390	J
Manganese	574		484		786		956		724		360		830		554	
Mercury	0.14	K	0.18	K	0.021	J	0.65	K	0.022	J	0.037	K	0.17	K	0.038	K
Nickel	26.9	J	27.8	J	11.8	J	30.2	J	12.2	J	12.8	J	13.3	J	13.7	J
Potassium	1120		1060		644		1400		783		643		689		726	
Selenium	0.33	UR	0.35	UR	0.35	UR	0.33	UR	0.36	UR	0.34	UR	0.35	UR	0.33	UR
Silver	26.3	J	1.6	J	0.04	U	1.7		0.04	U	0.04	U	0.3	B	0.04	U
Sodium	189	R	192	R	158	B	167	R	157	B	145	B	180	K	146	B
Thallium	0.42	UL	0.44	UL	0.45	UL	0.42	UL	0.46	UL	0.43	UL	0.45	UL	0.43	UL
Vanadium	43.4		40.9		31.3		22.7		28.4		32.3		25.7		34.9	
Zinc	282		231		33.4		239		46.3		28.6		51		41.9	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1'-Biphenyl	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
1,2,4,5-Tetrachlorobenzene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,3,4,6-Tetrachlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4,5-Trichlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4,6-Trichlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4-Dichlorophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4-Dimethylphenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,4-Dinitrophenol	810	U	800	U	800	U	800	U	830	U	790	U	850	U	800	U
2,4-Dinitrotoluene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2,6-Dinitrotoluene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2-Chloronaphthalene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2-Chlorophenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
2-Methylnaphthalene	200	U	1.3	J	0.93	J	1.3	J	2.5	J	9.9	U	2.8	J	1.4	J
2-Methylphenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
2-Nitroaniline	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
2-Nitrophenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
3,3'-Dichlorobenzidine	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
3-Nitroaniline	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4,6-Dinitro-2-methylphenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4-Bromophenyl Phenyl Ether	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
4-Chloro-3-methylphenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
4-Chloroaniline	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
4-Chlorophenyl Phenyl Ether	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
4-Methylphenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4-Nitroaniline	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
4-Nitrophenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
Acenaphthene	15	J	1.8	J	0.8	J	0.86	J	3	J	9.9	U	1.2	J	1.2	J
Acenaphthylene	200	U	10	J	1.2	J	0.86	J	2.1	J	1.2	J	1.6	J	1.3	J
Acetophenone	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Anthracene	28	J	19		1.4	J	1.3	J	14		0.86	J	1.6	J	1.2	J
Atrazine	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Benz(a)anthracene	270		180		11		9.6	J	130		7.5	J	11		10	J
Benzaldehyde	210	U	210	U	210	U	210	U	210	U	200	U	77	J	210	U
Benzo(a)pyrene	280		200		14		13		130		9.7	J	16		14	
Benzo(b)fluoranthene	310		250		18		16		130		11		22		16	
Benzo(g,h,i)perylene	180	J	160		11		13		67	J	7.9	J	14		9.9	J
Benzo(k)fluoranthene	290		230		13		18		120		10		16		15	
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Bis(2-chloroethyl)ether	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Bis(2-ethylhexyl)phthalate	210	U	210	U	690		120	J	300		96	J	140	J	210	U
Butylbenzylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Caprolactam	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Carbazole	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Chrysene	280		200		15		15		130		11		20		17	
Di-n-butylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Di-n-octylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Dibenz(a,h)anthracene	51	J	43		2.5	J	2.8	J	35	J	1.7	J	2.9	J	2.2	J
Dibenzofuran	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Diethylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Dimethylphthalate	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Fluoranthene	370		200		30		24		240		24		28		36	
Fluorene	16	J	2	J	0.91	J	0.73	J	4.6	J	0.75	J	1.3	J	1.6	J
Hexachlorobenzene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Hexachlorobutadiene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Hexachlorocyclopentadiene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Hexachloroethane	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Indeno(1,2,3-cd)pyrene	210		190		12		15		88	J	8.2	J	15		11	
Isophorone	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
N-Nitroso-di-n-propylamine	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
N-Nitrosodiphenylamine (1)	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Naphthalene	200	U	2.3	B	1.4	B	2.1	B	10	B	1	B	4	B	1.8	B
Nitrobenzene	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Pentachlorophenol	410	U	400	U	400	U	400	U	410	U	390	U	420	U	400	U
Phenanthrene	140	J	51		14		10	J	73		11		15		22	
Phenol	210	U	210	U	210	U	210	U	210	U	200	U	220	U	210	U
Pyrene	380		220		29		22		210		23		27		34	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1,2,2-Tetrachloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
1,1,2-Trichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1-Dichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,1-Dichloroethene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2,3-Trichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2,4-Trichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dibromo-3-chloropropane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dibromoethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloroethene (cis)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichloroethene (trans)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,2-Dichloropropane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,3-Dichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
1,4-Dichlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
2-Butanone	7.6	B	8.2	B	15		12	J	10	J	12	U	20		7.3	B
2-Hexanone	13	U	14	U	15	U	14	U	15	U	12	U	16	U	13	U
4-Methyl-2-pentanone	13	U	14	U	15	U	14	U	15	U	12	U	16	U	13	U
Acetone	110	J	120	J	160	J	110	J	120	J	75	B	230	J	110	J
Benzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Bromoform	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Bromomethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Carbon Disulfide	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Carbon Tetrachloride	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chlorobenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chloroethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chloroform	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Chloromethane	5.4	U	2.4	J	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
cis-1,3-Dichloropropene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Cyclohexane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Dibromochloromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Dichlorodifluoromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Ethylbenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Isopropylbenzene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
M,p-xylene	11	U	11	U	12	U	11	U	12	U	9.6	U	13	U	11	U
Methyl Acetate	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Methyl Tert-butyl Ether (mtbe)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Methylcyclohexane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Methylene Chloride	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
O-xylene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Styrene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Tetrachloroethene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Toluene	5.4	U	5.5	U	5.9	U	2.2	J	5.8	U	4.8	U	6.3	U	5.3	U
trans-1,3-Dichloropropene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Trichloroethene	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Trichlorofluoromethane	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U
Xylene (Total)	5.4	U	5.5	U	5.9	U	5.6	U	5.8	U	4.8	U	6.3	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	6.3	J	5.4	J	1.9	J	29	J	4.1	U	3.9	U	1.2	J	4	U
4,4'-DDE	210		140		4	UJ	12	J	4.1	U	3.9	U	3.2	J	1.2	J
4,4'-DDT	450		300		4	UJ	130	J	5.1	R	3.9	U	8.9	J	1.4	J
Aldrin	0.57	J	0.68	J	2.1	UJ	2.1	UJ	2.1	U	2	U	0.33	J	2.1	U
Alpha-BHC	2.1	U	2.1	U	2.1	UJ	2.1	UJ	5.6		2	U	2.2	U	2.1	U
Alpha-Chlordane	1.7	J	2.2	J	2.5	R	2.1	UJ	2.1	U	2	U	2.2	U	0.61	J
Aroclor-1016	30	U	29	U	29	UJ	29	UJ	30	U	29	U	31	U	29	U
Aroclor-1221	42	U	41	U	41	UJ	41	UJ	43	U	40	U	44	U	41	U
Aroclor-1232	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1242	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1248	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1254	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1260	62	J	150	J	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Aroclor-1262	NA		NA		NA		NA		NA		NA		NA		NA	
Aroclor-1268	NA		NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	21	U	21	U	1	UJ	1	UJ	1.1	U	1	U	1.1	U	1	U
Delta-BHC	2.1	U	2.1	U	2.1	UJ	2.1	UJ	2.1	U	2	U	2.2	U	2.1	U
Dieldrin	85	J	79	J	3.1	J	3.3	J	4.3		81		11		110	
Endosulfan I	2.1	U	2.1	U	2.1	UJ	2.1	UJ	0.58	J	2	U	2.2	U	2.1	U
Endosulfan II	7.4	J	16	J	4	UJ	4	UJ	4.1	U	3.9	U	0.73	J	4	U
Endosulfan Sulfate	4.1	U	4	U	4	UJ	4	UJ	1.3	J	3.9	U	4.2	U	4	U
Endrin	5.6	J	16	J	4	UJ	4	UJ	4.1	U	3.9	U	0.61	J	4	U
Endrin Aldehyde	4.1	U	4	U	0.61	J	2.2	J	1.6	J	3.9	U	3.7	J	0.94	J
Endrin Ketone	4.1	U	4	U	4	UJ	4	UJ	9.6	J	3.9	U	4.2	U	4	U
Gamma-BHC (Lindane)	2.1	U	2.1	U	2.1	UJ	2.1	UJ	2.1	U	2	U	2.2	U	2.1	U
Gamma-Chlordane	17	J	33	J	2.1	UJ	2.1	UJ	2.1	U	2	U	0.58	J	2.1	U
Heptachlor	2.1	U	2.1	U	2.1	UJ	2.1	UJ	2.1	U	2	U	2.2	U	2.1	U
Heptachlor Epoxide	9.8	J	20	J	2.1	UJ	21	U	0.57	J	2	U	2.2	U	2.1	U
Methoxychlor	21	U	21	U	21	UJ	21	UJ	21	U	20	U	22	U	21	U
Toxaphene	100	U	100	U	100	UJ	100	UJ	100	U	99	U	110	U	100	U
DIOXIN/FURANS																
1,2,3,4,6,7,8-HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
1,2,3,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,4,7,8-PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
2,3,7,8-TCDF	NA		NA		NA		NA		NA		NA		NA		NA	
OCDD	NA		NA		NA		NA		NA		NA		NA		NA	
OCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Teq Halfnd	NA		NA		NA		NA		NA		NA		NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS35**		**03SS35-D**		**03SS36**		**03SS37**		**03SS38**		**03SS39**		**03SS40**		**03SS41**	
Sample Date:	**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/26/2009**		**8/25/2009**		**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS35-D**		**03SS35**												**03SS41-D**	
Total HpCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HpCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total HxCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total PeCDF	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDD	NA		NA		NA		NA		NA		NA		NA		NA	
Total TCDF	NA		NA		NA		NA		NA		NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
INORGANICS	**mg/kg**		**mg/kg**	
Aluminum	23900		18500	
Antimony	0.22	L	0.22	UL
Arsenic	3.8	L	4.6	L
Barium	103		79	
Beryllium	0.79	K	0.7	K
Cadmium	0.03	UR	0.03	UR
Calcium	522	J	629	J
Chromium	20.4		24.2	
Cobalt	9.9	J	7.7	J
Copper	34.3	K	16.8	K
Cyanide	0.2	UJ	0.21	UJ
Iron	21200	J	24700	J
Lead	19.2	J	14.7	J
Magnesium	1320	J	2130	J
Manganese	602		334	
Mercury	0.047	K	0.033	J
Nickel	13.7	J	12.5	J
Potassium	680		1100	
Selenium	0.33	UR	0.35	UR
Silver	0.04	U	0.04	U
Sodium	155	B	158	B
Thallium	0.42	UL	0.45	UL
Vanadium	33.9		39.8	
Zinc	42.5		34.3	
SEMIVOLATILES	**ug/kg**		**ug/kg**	
1,1'-Biphenyl	200	U	210	U
1,2,4,5-Tetrachlorobenzene	200	U	210	U
1,2,4-Trichlorobenzene	NA		NA	
1,2-Dichlorobenzene	NA		NA	
1,3-Dichlorobenzene	NA		NA	
1,4-Dichlorobenzene	NA		NA	
1-Methylnaphthalene	NA		NA	
2,2'-Oxybis(1-chloropropane)	200	U	210	U
2,3,4,6-Tetrachlorophenol	200	U	210	U
2,4,5-Trichlorophenol	200	U	210	U
2,4,6-Trichlorophenol	200	U	210	U
2,4-Dichlorophenol	200	U	210	U
2,4-Dimethylphenol	200	U	210	U
2,4-Dinitrophenol	800	U	830	U
2,4-Dinitrotoluene	200	U	210	U
2,6-Dinitrotoluene	200	U	210	U
2-Chloronaphthalene	200	U	210	U
2-Chlorophenol	400	U	410	U
2-Methylnaphthalene	2	J	1.1	J
2-Methylphenol	200	U	210	U
2-Nitroaniline	400	U	410	U
2-Nitrophenol	200	U	210	U
3,3'-Dichlorobenzidine	200	U	210	U
3-Nitroaniline	400	U	410	U
4,6-Dinitro-2-methylphenol	400	U	410	U
4-Bromophenyl Phenyl Ether	200	U	210	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
4-Chloro-3-methylphenol	200	U	210	U
4-Chloroaniline	200	U	210	U
4-Chlorophenyl Phenyl Ether	200	U	210	U
4-Methylphenol	400	U	410	U
4-Nitroaniline	400	U	410	U
4-Nitrophenol	400	U	410	U
Acenaphthene	0.88	J	10	U
Acenaphthylene	1.9	J	1.2	J
Acetophenone	200	U	210	U
Anthracene	2.1	J	0.99	J
Atrazine	200	U	210	U
Benz(a)anthracene	13		7.6	J
Benzaldehyde	200	U	210	U
Benzo(a)pyrene	14		10	J
Benzo(b)fluoranthene	21		11	
Benzo(g,h,i)perylene	10	J	8.1	J
Benzo(k)fluoranthene	12		11	
Benzoic Acid	NA		NA	
Benzyl Alcohol	NA		NA	
Bis(2-chloroethoxy)methane	200	U	210	U
Bis(2-chloroethyl)ether	200	U	210	U
Bis(2-ethylhexyl)phthalate	200	U	210	U
Butylbenzylphthalate	200	U	210	U
Caprolactam	200	U	210	U
Carbazole	200	U	210	U
Chrysene	18		12	
Di-n-butylphthalate	200	U	210	U
Di-n-octylphthalate	200	U	210	U
Dibenz(a,h)anthracene	2.2	J	1.7	J
Dibenzofuran	200	U	210	U
Diethylphthalate	200	U	210	U
Dimethylphthalate	200	U	210	U
Fluoranthene	44		23	
Fluorene	1.6	J	0.88	J
Hexachlorobenzene	200	U	210	U
Hexachlorobutadiene	200	U	210	U
Hexachlorocyclopentadiene	200	U	210	U
Hexachloroethane	200	U	210	U
Indeno(1,2,3-cd)pyrene	15		9.1	J
Isophorone	200	U	210	U
N-Nitroso-di-n-propylamine	200	U	210	U
N-Nitrosodiphenylamine (1)	200	U	210	U
Naphthalene	3.8	B	1.5	B
Nitrobenzene	200	U	210	U
Pentachlorophenol	400	U	410	U
Phenanthrene	16		11	
Phenol	200	U	210	U
Pyrene	27		22	
VOLATILES	**ug/kg**		**ug/kg**	
1,1,1-Trichloroethane	5.5	U	5.3	U
1,1,2,2-Tetrachloroethane	5.5	U	5.3	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5.5	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
1,1,2-Trichloroethane	5.5	U	5.3	U
1,1-Dichloroethane	5.5	U	5.3	U
1,1-Dichloroethene	5.5	U	5.3	U
1,2,3-Trichlorobenzene	5.5	U	5.3	U
1,2,4-Trichlorobenzene	5.5	U	5.3	U
1,2-Dibromo-3-chloropropane	5.5	U	5.3	U
1,2-Dibromoethane	5.5	U	5.3	U
1,2-Dichlorobenzene	5.5	U	5.3	U
1,2-Dichloroethane	5.5	U	5.3	U
1,2-Dichloroethene (cis)	5.5	U	5.3	U
1,2-Dichloroethene (Total)	NA		NA	
1,2-Dichloroethene (trans)	5.5	U	5.3	U
1,2-Dichloropropane	5.5	U	5.3	U
1,3-Dichlorobenzene	5.5	U	5.3	U
1,4-Dichlorobenzene	5.5	U	5.3	U
2-Butanone	13	J	6.8	B
2-Hexanone	14	U	13	U
4-Methyl-2-pentanone	14	U	13	U
Acetone	130	J	93	J
Benzene	5.5	U	5.3	U
Bromochloromethane	NA		NA	
Bromodichloromethane	5.5	U	5.3	U
Bromoform	5.5	U	5.3	U
Bromomethane	5.5	U	5.3	U
Carbon Disulfide	5.5	U	5.3	U
Carbon Tetrachloride	5.5	U	5.3	U
Chlorobenzene	5.5	U	5.3	U
Chloroethane	5.5	U	5.3	U
Chloroform	5.5	U	5.3	U
Chloromethane	5.5	U	5.3	U
cis-1,3-Dichloropropene	5.5	U	5.3	U
Cyclohexane	5.5	U	5.3	U
Dibromochloromethane	5.5	U	5.3	U
Dichlorodifluoromethane	5.5	U	5.3	U
Ethylbenzene	5.5	U	5.3	U
Isopropylbenzene	5.5	U	5.3	U
M,p-xylene	11	U	11	U
Methyl Acetate	5.5	U	5.3	U
Methyl Tert-butyl Ether (mtbe)	5.5	U	5.3	U
Methylcyclohexane	5.5	U	5.3	U
Methylene Chloride	5.5	U	5.3	U
O-xylene	5.5	U	5.3	U
Styrene	5.5	U	5.3	U
Tetrachloroethene	5.5	U	5.3	U
Toluene	5.5	U	5.3	U
trans-1,3-Dichloropropene	5.5	U	5.3	U
Trichloroethene	5.5	U	5.3	U
Trichlorofluoromethane	5.5	U	5.3	U
Vinyl Acetate	NA		NA	
Vinyl Chloride	5.5	U	5.3	U
Xylene (Total)	5.5	U	5.3	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
PESTICIDES/PCBS	**ug/kg**		**ug/kg**	
4,4'-DDD	4	U	4.1	U
4,4'-DDE	1.2	J	4.1	U
4,4'-DDT	1.4	J	4.1	U
Aldrin	2	U	2.1	U
Alpha-BHC	2	U	2.1	U
Alpha-Chlordane	1.2	J	2.1	U
Aroclor-1016	29	U	30	U
Aroclor-1221	41	U	43	U
Aroclor-1232	20	U	21	U
Aroclor-1242	20	U	21	U
Aroclor-1248	20	U	21	U
Aroclor-1254	20	U	21	U
Aroclor-1260	20	U	21	U
Aroclor-1262	NA		NA	
Aroclor-1268	NA		NA	
Beta-BHC	1	U	1.1	U
Delta-BHC	2	U	2.1	U
Dieldrin	110		14	
Endosulfan I	2	U	2.1	U
Endosulfan II	4	U	4.1	U
Endosulfan Sulfate	4	U	4.1	U
Endrin	4	U	4.1	U
Endrin Aldehyde	4	U	4.1	U
Endrin Ketone	4	U	4.1	U
Gamma-BHC (Lindane)	2	U	2.1	U
Gamma-Chlordane	2	U	2.1	U
Heptachlor	2	U	2.1	U
Heptachlor Epoxide	2	U	2.1	U
Methoxychlor	20	U	21	U
Toxaphene	100	U	100	U
DIOXIN/FURANS				
1,2,3,4,6,7,8-HpCDD	NA		NA	
1,2,3,4,6,7,8-HpCDF	NA		NA	
1,2,3,4,7,8,9-HpCDF	NA		NA	
1,2,3,4,7,8-HxCDD	NA		NA	
1,2,3,4,7,8-HxCDF	NA		NA	
1,2,3,6,7,8-HxCDD	NA		NA	
1,2,3,6,7,8-HxCDF	NA		NA	
1,2,3,7,8,9-HxCDD	NA		NA	
1,2,3,7,8,9-HxCDF	NA		NA	
1,2,3,7,8-PeCDD	NA		NA	
1,2,3,7,8-PeCDF	NA		NA	
2,3,4,6,7,8-HxCDF	NA		NA	
2,3,4,7,8-PeCDF	NA		NA	
2,3,7,8-TCDD	NA		NA	
2,3,7,8-TCDF	NA		NA	
OCDD	NA		NA	
OCDF	NA		NA	
Teq Halfnd	NA		NA	
Total 2,3,7,8-TCDD Equiv.	NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL - LANDFILL AREA
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SS41-D**		**03SS42**	
Sample Date:	**8/25/2009**		**8/25/2009**	
Duplicate:	**03SS41**			
Total HpCDD	NA		NA	
Total HpCDF	NA		NA	
Total HxCDD	NA		NA	
Total HxCDF	NA		NA	
Total PeCDD	NA		NA	
Total PeCDF	NA		NA	
Total TCDD	NA		NA	
Total TCDF	NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE SOIL
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**		**03SW10**		**03SW10**	
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**		**10/13/2008**		**4/1/2009**	
Duplicate:													**03SW09**							
INORGANICS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**					
Aluminum	1030		74	B	157	B	838		357	B	441	B	382	B	80	U	NA		NA	
Antimony	45	U	64		45	U	45	U	20	U	20	U	20	U	2	U	NA		NA	
Arsenic	2	U	2	U	2	U	2		1	U	1	U	1	U	6	U	NA		NA	
Barium	42		99		94		15		60.8		58.8		23.3		84.1		NA		NA	
Beryllium	5		5		5		3	B	1	U	1	U	1	U	1	U	NA		NA	
Cadmium	4	U	4	U	4	U	4	U	5	U	5	U	5	U	1	U	NA		NA	
Calcium	13100		19100		10400		8900		45600		11100		11000		16400		NA		NA	
Chromium	7	U	7	U	7	U	7	U	245		5	U	5	U	1.5	B	NA		NA	
Cobalt	10	U	10	U	10	U	10	U	6.3		5	U	5	U	6	U	NA		NA	
Copper	9		4		5	B	7	B	20.5	K	22.5	K	29.6	K	0.8	B	NA		NA	
Cyanide	12	U	12.5	U	12.5	U	10	U	8		5	U	5	U	NA		NA		NA	
Iron	1360		1940		685		1490		747		618		530		430		NA		NA	
Lead	9.6		1.1		1.4		1.8		83.5		1.8	K	1.4	K	0.07	J	NA		NA	
Magnesium	3150		4240		3590		3030		13800		3220		3220		5800		NA		NA	
Manganese	112		1550		315		67		84.7		37.8		25.2		95.6		NA		NA	
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.5	U	NA		NA	
Nickel	12	B	12	U	12	U	19		20	U	20	U	20	U	1.2	J	NA		NA	
Potassium	2560		2670		2140	U	4060		1520		2460		2210		1730		NA		NA	
Selenium	4	U	4	U	4	U	4	U	1	UL	1	U	1	U	6	U	NA		NA	
Silver	6	U	6	U	6	U	6	U	5	U	5	U	5	U	0.6	B	NA		NA	
Sodium	4450	U	4800		246000		4450	U	5620		1240		1280		7670		NA		NA	
Thallium	2	U	2	U	2	U	2	U	1	U	1	U	1	U	1	U	NA		NA	
Vanadium	4	U	4	U	4	U	6		5	U	5	U	5	U	0.8	B	NA		NA	
Zinc	14	B	7	B	17	B	23		11700		22.1		14.1		3.6	J	NA		NA	
SEMIVOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**					
1,1-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		2.9	U	NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,2'-Oxybis(1-chloropropane)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4,5-Trichlorophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
2,4,6-Trichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2,4-Dinitrophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
2-Nitroaniline	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
3,3'-Dichlorobenzidine	20	U	20	U	20	U	20	U	10	U	10	U	10	U	NA		NA		NA	
3-Nitroaniline	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
4,6-Dinitro-2-methylphenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**		**03SW10**		**03SW10**	
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**		**10/13/2008**		**4/1/2009**	
Duplicate:													**03SW09**							
4-Bromophenyl Phenyl Ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Chlorophenyl Phenyl Ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
4-Nitroaniline	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
4-Nitrophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
Acenaphthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Acetophenone	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Atrazine	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benz(a)anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzaldehyde	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Benzoic Acid	50	U	50	U	50	U	50	U	NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	10	U	10	U	10	U	10	U	NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Bis(2-chloroethyl)ether	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Bis(2-ethylhexyl)phthalate	1	J	10	U	10	U	2	B	10	U	10	U	10	U	NA		NA		NA	
Butylbenzylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Caprolactam	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA		10	U	10	U	10	U	NA		NA		NA	
Chrysene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Di-n-butylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Di-n-octylphthalate	10	U	10	U	10	U	3	B	10	U	10	U	10	U	NA		NA		NA	
Dibenz(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Diethylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Dimethylphthalate	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Fluorene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Isophorone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
N-Nitrosodiphenylamine (1)	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Pentachlorophenol	50	U	50	U	50	U	50	U	25	U	25	U	25	U	NA		NA		NA	
Phenanthrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Phenol	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
Pyrene	10	U	10	U	10	U	10	U	10	U	10	U	10	U	NA		NA		NA	
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**		**03SW10**		**03SW10**	
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**		**10/13/2008**		**4/1/2009**	
Duplicate:													**03SW09**							
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,1-Dichloroethene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
1,2-Dibromo-3-chloropropane	NA		NA		NA		NA		NA		NA		NA		7	U	7	U	7	U
1,2-Dibromoethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,2-Dichloroethene (cis)	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloroethene (Total)	5	U	5	U	5	U	5	U	10	U	10	U	10	U	NA		NA		NA	
1,2-Dichloroethene (trans)	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
1,4-Dioxane	NA		NA		NA		NA		NA		NA		NA		NA		320	U	NA	
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	UR	10	U	10	UR
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U	5	U	5	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	5	U	5	U	5	U
Acetone	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	UR	10	U	10	UR
Benzene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Bromochloromethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Bromodichloromethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Bromoform	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
Carbon Disulfide	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Carbon Tetrachloride	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Chlorobenzene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
Chloroform	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Cyclohexane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Dibromochloromethane	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Ethylbenzene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Isopropylbenzene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
M+p-xylenes	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		2	U	2	U	2	U
Methyl Cyclohexane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methyl Tert-butyl Ether	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Methylene Chloride	2	B	3	B	3	B	4	B	10	U	7	B	10	U	1	U	1	U	1	U
O-xylene	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Styrene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Tetrachloroethene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Toluene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	0.21	J	1	U	1	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Trichloroethene	5	U	5	U	5	U	5	U	10	U	10	U	10	U	1	U	1	U	1	U
Trichlorofluoromethane	NA		NA		NA		NA		NA		NA		NA		1	U	1	U	1	U
Vinyl Acetate	10	U	10	U	10	U	10	U	NA		NA		NA		NA		NA		NA	
Vinyl Chloride	10	U	10	U	10	U	10	U	10	U	10	U	10	U	1	U	1	U	1	U
Xylene (Total)	5	U	5	U	5	U	5	U	10	U	10	U	10	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW01**		**03SW03**		**03SW04**		**03SW05**		**03SW08**		**03SW09**		**03SW09-D**		**03SW10**		**03SW10**		**03SW10**	
Sample Date:	**9/16/1991**		**9/16/1991**		**9/16/1991**		**9/23/1991**		**3/20/1997**		**3/20/1997**		**3/20/1997**		**3/19/2008**		**10/13/2008**		**4/1/2009**	
Duplicate:													**03SW09**							
PESTICIDES/PCBS	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**							
4,4'-DDD	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA		NA	
4,4'-DDE	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA		NA	
4,4'-DDT	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA		NA	
Aldrin	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Alpha-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Alpha-Chlordane	0.5	U	0.5	U	0.5	U	0.5	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Beta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Delta-BHC	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Dieldrin	0.1	U	0.1	U	0.1	U	0.1	U	0.03	J	0.02	J	0.02	J	NA		NA		NA	
Endosulfan I	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Endosulfan II	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA		NA	
Endosulfan Sulfate	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA		NA	
Endrin	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA		NA	
Endrin Aldehyde	NA		NA		NA		NA		0.1	U	0.1	U	0.1	U	NA		NA		NA	
Endrin Ketone	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NA		NA		NA	
Gamma-BHC (Lindane)	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Gamma-Chlordane	0.5	U	0.5	U	0.5	U	0.5	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Heptachlor	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Heptachlor Epoxide	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	NA		NA		NA	
Methoxychlor	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NA		NA		NA	
Toxaphene	1	U	1	U	1	U	1	U	5	U	5	U	5	U	NA		NA		NA	
Aroclor-1016	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA		NA		NA	
Aroclor-1221	0.5	U	0.5	U	0.5	U	0.5	U	2	U	2	U	2	U	NA		NA		NA	
Aroclor-1232	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA		NA		NA	
Aroclor-1242	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA		NA		NA	
Aroclor-1248	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	NA		NA		NA	
Aroclor-1254	1	U	1	U	1	U	1	U	1	U	1	U	1	U	NA		NA		NA	
Aroclor-1260	1	U	1	U	1	U	1	U	1	U	1	U	1	U	NA		NA		NA	

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**		**03SW11**		**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**		**4/1/2009**		**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**																**03-SW-15**					
INORGANICS			**ug/L**						**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Aluminum	NA		174		NA		NA		159	K	146	K	154	K	185	K	151	K	120	K	317	K
Antimony	NA		2	U	NA		NA		1.9	U	1.9	U	2	B	2.3	B	1.9	U	1.9	U	2.3	B
Arsenic	NA		6	U	NA		NA		2.7	U	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U
Barium	NA		113		NA		NA		57.9		46.2		55.1		33.8		33.9		32.5		40	
Beryllium	NA		1	U	NA		NA		0.86	B	1.1	B	1.1	B	1.6	B	1.1	B	0.7	B	1.8	B
Cadmium	NA		1	U	NA		NA		0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Calcium	NA		22300		NA		NA		13600		13700		13200		13900		14000		14100		13400	
Chromium	NA		1.7	B	NA		NA		0.87	U	1.1		1.3		1.1		0.87	U	1.1		0.87	U
Cobalt	NA		0.2	J	NA		NA		0.62	U	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U
Copper	NA		3	B	NA		NA		0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U	0.7	U
Cyanide	NA		NA		NA		NA		2	U	2	U	2	U	2	U	2	U	2	U	2	U
Iron	NA		1060		NA		NA		228		185		222		232		225		216		245	
Lead	NA		0.9	J	NA		NA		2.2		2.5		2.5		2.3		2	U	2.7		2.3	
Magnesium	NA		7470		NA		NA		4050		3940		3970		3750		3760		3770		3780	
Manganese	NA		197		NA		NA		46.2		41.6		39		52.7		53		33		30.9	
Mercury	NA		0.5	U	NA		NA		0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nickel	NA		2	J	NA		NA		0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U	0.98	U
Potassium	NA		1880		NA		NA		1430	L	1520	L	1440	L	1610	L	1600	L	1610	L	1650	L
Selenium	NA		6	U	NA		NA		4.7	U	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U
Silver	NA		0.6	B	NA		NA		0.63	U	0.63	U	0.63	U	0.63	U	0.63	U	0.63	U	0.63	U
Sodium	NA		18800		NA		NA		6350		6240		6500		5510	B	5580	B	5730	B	5790	B
Thallium	NA		1	U	NA		NA		5	UL	5	UL	5	UL	5	UL	5	UL	5	UL	5	UL
Vanadium	NA		1.4		NA		NA		1.1	B	1.1	B	1.1	B	0.96	B	1.1	B	1.4	B	1.1	B
Zinc	NA		16		NA		NA		5.1	B	4.8	B	6	B	5.5	B	6.4	B	5.7	B	11.9	L
SEMIVOLATILES			**ug/L**						**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1-Biphenyl	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
1,2,4,5-Tetrachlorobenzene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
1,2,4-Trichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,4-Dioxane	NA		3	U	NA		NA		NA		NA		NA		NA		NA		NA		NA	
1-Methylnaphthalene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
2,2'-Oxybis(1-chloropropane)	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,3,4,6-Tetrachlorophenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4,5-Trichlorophenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4,6-Trichlorophenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4-Dichlorophenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4-Dimethylphenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,4-Dinitrophenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
2,4-Dinitrotoluene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2,6-Dinitrotoluene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2-Chloronaphthalene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2-Chlorophenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
2-Methylnaphthalene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
2-Methylphenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
2-Nitroaniline	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
2-Nitrophenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
3,3'-Dichlorobenzidine	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
3-Nitroaniline	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
4,6-Dinitro-2-methylphenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**		**03SW11**		**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**		**4/1/2009**		**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**																**03-SW-15**					
4-Bromophenyl Phenyl Ether	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Chloro-3-methylphenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Chloroaniline	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Chlorophenyl Phenyl Ether	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
4-Methylphenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
4-Nitroaniline	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
4-Nitrophenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
Acenaphthene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
Acenaphthylene	NA		NA		NA		NA		0.21	U	0.2	U	0.016	J	0.22	U	0.22	U	0.2	U	0.2	U
Acetophenone	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Anthracene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
Atrazine	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Benz(a)anthracene	NA		NA		NA		NA		0.21	U	0.2	U	0.027	J	0.22	U	0.22	U	0.2	U	0.2	U
Benzaldehyde	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Benzo(a)pyrene	NA		NA		NA		NA		0.21	U	0.2	U	0.047	J	0.22	U	0.018	J	0.2	U	0.013	J
Benzo(b)fluoranthene	NA		NA		NA		NA		0.016	J	0.015	J	0.097	J	0.014	J	0.021	J	0.2	U	0.016	J
Benzo(g,h,i)perylene	NA		NA		NA		NA		0.21	U	0.2	U	0.036	J	0.22	U	0.018	J	0.2	U	0.2	U
Benzo(k)fluoranthene	NA		NA		NA		NA		0.014	J	0.013	J	0.085	J	0.22	U	0.014	J	0.2	U	0.2	U
Benzoic Acid	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Benzyl Alcohol	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bis(2-chloroethoxy)methane	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Bis(2-chloroethyl)ether	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Bis(2-ethylhexyl)phthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Butylbenzylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Caprolactam	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Carbazole	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Chrysene	NA		NA		NA		NA		0.21	U	0.2	U	0.053	J	0.22	U	0.22	U	0.2	U	0.2	U
Di-n-butylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Di-n-octylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Dibenz(a,h)anthracene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.012	J	0.2	U	0.2	U
Dibenzofuran	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Diethylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Dimethylphthalate	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Fluoranthene	NA		NA		NA		NA		0.21	U	0.2	U	0.12	J	0.22	U	0.016	J	0.2	U	0.012	J
Fluorene	NA		NA		NA		NA		0.67		0.63		0.69		0.67		0.64		0.62		0.59	
Hexachlorobenzene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Hexachlorobutadiene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Hexachlorocyclopentadiene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Hexachloroethane	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA		0.011	J	0.01	J	0.042	J	0.22	U	0.017	J	0.01	J	0.012	J
Isophorone	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
N-Nitroso-di-n-propylamine	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Naphthalene	NA		NA		NA		NA		0.21	U	0.2	U	0.21	U	0.22	U	0.22	U	0.2	U	0.2	U
Nitrobenzene	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Pentachlorophenol	NA		NA		NA		NA		11	U	10	U	10	U	11	U	11	U	10	U	10	U
Phenanthrene	NA		NA		NA		NA		0.21	U	0.2	U	0.096	J	0.22	U	0.22	U	0.2	U	0.2	U
Phenol	NA		NA		NA		NA		5.3	U	5	U	5.1	U	5.6	U	5.6	U	5	U	5	U
Pyrene	NA		NA		NA		NA		0.013	J	0.013	J	0.099	J	0.012	J	0.021	J	0.014	J	0.02	J
VOLATILES	**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**		**03SW11**		**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**		**4/1/2009**		**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**																**03-SW-15**					
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	2	U	2	U	2	U	2	U	0.18	B	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	2	U	2	U	2	U	2	U	0.18	B	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-chloropropane	7	U	7	U	7	U	7	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene (cis)	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene (Total)	NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene (trans)	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dioxane	NA		NA		320	U	NA		NA		NA		NA		NA		NA		NA		NA	
2-Butanone	10	UR	10	UR	10	U	10	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR	2.5	UR
2-Hexanone	5	U	5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Acetone	10	UR	10	UR	10	U	10	UR	2.5	U	2.5	U	2.5	U	1.3	J	2.5	U	2.8		3.8	
Benzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	1	U	1	U	1	U	1	U	NA		NA		NA		NA		NA		NA		NA	
Bromodichloromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Cyclohexane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
M+p-xylenes	2	U	2	U	2	U	2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Methyl Acetate	2	U	2	U	2	U	2	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Cyclohexane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Tert-butyl Ether	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
O-xylene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichlorofluoromethane	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vinyl Chloride	1	U	1	U	1	U	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Xylene (Total)	NA		NA		NA		NA		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Sample ID:	**03SW10-D**		**03SW11**		**03SW11**		**03SW11**		**03-SW-12**		**03-SW-13**		**03-SW-14**		**03-SW-15**		**03-SW-15-D**		**03-SW-16**		**03-SW-17**	
Sample Date:	**4/1/2009**		**3/19/2008**		**10/13/2008**		**4/1/2009**		**12/15/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**		**12/16/2008**	
Duplicate:	**03SW10**																**03-SW-15**					
PESTICIDES/PCBS									**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**		**ug/L**	
4,4'-DDD	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDE	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
4,4'-DDT	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Aldrin	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Alpha-BHC	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Alpha-Chlordane	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Beta-BHC	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Delta-BHC	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Dieldrin	NA		NA		NA		NA		0.0096	J	0.0096	J	0.011	J	0.008	J	0.0082	J	0.0097	J	0.011	J
Endosulfan I	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Endosulfan II	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endosulfan Sulfate	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin Aldehyde	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Endrin Ketone	NA		NA		NA		NA		0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Gamma-BHC (Lindane)	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Gamma-Chlordane	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Heptachlor	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Heptachlor Epoxide	NA		NA		NA		NA		0.053	U	0.051	U	0.05	U	0.05	U	0.05	U	0.051	U	0.05	U
Methoxychlor	NA		NA		NA		NA		0.53	U	0.51	U	0.5	U	0.5	U	0.5	U	0.51	U	0.5	U
Toxaphene	NA		NA		NA		NA		2.6	U	2.6	U	2.5	U	2.5	U	2.5	U	2.6	U	2.5	U
Aroclor-1016	NA		NA		NA		NA		0.98	U	0.95	U	0.93	U	0.93	U	0.93	U	0.95	U	0.93	U
Aroclor-1221	NA		NA		NA		NA		1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor-1232	NA		NA		NA		NA		0.98	U	0.95	U	0.93	U	0.93	U	0.93	U	0.95	U	0.93	U
Aroclor-1242	NA		NA		NA		NA		0.66	U	0.64	U	0.63	U	0.63	U	0.63	U	0.64	U	0.63	U
Aroclor-1248	NA		NA		NA		NA		0.66	U	0.64	U	0.63	U	0.63	U	0.63	U	0.64	U	0.63	U
Aroclor-1254	NA		NA		NA		NA		0.66	U	0.64	U	0.63	U	0.63	U	0.63	U	0.64	U	0.63	U
Aroclor-1260	NA		NA		NA		NA		0.98	U	0.95	U	0.93	U	0.93	U	0.93	U	0.95	U	0.93	U

DATA SUMMARY OF ANALYTICAL RESULTS
SITE 3 SURFACE WATER
NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA

Data Qualifiers:
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
U -- Value is a non-detected result as reported by the laboratory.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
NA -- No result is available/applicable for this parameter in this sample.

APPENDIX B

SOIL BORING AND MONITORING WELL INSTALLATION LOGS

SOIL BORINGS

BORING LOG S3W-2I

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-2. I
DATE 4/21/97 (5/7/97 below 13')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury
Robert Good

SAMPLE NO. / Time	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
4/21/97 1105	0 / 4				Soft.	Dark yellow orange	0-4' Silty (30%) CLAY with trace sand, moist.	CL	Color varies to light BRN PID=0
1109 11:10	8				Med HARD Very HARD	Light BRN gray Pinkish Gray	6' SANDSTONE slight weathering coarse to very coarse. 7' Sandstone, coarse to very coarse		PID=0
1115	12				Very HARD	Pinkish Gray to white	11' SANDSTONE, very coarse grained, slight weathering, quartz rich Wet		11' - water PID=0
1120 5/7/97 → 8:55	16				HARD	Brown	13' SAME 14' Sandstone - Fine to coarse grained, Soft streaks ≈ 16'		Set 6" steel casing AT 13' WATER < 5 GPM
	20					Reddish Gray	19' Sandstone, Fine grained Few - softer brown stained weathering streaks		
9:18	24					Reddish Gray	22' sandstone, Fine grained 24' - "DRY" Fracture		Additional water < .5 gpm yield = 1 GPM
	28				HARD	Light Gray	25.5' weathered streak on Fracture 27' Sandstone - Less Stain		25' yield ≈ 5 GPM PID = 0
0941	32				HARD	Pinkish Gray	28'-29' Conglomerate, Arkose and Fine grained SST.		27-28' slight increased water yield ≈ 5 GPM (total)
10:02	36					Light Pinkish Gray	30'-34' Sandstone, Fine grained trace "rusty" staining. 35' - White Clay incl. in SST.		Muddy brown gw discharge PID = 0 ppm
10:23	40					Light Gray	39' Sandstone, Fine grained some medium - coarse grained sand and pebbles		Water ≈ 7 GPM
	44						41'-42' possible Fracture, some white to greenish/gray clay incl.		
10:38	48						43'-44' SAME with possible thin silty streaks		47' Lost some water - Fracture
	52					Reddish Brown	49' Mudstone to Siltstone microcrevo. 49-54'		
10:59	56				HARD	Reddish BRN	Mudstone grading to harder Siltstone and Fine grained sandstone some softer Shale/Mudstone		—

REMARKS

BORING NO.

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03 MW 02 I

BORING LOG S3W - 2I (page 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W - 2I
DATE 5/7/97
DRILLER Advanced Drilling INC
FIELD GEOLOGIST ~~Tobin Loonsbury~~ ROBERT GOOD

SAMPLE NO. TIME	DEPTH (FT.) 56'	BLOWS 6"	SAMPLE REC LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
11:06	60					Reddish Brown	54-59' Siltstone/Mudstone with very fine grained sand, micaceous PID = 0		Slight increased water Total ≈ 8-10 GPM
11:15	64						59'-64' SAME		Possible increased water ≈ 10-12 GPM
	68				HARD	Reddish Brown	64'-68' Siltstone and fine grained sand - relative harder		
11:35	72				very HARD	Reddish BRN to Reddish Gray	68-69' Sandstone silty, micaceous, very fine and fine ground, 70' Fracture on shale seam.		Possibly increase water to 12-15 GPM
12:02	76				hard	Reddish BRN to Reddish Gray	74'-76' Silty Sandstone very fine grained, to siltstone		75' Poss. Fracture Slight water increase to 15-18 GPM
1223	80						76-78 Slightly softer and more red, shaley 78'-81' As Above		
	84					Med Dark Brown Red-Brn	81'-83 Sandstone, fine grained 83'-84' Mudstone and Siltstone		Water increased to 25 GPM
1238	88				Med. HARD	Reddish Brown	84'-89' Siltstone and very fine grained sandstone, some shaley intervals (Redder color)		
1255	92					Reddish Gray	91' micaceous, silty sandstone fine grained, with siltstone		0.0 PPM
1321	96				HARD	Reddish Gray	93.5'-94' Siltstone 94' Sandstone, very fine to fine grained, micaceous 0.0 ppm		92.5'-93' Fracture 95' Fracture water ≈ 30 GPM
13:47	100						99' As Above		
14:19	104				Hard	Light Gray	99-104 Sandstone, fine grained with some "rusty" brown		
14:57	108						104'-109' SAME AS Above		0.0 PPM
15:00	112						109'-114' SAME As Above		—

REMARKS

BORING NO.

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BORING LOG S3W-2I (page 3)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-2I
DATE 5/7/97 (5/8/97 below 119')
DRILLER Advanced Drilling INC
FIELD GEOLOGIST ~~Tobia Lounsbury~~ Robert Good

~~SAMPLE NO.~~ TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	112								
5/7/97 1536	116					Very Lt. Gray to Lt. Pinkish Gray	114'-116' SANDSTONE, fine grained		
1607 5/8/97	120					Lt. Grayish Brown	116'-119' SANDSTONE, fine grained		
0822 0836	124					Medium Brown Reddish Brown	120' SANDSTONE, fine grained. 121' micaceous SILTSTONE And very fine grained SST.		121' Possible Fracture water ≈ 35 GPM
	128'					Reddish Brown	124'-127' SILTSTONE And silty Sandstone, very fine grained - Few thin Shaley mudstone/claystone Layers		Possible fractures 0.0 ppm
0850	132						127'-129' As Above 130'-131' Possible Fracture		
	136					Reddish Gray	129'-134' As Above 135-136' Micaceous SILTSTONE Slightly Harder		
924	140				HARD	Lt Reddish Gray	136'-139' SANDSTONE silty, Fine grained grades to Lt Brn. Fine grained SST.		0.0 ppm
10:12	144				HARD	Reddish Gray / Pinkish Gray	140'-141' Silty SANDSTONE, Very fine grained 142-144' SANDSTONE Fine grained		Possible small fractures water increase to ~45 GPM
	~~148~~						144' total Depth of Borehole		

REMARKS

BORING NO.

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BORING LOG S3W-5I / 03 MW 05 I

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-5I
DATE 4/18/97 (4/17/97 0'-5') (4/23/97 below 27')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

	SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
		0								
4/17/97	1612	4				Soft	Grayish BRN	SILT with Clay (20%) trace sand (<5%) Soft, moist		
	1615	8				Soft	Light Brown	SILT with sand (20-40%) trace clay, loose DRY		
4/18/97	0835 0837	12				Soft Soft	Light BRN	SANDstone, very weathered medium grained 11' Clayey SILT with sand (5%)		PID=0
	0839	16				Soft	Light BRNish Gray	15' SANDstone, very weathered much silt included		PID=0
	0843	20				Medium Soft	Grayish Red	17' SILTSTONE with Claystone weathered.		
	0851	24				Med. Soft Med. HARD	BRN Gray BRN Gray	20' SANDSTONE, weathered, med. grained, DRY 21' SANDSTONE, weathered, Dry		23' HARD SST Slight weathering
	0900 0910	28				HARD HARD	Grayish BRN Blackish Red	25' SANDSTONE, Slight weathering DRY (10% siltstone) 27' SANDstone w/siltstone (20%)		PID=0 Set 6" CASING to 27' Deep
23/97	1100	32				HARD	BRNish Gray	29' SANDSTONE, medium grained, weathered, many Lt Brown oxidation "spots", DAMP		PID=0 trace WATER AT 30' Fracture AT 31' (1")
	1118	36						33' SAME		WATER AT 33' 0.1-0.2 GPM
	1135	40				HARD	Lt BRNish Gray	36' Sandstone, coarse grained well sorted, slight weathering, some oxidation spots SUBANGULAR grains.		PID=0 36' WATER ≈ 0.7 39' 1 GPM GPM
	1157	44				HARD	Light Brownish Gray	42' SANDstone, medium grained well sorted, slight weathering, trace of iron oxide "spots"		WATER ≈ 5 GPM
	1223	48				very HARD	Light Gray	47' SANDstone, medium grained well sorted, slight weathering to FRESH,		
		52								
	1250	56				very HARD	Pinkish Gray	52' SANDstone, medium to coarse grained, Fresh, some surface stain on cuttings PID=0		—

REMARKS

BORING NO.

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BORING LOG S3W-5I (page 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO.
DATE 4/23/97 (4/24/97 Below 105')
DRILLER Advanced Drilling INC (Rick EMPSON)
FIELD GEOLOGIST Tobin Lounsbury

~~SAMPLE NO.~~ TIME	DEPTH (FT.) 56	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
1310	60						56' SAME water ≈ 6-7 GPM		Fracture zones 56; 57.5-58 59.5-62'
1322	64				Very HARD	Lt Brnish Gray to Lt Gray	62' Sandstone, coarse grained well sorted, slight weathering Very HARD PID=0		NO SIGNIFICANT increased water Produced ≈7 GPM
1341	68				Very HARD	Brnish Gray	66' SILTstone, trace of very fine grained sand ~~stone~~ trace of Kaolinite Clay.		Light RAIN
1350	72				Very HARD	Brnish Gray	69' SILTstone with fine grained sand (10%) and Kaolinite Clay (white soft paste) 5%.		PID NOT working Properly
1402	76						74' SAME NO Kaolinite clay observed		
1420	80						77' SAME 79'-80' Fracture		Water from Borehole ≈ 9 GPM
1444	84				med soft Very HARD	Dk Red BRN Grayish Red	80' Clay stone 82' SILTstone trace Claystone TRACE very fine grained sand		Fracture 83-83.5 TOTAL WATER ≈ 11 GPM
1500	88				HARD	Grayish Red	84' SILTstone, with Claystone (20%) Fresh, HARD		15:00 RAIN stopped
1517	92						88' SAME - HARD to Very HARD		Fracture 89.-89.5 Water ≈ 11 GPM
1540	96				Very HARD	Grayish Red to Blackish RED	94' SILTstone, with very fine grained sand (10%) Fresh, Very HARD, PID=0		
1600 1630	100						96' Same - 99' SAME		SLOW Drilling
1652	104				Very HARD	Grayish Red	102' SANDSTONE, with siltstone (30%), very fine grained, Fresh		TOTAL RATE of water ≈ 13 GPM
4/24/97 0809	108				Very HARD	Light Brownish Gray	105' SANDSTONE with Siltstone (20%) very fine grained, well sorted, Fresh		PID=0 water ≈ 13 GPM
0840	112						109' SAME		-

REMARKS

BORING NO.

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03 MW 05 I

BORING LOG S3W-5I (Page 3)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-5I
DATE 4/24/97
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	112								
0859 0909	116				Very HARD	Grayish RED	112' SILTstone, trace very fine grained sand, Fresh, very HARD 114' SAME		Fracture 111' Fracture 112'-112.5' Fracture 114'
0928	120				Very HARD	Pinkish Gray / Lt BRN Gray	117' SAME - color varies Grayish Red / Blackish Red		Water ≈ 15 GPM Fracture 116' Water ≈ 16 GPM
0935	124				very HARD	Pinkish Gray / Lt BRN Gray	119' SANDSTONE, very coarse grained Angular to Sub Angular quartz/Feldspar sand, Fresh to slight weathering		Some granuole > 2 mm PID = 0
0955	128				very HARD	Pinkish Gray to White	124' Conglomeritic SANDSTONE, very coarse grained with granules & pebbles Range 1mm - 10mm 80% of grains 1.5 - 2.0 mm size		PID = 0 Some Mafic - Accs. minerals incl.
1017	132				very HARD	Very Light Gray	129' Sandstone, coarse grained well sorted, Fresh Rock, quartz / Feldspar SST (ARKOSE)		Some Pinkish Gray color variation
1044	136						133' SAME		Water from Borehole ≈ 17 GPM
11:15	140				very HARD	Pinkish Gray to very Light Gray	139' SANDstone, very coarse grained well sorted, with some (5%) qtz grains > 3mm diameter FRESH ROCK		PID = 0
	144								
11:42	149				medium Soft	Grayish Red	145' Claystone, trace of Siltstone.		Fracture Zone 145'-147'
11:49					Medium Soft to Medium HARD	Moderate Red to Grayish RED	149' Claystone		Fracture Zone 148' - 150'
							Stop Borehole At total depth 150'		Water produced Approx ≈ 20 GPM

REMARKS

BORING NO.
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BORING LOG 53W-6S / 03MW06S

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. 53W-6S
DATE 4/21/97 (4/22/97 below 25')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

	SAMPLE NO. Time	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
		0								
4/21/97	0826	4				Soft	Moderate BRN	0-3' Clayey (20%) SILT trace SAND(5%) very moist to wet PID=0	ML	Some Fill stone included.
	0829 0832	8				Soft Soft	Lt BRN Lt BRN	4-5' Silt with Clay (10%) very moist 7' Sandy (20%) SILT, DRY, trace clay, sand is medium grained.	ML	PID=0 PID=0
	838	12				Soft	LT BRN	9' Sandy (10%) Clayey (20%) SILT moist		PID=0
	0841	16				Medium Soft	Light BRNish GRAY	12' SANDstone, weathered medium to coarse grained, moist		PID=0 Dust color - Light yellowish orange
	0850	20				Medium HARD	BRNish Gray to LT. BRN-Gray	19' SANDstone slightly weathered, medium grained, moist.		PID
	0854 0856	24				Medium HARD		21' SAME 23' SANDstone, As Above, Slightly Less Weathered		PID=0
	0859	28				Medium HARD to HARD	BrNish Gray	25' SANDstone, medium to coarse grained, Dry, slightly weathered.		PID=0, Set 6" Steel Casing to 25'
4/22/97	1405	32				HARD	Light Brownish Gray	28' SAND Stone, medium grained well sorted, slight weathering, iron oxide "spots" DRY		PID=0 white cuttings DUST
	1415	36				HARD	Brownish Gray	32' SANDstone, coarse grained, well sorted, Angular grains, weathered Many iron oxide spots, DRY		PID=0 white dust.
	1440	40						37' - SAME trace of water on cuttings - Reduced dust generated - 39' ≈ 0.1 GPM		PID=0 Trace WATER
		44								
	1457 1504	48				Medium HARD HARD	Gray-ish Red BRN-GR	44' Siltstone, with claystone (20-30%) moist. 47' SANDstone, medium to coarse grained, weathered, moist		PID=0
		52								Water 0.1 GPM
	1520	56				Medium HARD	Grayish Red	53' Siltstone/Claystone (30-40%) Slight weathering, some shale fissile structure, moist to DRY		Dusty cuttings -

REMARKS

BORING NO.

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* See Legend on Back

03 MW 06 S

BORING LOG S 3W - 6S (PAGE 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W - 6 S
DATE 4/22/97 (4/23/97 Below 60')
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

~~SAMPLE NO.~~ TIME	DEPTH (FT.) 56	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
1533	60				Very HARD	Blackish Red	58' Siltstone, (No Claystone) Fresh, very HARD		Fracture AT 57' No increased water.
4/23/97 804	64				Medium Soft to Med. Hard	Moderate Red to Grayish Red	62' Clay Stone, trace Siltstone, weathered, Fractured PID=0		Fracture ZONE 61-64' water ≈ 0.5 GPM
814	68				Very HARD	Grayish Red	66' Siltstone, some Claystone (10-20%) Fresh, very HARD PID=0		Fracture 68'-69' water ≈ 1.5-1.7 GPM
0824	72				Very HARD	Grayish Red	70' Siltstone, trace very fine grained sandstone (no Claystone) Fresh, color varies to Pale Red.		PID=0
0835	76				Very HARD		75' SAME		Fracture ZONE 72.5-75' water ≈ 2.0 GPM
0847	80						78' SAME		Fracture 78'-78.5 water ≈ 3.0 GPM
0858	84				Very HARD	Grayish Red	83' SANDStone, with Siltstone (20%) very fine grained, Fresh, very HARD, PID=0		Fracture 81'-84' WATER ≈ 4.5 GPM
9:10			TD		Very HARD	Grayish Red	85' SANDstone, trace Siltstone (5%) Set is Very fine to Fine grained, Fresh, some MICA Flakes		Total water Approx 5.0 GPM
							Stop Borehole AT 85' Total Depth		

REMARKS

BORING NO.
PAGE 2 OF 2

* See Legend on Back

BORING LOG S3W-6I / 03 MW 06 I

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-6I
DATE 4/18/97 (4/21/97 Below 20')
DRILLER Advanced Drilling INC (Rick Empson
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. Time	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	0								
1601	4				Soft	Moderate Brown	0-3' Clayey SILT (30% CL) with trace fine grained sand moist,		PID=0 included FILL pebbles.
1604 1611	8				Soft Soft	Light Brown	4'-5' Clayey SILT (15% CL) trace sand moist 7' sandy Silt dry soft		PID=0
1617 1620	12				Soft Med HARD	Lt BRN BRN GRAY	9' Sandy Clayey SILT 11' SANDSTONE, weathered		incl. very weathered sandstone
1624	16				Med HARD	BRN GRAY	14' SANDSTONE, medium to coarse grained, DRY, weathered		PID=0
1630 1634 1638	20				HARD	BRNish GRAY	16' SANDSTONE, medium grained slight weathering 17' same (less weathered) 20' same		PID=0 SET 6" STEEL CASING to 20'
1351	24				HARD	Lt. BRNish GRAY	21' SANDSTONE, medium grained DRY, weathered, Brown Iron oxidation spots on Rock		PID=0
1357	28				Medium HARD to HARD	PALE yellowish BRN	24' SANDSTONE, medium grained well sorted, DRY.		White dulling DUST PID=0
1420	32				HARD	very PALE ORANGE	23' SANDSTONE, medium grained well sorted, slight weathering, DRY		PID=0 31.5-32 SMALL Fracture
1440	36				Medium HARD to HARD	Grayish orange to LT BRN	32' SANDSTONE, medium grained weathered, Feldspar rich (20%)		PID=0 very Dusty
	40								35.5-39 FRACTURE ZONE
1500 1506	44				Medium HARD	PALE Red PURPLE	40' SAME 43' SANDSTONE, fine grained, Slight weathered,		PID=0
1513	48				Medium HARD	Grayish Red	47' SILTSTONE with Claystone (20%)		
1519	52				HARD	BLACKISH RED	49' siltstone trace very fine grained sand		PID=0
1526	56				Med. Soft to Med HARD	Grayish Red	53' Claystone with trace siltstone, moist "Shaley Structure"		PID=0 some trace water

1/21/97

REMARKS

BORING NO.

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* See Legend on Back

03 MW06 I

BORING LOG S3W-6I page 2

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-6I
DATE 4/21/97 (4/22/97 Below 80')
DRILLER Advanced Drilling INC (RICK EMPSON)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	56								
1530	60						57'-58' SAME 59'-60' Fracture Zone		No Significant Water Produced 0.1 GPM
1540	64				HARD	Grayish Red	62' SILTstone, with claystone (15%) moist, HARD,		PID = 0
1547	68				Med. HARD	Pale Red to Grayish Red	64' Clay Stone / siltstone Moist, waxy texture		PID = 0 Fracture 64'-65'
1600	72				Very HARD	Blackish Red	67' Siltstone (NO Claystone) Dry to Slight Moist Fresh Rock		
1608	76				HARD		73' SAME, Less HARD some Clay stone included 5-10%		PID = 0
1625	80				Very HARD	Blackish Red	76' SILTStone, NO Claystone Slight moist Fresh 78' Same		
1/22/97 0820	84				Very HARD	Grayish Red to BLKish RED	82' SILTStone, 20% - very fine grained Sandstone, Fresh Rock		PID = 0 83' - 2" FRACTURE WATER ≈ 0.56 GPM
0850	88				Very HARD	Grayish Red	85' SANDSTONE, very fine grained well sorted with 20% Siltstone FRESH ROCK		PID = 0
0920	92				Very HARD	Light Brownish Gray	90' SANDSTONE very fine to fine grained, well sorted FRESH ROCK, Fracture Zone 92'		91' - SMALL Fracture 92-92.5' FRACTURE WATER ≈ 1.2 GPM
1000	96						95' SAME		
1030	100				HARD	LT GRN Gray to Lt Gray	98' SANDStone, medium grained, well sorted, some slight weathering w/ iron oxide stain spots		Fracture Zone 98' (3") Water ≈ 1.6 GPM
1040	104				Very HARD	Pale Red Purple to Lt. Gray	102' SANDstone, Very Coarse grained, Slight weathering to Fresh some Angular quartz crystal > 3 mm.		Ave diam. of SAND ≈ 1 mm PID = 0
1050	108				Very HARD	PALE PINK	105' SANDSTONE, Very Coarse grained, with some granuals > 3 mm. sub Angular to Angular.		WATER IN Bore ≈ 5 GPM
11:10	112				Very HARD	Pinkish Gray	110' SANDstone, medium grained, well sorted, Fresh		WATER ≈ 6 GPM PID = 0

REMARKS

BORING NO.
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03 MW 06 I

BORING LOG S3W-6I page 3

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW GROVE - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. S3W-6I
DATE 4/22/97
DRILLER Advanced Drilling INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	112								
11:25	116				Very HARD	Pinkish Gray	113' Conglomeratic SANDStone Very coarse grained with 10% of grains > 3 mm (Range 1-7 mm), sub Angular		
11:40	120				Very HARD	Pale PINK to Lt. BRN Gray	117' Conglomerate SANDy (30%) Angular to sub Angular quartz Feldspar 4-7 mm size, some 1 cm size quartz.		117-120 Fracture ZONE, water is 10-12 GPM
11:52	124				Medium HARD	Grayish Red	120' SILTstone, with Claystone (10-20%) Slight weathering to Fresh.		122-124 Fracture ZONE water ≈ 16 GPM
11:56	128				Medium HARD	Grayish Red	124' CLAYSTONE, 20% Siltstone Blocky structure wavy texture		PID = 0
12:10	132						128' SAME		128' Fracture
12:20	136						133' SAME		133' Fracture water ≈ 20 GPM
12:30	140				Medium Soft to Medium HARD	Grayish Red.	139-140' SAME (Less siltstone)		139 Fracture with ≈ 22 GPM
12:38	144						143-144 Fracture Zone Rock is SAME Claystone with some Shaley Cleavage		143 Fracture
12:49	148				HARD	Grayish Red	148' Claystone/Siltstone (20-30%) Fresh		Fracture Zone 148'-149'
12:52	152				very HARD	Grayish Red to Blackish Red	149' SILTSTONE, Fresh, very hard (NO Claystone)		End Borehole 150'
									Total WATER is Approx. 22 GPM

REMARKS

BORING NO.
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BORING LOG 03 MW ~~10~~ 07 5

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Willow Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. ~~03 MW 10 5~~ 03 MW 07 5
DATE 5/29/97 (5/30/97 - below 14')
DRILLER Advanced Drilling INC (Rick Emposn)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
5/29/97 0925	0 / 4				Soft	Moderate Yellow Brown	0-1' Top Soil Silt/Sand w grass 1-3' SAND, with silt 5-10%, Coarse grained, loose, slight moist		PID=0
0926 0930 0931	8				Med Soft Med. HARD HARD	Lt Gray Lt Gray	3-5' SANDstone, coarse grained, weathered, slight moist 6.5' Same 7.0 SANDstone, medium grained		PID=0 PID=0 PID=0
0934	12				HARD	Lt BRN GRAY	8' SANDY (20%) SILTSTONE, slight weathering, HARD, DRY. Color varies to pale Red Purple		PID=0
0938	16				HARD	Lt BRN Gray	12' SANDstone, Medium grained, well sorted, slight weathering, brown oxidation spots. Stop Borehole 14'		PID=0 Set 6" Steel Casing - to 14' Deep
5/30/97 0934	20				Med Soft Med HARD	Dark Reddish BRN	16' Mudstone, 60% Silt 40% Clay weathered, DRY		Dry Dark Dust
0941	24				Med. HARD to HARD		20' Same - med Hard to HARD		Slight Moist
0947	28						25' SAME		DRY Dusty
0952	32				HARD	grayish Red	28' Siltstone with 20% clay, trace very fine grained SAND, slight weathering, HARD, Dry to slight moist		Slower Drilling 28' DRY
10:04	36				Very HARD	grayish Red to Blackish Red	33' SILTSTONE with trace of very fine SAND, slightly weathered, very HARD Moist (NO Free flow water)		water (NO Dust) AT 31'
10:15	40						36' SAME water from Borehole ~ 1-2 GPM Fracture 39.5'-41'		36' 1-2 GPM water Flow 40'-3 GPM
10:24 10:35	44				Grayish Red	HARD to Med. HARD	40'- Same 42' SILTSTONE to Mudstone (60% silt) Less Hard at fracture zone trace very fine grained SAND.		Fracture Zone 41-45' 6-8 GPM
10:47	48				Very HARD	Grayish Red	46' SILTSTONE, trace clay, trace very fine grained SAND		Fractured Rock 46'-49' 12 GPM
10:56	52						50' SAME		Fracture 51'-54' 15-17 GPM
11:08	56				Medium HARD	Grayish Red	54' Mudstone to Claystone (range 40-60% Clay) Clay/silt content varies		Fracture 55'-57' water ~20-23 GPM

REMARKS

BORING NO.

* See Legend on Back

BORING LOG 03 MW ~~10~~ 07 S (PAGE 2)

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT WILLOW Grove - NAS
PROJECT NO. 5466
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. ~~03 MW 10 S~~ 03MW07 S
DATE 5/30/97
DRILLER Advanced DRILLING INC (Rick Empson)
FIELD GEOLOGIST Tobin Lounsbury

SAMPLE NO. / TIME	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	56								
	60								
11:25	64				Med HARD TO Med Soft	PALE Reddish BROWN	60' Claystone, trace silt		Fracture Zone 61'-63' Water ~ 23 GPM
11:33 11:45	68				Very HARD	Grayish Red Med LT Gray	64' SILTSTONE, trace very fine grained sand, Fresh Rock, very HARD. 66' SANDSTONE, fine grained, well sorted, Fresh, very hard		
12:10	72				Very HARD	Medium Gray	70' SANDSTONE medium grained fresh to slightly weathered, trace of kaolinite clay		WATER from Rock 70' ~ 27 - 30 GPM
12:28	76						74' SAME - medium to coarse grained - SANDSTONE		WATER ~ 30 GPM
							END of Borehole AT 75'		

REMARKS

BORING NO.

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* See Legend on Back

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
BORING NUMBER: 03 MW08
PROJECT NUMBER: N62472-03-D-0057
DATE: 10/31/05
DRILLING COMPANY: EICHELBERGERS, INC.
GEOLOGIST: R. G. SCHAAR
DRILLING RIG: INGERSOLL RAND - T3W
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
				2'	VERY LOOSE	LT BROWN	TOPSOIL W. ORGANIC CONT.	SP					0.0
					LOOSE	MED BROWN	OVERBURDEN, ORGANIC	SP					
							CONTENT DECREASING		TRANSITION TO	0.0		0.0	
							WITH DEPTH, INCREASING		"OL"				
				9'			SILT				0.0		0.0
						GRY	FRACTURED/WEATHERED						
							BEDROCK (SANDSTONE)			0.0		0.0	
A	16						W. REDUCED MINERALIZ.						
		N.A.					COARSE CUTTINGS W.				0.0	0.0	0.0
							OCC. QUARTZ ENCLOSURES			0.0			0.0
												0.0	
											0.0		
A	23									0.0			
				23'		RED	SANDSTONE W. INCREASING					0.0	
A	30						Fe CONTENT,			0.0			0.0
							QUARTZ DECREASING				0.0		
							W. DEPTH					0.0	
											0.0		
				38.5'					CASING SET @ 38.5'	0.0			
							NO LITH					0.0	0.0
							CHANGES				0.0		
A	44			~44'			COARSE FRAGS,			0.0			
							GOOD MINERALIZATION		WATER ENCOUNTERED		0.0	0.0	0.0
							Fe RICH, OCC. CLAY		@ APX. 42-44'				
A							MINERALS		LOW YIELD (~5GPM)				0.0

0 → 50

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): 0.0

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
PROJECT NUMBER: N62472-03-D-0057
DRILLING COMPANY: EICHELBERGERS, INC.
DRILLING RIG: INGERSOLL RAND - T3W
BORING NUMBER: 03 MW08
DATE: 10/31/05
GEOLOGIST: R. G. SCHAAR
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Drilled BZ**
						RED	INCREASING COARSE		INCREASING		0.0		0.0
							SANDSTONE, MORE		YIELD, APX. 10 GPM				
							COMPLETE MINERALIZAT.			0.0		0.0	
							OCC. CLAY MINERALS				0.0		
A	60												
							Fe INCREASE				0.0		0.0
										0.0			
A	65												
									DRASTICALLY RED.			0.0	
		N.A.		70'			TRANSITION TO		YIELD (< 5GPM)	0.0			0.0
							BETTER MINERALIZATION				0.0		0.0
							ZEOLITES + LARGE						0.0
							QUARTZ FRAGMENTS			0.0			
											0.0	0.0	0.0
A	82			82'			FRACTURE ZONE,		YIELD ~ 12-15GPM		0.0		0.0
	85						CLAY MINERALS AND		Fe-RICH WATER				
							ZEOLITES ABUNDANT			0.0			
A	87						Fe RICH, FINE TO					0.0	
A	90						MOD. COARSE FRAGS,				0.0		0.0
							POOR MINERALIZATION						
						GREY	DECREASING Fe CONTENT		Fe CONTENT	0.0		0.0	
A	95						TRANS. FROM SANDSTONE		NON-EXIST.		0.0		
							TO SILTSTONE?		GREY COLOR				0.0
A	100									0.0	0.0	0.0	

50 ↑ ↓ 100

* When rock coring, enter rock brokenness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
BORING NUMBER: 03MW08
PROJECT NUMBER: N62472-03-D-0057
DATE: 10/31/05
DRILLING COMPANY: EICHELBERGERS, INC.
GEOLOGIST: R. G. SCHAAR
DRILLING RIG: INGERSOLL RAND - T3W
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Drillers BZ**
						GREY	NO CHANGES			0.0			0.0
							NOTED				0.0	0.0	
										0.0	0.0		
A	109												
A	110				109	—	GREY SANDSTONE FRAGS		SLIGHT OVER-				0.0
							W. FE MINERALS, GOOD		PRESSURE @			0.0	
							MINERALIZATION W. ZEOLITES		DRILL STEM @	0.0	0.0		
A	115						DARK GREY SANDSTONE		~110'				
							FRAGS; MOD. MINERALIZ					0.0	
		N.A.					OCC. CLAY MINERALS			0.0			0.0
				122'			HIGHLY FRACTURED		DRASTIC SLIPPAGE		0.0		
							BEDROCK (SILTSTONE?)		ON DRILL STEM			0.0	
A	125								(APX 2-3 FEET)		0.0		0.0
				127'			END OF FRACTURE		INCREASED YIELD	0.0			
A	130						ZONE APX 126'-128'		(@ 15 GPM)			0.0	
						GREYISH	FE CONTENT INCREAS				0.0		0.0
						RED	W. DEPTH			0.0			
A	135						COARSE SANDSTONE						
							FRAGS, MOD TO GOOD				0.0		
A	140					GREY	MINERALIZATION						
							DEVOIDAF FE,			0.0			0.0
							GOOD MINERALIZATION						
A	145						COARSE FRAGS					0.0	
										0.0			
A	150												

100' ↓ 150'

* When rock coring, enter rock hardness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
BORING NUMBER: 03 MW 08
PROJECT NUMBER: N62472-03-D-0057
DATE: 10/31/05
DRILLING COMPANY: EICHELBERGERS, INC.
GEOLOGIST: R. G. SCHAAR
DRILLING RIG: INGERSOLL RAND - T3W
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole*	Driller BZ**
						GREY	COMPETENT / DENSE		DECREASED	0.0	0.0		
							BEDROCK, NO SIGN.		YIELD (5-10 GPM)			0.0	
A	155						MINERALIZATION			0.0	0.0		0.0
A	160											0.0	
													0.0
A	165									0.0	0.0		
												0.0	
A	170	N.A.		170' 172' ?			INCREASING		INCREASED YIELD	0.0	0.0		0.0
							MINERALIZATION,		SLOPPAGE ON				
							COARSER CUTTINGS		DRILL STEM				0.0
A	175 x3					30	W/FRACTURE ZONE?		(APX. 2 FEET)	0.2	0.0		0.0
							(@ 178') NO CLAY		INCREASED	0.2		0.1	0.0
A	180						MINERALS, GREYISH		YIELD (7-10 GPM)		0.0	0.1	
							BROWN,		SHEEN ON	0.2		0.2	0.0
							MED. COARSE		WATER @				
A	185 x2						DARK GREY FINE BR		APX. 178'-185'		0.0	0.0	0.0
A	186						FRAGS W. ABUNDANT			0.0			
A	190						ZEOLITES, MOD MINER.						
									YIELD MAINTAINS		0.0		0.0
									@ >10 GPM	0.0			
A	195						FINE SANDSTONE				0.0		
							FRAGS, POOR MINERAL					0.0	
A	200									0.1			0.0

150 ↑ ↓ 200

* When rock coring, enter rock brokenness.

** Include monitor reading in 8 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

BORING LOG

PROJECT NAME: GW INVEST. - NAS WILLOW GROVE
PROJECT NUMBER: N62472-03-D-0057
DRILLING COMPANY: EICHELBERGERS, INC.
DRILLING RIG: INGERSOLL RAND - T3W
BORING NUMBER: 03MW08
DATE: 10/31/05
GEOLOGIST: R. G. SCHAAR
DRILLER: D. NEY

Sample No. and Type or RQD	Depth (Ft) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Sample	Sample BZ	Borehole*	Drill BZ**
		N.A.				GREY	SEMI-COMPETENT		YIELD MAINTAINS	0.0		0.0	0.0
							BEDROCK, MARGINAL		@ > 10 GPM		0.0		
A	205						MINERALIZATION			0.0			
							SOME ZEOLITES,				0.0	0.0	
A	210					RED	MOD. COARSE FRAGS						
							Fe RICH, INCREASING			0.0	0.0		0.0
							Fe WITH DEPTH					0.0	
							SOME Fe TRACES, PLENTY ZEOLITES				0.0		
						GREY	NOTED.			0.0			
A	220						GREYISH SILTSTONE		H_2O CLOUDY		0.0	0.0	0.0
				EOB @ 224'			FINE FRAGS, MOD		GREY YIELD		0.0		0.0
A	224						MINERALIZATION		< 10 GPM	0.0	0.0	0.0	0.0

200 ↑ ↓ 224

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Willow Grove Site 3
PROJECT NUMBER: 112G02014
DRILLING COMPANY: Advanced Drilling
DRILLING RIG: CUMMINS

BORING No.: 03MW09S/03MW09
DATE: 1/14-15/10
GEOLOGIST: JS TOMA/AVAGE
DRILLER: JOEL/RICK

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0-1			1.0	LOOSE	DRK BRN	SILT W/TRACE CLAY		UPPER 2" FROZEN	—	—	0	0
	3			3.0	LOOSE	BRN	SILT W/TRACE CLAY			—	—	0	0
					LOOSE → M. DENSE	BRN	SILT						
				8.0 ▽					WET 8-9'	—	—	3-6	0
	9			9.0									
					DENSE	BRN → RED BRN	WEATHERED SILTSTONE						
	13			13.0									
	15.0			15.0	V. DENSE	BRN	SILTSTONE LESS WEATHERED		PID READING AFFECTED BY MOISTURE SET CASING	—	—	9-416	0
	35			35.0			SILTSTONE		WATER PRODUCING ZONES 15'-35' Q ~3-4 GPM				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: 1/14/10 SET 6" ID STEEL CASING TO 15' GROUTED & LET SET UP OVER NIGHT, DRILLED OPEN HOLE TO 35' ON 1/15/10
1/14/10 DRILLED & CONSTRUCTED OVERBURDEN WELL 03MW09

Converted to Well: Yes X No ____ Well I.D. #: 03MW09S

03MW09S LOCATED ~10' SW of 03MW09

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB17
DATE: 3/22/06
GEOLOGIST: K. Goslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler-BZ	Borehole**	Driller-BZ**
						Orange/	Sandy soil,		Hand auger				
				2'		Brown	contains some silt/clay					0	
							clayey, moist						
				4'			sandy @ 3.5 - 4'					0	
							sandy soil		Geoprobe				
5'				6'			small, broken pieces of BR			X		0	
							sandy soil						
				8'			less moist, refusal @ 8'			X		0	
		NA							Refusal @ 8'				
10'													
15'													
20'													

0 ↓ 25

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB17-0406 @ 1045
03SB17-0608 @ 1055

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB18
DATE: 3/22/06
GEOLOGIST: K. Goslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						Dk. Brown	moist w/ 10% sand,		Hand auger	0.3			
				2'		Red	plastic						
						Red/	moist w/ some orange						
				4'		Brown	soil			0			
						Gray/	sandy soil w/ pieces of		Geoprobe				
5'				6'		Or. Red	rock (1") sandy w/ clay less moist than 2-4'			0			
						Or. Red	Sandy, dk red clay						
				8'			< moist than 4-6'			0			
						Orange	Sandy w/ clay						
10'				10'			very uniform			0			
						Orange/	Sandy w/ clay, moist						
				12'		Red	very uniform			0			
									Refusal @ 12'				
15'													
20'													

0 ↑ 25'

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB18-0002 @ 1140
03SB18-1012 @ 1215

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB19
DATE: 3/22/06
GEOLOGIST: K. Gustin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
		NA.				Dk. Brown	Sandy w/ 0.5"-0.75"		Hand auger				
				2'		Reddish	broken rock throughout			0			
							clayey / plastic						
				4'						0			
							poor recovery		Geoprobe				
						Or. Br.	Sandy						
							clayey w/ very damp						
				8'			zone 1" thick			0			
									Refusal @ 8'				

5' 10' 15' 20' 25'

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB19-0204 @ 1420
03SB19-0408 @ 1440

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB20
DATE: 3/22/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						Dk. Brown	moist w/ lt. brown		Hand auger				
				2'		↓	& reddish veins			0			
						R./ Brown	0.5-1" rock fragments, moist						
				4'		↓	w/streaks of gr./lt. purple		↓	0			
						O./	clayey w/ 2" of Dk. gray moist soil		Geoprobe				
5'				6'		Brown	& 2" of reddish brown			0			
							sandy w/ veins of						
				8'		↓	reddish clay			0			
						Dk.	clayey w/veins of rust, moist						
				10'		Gray	veins of Or./Br. clayey & 1" of reddish soil			0			
10'		N/A				O./	sandy w/ moisture						
				12'		Brown	slight plasticity, uniform color			0			
									Refusal @ 12'				
15'													
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collected 03SB20 - 0608 @ 1550
03SB20 - 1012 @ 1605

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB21
DATE: 3/22/06
GEOLOGIST: K. Goslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						Dk. Br.	moist, sandy w/ reddish veins		Hand auger				
				2'						0			
							becomes reddish w/ veins of purple/gray sand & moist clayey soil						
				4'						0			
						Reddish Brown	clayey soil w/ fine white sand, dk. brown		Geoprobe				
5'				6'						0			
				8'						0			
						O. / Br.	clayey w/ fine white sand bands of sand						
10'				10'						0			
		NA					clayey soil w/ fine, white sand olive band @ 11.5'						
				12'						0			
							clayey soil w/ fine, white sand						
				14'						1			
				15'			clayey soil w/ fine sand			0			
15'									Refusal @ 15'				
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB21-1012 @ 1700 & Dup-1 from 03SB21-1012
03SB21-1415 @ 1715

Converted to Well: Yes _____ No ✓ Well I.D. #: _____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB22
DATE: 3/23/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
						Red.	moist, 1' compacted clay		Hand auger				
				2'		O./ Grey	moist, 1' sandy soil			0			
						O/	moist, sandy (2-3')						
				4'		Brown	Dk. gr. w/red veins, moist, clayey			0			
5'							moist, sandy, plastic		Geoprobe				
				6'			sandy @ 5.5-6'			0.1			
						Dk. Br.	w/gr. moist, clayey soil						
				8'			very plastic			0.2			
						O./ Br.	moist, clayey, some plasticity						
10'				10'						0			
		NA					moist, sandy						
				12'						0			
									Refusal @ 12'				
15'													
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collected 03SB22-0406 @ 0820
03SB22-0608 0835

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB23
DATE: 3/23/06
GEOLOGIST: K. Goslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						O./Br.	Sandy, moist w/ 20% clay		Hand auger				
				2'						0			
						Dk. Red/Br.	moist, sandy & clayey						
				4'						0			
						O./Br.	moist, sandy, top 6" reddish/grey		Geoprobe				
5'				6'		Dk. O./				0			
						Br.	moist, sandy w/ reddish veins						
				8'						0			
							clayey, moist, tightly packed w/sand & grey veins						
		AA		10'						0			
10'							sandy w/veins of red						
				12'			Very moist -			0			
									Refusal @ 12'				
15'													
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collected 03SB23-0406 @ 1015
03SB23-1012 @ 1035

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB24
DATE: 3/23/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							gravel / asphalt		Hand auger				
				2'			not sampled			–			
						Dk. Br.	moist w/ very fine						
				4'		Br.	texture, sandy			0			
						Dk. Gr.	veins of reddish, gray clay		Geoprobe				
5'				6'		Br.	moist/sandy, v. moist @ 4'-4.5'			0			
						O./	1' of v. moist, orange clayey	very					
				8'		Red	1' of v. moist, reddish clayey	compacted		0			
							1" section of Hard gravel @ 9.5'						
		NA		10'			silty, moist, reddish & plastic			0			
10'				11.2'			moist, dk. red clayey/silty			0			
							end of cutting (10.8'-11.2')		Refusal @ 11.2'				
							very dry, much > dry						
							than 8'-10', plastic						
15'													
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Collected 03SB24 - 0406 @ 1140
03SB24 - 1011.2 @ 1200 & Dup-02 from 03SB24-1011.2

Converted to Well: Yes _____ No ✓ Well I.D. #: _____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB25
DATE: 3/23/06
GEOLOGIST: K. Goslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						0./	1' very sandy, lt. brown		Hand auger				
				2'		Br.	1.5' very moist, orange soil			0			
							sandy, moist w/ lt. brown						
				4'			sandstone pieces, dry @ 3.5-4'			0			
5'							moist, sandy w/		Geoprobe				
				6'			veins of rust			0			
							clayey, v. moist 6-7.5',						
				8'			v. dry 7.5-8', reddish sand			0.1			
							sandy w/ reddish soil mix						
10'		NA		9.9'			very dry, crumbles			0.1			
									Refusal @ 9.9'				
15'													
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collected 03SB25 - 0608 @ 1405
03SB25 - 0809.9 @ 1410

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ECOR Solutions, Inc.

BORING LOG

PROJECT NAME: NAS JRB Willow Grove
PROJECT NUMBER: N0100.210
DRILLING COMPANY: Eichelbergers, Inc.
DRILLING RIG: Geoprobe

BORING No.: 03SB26
DATE: 3/23/06
GEOLOGIST: K. Gaslin
DRILLER: D. Myers

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID reading (ppm): Sample	Surpplier BZ	Borehole**	Driller BZ**
						O/Gr	moist w/ black broken rock		Hand auger				
				2'		↓	(0.2-0.5" diam.), slight plasticity		↓	0			
						Dk. O	moist w/ uniform grain,						
				4'		Br.	some plasticity, rock @ 3.5'			0			
							moist, sandy, highly compacted		Geoprobe				
5'				6'		↓	mod. plasticity, reddish @ 5-6'			0			
						Dk. Br.	moist, sandy, less plastic than 4-6'						
				8'		↓	rust/orange @ 7-8'			0			
							moist, sandy						
		NA		10'		↓				0			
10'						V. Dk. Br.	moist, sandy w/ uniform						
				12'		↓	grain, slightly plastic			0			
							moist sandy						
				13.5'		↓	lt. br. sand @ 13-13.5'		↓	0.1			
15'									Refusal @ 13.5'				
20'													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collected @ 03SB26-0406 @ 1520
03SB26-1213.5 @ 1540

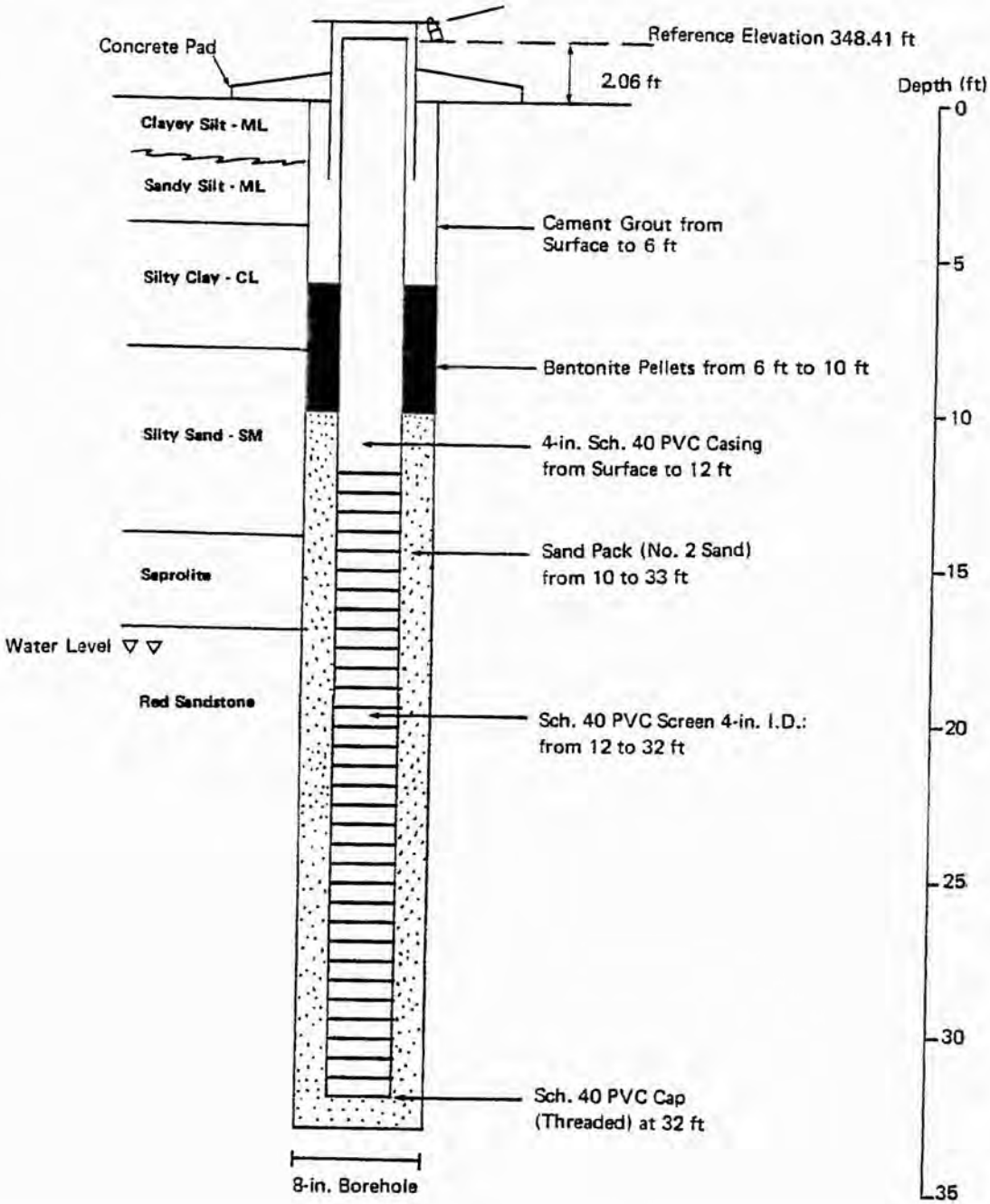
Drilling Area Background (ppm): 0

Converted to Well: Yes _____ No ✓ Well I.D. #: _____

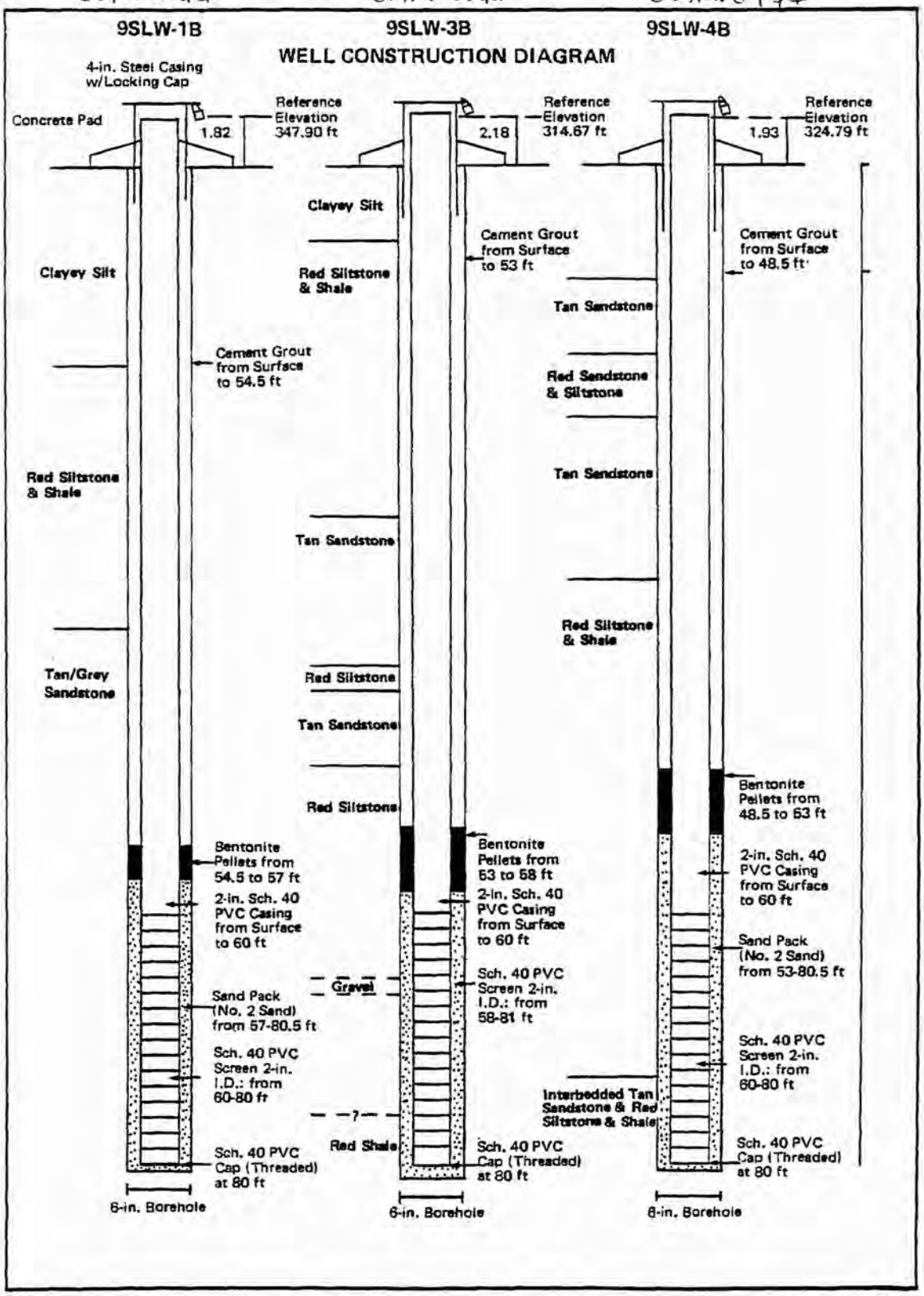
MONITORING WELLS

03MW01S

9SLW-1
WELL COMPLETION DIAGRAM



03MW01 $I 03MW03 $I 03MW04 $I



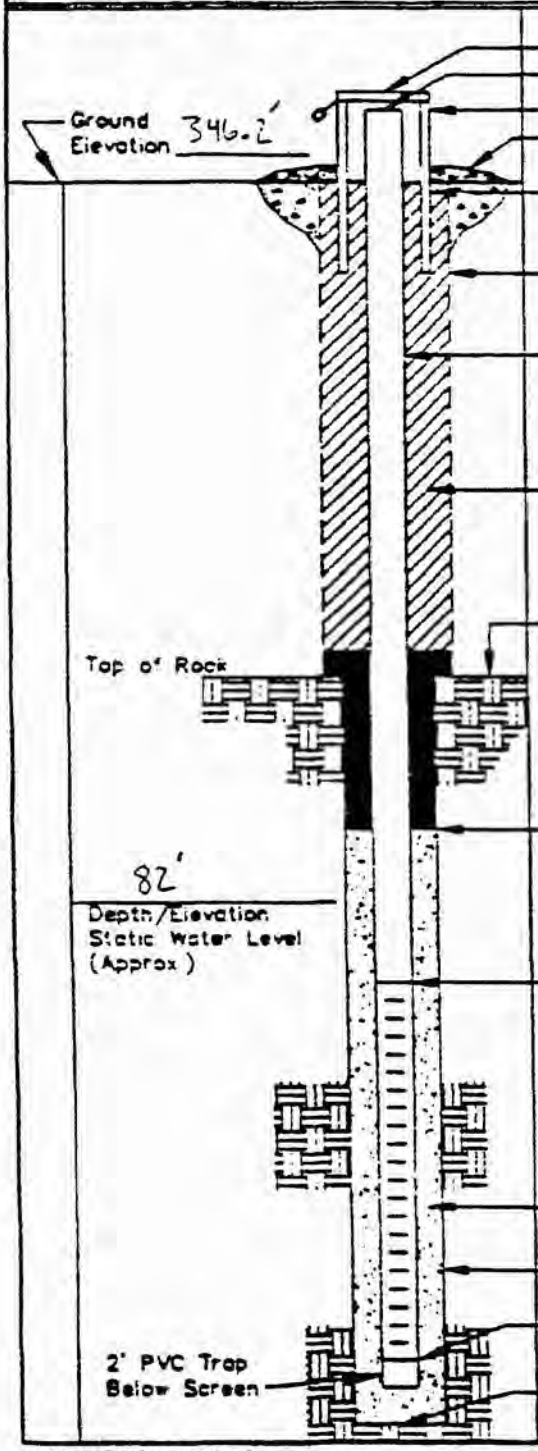
03MW01I

NUS CORPORATION

WELL NO.: 9 SLW-1C

BEDROCK MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: ~~555~~ WILLOW GROVE	LOCATION: NINTH ST. LANDFILL	DRILLER: T. STEWART
PROJECT NO.: 5552	BORING: 9/05/91 - 9/11/91	DRILLING METHOD: SOLID STEM TO 15.5' 10 1/2 HAMMER TO 21' 8 1/2 HAMMER TO 180
ELEVATION: 346'	DATE: 9 SLW-1C	
FIELD GEOLOGIST: R. GOOD		DEVELOPMENT METHOD:



ELEVATION OF TOP OF SURFACE CASING: 347.7'

ELEVATION TOP OF RISER: 347.5'

STICK UP OF CASING ABOVE GROUND SURFACE: 1.5'

TYPE OF SURFACE SEAL: CEMENT / BENTONITE GROUT

TYPE OF PROTECTIVE CASING: 8" ID STEEL CASING

I.D. OF PROTECTIVE CASING: 8"

DIAMETER OF HOLE: 10" Ø HOLE

TYPE OF RISER PIPE: 4" ID PVC, SCH. 40

RISER PIPE I.D.: 4"

TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT

DEPTH/ELEVATION TOP OF BEDROCK: 14'

DEPTH/ELEVATION TOP OF SAND: 156'

DEPTH/ELEVATION TOP OF SCREEN: 159'

TYPE OF SCREEN: 4" ID PVC SCREEN

SLOT SIZE x LENGTH: 10" SLOT, SCH. 40

TYPE OF SAND PACK: NO. 1 SAND

DIAMETER OF HOLE IN BEDROCK: 8"

DEPTH/ELEVATION BOTTOM OF SCREEN: 179'

DEPTH/ELEVATION BOTTOM OF SAND: 179.5'

DEPTH/ELEVATION BOTTOM OF HOLE: 179'

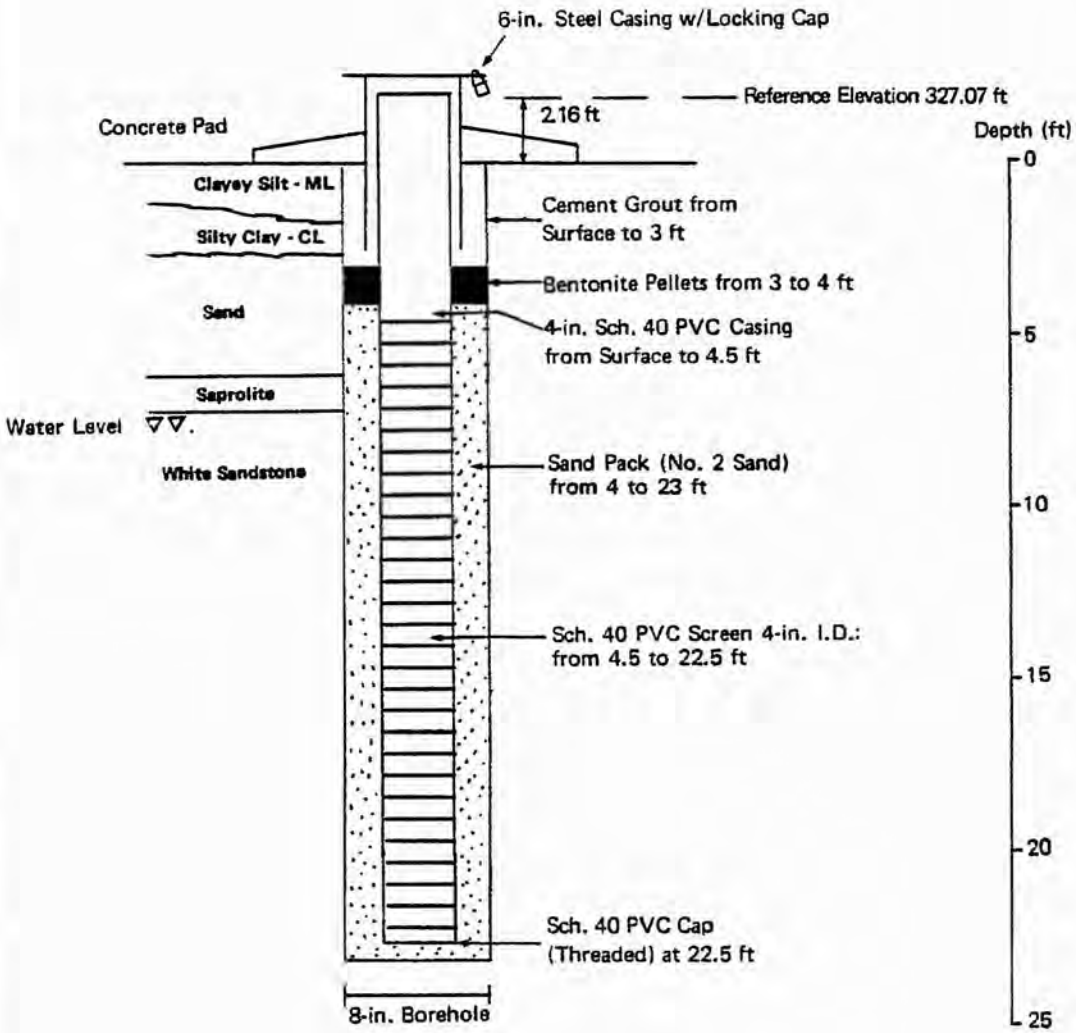
BACKFILL MATERIAL BELOW SAND: 0

NOTE: NOT TO SCALE

B.5-1

03MW02S

9SLW-2
WELL CONSTRUCTION DIAGRAM



BORING NO.: 03 MW 02 SI

BROWN & ROOT ENVIRONMENTAL

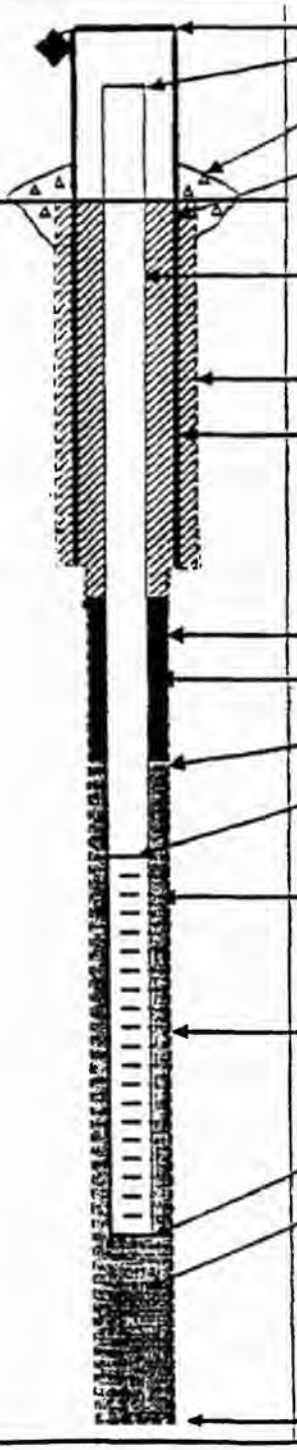
03 MW 02 SI

MONITORING WELL SHEET

PROJECT: Willow Grove - NAS
PROJECT NO.: 5H666
ELEVATION:
FIELD GEOLOGIST: Tonin Lounsbury - Vince Snickona

LOCATION: 9TH ST. Landfill
BORING: 63W - 2 I
DATE: 6/11/97

DRILLER: Advanced Drilling INC
DRILLING METHOD: Air Rotary
DEVELOPMENT METHOD: Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D. 03 MW 02 SI
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 13' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 44' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 52' bgs

ELEVATION/DEPTH TOP OF SCREEN: 55' bgs
TYPE OF SCREEN: 2 inch diam. PVC
SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 65' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 70' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite 70'-130' 130'-144' is well 03 MW 02 I in same Borehole

ELEVATION / DEPTH OF HOLE: 144' bgs

BROWN & ROOT ENVIRONMENTAL

03 MW 02 I

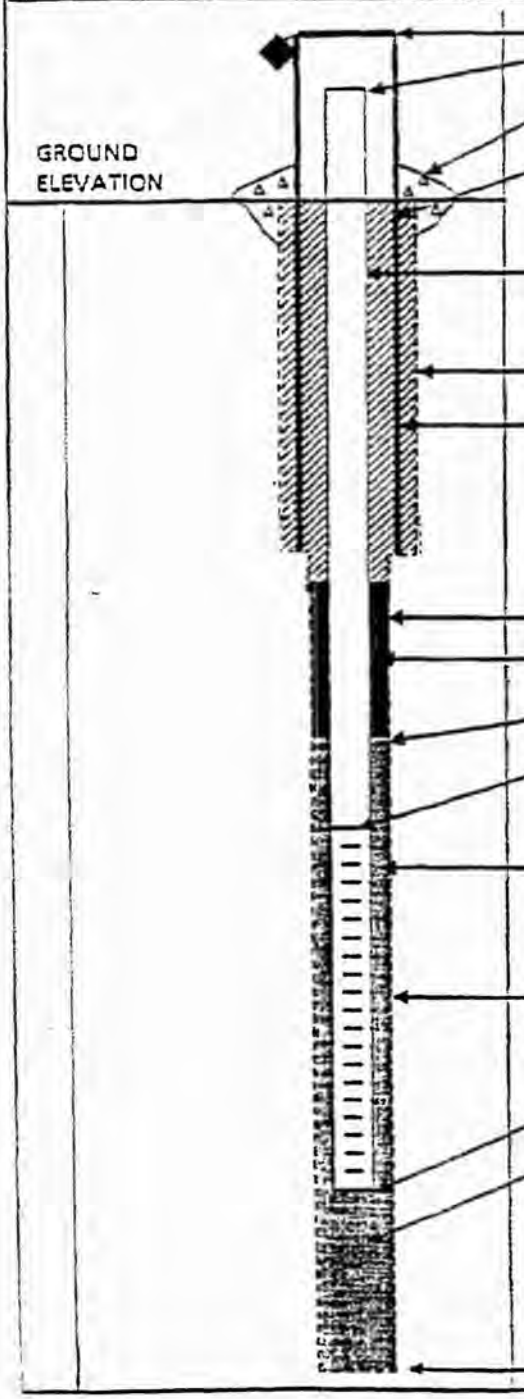
BORING NO.: 03 MW 02 I

MONITORING WELL SHEET

PROJECT: Willow Grove - NAS
PROJECT NO.: 5H66
ELEVATION:
FIELD GEOLOGIST: Tom Lowisbury - Vince Shickora

LOCATION: 9th Street
BORING: S3W - 2I
DATE: 6/11/97

DRILLER: Advanced Drilling INC
DRILLING METHOD: Air Rotary
DEVELOPMENT METHOD: Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D.
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 13' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 70' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 130' bgs

ELEVATION/DEPTH TOP OF SCREEN: 134' bgs
TYPE OF SCREEN: 2 inch diam. PVC
SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

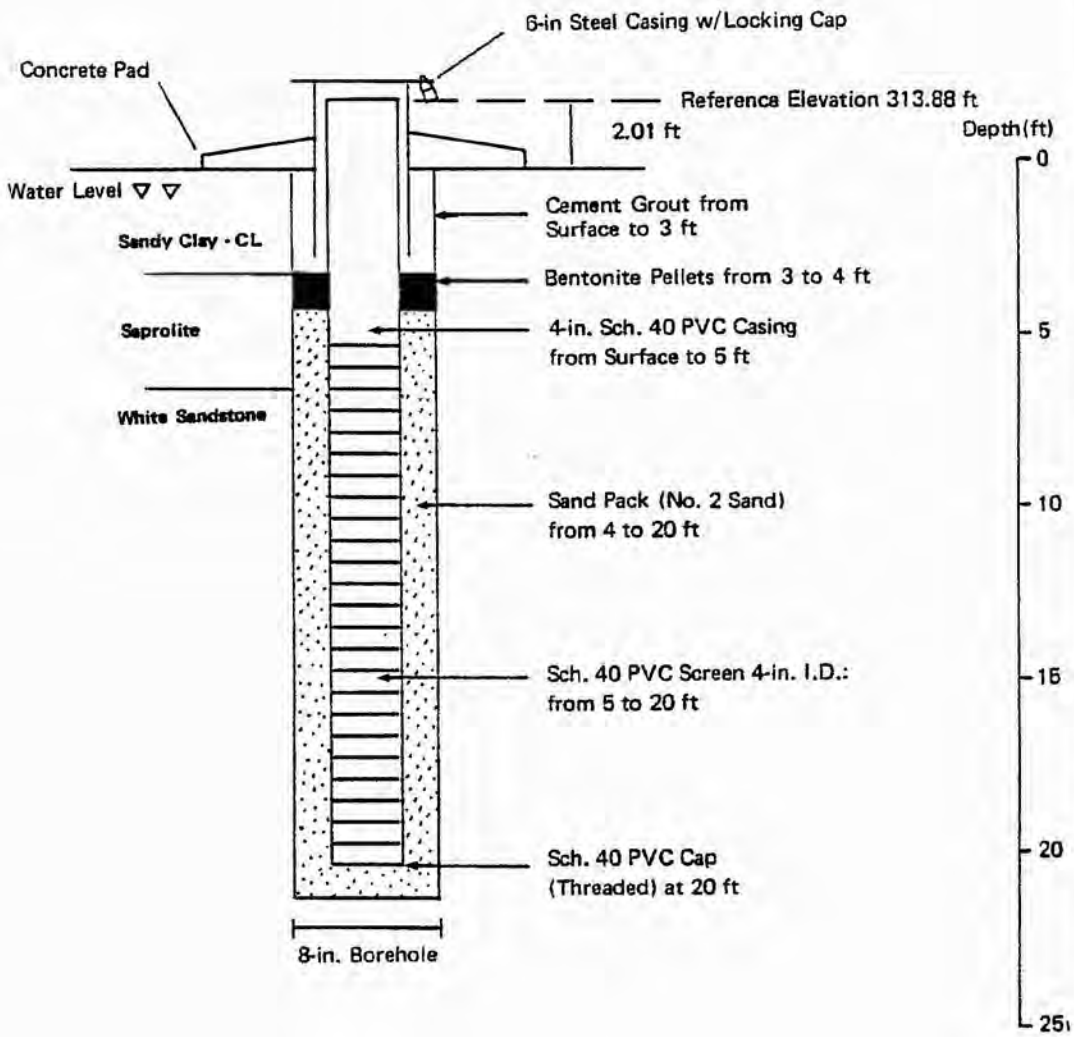
ELEVATION / DEPTH BOTTOM OF SCREEN: 144' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 144' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: SAND

ELEVATION / DEPTH OF HOLE: 144' bgs

03MW035

9SLW-3
WELL CONSTRUCTION DIAGRAM



03MW03I

NUS CORPORATION

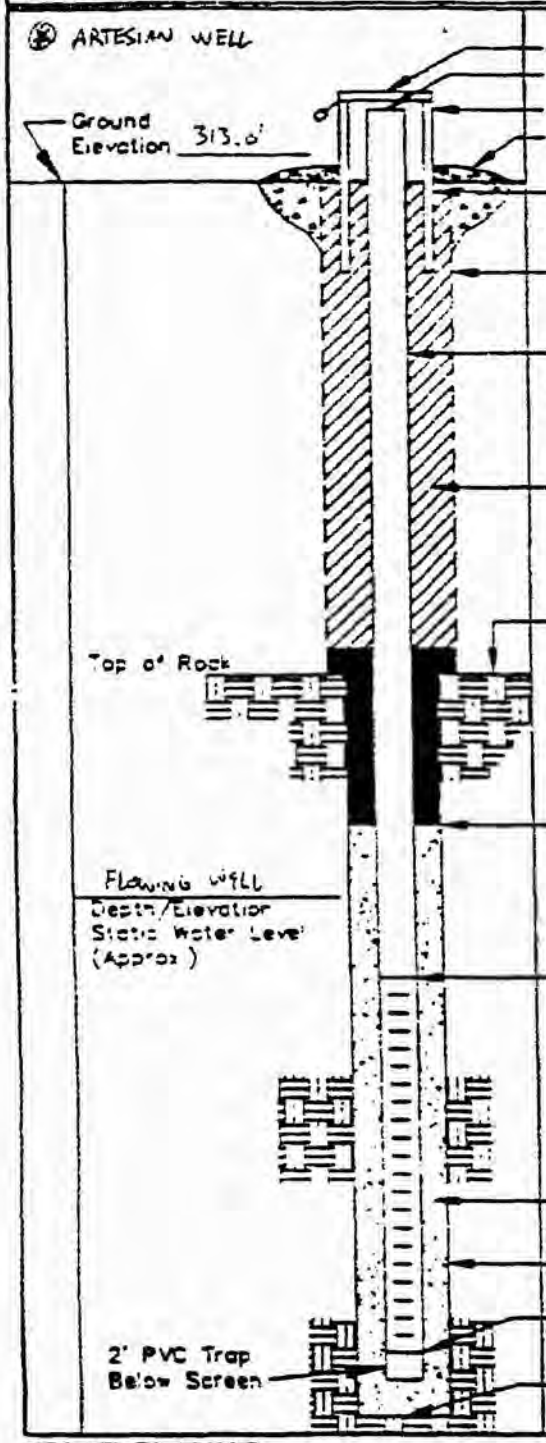
WELL NO.: 9SLW-3C

BEDROCK MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: WILLOW GROVE
PROJECT NO.: 3552
ELEVATION: 313.0'
FIELD GEOLOGIST: R. GOOD

LOCATION: NINTH ST. LANDFILL
BORING: 9SLW-3C
DATE: 9/6/91 - 9/12/91

DRILLER: T. STEWART
DRILLING METHOD: SPLIT SPOON TO 10' 10" AIR HAMMER TO 20 8" AIR HAMMER TO 171'
DEVELOPMENT METHOD:



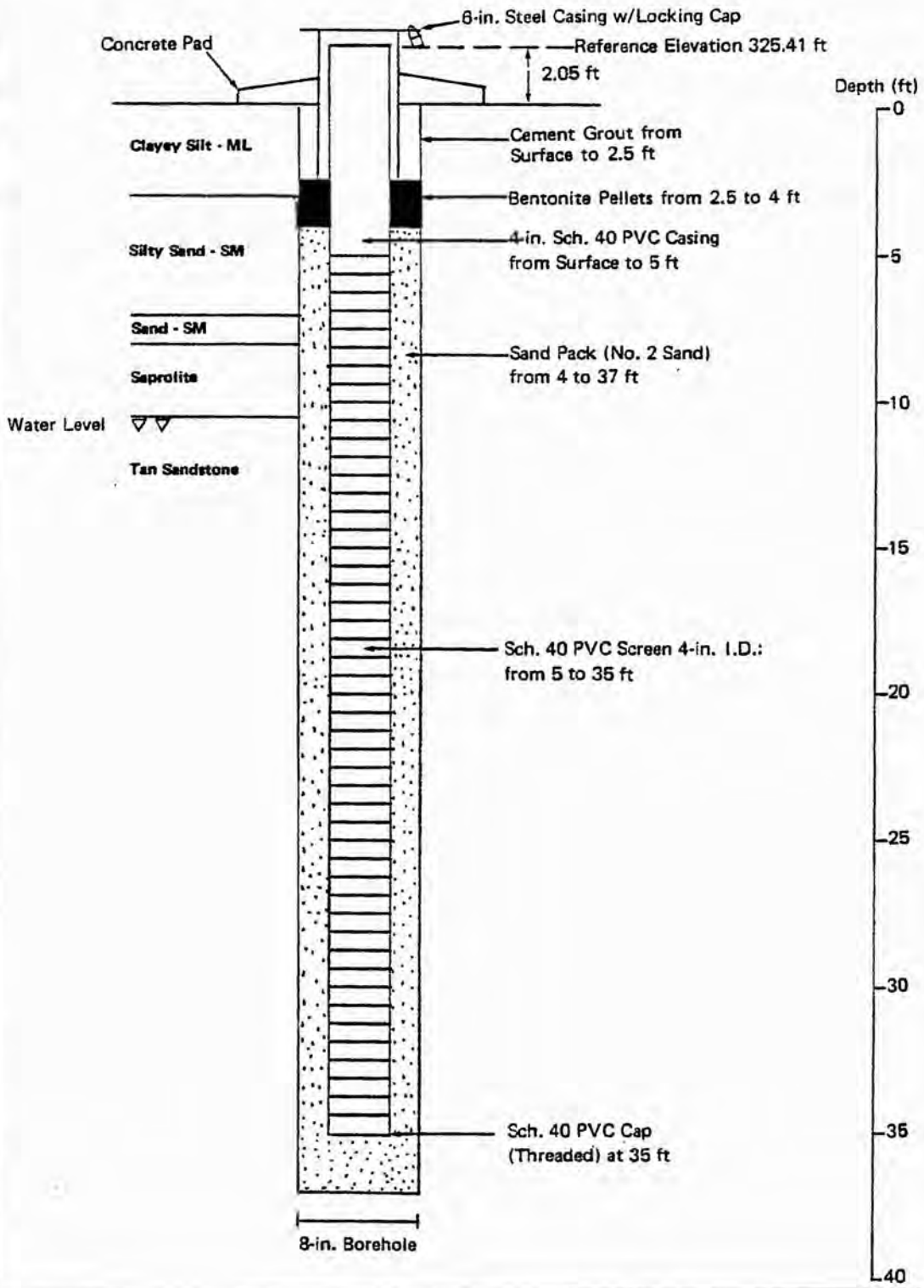
ELEVATION OF TOP OF SURFACE CASING: 316.0
ELEVATION TOP OF RISER: 315.0'
STICK UP OF CASING ABOVE GROUND SURFACE: 3.0
TYPE OF SURFACE SEAL: CEMENT / BENTONITE GROUT.
TYPE OF PROTECTIVE CASING: 8" ID STEEL CSG.
I.D. OF PROTECTIVE CASING: 8"
DIAMETER OF HOLE: 10" Ø HOLE.
TYPE OF RISER PIPE: 4" ID PVC, SCH. 40
RISER PIPE I.D.: 4"
TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT
DEPTH/ELEVATION TOP OF BEDROCK: 10.0'
DEPTH/ELEVATION TOP OF SAND: 145.0'
DEPTH/ELEVATION TOP OF SCREEN: 148.5'
TYPE OF SCREEN: 4" ID PVC.
SLOT SIZE x LENGTH: 10 SLOT, SCH. 40.
TYPE OF SAND PACK: NO. 1 SAND.
DIAMETER OF HOLE IN BEDROCK: 8" HOLE
DEPTH/ELEVATION BOTTOM OF SCREEN: 168.5'
DEPTH/ELEVATION BOTTOM OF SAND: 171.0
DEPTH/ELEVATION BOTTOM OF HOLE: 171.0'
BACKFILL MATERIAL BELOW SAND: 0

NOTE: USE 3RD DECIMAL

B52

03MW04S

9SLW-4
WELL CONSTRUCTION DIAGRAM



NUS CORPORATION

WELL NO.: 03MW04I 9SLW-4C

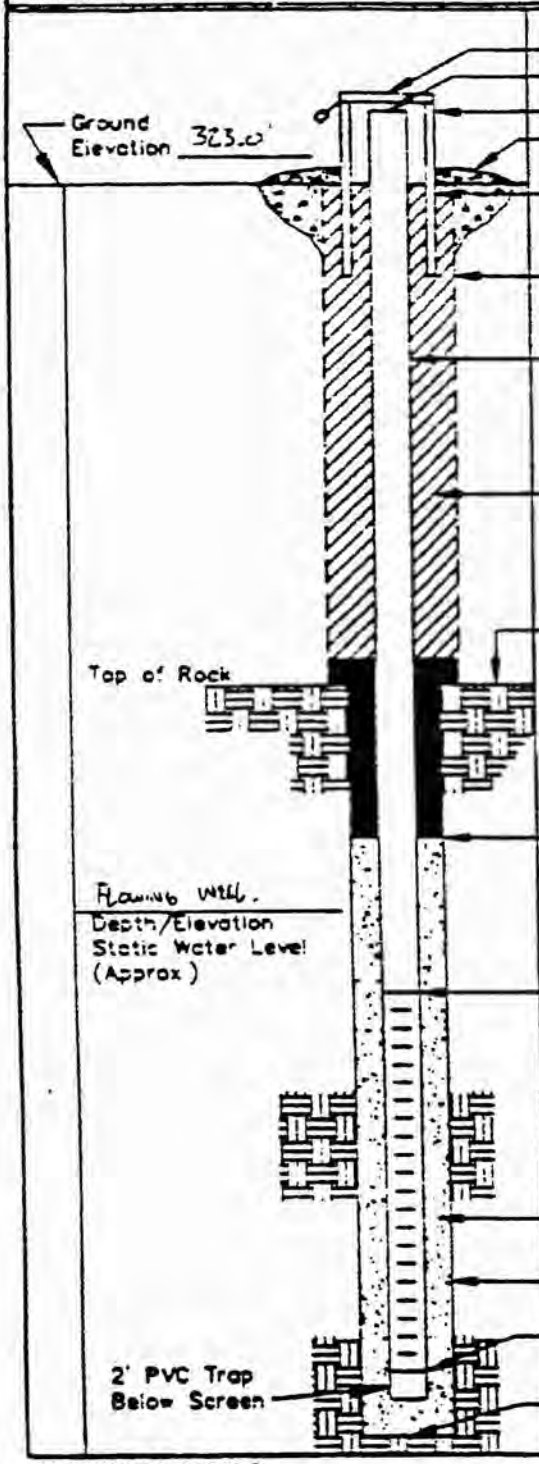
BEDROCK MONITORING WELL SHEET

WELL INSTALLED IN BEDROCK

PROJECT: WILLOW GROVE
PROJECT NO.: 3552
ELEVATION: 323.0'
FIELD GEOLOGIST: S. CONTI

LOCATION: NINTH ST. LANDFILL
BORING: 9SLW-4C
DATE: 9/06/91 - 9/10/91

DRILLER: J. ADAMS
DRILLING METHOD: 10" Ø AIR HAMMER TO 26'; 7 7/8" Ø AIR HAMMER TO 174'
DEVELOPMENT METHOD:



ELEVATION OF TOP OF SURFACE CASING: 325.6'
ELEVATION TOP OF RISER: 324.9'
STICK UP OF CASING ABOVE GROUND SURFACE: 2.6'
TYPE OF SURFACE SEAL: CEMENT / BENTONITE GROUT.
TYPE OF PROTECTIVE CASING: 8" ID STEEL CSG
I.D. OF PROTECTIVE CASING: 8"
DIAMETER OF HOLE: 10" Ø HOLE.
TYPE OF RISER PIPE: 4" ID PVC, SCH. 40.
RISER PIPE I.D.: 4"
TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT.
DEPTH/ELEVATION TOP OF BEDROCK: 8.0 /
DEPTH/ELEVATION TOP OF SAND: 145.0' /
DEPTH/ELEVATION TOP OF SCREEN: 148.0' /
TYPE OF SCREEN: SCH. 40 PVC
SLOT SIZE x LENGTH: 10 SLOT, 20'
TYPE OF SAND PACK: NO. 1 SAND
DIAMETER OF HOLE IN BEDROCK: 7 7/8"
DEPTH/ELEVATION BOTTOM OF SCREEN: 168.0' /
DEPTH/ELEVATION BOTTOM OF SAND: 169.0 /
DEPTH/ELEVATION BOTTOM OF HOLE: 173.0' /
BACKFILL MATERIAL BELOW SAND: 4.0'

NOTE: NOT TO SCALE

03MW05S

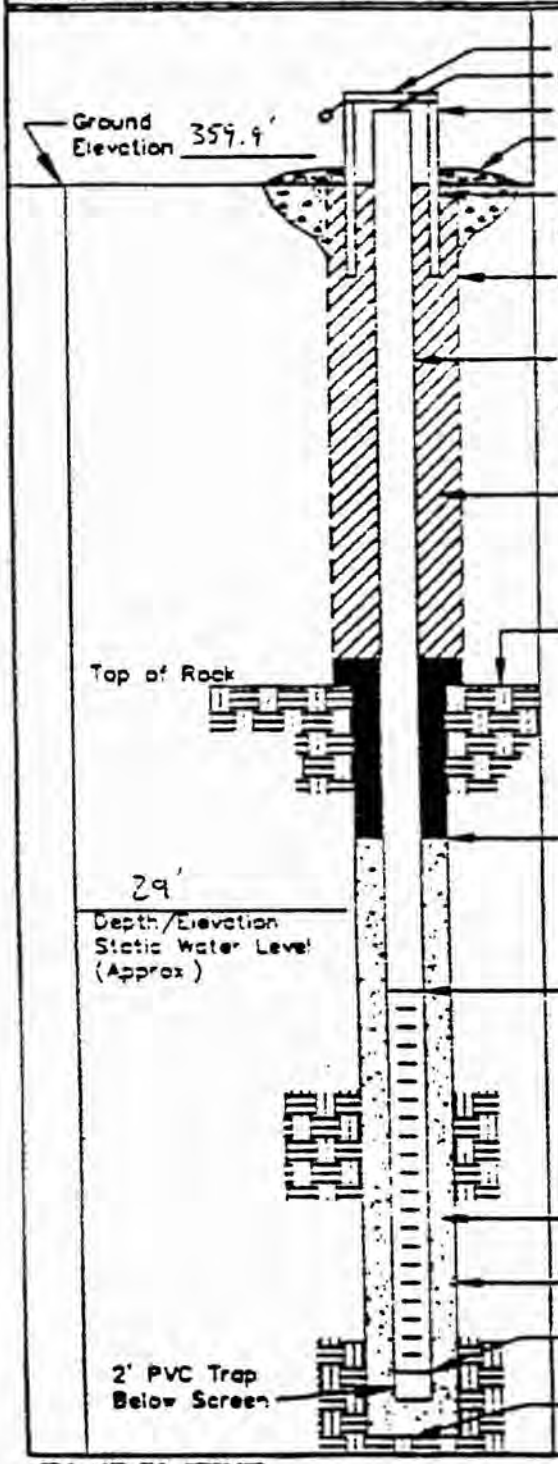
NUS CORPORATION

WELL NO.: 9SLW-5

BEDROCK MONITORING WELL SHEET

WELL INSTALLED IN BEDROCK

PROJECT: WILLOW GROVE	LOCATION:	DRILLER: T. STEWART
PROJECT NO.: 3552	BORING: 9 SLW - 5	DRILLING METHOD: SPLIT SPOON TO 14.5' 8" AIR HAMMER TO 38
ELEVATION: 359.4'	DATE: 9/10/91 - 9/11/91	DEVELOPMENT METHOD:
FIELD GEOLOGIST: R. GOOD		



ELEVATION OF TOP OF SURFACE CASING: 363.2'
ELEVATION TOP OF RISER: 362.9'
STICK UP OF CASING ABOVE GROUND SURFACE: 3.3'
TYPE OF SURFACE SEAL: CEMENT
TYPE OF PROTECTIVE CASING: 8" STEEL CSG.
I.D. OF PROTECTIVE CASING: 8'
DIAMETER OF HOLE: 8" HOLE.
TYPE OF RISER PIPE: 4" ID PVC, SCH. 40
RISER PIPE I.D.: 4"
TYPE OF BACKFILL/SEAL: CEMENT / BENTONITE GROUT.
DEPTH/ELEVATION TOP OF BEDROCK: 14.5' /
DEPTH/ELEVATION TOP OF SAND: 15.0' /
DEPTH/ELEVATION TOP OF SCREEN: 17.0' /
TYPE OF SCREEN: 4" ID PVC, SCH 40.
SLOT SIZE x LENGTH: 10 SLOT, 20'
TYPE OF SAND PACK: NO. 1 SAND
DIAMETER OF HOLE IN BEDROCK: 8" Ø HOLE.
DEPTH/ELEVATION BOTTOM OF SCREEN: 37.0' /
DEPTH/ELEVATION BOTTOM OF SAND: 37.5' /
DEPTH/ELEVATION BOTTOM OF HOLE: 38.0' /
BACKFILL MATERIAL BELOW SAND: 0.5'

10.5-4

BROWN & ROOT ENVIRONMENTAL

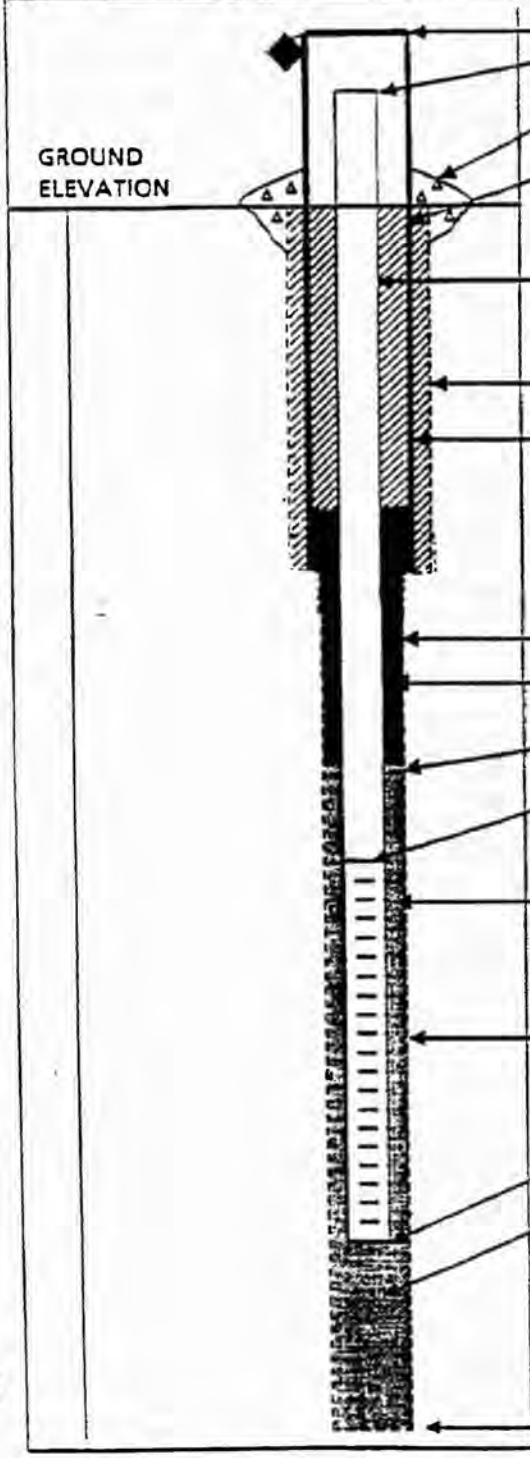
03 MW05 I

MONITORING WELL SHEET

PROJECT Willow Grove NAS
PROJECT NO. 5466
ELEVATION
FIELD GEOLOGIST Tobin Lousbury

LOCATION 9TH St. LANDFILL
BORING 03MW05I
DATE 5/22/97
Borehole S3W-5I

DRILLER Advanced Drilling INC
DRILLING METHOD Air Rotary
DEVELOPMENT METHOD Submersible Pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL:

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D. 03 MW 05 I
TYPE OF RISER PIPE: 2 inch PVC

BOREHOLE DIAMETER: 10 inch

PERM. CASING I.D. depth 27' bgs
TYPE OF CASING & BACKFILL: CASING to 27'
6" Steel CASING set IN cement/bentonite grout

ELEVATION / DEPTH TOP OF SEAL: 22' bgs
TYPE OF SEAL: Bentonite
Hole Plug, Slurry, Hole Plug

DEPTH TOP OF SAND PACK: 78' bgs

ELEVATION/DEPTH TOP OF SCREEN: 82' bgs
TYPE OF SCREEN:

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 92' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 96' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION / DEPTH OF HOLE: 150' bgs

03 MW06 S

BROWN & ROOT ENVIRONMENTAL

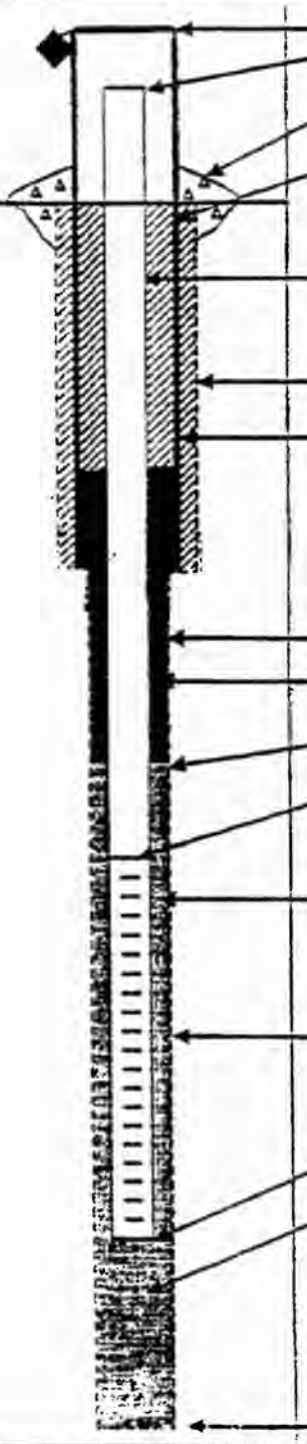
03 MW06 S

MONITORING WELL SHEET

PROJECT Willow Grove - NAS
PROJECT NO. 54666
ELEVATION
FIELD GEOLOGIST Tobin Lounsbury

LOCATION 9TH St LANDFILL
BORING S3W-6S
DATE 5/22/96

DRILLER Advanced Drilling INC (Rick Empson)
DRILLING METHOD Air Rotary
DEVELOPMENT METHOD Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above grand
ELEVATION OF TOP OF RISER PIPE: 2.0' above grand

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D.
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 25' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 20' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 25' bgs

ELEVATION/DEPTH TOP OF SCREEN: 26' bgs
TYPE OF SCREEN: 2 inch diam. PVC
SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 36' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 38' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: 38' - 72' Bentonite Hole Plug
72'-85' (well 03MW06SI in same borehole)

ELEVATION / DEPTH OF HOLE: 85' bgs

BORING NO.: 03 MW 06 SI

BROWN & ROOT ENVIRONMENTAL

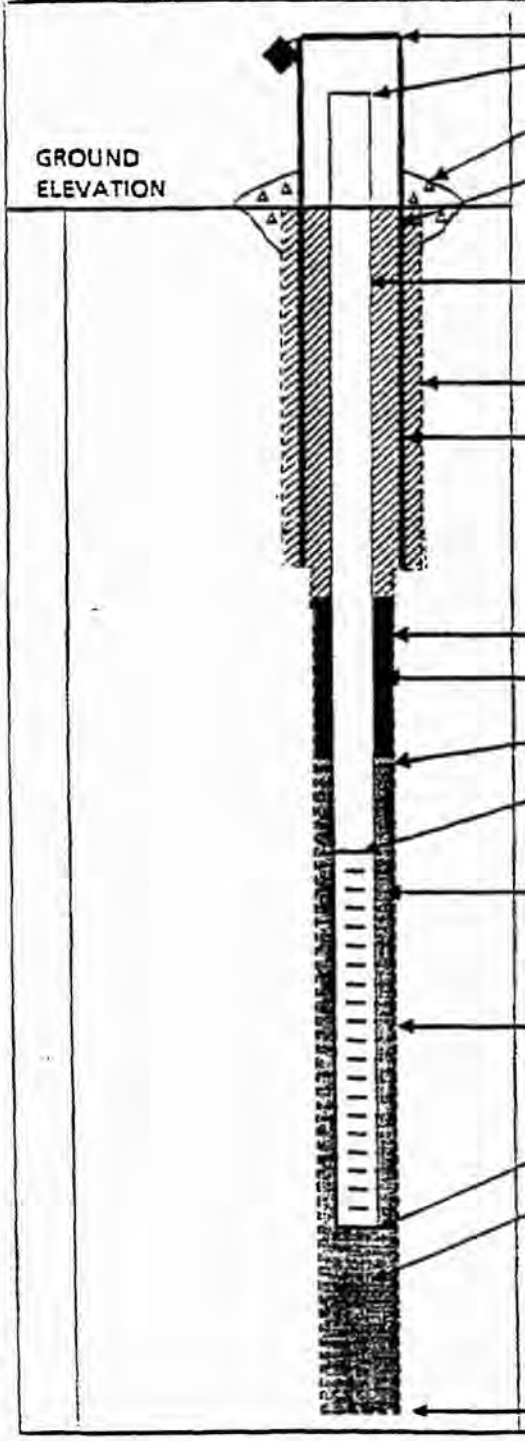
03 MW 06 SI

MONITORING WELL SHEET

PROJECT: Willow Grove - NAS
PROJECT NO.: 5466
ELEVATION:
FIELD GEOLOGIST: Tobin Lounsbury

LOCATION: 9TH Street Landfill
BORING: 03 MW 06 SI
DATE: 5/22/97

DRILLER: Advanced Drilling INC
DRILLING METHOD: Air Rotary
DEVELOPMENT METHOD: Submersible Pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2' Square Concrete

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" diam steel

RISER PIPE I.D. 03 MW 06 SI
TYPE OF RISER PIPE: SCH 40 PVC 2" Diameter

BOREHOLE DIAMETER: 10 INCHES

PERM. CASING I.D. depth - 20' bgs
TYPE OF CASING & BACKFILL:
6" diam. Steel Set with bentonite/Cement grout

ELEVATION / DEPTH TOP OF SEAL: 38' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 72' bgs

ELEVATION/DEPTH TOP OF SCREEN: 75' bgs
TYPE OF SCREEN: 0.02 inch slot 2 inch diameter PVC

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING:

ELEVATION / DEPTH BOTTOM OF SCREEN: 85' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 85' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION / DEPTH OF HOLE: 85' bgs

BROWN & ROOT ENVIRONMENTAL
03 MW 06 I

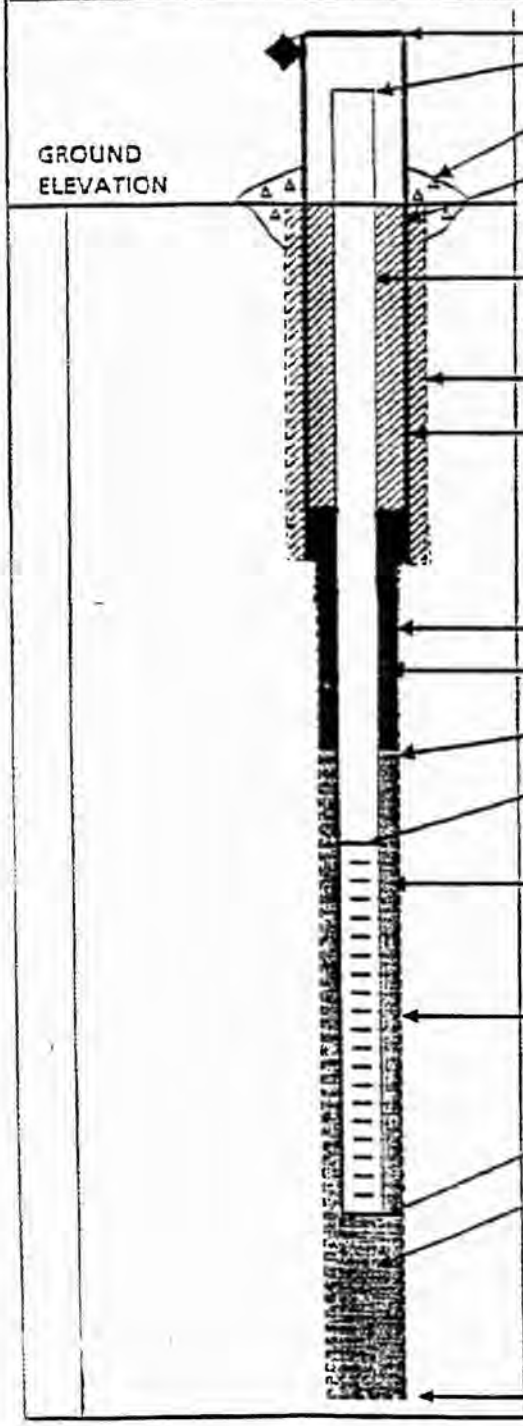
BORING NO: 03 MW 06 I

MONITORING WELL SHEET

PROJECT Willow Grove - NAS
PROJECT NO. 54666
ELEVATION
FIELD GEOLOGIST Tobin Lounsbury

LOCATION 9th ST. LANDFILL
BORING S3W - 6I
DATE

DRILLER Advanced Drilling INC
DRILLING METHOD Air Rotary
DEVELOPMENT METHOD Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.60' above ground

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D. 03 MW 06 I
TYPE OF RISER PIPE: SCH 40- 2" diam PVC

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 20' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 18' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 136' bgs

ELEVATION/DEPTH TOP OF SCREEN: 140' bgs
TYPE OF SCREEN: 2 inch diam PVC
SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 150' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 150' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: SAND

ELEVATION / DEPTH OF HOLE: 150' bgs

BORING NO.: 03 MW 07 S

BROWN & ROOT ENVIRONMENTAL

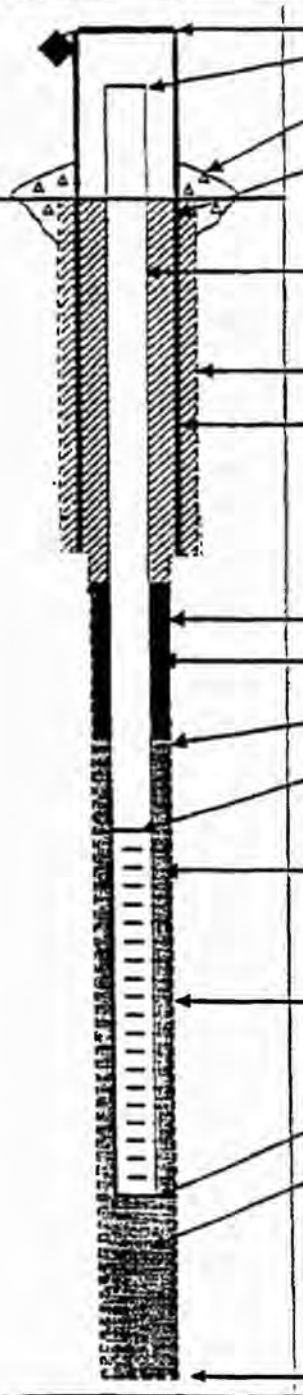
03 MW07 S

MONITORING WELL SHEET

PROJECT Willow Grove - NAS
PROJECT NO. 54666
ELEVATION
FIELD GEOLOGIST Tonin Lounsbury

LOCATION 9th St. Landfill
BORING 03 MW 07 S
DATE 6/16/97

DRILLER Advanced Drilling INC
DRILLING METHOD Air Rotary
DEVELOPMENT METHOD Submersible pump



ELEVATION OF TOP OF PERM. CASING: 2.5' above ground
ELEVATION OF TOP OF RISER PIPE: 2.0' above ground

TYPE OF SURFACE SEAL: 2'x 2' Concrete pad

I.D. OF PERM. CASING:
TYPE OF SURFACE CASING: 6" Steel case

RISER PIPE I.D. 03 MW 07 S
TYPE OF RISER PIPE: SCH 40- 2" diam PVC
set in cement/bentonite grout 26'-0' bgs.

BOREHOLE DIAMETER: 10 inches

PERM. CASING I.D. depth: 14' bgs
TYPE OF CASING & BACKFILL:
6 inch diam. Steel set in bentonite/cement grout

ELEVATION / DEPTH TOP OF SEAL: 26' bgs
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 30.5' bgs

ELEVATION/DEPTH TOP OF SCREEN: 34' bgs
TYPE OF SCREEN: 2 inch diam. PVC
SCH 40 0.02" slot size

TYPE OF SAND PACK: #2 Morie SAND

BOREHOLE DIA. BELOW CASING: 6 inches

ELEVATION / DEPTH BOTTOM OF SCREEN: 44' bgs

ELEVATION / DEPTH BOTTOM OF SAND PACK: 50' bgs
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite backfill 50'-75'

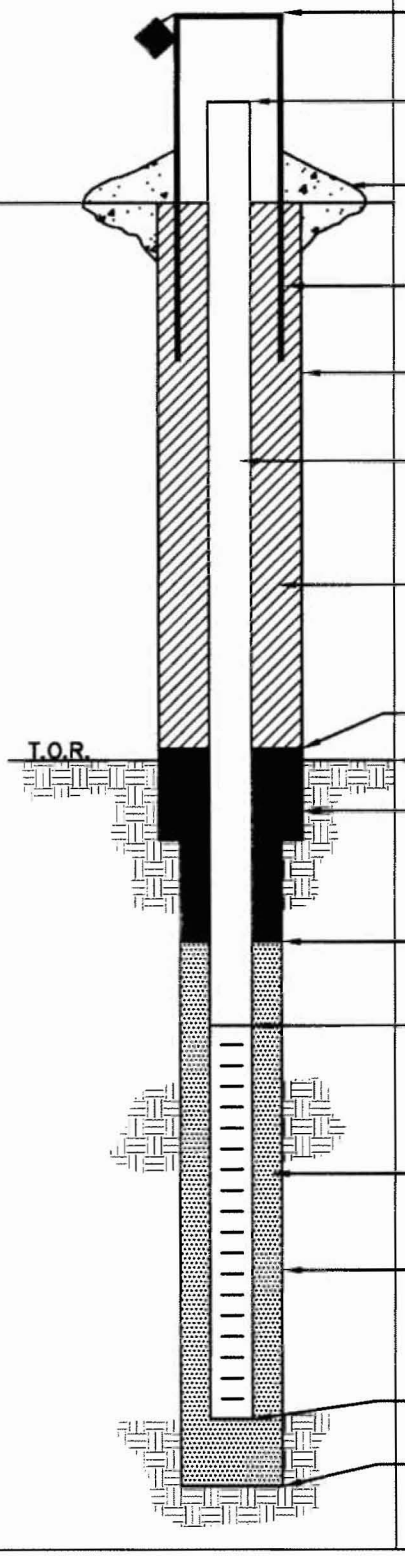
ELEVATION / DEPTH OF HOLE: 75' bgs

WELL NO.: 03MW08S

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT Willow Grove Site 3	LOCATION Site 3	DRILLER D. Ney
PROJECT NO.	BORING 03MW08	DRILLING METHOD Air rotary
DATE BEGUN	DATE COMPLETED	
FIELD GEOLOGIST R. G. Scharr		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT TOP OF RISER: /

TYPE OF SURFACE SEAL: concrete

I.D. OF SURFACE CASING: 8"

DIAMETER OF HOLE: 12"

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: Schedule 40 PVC

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: /28'

ELEVATION/DEPTH TOP OF BEDROCK: 10'

TYPE OF SEAL: bentonite

ELEVATION/DEPTH TOP OF SAND: /33

ELEVATION/DEPTH TOP OF SCREEN: /38
TYPE OF SCREEN: schedule 40 PVC
SLOT SIZE x LENGTH: 0.02" X 30'
I.D. SCREEN: 2"

TYPE OF SAND PACK: No. 2

DIAMETER OF HOLE IN BEDROCK: 8"

CORE/REAM:

ELEVATION/DEPTH BOTTOM SCREEN: /68
ELEVATION/DEPTH BOTTOM OF SAND: /73
ELEVATION/DEPTH BOTTOM OF HOLE: /225
BACKFILL MATERIAL BELOW SAND: 03MW08D constructed in same borehole

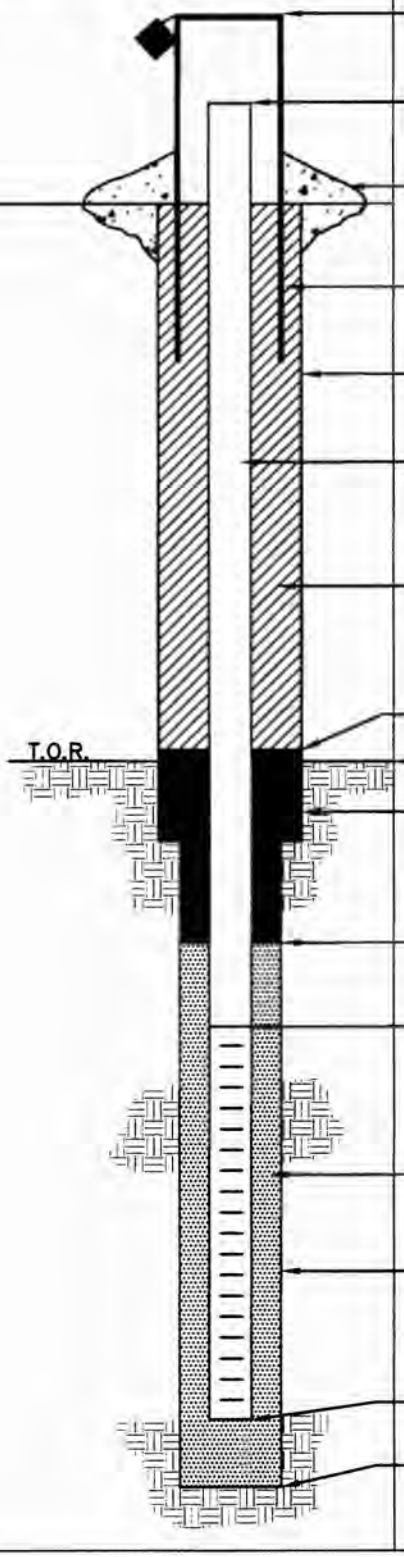
ACAD: FORM_MWINBR.dwg 07/20/99 INL

WELL NO.: 03MW08D

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT Willow Grove Site 3	LOCATION Site 3	DRILLER D. Nly
PROJECT NO.	BORING 03MW08	DRILLING METHOD Air rotary
DATE BEGUN	DATE COMPLETED	
FIELD GEOLOGIST R.G Schaar		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT TOP OF RISER: /

TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"

DIAMETER OF HOLE: 12"

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: Schedule 40 PVC

TYPE OF BACKFILL: Cement/bentonite grout; 03MW08S constructed in same borehole

ELEVATION/DEPTH TOP OF SEAL: 1153'

ELEVATION/DEPTH TOP OF BEDROCK: 10'

TYPE OF SEAL: bentonite

ELEVATION/DEPTH TOP OF SAND: 1158'

ELEVATION/DEPTH TOP OF SCREEN: 1163'

TYPE OF SCREEN: Schedule 40 PVC

SLOT SIZE x LENGTH: 0.02" X 10'

I.D. SCREEN: 2"

TYPE OF SAND PACK: No. 2

DIAMETER OF HOLE IN BEDROCK: 8"

CORE/REAM:

ELEVATION/DEPTH BOTTOM SCREEN: 1173'

ELEVATION/DEPTH BOTTOM OF SAND: 1178'

ELEVATION/DEPTH BOTTOM OF HOLE: 1225'

BACKFILL MATERIAL BELOW SAND: cement/bentonite grout

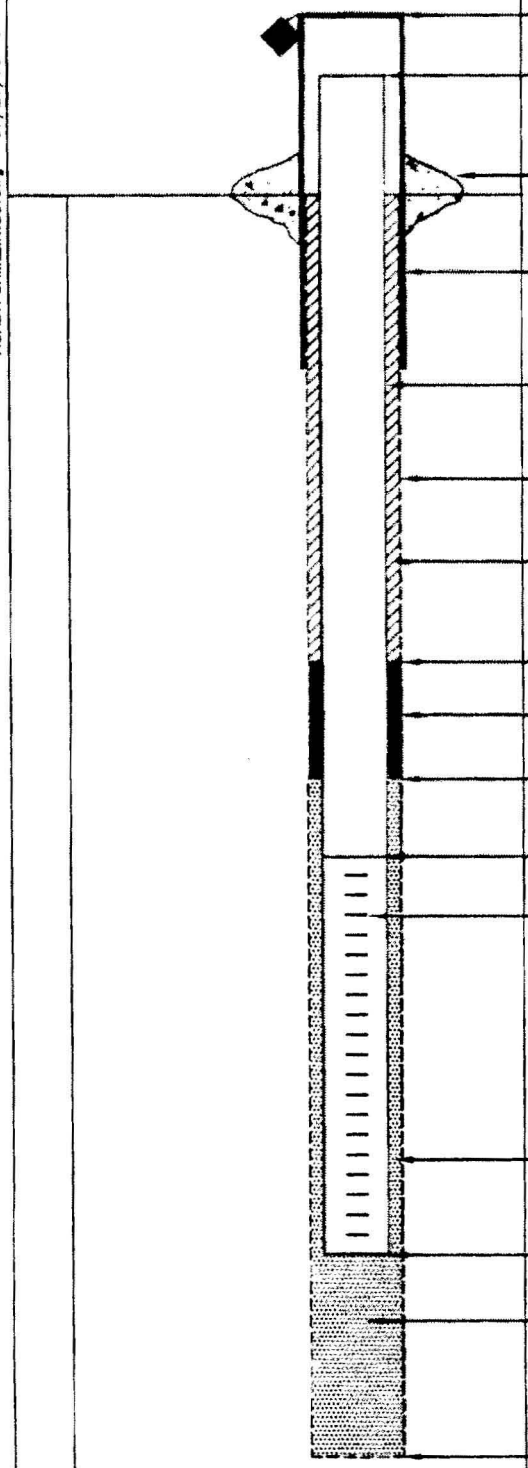
ACAD:FORM_MWINBR.dwg 07/20/99 INI

WELL NO.: 03MW09D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT Willow Grove	LOCATION Site 3	DRILLER Joe/Melxsey
PROJECT NO. 112G02014	BORING 03MW09D	DRILLING METHOD Air Rotary
DATE BEGUN 1/14/10	DATE COMPLETED 1/15/10	DEVELOPMENT METHOD pump
FIELD GEOLOGIST J.S. Tomalavage		
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 13'

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 12.7'

TYPE OF SURFACE SEAL: Neat Cement

I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Steel

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 6"

TYPE OF BACKFILL: Cement/Bentonite Grout

ELEVATION/DEPTH TOP OF SEAL: 13'

TYPE OF SEAL: 0.0 Sand

DEPTH TOP OF SAND PACK: 4'

ELEVATION/DEPTH TOP OF SCREEN: 15

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010"

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: No. 1 Sand

ELEVATION/DEPTH BOTTOM OF SCREEN: 110'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 110'
BACKFILL MATERIAL BELOW SAND:

ELEVATION/DEPTH OF HOLE: 110'

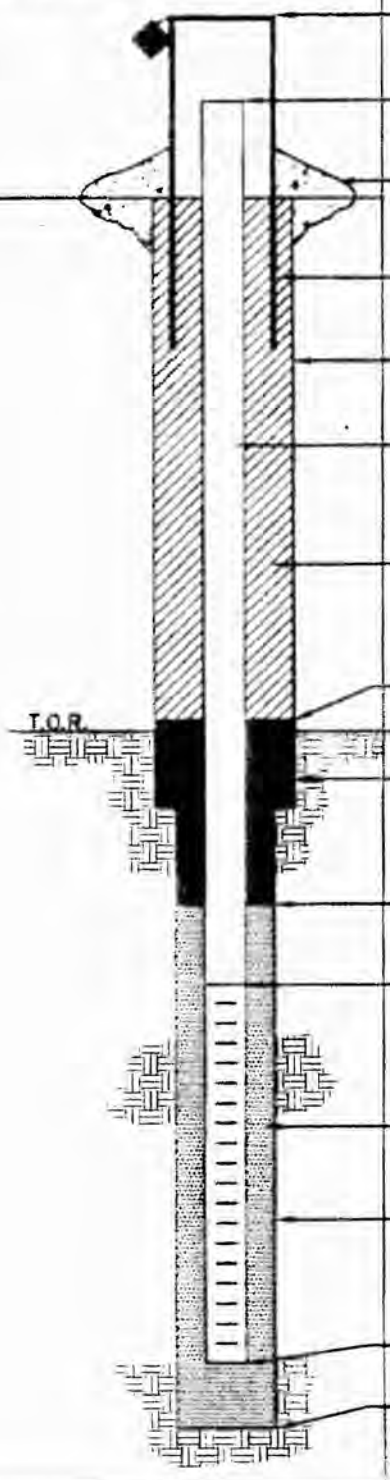
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 03MW09S
AT

Tetra Tech NUS, Inc.

BEDROCK MONITORING WELL SHEET WELL INSTALLED IN BEDROCK

PROJECT Willow Grove	LOCATION SITE 3	DRILLER ADVANCED DRILLING
PROJECT NO. 112G02014	BORING 03MW09S	DRILLING METHOD ROTARY
DATE BEGUN 1/14/10	DATE COMPLETED 1/20/10	
FIELD GEOLOGIST V. SHICKORA		DEVELOPMENT METHOD pump
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 12.5

ELEVATION/HEIGHT TOP OF RISER: 10.40

TYPE OF SURFACE SEAL: CEMENT

I.D. OF SURFACE CASING: 6"

DIAMETER OF HOLE: 10"

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: CEMENT GROUT

ELEVATION/DEPTH TOP OF SEAL: 14'

ELEVATION/DEPTH TOP OF BEDROCK: 15'

TYPE OF SEAL: BENTONITE CLAY

ELEVATION/DEPTH TOP OF SAND: 16'

ELEVATION/DEPTH TOP OF SCREEN: 18'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: NO.10 X 15'
I.D. SCREEN: 2"

TYPE OF SAND PACK: NO.1 FILTER SAND

DIAMETER OF HOLE IN BEDROCK: 6"
CORE/REAM:

ELEVATION/DEPTH BOTTOM SCREEN: 33
ELEVATION/DEPTH BOTTOM OF SAND: 35
ELEVATION/DEPTH BOTTOM OF HOLE: 35
BACKFILL MATERIAL BELOW SAND: NA
BEDROCK BELOW SAND

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